



저작자표시-비영리-변경금지 2.0 대한민국

이용자는 아래의 조건을 따르는 경우에 한하여 자유롭게

- 이 저작물을 복제, 배포, 전송, 전시, 공연 및 방송할 수 있습니다.

다음과 같은 조건을 따라야 합니다:



저작자표시. 귀하는 원저작자를 표시하여야 합니다.



비영리. 귀하는 이 저작물을 영리 목적으로 이용할 수 없습니다.



변경금지. 귀하는 이 저작물을 개작, 변형 또는 가공할 수 없습니다.

- 귀하는, 이 저작물의 재이용이나 배포의 경우, 이 저작물에 적용된 이용허락조건을 명확하게 나타내어야 합니다.
- 저작권자로부터 별도의 허가를 받으면 이러한 조건들은 적용되지 않습니다.

저작권법에 따른 이용자의 권리는 위의 내용에 의하여 영향을 받지 않습니다.

이것은 [이용허락규약\(Legal Code\)](#)을 이해하기 쉽게 요약한 것입니다.

[Disclaimer](#)

국제학석사학위논문

**Challenges of the participation of private sector in the
development of the Greater Mekong Subregion Power
Trade (GMS-4)**

메콩경제권 전류 무역 개발에 대한 사기업 참여의 문제점
GMS-4 사례를 중심으로

2015년 2월

서울대학교 국제대학원
국제대학과 국제통상전공
Helene Tabuteau

**Challenges of the participation of private sector in the
development of the Greater Mekong Subregion Power
Trade (GMS-4)**

A thesis presented by

Helene Tabuteau

to

Graduate Program in International Commerce
in fulfillment with the requirements
for the degree of Master of International Studies

Graduate School of International Studies
Seoul National University
Seoul, Republic of Korea

February 2015

**Challenges of the participation of private sector in the development
of the Greater Mekong Subregion Power Trade (GMS-4)**

메콩경제권 전류 무역 개발에 대한 사기업 참여의 문제점
GMS-4 사례를 중심으로

지도교수 박태호

이 논문을 국제학석사 학위논문으로 제출함

2014년 12월

서울대학교 국제대학원

국제학과 국제통상전공

Helene Tabuteau

Helene Tabuteau 의 석사학위논문을 인준함

2014년 12월

위원장

안덕근



부위원장

김태균



위원

박태호



Seoul National University

THESIS ACCEPTANCE CERTIFICATE

The undersigned, appointed by

The Graduate School of International Studies
Seoul National University

Have examined a thesis entitled

**Challenges of the participation of private sector in the development
of the Greater Mekong Subregion Power Trade (GMS-4)**

Academic Advisor: **Bark, Taeho**

Presented by **Helene Tabuteau**,
Candidate for the degree of Master of International Studies,

And hereby certify that it is worthy of acceptance.

Committee Chair

Signature

Ahn, Dukgeun



Committee Vice-Chair

Signature

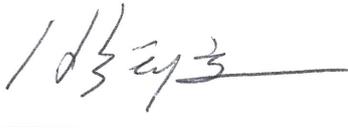
Kim, Taekyoon



Thesis Advisor

Signature

Bark, Taeho



© Copyright by Helene Tabuteau 2015
All Rights Reserved

Abstract

Helene Tabuteau

International Commerce

Graduate School of International Studies, Seoul National University

Energy and power market integration is one of the eight priorities defined in the strategic framework 2012-2022 of the GMS Economic Cooperation program, relying on interconnection infrastructure development and power trading. Strongly promoted by the Asian Development Bank, power trade is expected to better allocate power supply and to contribute to the region's growth. However, this ambition requires large investments, which has resulted in seeing private sector as a critical ingredient to the power sector development, and, accordingly, power trade.

Focusing on GMS-4 countries, the research expounds the current features of private participation in the power sector and its fit in the regional grid; then examines the limitations of private participation to the development of regional power trade, by introducing the angle of cross-border infrastructures investment specificities. This thesis offers a comprehensive understanding of the relation between electricity market structures, power trade institutions and the diversification of actors of the electric grid, and argues that the GMS institutions' gradual approach toward an integrated electricity market, orchestrated by the Regional Power Trade Coordination Committee (RPTCC), is contrasting with the inclusion of private sector investment in the regional grid.

In addition to coping with heterogeneous macroeconomic and legal frameworks in the event of cross-border infrastructure development, private sector participation isn't backed by current institutions or regional initiatives. Current institutions are accommodating national state-held power sectors and are building on bilateral agreements. The present research's comparison with other regional power trade experiences highlights that the central role of transmission system or the diversification of power purchase agreements may deserve to be integrated to GMS initiatives.

Keywords: Greater Mekong Subregion (GMS), Electricity market, Power trade, Cross-border infrastructures, Private sector participation, Harmonization

Student number: 2014-24239 (Helene Tabuteau, M.A. International Commerce)

Table of Contents

1. Introduction: Regional electricity market integration, Greater Mekong Subregion Power Trade & Private participation -----	1
1.1. Foreword -----	1
1.1.1. Power trade: definition -----	1
1.1.2. Presentation of the GMS & Energy cooperation-----	1
1.1.3. Ambitions -----	7
1.2. Literature review: Electricity market integration (EMI), power trade and power infrastructure in Asia -----	10
2. Research question: Private participation in the Power Trade -----	21
2.1. Objective of the study -----	21
2.2. Relevance of the study: Private participation as the next needed step for the Power Trade -----	23
2.3. Methodology -----	26
2.4. Findings: Private sector participation is building linkages, but not a regional grid -----	28
3. Modalities of private participation -----	31
3.1. Segments in the electricity industry-----	31
3.2. Models for private sector participation -----	32
3.2.1. Privatization-----	33
3.2.2. Licensees -----	33
3.2.3. Public Private Partnership (PPP)-----	34

3.2.4. Local and foreign actors-----	39
3.2.5. Analysis: Enhancing Power Trade with private sector participation? -----	39
3.3. Current picture of private participation-----	40
3.3.1. Thailand -----	40
3.3.2. Vietnam-----	43
3.3.3. Cambodia-----	46
3.3.4. Lao -----	49
3.3.5. Analysis: Fit of the current picture with Power Trade -----	52
4. Issues and obstacles in linking private participation and GMS Power Trade----	56
4.1. What is needed to spur more cross-border infrastructure investments?-----	59
4.1.1. State hold and market structure -----	60
4.1.2. Attractiveness of the investment environment -----	65
4.1.3. Application to the GMS-4 case: an understanding of the complex situation -----	73
4.2. Harmonization, regulation and standards: cross-border complexity -----	95
4.2.1. Landmarks of the institutional development -----	96
4.2.2. Gradual approach -----	98
4.2.3. Operational capacity for interconnection -----	100
4.2.4. Institutional capacity: lifting the barriers to cross-border trade-----	102
4.2.5. Engaging the dialogue with the private sector -----	110
4.2.6. Case for PPP – Cross-border rationale -----	111
4.3. Development of the private sector and regional development objectives: any contradiction?-----	116
4.3.1. Price-----	116

4.3.2. The incorporation of environmental and social issues: environmental injustice and private sector -----	118
4.4. Conclusion: Assessing the private sector capacity to contribute to the Power Trade objective -----	122
5. Lessons from other regional power trade initiatives-----	126
5.1. European initiatives -----	126
5.2. EAPP (Eastern African Power Pool) -----	131
5.3. SAPP (South African Power Pool)-----	134
5.4. SIEPAC Transmission Project (Sistema de Interconexión Electrica de los Países de America Central) & Central America Regional Electricity Market (MER) -----	139
5.5. Regional Transmission Operator -----	143
5.6. Lessons for private sector participation in power trade infrastructure -----	144
6. Comments on GMS Power Trade prospects-----	150
6.1. Gaining consensus toward a regional electricity market-----	150
6.2. About power exchange governance, following the RPCC creation -----	152
6.3. Comments on ADB set of actions given our observations on the inclusion of private sector-----	154
7. Conclusion & Way forward-----	159
8. References -----	164

List of abbreviations

ADB	Asian Development Bank
BOT	Build Operate Transfer model of PPP
CRIE	Regional Commission for Electric Interconnection (see SIEPAC)
DAM	Day Ahead Market
EAPP	Eastern African Power Pool
ECT	Energy Charter Treaty
EDC	Electricity of Cambodia Cie (Electricité du Cambodge)
EDL	Electricity of Lao Cie (Electricité du Laos)
EDV	Electricity of Vietnam Cie (Electricité du Vietnam)
EGAT	Electricity Generating Authority of Thailand
EIA	Energy International Agency
EMI	Electricity Market Integration
EOR	Regional System Operator of SIEPAC
EPF	Electric Power Forum (GMS)
ERAV	Electricity Regulatory Authority of Vietnam
ESCAP	Economic and Social Commission for the Asia-Pacific
ESMAP	Energy Sector Management Assistance Program, World Bank
GMS	Greater Mekong Subregion
GMS-4	<i>designating Thailand, Lao PDR, Cambodia and Vietnam, members of the GMS</i>
GMS-BF	Greater Mekong Region Business Forum
IADB	Inter-American Development Bank
ICA	Infrastructure Consortium for Africa
IFC	International Finance Corporation, World Bank

IGA	Inter-Governmental Agreement on Regional Power Trade
IISD	International Institute for Sustainable Development
IPIAI	Infrastructure Private Investment Attractiveness Index
IPP	Independent Power Producer (or Independent Power Plant)
MEA	Metropolitan Electricity Authority of Thailand
MER	Regional Electricity Market (Mercado de Electricidad Regional, see SIEPAC)
MIGA	Multilateral Investment Guarantee Agency, World Bank
MOIT	Ministry of Industry and Trade (Vietnam)
MOU	Memorandum Of Understanding
MPI	Ministry of Planning and Investment (Lao PDR)
MRC	Mekong River Commission
ODA	Official Development Assistance
PEA	Provincial Electricity Authority of Thailand
PPA	Power Purchase Agreement
PPIAF	Public-Private Infrastructure Advisory Facility
PPP	Public-Private Partnership
PSP	Private Sector Participation
RETA	Regional Technical Assistance
RIMPPI	Regional Indicative Master Plan on Power Interconnection
RMO	Regional Market Operator (Electricity)
RPCC	Regional Power Coordination Center
RPTCC	Regional Power Trade Coordination Committee
RPTOA	Regional Power Trade Operating Agreement
RTO	Regional Transmission Organization
SADC	Southern African Development Community

SB	Single Buyer scheme
SAPP	Southern African Power Pool
SEA	Strategic Environmental Assessment
SIDA	Swedish International Development Cooperation Agency
SIEPAC	Central-American Countries' Electric Interconnection System
SOE	State Owned Enterprise
SPC	Special Purpose Company
SPP	Small Producer Plants
SPV	Special Purpose vehicle
STEM	Short Term Energy Market
TPA	Third Party Access
TSO	Transmission System Operator
WB	World Bank
WGPG	Working Group on Performance standards and Grid code
WGRI	Working Group on Regulatory Issues
ZIZABONA	Zimbabwe-Zambia-Botswana-Namibia Interconnector

1. Introduction: Regional electricity market integration, Greater Mekong Subregion Power Trade & Private Participation

1.1. Foreword

1.1.1. Power trade: definitions

Power trade stands for flows of electric current as a commodity, through transmission lines. Electricity is transmitted and retailed immediately, as electric power cannot be stored. It is traded between a producer and/or owner of the transmission lines, and a buyer, which can be a large consumer, or the owner of a transmission line. The electricity generation, transmission, distribution and control networks form the electrical grid. After generation, electric current is first transmitted by high voltage, then goes through transformers in the distribution network as medium voltage, and is transformed again into 220 or 240 V voltage used by consumers to be distributed to households¹. This transmission system is referred to as the grid.

Cross-border power trade, then, stands for the trade of electricity as a commodity from a country A electrical grid, to a country B electrical grid. It can happen in the context of a common power market (transboundary power market), or a designated bilateral agreement applying to a restricted line only.

1.1.2. Presentation of the GMS & Energy cooperation

China, Cambodia, Lao People's Democratic Republic, Vietnam, Thailand and Myanmar entered a program of subregional economic cooperation in 1992, sponsored by the Asian

¹ Alstom, website presentation, *What are electrical grids?*, accessible at: <http://www.alstom.com/grid/about-us/understanding-electrical-grids/What-are-electrical-grids/>

Development Bank which holds its secretariat, and named Greater Mekong Subregion program (hereafter referred to as GMS). Energy and power market integration is one of the eight sector and multi-sector priorities defined in the strategic framework 2012-2022 of the GMS Economic Cooperation program. The Energy Road Map, which has been issued along with the strategic framework, makes a special point out of the power subsector. The goal of the GMS in the matter is stated as follows: “[to continue] the development of a regional power market through a two-pronged approach: providing the policy and institutional framework for power trading, and developing the grid interconnection infrastructure to connect the various GMS power systems”². The integration of power markets of the GMS to form a subregional electric market has been set as a long-term objective; the economic and environmental benefit of regional integration in the GMS energy sector is estimated at savings amounting to about 19% of total energy costs or about \$200.0 billion³. Indeed, the six countries share a regional concern for ensuring the adequate supply of energy at a least cost in one of the fastest growing area in the world⁴.

The point is to exploit the three natural complementarities within the subregion: natural cross-border interconnections (adjacent border connections, leading to cost effectiveness of exchanges there), interconnections arising from differences in natural resource endowments (from resource-rich, mainly hydropower capacity-rich countries, to countries with high demand), and interconnections arising from differences in peak load profile,

² The Greater Mekong Subregion Economic Cooperation Program Strategic Framework 2012–2022, Asian Development Bank Report, 2011, p.13

³ Greater Mekong Subregion Power Trade and Interconnection, 2 Decades of Cooperation, Asian Development Bank Publication, September 2012

⁴ Energy Sector Integration for Low Carbon Development in Greater Mekong Sub-region: Towards a Model of South-South Cooperation, Zhai, Y.

given seasonal slight differences in peak variations. This is reflected in the World Bank official rationale for granting funds contributing to the development of power trade scheme⁵.

GMS cooperation in power should enable access to cheaper and more reliable electricity, “a critical factor in the region's productivity, competitiveness, and growth”⁶. Specifically, the expected benefits of power trade are⁷:

- The enhanced connectivity of the region, reducing slightly power demand peak congestion
- The improved competitiveness and competition, lowering electricity prices for consumers
- The lesser dependence on fossil fuels with the development of hydropower infrastructures, and the decreased dependence on petroleum imports
- “A greater sense of community”⁸.

Allegedly, the ADB may also follow a social and developmental rationale too in developing power trade. In order to reach the poverty reduction target that it has set⁹, the ADB emphasizes the promotion of local industrialization, the promotion of technological and institutional innovation, but also the need to avoid energy bottlenecks. In this context, positive impacts are expected for exporters as well as importers of energy trade, as

⁵, World Bank Report No: 37455, Project appraisal document on proposed IDA grants in support of the Mekong Subregion Trade Projects, Annexe 1, II. A. “World Bank’s approach toward supporting the GMS Power trading Program, the case for a GMS Energy Market”, p.28

⁶ Mekong Development Forum in Tokyo to Focus on Infrastructure Partnerships, ADB News Release, July 7, 2005

⁷ See International Experience with Cross-border Power Trading, Report to the Regional Electricity Regulators’ Association (RERA) and the World Bank, September 2009, section 7.1. p.74

⁸ ADB Evaluation Study, Energy Sector in the Greater Mekong Subregion, IV. E. p.31

⁹ ADB Millennium Goals. A deadline is fixed for 2015, but poverty eradication is targeted for 2030. See: <http://www.adb.org/news/future-development-goals-target-end-poverty-2030-study>

attested by a report released in 2008 by the regional UNDP center of Bangkok¹⁰. The positive outcome (with developmental target) of energy trade (applying to power trade¹¹) depends on good governance arrangements to ensure that the benefits of this trade reach the poor. Indeed, energy trade may have an indirect effect on social disparities if profits from the energy trade are reinvested into the economy to promote access to energy and fair competition on the market¹².

GMS-4 focus

In the course of this research, the analysis will be restrained to four countries of the GMS: Thailand, Lao PDR, Cambodia and Vietnam (hereafter designated as GMS-4), which have together displayed deeper cooperation on cross-border issues in the region, notably on the water resource issue, as the four countries together created the Mekong Committee in 1957, later becoming the Mekong River Commission in 1995. Myanmar and China are not full members of this initiative and have only observer status since 1995. Also, as the present research will try to investigate regulatory and investment environment of the countries regarding power sector, the focus on four countries enables to restrain information volume and countries' specificities. It is even more so that, first, Myanmar has only very recently opened its borders to foreign investment, with a process still ongoing (resources accessible online are also scarce); and second, that China inclusion in the GMS program is torn between sole consideration of the Yunnan region and the gigantic scale of the whole country. Also, the amount of relevant information available in

¹⁰ Cross Border Energy Trade and its impact on the Poor, Regional Energy Programme for Poverty Reduction (REP-PoR), UNDP Regional Centre in Bangkok, Thailand, 2008

¹¹ Author's judgment. The conditions and modalities of energy trade or power trade encompass similar reality: tapping the local resources, raising the issue of the access to energy/electricity to the local area where resources are tapped; etc.

¹² Cross Border Energy Trade (...), *ibid*

Chinese language only couldn't have been reviewed by the author of this research, presenting a risk of incomplete analysis. As the findings and conclusion of the research do have application to Myanmar and China, despite their specificities, the restriction to four countries is found to be relevant.

It is important to note that poverty in the GMS-4 is also marked by “power poverty”, in Cambodia and Lao PDR, despite electrification rate which have skyrocketed in the past years. In 2009, 55% of the population of Lao PDR and only 24% of the population of Cambodia (households) had access to electricity. Not accessing electricity means that a number of daily work and business affairs are impeded. As such, extending the grid and providing access to electricity to most isolated areas is a poverty eradication priority.

<Table 1: Electrification status in the GMS>

	Population without electricity 2009 (millions)	Population with access to electricity 2009 (%)	Population with access to electricity 2011 (%)
Cambodia	11.3	24.0	34.0
Lao PDR	2.6	55.0	78.0
Thailand	0.5	99.3	99.0
Vietnam	2.1	97.6	96.1

Source: Regional Power sector integration: Lessons from global case studies and a literature review – ESMAP Briefing Note 004/10, Greater Mekong Subregion Transmission and Trading Case study, June 2010 – Annex 2, p.75

More broadly, the four countries display heterogeneous levels of development and nature of political regime. All of these countries have a regime of authoritarian nature to some degree, as Thailand went back to military rule in May 2014, two countries are still under

communist rule (Vietnam and Lao), and Cambodia government is violating the supposed multi-party system. This is all questioning the role of the government in lifting up its population from poverty. As GMS-4 is still in a development process, and includes governments quite weak to answer basic needs and rights of its population, the challenge to build regional concert and investment-intensive infrastructure appears starker.

National motives perspective

Besides regional goal and economic cooperation grand objective, countries involved in the GMS scheme also have purely national motives. Thailand was the first country to start trading electric current with its Lao neighbor, following surging energy demand. The need to feed national growth in the early nineties led to the signature of the first Memoranda Of Understanding (MOU, see section 3) with Lao government in 1993, for the import of 1500MW of power¹³. Further MOU with Lao PDR, and eventually Myanmar and China followed. So, originally, the original motivation for the development of power trade lies in Thailand's booming growth. Vietnam, too, with a double-digit rate of growth in electricity demand, look forward to further exchanges within the GMS in order to answer peak demand, and alleviate dependency on Chinese imports. While Thailand and Vietnam are motivated by limited domestic opportunities for power generation relative to its needs, Lao PDR and Myanmar are motivated by this export opportunity, providing both revenues and the possibility to expand domestic electrification, by allocating part of the developed production to local needs. Cambodia is both motivated by trade opportunities and self-electrification, the main point being the

¹³ Source: Regional Power sector integration: Lessons from global case studies and a literature review – ESMAP Briefing Note 004/10, Greater Mekong Subregion Transmission and Trading Case study, June 2010 – Annex 2, p.75

access to cheaper electricity. Cambodia is still relying heavily on costly fuel power, and its electricity tariff is excessively high.

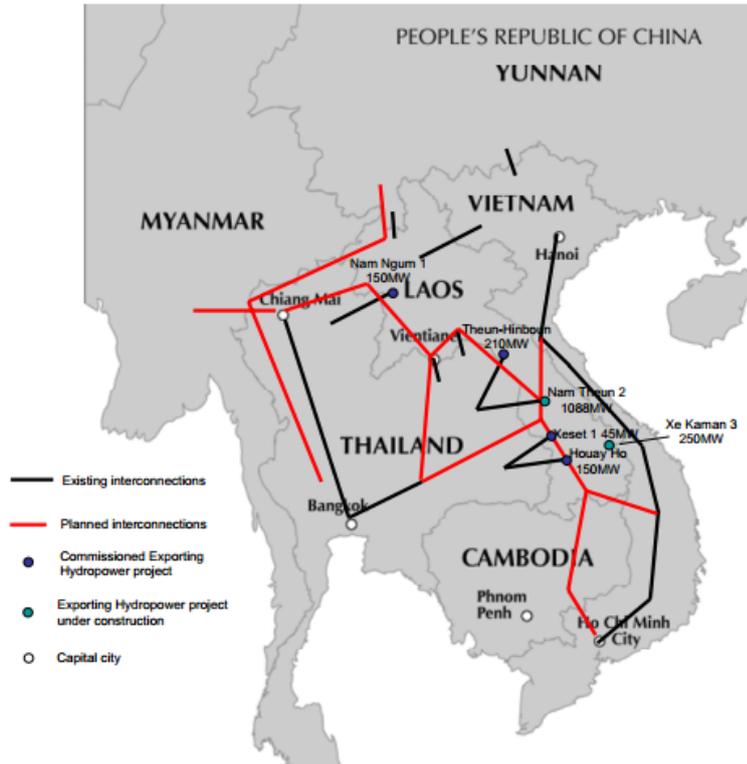
With Thailand and Vietnam being the largest energy demand drivers, Lao PDR presenting the booming energy production potential, and with Cambodia lagging behind, the challenge lies both in building the infrastructure to enable the production of electricity power given the large production potential; and in developing transmission and interconnection infrastructure.

1.1.3. Ambitions

What seeks to be achieved can be illustrated with a map of existing and projected interconnections. The Master Plan actually relies on hydropower development: prioritized projects were first generation infrastructure projects.

<Figure 1: Indicative Power sector Master Plan for the GMS released in 2000>

Figure 7.1: Indicative Power Sector Master Plan for the Greater Mekong Subregion



Source: Asian Development Bank

Source: International Experience with Cross-border Power Trading, Report to the Regional Electricity Regulators' Association (RERA) and the World Bank, Sept. 2009, Castalia Advisory Group

Also evocative are the targeted cross-border carrying capacity for 2015, and 2028. As can be observed, transmission emanating from Lao PDR especially is expected to surge, as well as China and Myanmar bilateral exchange, in the event of a political stabilization.

<Table 2: Update of the Regional Indicative Master Plan on Power Interconnection, 2010
(expressed in megawatt carrying capacity, MW)>

Interconnection	Committed 2011-2015	Planned 2016- 2028
Thailand - Lao PDR (north)	2 320	2 100
Thailand - Cambodia	60	-
Vietnam (north) - Lao PDR (north)	-	2 400
Viet Nam (central)-Lao PDR (south)	1 225	900
Viet Nam (south) - Cambodia	220	200
Lao PDR - Cambodia	40	-

Source: Greater Mekong Subregion power trade and Interconnection, 2 Decades of Cooperation – Asian Development Bank Publication, September 2012 – Prepared by RTE International et al., under ADB RETA 6440, Appendix 3.E., p.27

This multiplied capacity means that the consumption possibilities are greatly improved as well.

In Brief

The establishment of a power trade scheme, within a regional grid, is thus a challenge encompassing:

- Infrastructure development, in power generation (within borders)
- Infrastructure development in power transmission (across borders)
- Power purchasing agreements framework
- A regional market institutions and legal framework

Power trade is thus the ambition of a regional electric network, requiring infrastructures as well as coordination. The stakes of power trade require large investments and expertise, challenging GMS-4 countries capacities and governments.

1.2. Literature review: Electricity market integration (EMI), power trade and power infrastructure in Asia

Regional Electricity Market design & Obstacles to Regional Grid

Regarding the overall architecture and the efficient design of electricity market, relevant to the understanding of regional electricity market, Hogan contribution has been significant. Hogan (1995) emphasized on the combination of critical characteristics of the power system and prices, to ensure efficiency of the market. Still Hogan (2013) recommended an independent entity controlling generation and transmission to solve both open access and fair competition. Barker et al. (1997) study for the World Bank brought useful insights to power sector organization in the event of electricity market integration, by discussing power pool scheme. They determined four distinct decision-making models for power pools, with various degrees of independence and boards characteristics. Also, the design of electricity markets has been covered in a number of studies on its technical and ‘economics’ aspects, out of the scope of the present research.

The specific design of *regional* electricity markets, however, has been subject to much less abundant literature. The rationale for electricity market integration (EMI), especially, has been little discussed, but Sheng & Shi (2012), developing an econometric model, argued that income disparity could decrease with EMI (overall economic growth effect). Still, regional electricity market integration has been the focus of research of Oseni and

Pollitt (2014), who emphasized, through case studies, the necessity of strong and efficient institutions, as well as the right combination of regulation. Electricity trade, or power trade, is a component of EMI. It requires a sufficient degree of deregulation in order to reduce market inefficiencies (Billette de Villemeur & Pineau, 2011), as a regional electricity market is a form of restructuring which needs appropriate institutional changes. However, Oseni and Pollitt (2014) rather advocate for the role of international institutions to settle regional electricity trade.

The prospects for electricity market integration in Asia has interested few scholars, who usually make a broad case of ASEAN energy market integration and seldom discuss the nature of actors involved in regional electricity market. Yun & Zhang (2005) tackled the regional electric grid interconnection as an aspect of energy cooperation in North-East Asia, and advocated for a shared framework with NEA countries in order to promote such grid. Yet, Yun & Zhang draw largely on the challenge of North-Korea problematic inclusion in such a scheme and disregard institutional and operational implications. Wu (2012) asserted the role of cross-border interconnectivity within the East-Asian countries to promote a regional electricity market, and emphasized on four dimension of EMI: domestic market development, sub-regional connectivity and power market; harmonization of regulation and standards, and coordination in electricity policies and planning. The role of regional institutions for the broader energy market integration was explored as well by Aalto (2014), who argues that the strong stance of the states in South-East Asia hampers institutional harmonization, questioning the “democratic” functioning of ASEAN as an efficient tool to enforce a regional organization of energy markets. In another article (2014), Aalto further investigates the role of institutions in energy market, arguing that the very nature of institutions may be preventing a shared idea of energy

trade. Indeed, both formal and informal institutions coexist to regulate the energy market development. Yet, the sub-entity of the electricity market is left rather untouched by his study.

Saroha & Verma (2012), making a case for South-Asia, suggest a cross-border international model of power pool to tackle the lack of transmission system and of capital flow. Srivastava & Misra (2007), also focusing on the Indian peninsula case, complementarily highlight the need for attractive regimes to investors, hence the need for a coordinated investment strategy, alongside the regional energy cooperation. However, their article missed to relate discussed “back-to-back” arrangements to electricity sector institutions or obstacles to investment. There is thus a missing link to explore between electricity market integration, and private sector involvement modalities.

The barriers to EMI have also drawn some attention, discussing cross-border power trade. Gruber (2007) highlighted impacts of pre-liberalization regulations and infrastructures on cross-border trade, which hamper the development of interconnections. The abolition of obstacles to cross-border electricity lies in the regulation of energy markets. Based on the European power market, Brunekreeft et al. (2005), through economic modelisation, highlighted the main role of Transmission System Operators in building the power market, encompassing market rationale and efficiency. The cross-border complexity was also analyzed as an imperfect information game, “Bayesian-Cournot” game (Richter & Viehmann, 2014), with welfare derived out of the cross-border energy trade impacted, if players are uncertain about other players payoff regarding transmission rights.

Bridging the two views discussed above, and focusing on the European case and Germany, Steinbach (2013) discussed the inadequacy of grid infrastructure and

insufficient regional authorities' coordination for the development of renewable energy supply, thus drawing attention on the linkages between infrastructure, regulations and supply development. However, the article doesn't discuss how regional institutions initiatives or border countries specificities may impede further cross-border power trade.

Power trade current status in the Mekong

Below is provided latest available figures on effective power trade in the region. Though assumed to be slightly below current level of power trade (figures from 2010), it is remarkable that flows are still very limited in comparison with target and grand objectives set by the GMS.

<Table 3: GMS Power Trade Flows, GW-h (energy consumed), 2010>

FROM	TO					
	Cambodia	Lao PDR	Myanmar	Thailand	Viet Nam	PRC
Cambodia						
Lao PDR	7			6 938		
Myanmar						1 720
Thailand	385	1 042				
Viet Nam	1 155	163				
PRC		113			5 599	

Source: Greater Mekong Subregion power trade and Interconnection, 2 Decades of Cooperation – Asian Development Bank Publication, September 2012, Appendix 2, p.21

<Table 4: Main MOU in force in the GMS (October 2012)>

Importing Country	Total MOUs or Agreements
China	> 16 GW
Thailand	With Lao: 7 GW (2014)
	With Myanmar: 1.9 GW
Vietnam	5 GW
Total agreed imports	~30 GW

Source: Presentation by T. Lefèvre, Director CEERD, “The Case of “ADB/GMS RETA No 6440 – GMS Power Master Plan”, October 2012

A critical, yet constructive report on the GMS Regional grid ambition was a publication from the Swedish International Development Agency, also one of the biggest donor for power interconnection projects assistance. As stated in SIDA’s 2011 Review of the Greater Mekong Sub-Region Regional Power Trade¹⁴, though bilateral trade exists (at very small levels as for now), the regional grid is actually nowhere near effective development. This bilateral “trade” is rather a “point-to-point” energy sale.

In the place where SIDA remains critical to current achievement, Castalia analysts would rather suggest that those bilateral agreements are a useful basis to step toward larger commitment, as per stated in an ESMAP/Castalia report¹⁵: the bilateral agreement is of very rapid application, and foster infrastructure development as well, while contributing to country-to-country negotiation. There are hence two views in the evaluation of the

¹⁴ Review of the Greater Mekong Sub-Region Regional Power Trade, Final Report, SIDA Review 2011:9, 2011

¹⁵ International Experience with Cross-border Power Trading, Report to the Regional Electricity Regulators’ Association (RERA) and the World Bank, Sept. 2009, Castalia Advisory Group

GMS power trade: too little, and too “micro” focus; or slowly developing through indirect grid building.

Yet, SIDA assessment also raised concerns about the deficit in institutional set-up, the lack of “a clear understanding of all the preconditions and factors” that would make it possible for a regional power market to function. Current RETAs (Regional Technical Assistance) fall short of practical implementation guidelines¹⁶. Also, an ESMAP report¹⁷, though acknowledging GMS priority in planning interconnection projects, underlines the present lack of “structuring, financing and implementation” from the GMS institutions of the interconnections.

The International Conference on GMS 2020, which took place in February 2012 in Bangkok, and aimed to assess the GMS economic growth path and its impacts on environmental and social development, had led to some positive evaluation. Gadde et al. (2012), in the study released along with the Conference, emphasize on three main achievements since the creation of the Energy Power Forum framework in 1995: the Inter-Governmental Agreement, and consecutive Regional Power Trade Operating Agreement (RPTOA) and Regional Indicative Master Plan on Power Interconnection (RIMPPI) in 2008. Though the GMS countries are at varying stages of implementing policies directed at achieving energy efficiency, those achievements show that all countries of the GMS have demonstrated understanding of the need for implementation of power trading which would be achieved by developing a regional grid. However, modalities of this grid development remain rather untapped by the study, despite the

¹⁶ Review of the Greater Mekong Sub-Region Regional Power Trade, Final Report, SIDA Review 2011:9, 2011 – p.15

¹⁷ Source: Regional Power sector integration: Lessons from global case studies and a literature review – ESMAP Briefing Note 004/10, Greater Mekong Subregion Transmission and Trading Case study, June 2010

emphasis made on the need for transparent policies and simplified procedures to create an environment suitable to private sector. Hence, Gadde et al.'s work actually provide hints for the present research by raising the topic of private participation in the establishment of a regional grid and associated power trade.

In the same conference publication, Ward et al. (2012) pinpoint the increasing awareness of decision-makers in the GMS of the various ranges of options existing to enhance energy cooperation and maximization of efficiency, notably the interest for IPP, entrepreneurial initiatives, demand-side management programs. However, though the main point of the article was to raise the question of non-traditional security (preservation of livelihood), the article would not go over the role of decision-makers in managing these new risks.

Discussing about modalities and challenges of an energy cooperation profitable to all in the GMS thus encompasses thoughts about the private sector participation. Assessing the power trade development also requires an understanding of the various range of actors committed in the grid.

Private sector in power infrastructure development

A critical infrastructure is to be met in order to operate the regional electricity market. Traditionally, the state has undertaken power infrastructure provision and operation, as supply of a public good. However, the electricity sector reform has introduced the participation of private actors in the planning and procurement of power infrastructure (World Bank, Eberhart et al., 2011). Governments have transferred a growing part of control and ownership of electricity market segments to private actors. In a 1992 article, Barnett was defining four strategies for developing countries to finance electric power

projects, given the observed shortcomings. The first, and desperate, is to cut the investment in the power sector; the second is to increase the amount of aid to the power sector, the third is an increase in domestic finance for power sector development; the last strategy is to increase private foreign sector investment in domestic power sector. While the first two options are unsustainable, the third option explains the shift toward large governmental companies having a hold on the domestic power sector. Meanwhile, the last option is seen as “unavoidable”, and offering “the greatest” hope. Financial innovation is necessary to attract the capital. This analysis dates back to 1992, but has found applicability to evolutions witnessed through the 90s and 00s, with the development of large projects involving foreign public-private actors and other power sector champions from abroad.

The participation of private actors in the power sector requires governments to provide the right organizational framework, as Banks argues (2006), before pointing at the weak capacities of governments to do so. His article, however, falls short of reviewing interconnectivity aspects. Some case studies of private investors in electricity markets depict lessons for private investment inclusion in the electricity market. Xuegong et al. (2012), on the Chinese case, gave a set of limitations to the private sector and foreign investors’ engagement, among which the fragmented regulatory system, the limited access (third-party access) to transmission lines, the limited access to financing (state-hold). Those hindrances, however, do not entail transnational factors; even though China may be seen as facing trans-regionality, the author makes no point of the regions’ interconnection as impacting private sector involvement.

As the impact of transmission was already mentioned, regarding private participation Woolf (2003) emphasized the extent to which the transmission segment of the electricity

market is even more important when private sector is involved, as transmission gives significant price signals that drive private sector. Focusing on the case of emerging countries, Jiang et al. (2014) highlight the bargain taking place between a foreign (private-like) investor and a host country regarding private sector participation in infrastructure, resulting in the need for political stability from the investor point of view.

The participation of the private sector in power infrastructure has yet been criticized, mostly by NGO and in pre-privatization periods. But the load of studies on private sector impact on electricity is far from delivering a gloomy picture. For sure, many have been endorsed and produced by the World Bank, but those reports haven't been deprived of many careful remarks and lessons, such as the complexity of the political economy of pricing in the power sector (WB, 2003). Independent studies, such as McKenzie & Mookherjee's (2003), showed that following the introduction of private participation in electricity in Latin America, prices half-decreased. Andrès et al., for a PPIAF report (2008) on the impact of private participation in infrastructure, note the diversity of private participation forms and favorable environment such as realistic tariffs, strong demand growth, limited social sensitivity. The report doesn't exclude some critic, as it questions the sustainability of foreign private sector investments.

Private sector participation, still, can find justification in regional electricity market. Focusing on the European "Supergrid" perspective, Torriti (2014) reviewed the links between privatization of electricity actors and cross-border links on the electricity market. His modelization suggests that privatization had led to more cross-border power trade, because it promoted competition, cost-reflectiveness and a more efficient use of complementary resources. Yet, his study doesn't control on many situational factors (Europe based study).

Mentioning that private participation can take many forms, the recent emergence of public-private partnerships (PPP) projects deserves some attention. Osborne (2000) was stating how, according to international organizations, PPP has been acknowledged to improve efficiency of infrastructure. Oliveira Cruz & Marques (2013) observed that such PPP arrangements have developed in many developed and emerging countries as a result to infrastructure deficit. Aligned with this argument, Barnier (2003) noted that PPP has been further developed in sectors perceived as a burden to public responsibility. The case of PPP in the power sector, however, has been seldom tackled, except in a series of World Bank studies focused on PPI (Private-Public Infrastructures) (WB 2003, WB 2013), and less alone in relation to regional program. Private participation in water and sanitation services, in contrast, has spurred more curiosity. In the course of this research, the case of public-private partnership in the electricity sector and its adequacy with electricity integration and hence regional challenges will be assessed.

One particularly relevant study (Merme, Ahlers and Gupta, 2014) highlighted the emergence of private sector as an actor in the power grid development. Focusing on the private finance surge in hydropower projects in the Mekong (a “booming business”), Merme et al. highlight three reasons for this development: private sector investment, International Financial Institutions assistance and local policy changes (including the change in property rights) and the emergence of new forms of contracts. A main point in their study is the trend, in the Mekong region, of new actors and renewed roles of actors: Multilateral Bilateral Development Banks, Export Credit Agencies, Private Commercial Lenders and State-owned agencies. The increase in private sector involvement in the Mekong region is also mentioned in SIDA report, the majority of the actors (construction

companies, hydropower developers and private banks) coming from Asia, many of them outside of Mekong region's borders¹⁸.

This literature provides an overview of the changing nature of actors and their motives in the GMS energy cooperation scheme through power generation development. How private sector's participation can actually fit in power trade expansion is yet questioning further the private sector participation in interconnections and cross-borders infrastructures.

¹⁸ Review of the Greater Mekong Sub-Region Regional Power Trade, Final Report, SIDA Review 2011:9, 2011 – p.16

2. Research question: Private participation in Power Trade

2.1. Objective of the study

From the previous review, one can see that the studies regarding electricity market integration and associated cross-border power trade have not included the nature of actors actually involved in the supply and exchange of electricity, despite its importance for market organization, pricing and incentives. Studies on regional interconnectivity (Wu, 2012; Aalto, 2014) emphasized on institutions, planning, regulation, but did not look at concrete impact for grid development, nor at interactions of the structure with actors of the grid. The absence of focus on South-East Asia regional electricity market prospects, also, can be explained by the relatively new momentum of the GMS energy cooperation program. This new momentum motivates the present research.

Organizational framework and governments arrangements (Banks, 2006), fragmented electricity market (Xuegong, 2012), the role of transmission entity (Woolf, 2003) in enabling the private sector to participate in the power sector, are all hints, answers brought by different scholars to understand what impacts private sector participation. Bringing those insights together on a case study, and providing a comprehensive picture, will be a significant contribution. Gadde evaluation has brought critical insights, as it identified the need for clearer investment policies and suitable environment for private sector, but yet it is incomplete, as it doesn't relate such environment to regional grid development, nor encompass the impact of cross-border electricity connectivity.

The particularity of the GMS, regarding the nature of actors involved in the supply and exchange of electricity, entails even more questioning that both Vietnam and Lao PDR, in

the GMS, remain among the few communist regimes in the world. As those regimes are yet becoming more “mixed” in the past few years and integrate the private sector to the communist structure (with a government overlook on private activity), including FDI due to friendlier policies, it becomes relevant to question the perspectives for private sector participation in the power sector as well. Vietnam is engaged, since 1986, into the Doi Moi, a series of economic reforms towards the creation of a market economy under “socialism orientation”. Yet, the degree of state control and the stiff business climate is an issue, likely to impact power infrastructure development.

Overall, the point of the research is to confront the rationale for private participation in power infrastructure, and the statement made in a number of official documents released by ADB or the GMS on the need for private sector participation, with the current cross-border power trade framework displayed in the GMS-4. The underlying question which needs to be tackled is the compatibility between the power trade expansion and the modalities of private sector participation, given current power market specificities and regime type in the area. There is a big question mark for private sector in many aspects: can private sector contribute to more efficient power trade scheme? Under what modalities is the private sector intervening? How are communist regimes progressively integrating private initiatives and private actors? What are the institutional shortcomings, at a regional level? Is there a risk to neglect electrification “for everyone” by incorporating those actors?

The research questions of the present study are as follow: What is the nature of the limitations of the private sector participation in developing the regional grid and the power trade? Is the current institutionalization of the power trade consistent with

the private sector participation? Finally, are the limitations inherent to the Greater Mekong Subregion particularities?

The study thus intends to review the modalities of private sector contribution to the power trade, and the options to incorporate private capital into the region interconnectivity. Consecutively, it also intends to identify various institutional and ‘environmental’ deficits that may impede private sector participation. It has particular relevance in regards to factual elements.

2.2. Relevance of the study: Private participation as the next needed step for Power Trade

Power trade relies on an adequate and sound infrastructure development; hence the attention for the private sector comes from **the acknowledged infrastructure funding gap**. In 2009, an estimated 4 trillion US dollars was necessary to meet the infrastructure needs in electricity in Asia over the 2010-2020 decade¹⁹. In the GMS region only, active private participation would draw needed financial resources. As the ADB report released in 2013 puts it, the traditional provider for power infrastructure is the public sector, especially for countries where security of investment couldn’t be assured. However the constraints on public finance to develop infrastructure are “severe”, and the need for alternate capital is necessary not to alter infrastructure development and hence, growth. It is thus “generally accepted” that greater resort to private capital is an answer to public

¹⁹ Infrastructure for a Seamless Asia, A Joint Study of the Asian Development Bank and the Asian Development Bank Institute, 2009, accessible at: <http://www.adbi.org/files/2009.08.31.book.infrastructure.seamless.asia.pdf>

funding shortcomings²⁰, aligned with Barnett (1992) analysis previously evocated. Also, as noted by the World Bank, “greater private participation in the energy sector is needed not only at the project level, but also to enhance overall use efficiency”²¹.

In 2005, ADB Vice-President Liqun Jin was already advocating for energy related development goals and private sector interests to meet:

*"Development is a shared responsibility; it is also a shared opportunity [...] History has shown that, through effective cooperation and partnership, the public sector's development goals and the private sector's commercial objectives can both be met. Indeed, this is the only way to achieve our mutual goals."*²²

*“Greater involvement of the private sector is crucial to meeting the Mekong region's development and infrastructure investment need” (estimated at \$10 billion to \$15 billion over the next 5 to 10 years)”*²³ (2005).

The keynote address by Dr P. Trairatvorakul, Governor of the Bank of Thailand, at the Euromoney Greater Mekong Subregion Investment Forum, in Bangkok in 2013, was going in the same direction, with more details. He indicated that in order to meet the region funding requirements in infrastructure development, both private sector participation in infrastructure development through public-private partnership (PPP) and

²⁰ Assessment of the Greater Mekong Subregion energy sector development progress, prospects, and regional investment priorities, ADB Report, 2013

²¹ ADB Technical Assistance Report, Developing the Greater Mekong Subregion Energy Sector Strategy. Project No. 39002, January 2006

²² Mekong Development Forum in Tokyo to Focus on Infrastructure Partnerships, ADB News Release, July 7, 2005

²³ Private Sector Must Fill Infrastructure Investment Gap in Mekong, ADB VP Tells Tokyo Forum, ADB News Release, July 14, 2005

a supportive framework for private financing had to be sought²⁴. It has thus been some years now that private sector commitment in building the grid has been on the official agenda for the GMS, with push from the ADB.

Public sector efforts to reduce infrastructure deficit is critical, but it can be limited for the general interest. In IFC's vision too, private sector complements the role of government with market-based solutions, promoting a results-driven approach²⁵. Private infrastructure development is likely to limit government's debt, given that infrastructure has been developed largely with loans from the ADB in the region; loans which cost is to be born, in the end, by local consumers²⁶. The sustainability of the "financing" monopoly of states asks for alternative options.

The following paradigm has emerged to support private sector participation: *private sector involvement is the critical ingredient to the power sector reform and development*. Power infrastructure is capital intensive, and the private sector identifies how large projects not feasible at the national scale become feasible with regional scope, in the power trade development framework. Given the profitability of investment in the power sector, the potential offered by the resources and needs to cater in the region, one could expect responsiveness from the private sector and active private sector participation to enhance the region connectivity and electrification.

Yet, such paradigm is confronted to political reality of the GMS-4. The private sector participation in the regional connection is a complex issue, since, as discussed previously,

²⁴ Keynote address by Dr Prasarn Trairatvorakul, Governor of the Bank of Thailand, at the Euromoney Greater Mekong Subregion Investment Forum, Bangkok, 13 June 2013
<<http://www.bis.org/review/r130619b.pdf>>

²⁵ Infrastructure, How the private sector helps, IFC *Telling our story* Report, Vol. 6, 2012

²⁶ International Rivers, *Trading away the future – The Mekong Power Grid*, accessible at: <http://www.internationalrivers.org/files/attached-files/mekongpowergrid092506.pdf>

within the GMS-4, Lao PDR and Vietnam are still under communist regime incorporating elements of transition to market economy, and Cambodia also displays authoritarian derive. Undergoing capitalist incorporation and socialist transformation, those countries present challenges on the national scale as well at the regional scale, since consolidation at the national level also intensifies the complexity of regional consolidation. Both ADB reports²⁷ and SIDA conclude, on the arrangement for private sector, on the difficulties encountered in some public-private initiatives, from fiscal limitations to regulatory obstacles and issue of service delivery after delivery of the project.

The need to develop the regional grid, and the cooperative nature of this project adds to the importance to better understand the stakes and impediments to the private sector participation in projects fostering regional connectivity; not necessarily as an advocacy for the private sector participation, but also with the concern to better develop energy resources and hence, development, in the region.

2.3. Methodology

The research will follow a classic review - analysis - extension format. The current picture of the power sector in each country and associate private sector operation will first be drawn, in order to comprehend the modalities of private sector participation in the emerging regional grid so far.

²⁷ - Assessment of the Greater Mekong Subregion energy sector development progress, prospects, and regional investment priorities, ADB Report, 2013
- Energy Sector in the Greater Mekong Subregion, ADB Evaluation Study, Reference Number: SAP: REG 2008-51, December 2008

Then, I define the nature of power infrastructure designed for power trade, as “cross-border infrastructures”. Further on, with this definition settled, the constraints of private sector participation and modalities for participation are investigated through a four-question approach.

- What is needed to spur more appropriate power infrastructure investments?

The impact of cross-border connectivity will be specified within the assessment of the general environment for investment. Infrastructure projects investments’ attractiveness will be assessed, on the basis of an eight dimensions framework developed by the IDB.

- To what extent elements needed to spur more private cross-border infrastructure investments can be replicated and regionalized?

This second approach to private participation incentives aims to adopt a regional perspective, given the regional scope of power trade. Thus, regional institutions and regional plan for power infrastructure development will be discussed in terms of compatibility with private sector participation. More especially, I’ll consider the impact of regional regulatory harmonization.

- Is what is needed to spur more cross-border infrastructure investments also favorable to development objectives of the region? Or is there a contradiction?

The participation of private sector goes with some risks to be mitigated, including its fit with regional cooperation. This implies for the research to go further than stating regulatory issues, and to question private sector participation given development objectives in the region.

- How do other regional initiatives have dealt with private sector participation and regional electric market creation?

In order to cast a critical light on the obstacles and limitations identified, and to consider existing options and initiatives to include private sector participation, other regional power trade initiatives and their incorporation of private sector participation should be reviewed through case-studies.

The case studies should encompass both developing and “advanced” countries initiatives. Europe, United-States, Eastern Africa, South Africa and Central America models will be discussed.

The source of the data used is mostly qualitative, and relies on a number of reports and studies on power sector, infrastructure development, regulatory framework, found in specialized organizations websites such as the PPIAF, the ESMAP, the GMS, the ADB, the World Bank; in news articles and academic papers mostly originating from Science Direct and EBSCO. The ADB publications and all releases regarding the GMS have been studied too, to grasp the functioning of GMS and feed the discussion of institutions. Extensive use of search engine with key words related to each sub-parts of the research helped to compile a number of useful references.

2.4. Findings: Private sector participation building linkages but not a regional grid

The research sorts out the initial puzzle in three aspects: first, it argues that power infrastructures designed to enhance regional power connectivity and power exchanges

have a cross-border nature. Further on, and consequently, this research argues that, while the private sector participation limitation derives from usual “investment environment” constraints and reluctances from states and possibly civil society, in the GMS-4, the cross-border nature of power infrastructures is an additional source of complexity, and an obstacle to efficient and transparent private investment.

The cross-border nature of infrastructures justifies the need for the regulatory and institutional harmonization in the region, because regulatory decisions are affecting more than one country. In evaluating the existing institutional and regulatory framework, the research casted light on several limitations: first, previous institutions were almost exclusively designed to allow ad hoc PPA agreement. Second, recent developments are aligned with the need for technical and regulatory harmonization (with the creation of working groups), but prospects for an agreement on the power market structure are disputable. Also, regional transmission systems promoting private sector connection is missing.

The research also suggests that there is a contradiction between the gradual approach to electricity market integration of the GMS, and the expected private sector involvement. Market liberalization and harmonization seem to pre-conditions to the private sector’s sound and transparent involvement, and yet, they are seen as a far-ahead objective of the regional grid development.

Finally, the role of transmission system and transmission operator is emphasized in comparing GMS grid development, and SAPP and SIEPAC ones’. Backing the previous literature aforesaid mentioned, the research supports that transmission backbone may favor private sector investment, and notices that ADB 2013-2022 commitments rather

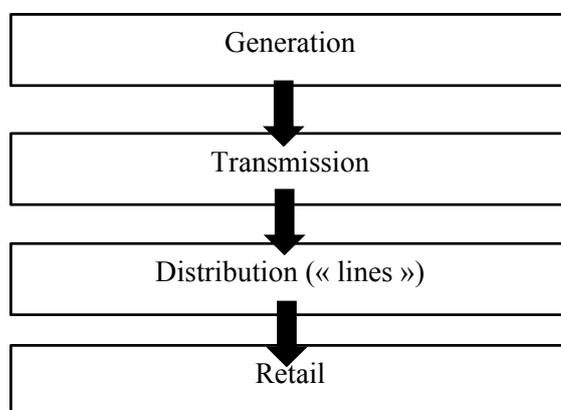
extend and stitch together transmission systems, instead of aiming toward a regional transmission.

3. Modalities of private participation in the GMS

3.1. Segments in the electricity industry

Our study should begin with an understanding of the segment of the electricity (or power) industry in which private sector can get involved as an ‘operational’ actor, and which would contribute to power trade development.

<Figure 2: Power sector vertical division>



Facilitating competition in the power sector requires disaggregating, to some extent, this vertical chain of actors²⁸. Traditionally, all these industry segments have been endorsed by a single state enterprise, as a single electricity monopoly. Disaggregating the vertical division in the power sector, in order to enable private investors to fit in, is a measure to liberalize market and is called *unbundling*. Different ‘sequencing’ between segments can be contemplated. This unbundling is conducted through electricity sector reforms, defining the new framework in which the state no longer holds complete control of one or

²⁸ Best Practices in Investment for Development, How to utilize FDI to improve infrastructure – electricity Lessons from Chile and New Zealand, Investment Advisory Series - Series B, number 1, United Nations Conference on Trade and Development, 2009. Accessible at: http://unctad.org/en/Docs/diaepcb20091_en.pdf

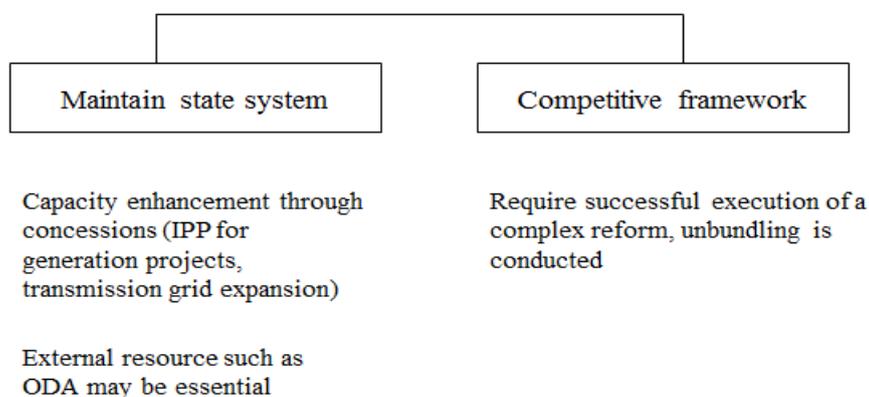
several segments, namely *privatization policies*. Those privatization policies would define to which extent the state enterprises are still involved in the different segments.

Hence, in each segment, actors can be categorized in State-Owned Enterprises (SOE), Local Investors and Foreign Direct Investors. Without unbundling, independent generation plants can develop, contracting with the state-owned enterprises.

3.2. Models for private sector participation

Two alternative approaches may be defined when a country seeks to expand its electricity industry, both including the ‘operational’ participation of the private sector²⁹. One alternative still relies on the state system, while the other is the (regulatory) implementation of a competitive framework (market driven, relying on private initiative).

<Figure 3: Two alternative approaches to expand the electricity industry³⁰>



²⁹ Best Practices in Investment for Development, How to utilize FDI to improve infrastructure – electricity Lessons from Chile and New Zealand, Investment Advisory Series - Series B, number 1, United Nations Conference on Trade and Development, 2009. p.3 . Accessible at: http://unctad.org/en/Docs/diaepcb20091_en.pdf

³⁰ Ibid. *Adapted by the author.*

Models of private sector participation in infrastructure projects are differentiated on the risk and responsibilities born by the private sector and the public sector, respectively. “Choosing” the right model, for a government, is thus equivalent to choosing the better allocation of risk and responsibilities. “Choosing the right model”, however, is very dependent on the nature of the government type. The more party control and state control nature of a regime, the less relevant may be the competitive framework for authorities. The mixture of both public and private involvement in infrastructure projects goes as Public Private Partnership. It is argued by major development organizations to be an important tool for governments to expand a country’s infrastructure³¹.

3.2.1. Privatization

Privatization refers to the transfer of ownership of the assets of an existing public work to the private sector. Privatization is the extreme case of private sector participation in infrastructure and it is applicable to an existing or a new project wholly owned by the private sector³². Since privatization reflects a harder political line and will, governments (especially in countries still in transition toward full market economy) would more easily go first for concession agreements, on assets or on operation.

3.2.2. Licensees

An Independent Power Plant or Independent Power Producer (IPP) is under *license contracts* with the state entity, which centralize electricity production to further dispatch it. In this situation the state entity is the sole buyer of electricity. Yet, it is possible that

³¹ Farquharson, E., Torres de Mästle, C., and Yescombe, E.R.; with Encinas, J., How to Engage with the Private Sector in Public-Private Partnerships in Emerging Markets, PPIAF / World Bank, 2011, p.145

³² Vives, A., Private Infrastructure: Ten Commandments for Sustainability

IPP be directly linked to big consumers (such as a coal mine, for instance), through transmission/distribution infrastructure that it has built and owns.

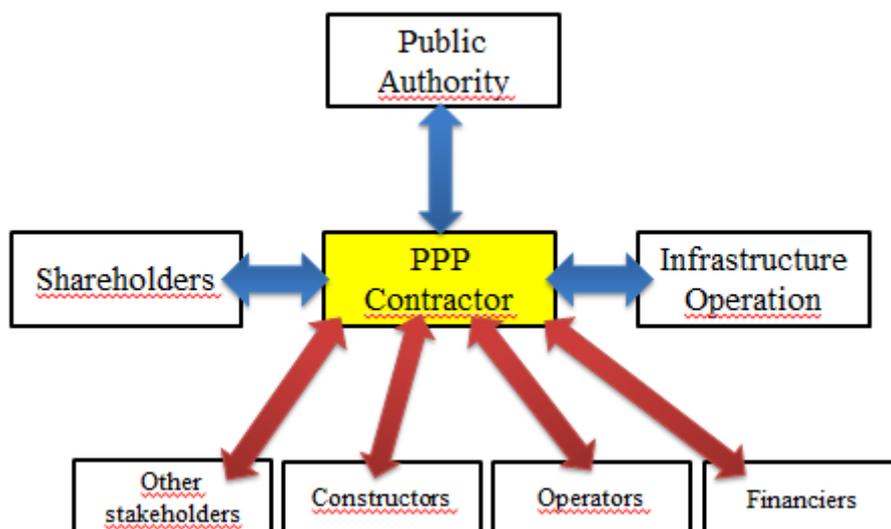
An IPP is an entity that owns or operates electricity generating facility, which isn't financed by the state. It is viewed as an option to facilitate investment in power generation where the public sector cannot afford it, and in which the state entity can exert control as the only buyer. The IPP accounts for the largest share in private activity in the electricity sector (77% of 2001-2005 activity, according to PPIAF). IPP can be state-owned companies that were privatized, as well as they can be developed through BOT, then involving private sector. When a wholly private organization, it is often found under contract with the state electric company, to which it sells its production at a contracted price.

3.2.3. Public Private Partnership (PPP)

PPP in the power sector has seldom been the subject of studies, except in country assessment based studies from the World Bank. Yet, it finds application for power sector infrastructure. PPP are a form of cooperation between the private sector and the public sector which translates in long-term contracts between public (state) entities and private entities, aiming at implementing and/or managing a public service (in the present study, electricity generation, distribution, retail). 'Public Private Partnership' is not a legal term, but a term-in-use. There is no broadly, "official" accepted definition of a PPP. Hence, each PPP project is unique. The extent to which the public entity intervenes in the project

varies, and so do the type of contract, the length of the contract, the financial modalities, how the risks are shared, among other things³³.

<Figure 4: Main actors of PPP contracts ³⁴>



The PPIAF identifies 7 types of PPP types³⁵ :

- 1) Service contract. Private company provides agreed service to the state entity.
- 2) Operation and maintenance contract (or Management contract). Similar to a Service contract, with additional outsourcing of the management and operation). This is the Independent Power Producer category.

³³ Conférence Européenne des Directeurs des Routes, Partenariats Public-Privé, redacted by Groupe de Projet Financement CEDR, main author : Robles, O. A., 2009

³⁴ Ibid, p.9, adapted by the author

³⁵ Toolkit for Public-Private Partnerships in Roads and Highways, PPIAF, March 2009, accessible at: <https://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/highwaystoolkit/6/pdf-version/5-36.pdf>
See also: Annamalai TR, Mahalingam A, Deep A (2012) Does private involvement (including public private partnerships) in delivery of water, telecommunication and electricity services lead to improved access and quality of service in developing countries? Protocol. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London. p.3

- 3) Build Transfer or Annuity type (Lease). The state entity is actually borrowing from the private entity, which finance and build the infrastructure before transferring it to the state entity for its operation.
- 4) Build Operate Transfer (BOT, concession). The government finances the entity and hence bears the equity risk, but the private entity operates it, until the end of the concession contract. During operation period, the developer earns the money to pay its lender (state entity) back and obtain a return³⁶.
- 5) Build Operate Transfer (BOOT, concession). The private company assumes all risk by financing, building, operating the infrastructure until the end of the concession contract. The key feature of BOOT is the private finance (through equity and debt) and imperative of return, as the private entity bears all the risk. This modality is very common for greenfield projects, though its structure may be very complex³⁷.
- 6) Rehabilitate Own Operate Transfer (same as 5, for rehabilitation)
- 7) Build Own Operate, Rehabilitate Own Operate (same as 5, but no transfer to the public entity planned)

What could be defined as an 8th step, is the privatization of an activity/previously state-owned company (more likely a divestiture, settled after an Initial Public Offer from a State Owned Enterprise), as defined in the i) section.

In electricity generation, the BOT and BOOT types are the most common project types for current implementation of power trade in the Mekong region. The PPA secures the payment stream for a BOT project or the contract with the Independent Power Producer.

³⁶ Exporting megawatts – Part III, 16 March 2014, Bangkok Post online, accessible at: <http://www.bangkokpost.com/print/400070/>>

³⁷ Toolkit for Public-Private Partnerships in Roads and Highways, PPIAF, March 2009, accessible at: <https://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/highwaystoolkit/6/pdf-version/5-36.pdf>

Moving toward more PPP is a first step toward the opening of the power sector to competition, by enabling private financing and operating to permeate the power sector.

The main objectives and benefits of a PPP, as given by the PPIAF, are as follow:

- To use private sector investment resources to finance infrastructure
- To create private sectors incentives (efficiency, timely completion...with the scope of a return on investment)
- To improve accountability of the public sector projects³⁸

Even though the participation of private sector may be hindered, there are sound motives for PPP from the government side. A PPP is expected to bring a number of benefits for the government signing into this type of contract. Notably: private sector incentive to use resources more efficiently (with the scope of a return on investment) (Osborne, 2000); the good allocation of risk required by a long-term contract; the scrutiny of both private and public parts and resulting more realistic debate on outcome to expect from the project endorsed³⁹.

The rationale for PPP is often described as having a triple dimension of sharing investment load, benefits, and sharing risk between the private entity and the government. The rationale for PPP entails the transfer of risks from the public entity to the private entity: the public entity can notably transfer construction risk, demand risk and service

³⁸ Developing a Public-Private Partnership Framework: Policies and PPP Units, PPIAF, Note 4, May 2004, p.1, accessible at: <http://www.ppiaf.org/sites/ppiaf.org/files/documents/Note-Four-Developing-a-PPP-Framework.pdf>

³⁹ Farquharson, E., Torres de Mästle, C., and Yescombe, E.R.; with Encinas, J., How to Engage with the Private Sector in Public-Private Partnerships in Emerging Markets, PPIAF / World Bank, 2011, p.4

availability to the private company⁴⁰. A PPP enable efficient risk allocation because there are risks that are typically better absorbed by the government, such as land acquisition risk; and risk that are better absorbed by private companies, such as construction, commercial and operating risk management⁴¹

A PPP can also take the form of a joint-venture⁴² between a public and a private company. This is a scheme that has developed recently for several hydroelectric plants and dams in the GMS. Ongoing projects include:

- Nam Lik 1 Hydroelectric Power Plant in Lao PDR, established by Thailand's state-operated investor PTT, hydroelectric power generation company HEC (Hydro Engineering Company), Laos's state-operated EDL (Electricite du Laos), and the constructor POSCO Engineering & Construction)⁴³

- The extension of the Theun-Hinboun Hydropower Project, joint venture with 60 percent of shares held by EDL, 20 percent by GMS Power and 20 percent by Statkraft.⁴⁴

Note that apart from PPP, other types of private participation exist⁴⁵, notably short-term lease, or *affermage*⁴⁶ contract. However, those are more likely to be encountered in

⁴⁰ PPP Basic and Principles of PPP Frameworks, PPIAF, Note 1, May 2012, p.2, accessible at: <http://www.ppiaf.org/sites/ppiaf.org/files/documents/Note-One-PPP-Basics-and-Principles-of-a-PPP-Framework.pdf>

⁴¹ Ibid, p. 5

⁴² A joint venture company has its own legal identity separate from those of its shareholders

⁴³ "POSCO E&C Begins Construction of Nam Lik1 Hydroelectric Power Plant in Laos", accessible at:

<http://finance.yahoo.com/news/posco-e-c-begins-construction-122700129.html>

⁴⁴ "Theun-Hinboun hydro expansion project powers up", accessible at:

http://www.vientianetimes.org.la/FreeContent/FreeContent_Theun_hinboun.htm

⁴⁵ Farquharson, E., Torres de Mästle, C., and Yescombe, E.R.; with Encinas, J., How to Engage with the Private Sector in Public-Private Partnerships in Emerging Markets, PPIAF / World Bank, 2011, p.9

⁴⁶ Ibid: "*affermage contracts, where the private sector enters into a long-term arrangement with the public authority to operate and maintain a facility and implement an investment program in the utility, although the public sector retains the responsibility for financing the investment*" p.10

sewerage or rural roads infrastructure projects, and won't be the object of our current study.

3.2.4. Local and foreign actors

The private companies engaged in public-private partnerships may actually be both local players and foreign private actors, whether in PPP and IPP schemes. The UNCTAD underlines in a 2009 report that the entrance of foreign investors in a market with active domestic companies can increase the prospects for more competition. Foreign private sector is mostly motivated by high return projects.

3.2.5. Analysis: Enhancing power trade with private sector participation?

Private participation ranges from mere service contract with the public entity to full privatization, either through divestiture, or through 'greenfield' projects. In between, partnerships between the public and the private sector translate into long-term contracts, with a variety of distribution of responsibilities. These options should be considered with the objective previously stated as a horizon: to build a regional grid in order to better allocate supply and meet the demand for energy, with reasonable tariffs and conditions. Regarding power trade, there are two main observations to draw.

First, power trade relies on improved generation capacity to increase energy supply. Through these various modes, capacity enhancement is possible, especially for generation projects perceived as most profitable and benefiting from the emerging de-bundling of the electricity generation industry.

Second, private sector participation also brings expertise and scale economies to power trade initiatives, hence efficiency gains. IPP are both an opportunity for small scale

producers, as well as for foreign expertise import (for instance, foreign electricity infrastructure champions' direct investment).

3.3. Current picture of private participation

With those characteristics in mind, the following sections will review current status of private participation in the power infrastructures in the GMS. Developing power generation capacity in the Mekong region has been the main driver of private sector participation so far, in the power trade framework, in hydropower development. As previously mentioned, state control is high especially in Vietnam and Lao PDR which communist regimes nonetheless progressively open sectors to private investment. In these countries, the picture of private participation is to be understood as part of a transition regime.

3.3.1. Thailand

3.3.1.1. Power Sector and cross-border network

A partially independent Energy Regulatory Commission watches over the power sector. However, there are three government owned companies which dominate the power market in Thailand since the 1970s. The state-owned company Electricity Generating Authority of Thailand (EGAT) is the main commercial actor in the electricity sector, with a monopoly in transmission system and a single-buyer status for any IPP (any Power Purchase Agreement should be signed with EGAT); and it regulates electricity prices. The two other state-owned companies that share the Thai supply market are the

Provincial Electricity Authority (PEA) and the Metropolitan Electricity Authority (MEA)⁴⁷.

The Ministry of Energy defines plans for the power system and industry development, and EGAT is a member of the planning subcommittee. The planning includes generation capacity and imports from neighboring countries, as well as the transmission system expansion.

As stated, EGAT is the sole electricity transmission provider⁴⁸. There are currently ten cross-border transmission lines between Thailand and Lao PDR⁴⁹. No transmission linkages exist yet between Thailand and Myanmar, or Thailand and Cambodia, the two other GMS neighbors.

3.3.1.2. Private participation

Given the power sector structure, the participation of the private sector in Thai power sector is limited to the generation segment, with several IPP plants and Small Producer Plants (SPP) which have contracted PPA with the EGAT, following EGAT bid solicitations⁵⁰. Some SPP, yet, can sell electricity directly to (large enough) end-users, such as neighboring plants⁵¹. The rest of the power sector is under state control.

⁴⁷ Woo, P. Y., Independent Power Producers in Thailand, Program on Energy and Sustainable Development At the Center for Environmental Science and Policy, Stanford University, Working Paper # 51, Aug. 2005. P.4

⁴⁸ U.S. Energy Information Administration, Country analysis, Thailand, updated February 20, 2013, accessible at: <http://www.eia.gov/countries/cab.cfm?fips=th>

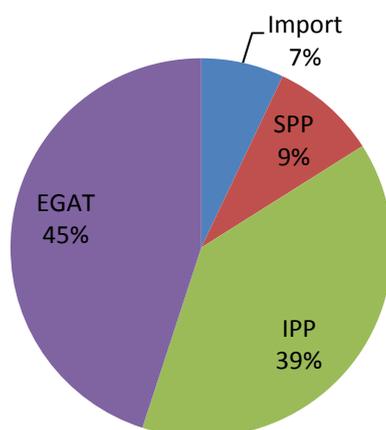
⁴⁹ See EDL official map, accessible at: http://www.edl.com.la/uploads/images/Featured_Images/2013/Existing-2013-Map.png

⁵⁰ Electricity Generating Authority of Thailand, Power purchase presentation, online resource, accessible at: http://www.egat.co.th/en/index.php?option=com_content&view=article&id=26&Itemid=133

⁵¹ Woo, P. Y., Independent Power Producers in Thailand, Program on Energy and Sustainable Development At the Center for Environmental Science and Policy, Stanford University, Working Paper # 51, Aug. 2005. P.4

IPP were initiated as of 1994, with a first round of bids from the EGAT. Those projects were usually mix-funded by domestic companies, the ADB and the Japan Bank for International Cooperation⁵². A new round of bids was initiated in 2007. In 2013, the EGAT had contracted PPA with seven IPP. Yet, the latest power system plan adopted includes no new IPP projects from 2020 to 2030, while the volume provided by EGAT-owned power plants is expected to boom⁵³. Also, EGAT has 25% of ownership of the EGCO, a mixed company which develop power plants within and outside of Thailand.

<Figure 5: Annual Power generation in Thailand, June 2013>



*SPP: Small Producer plant

Source: EGCO Group, Corporate presentation, 2013 p.8, available at:
 <<http://egco.listedcompany.com/misc/PRESN/20120828-EGCO-roadshowThailandFocus2013-01.pdf>>

⁵²Assessment of the Greater Mekong Subregion Energy Sector Development – Progress, Prospects and Regional investment priorities, 2013 Asian Development Bank, p.9

⁵³ Ibid, p.17 (Table 8)

3.3.2. Vietnam

3.3.2.1. Power Sector and cross-borders network

Though under communist rule, the power sector in Vietnam is at an advanced stage of unbundling compared to its neighbors, as part of the *Doi Moi* (renovation of the economy). The Ministry of Industry has enforced a road map for the electricity market in three phases, aimed at implementing a fully competitive electricity market in 2025⁵⁴. To achieve this, Vietnam is currently undergoing a power sector reform which aims at creating competition and supporting private participation, thus moving away from the model of a vertically integrated state-owned company Electricity of Vietnam (EDV). The first phase (2014-2015) targets a competitive market for the generation of electricity. The second phase (2014-2022) targets a competitive market for the wholesale sale of electricity. The third phase (2022 onwards) targets a competitive retail market.⁵⁵ In 2005, a regulatory body, the Electricity Regulatory Authority of Vietnam (ERAV) was established to carry the power system planning and supervise tariff regulation, key to the participation of independent power producers and of equitization⁵⁶ of EVN facilities⁵⁷. EVN was transformed into a holding company in 2006, and in 2008, a separate entity was created for the transmission activity, the National Power Transmission Corporation (debundling between generation and transmission segments). In 2008, EVN had already

⁵⁴ Rutherford, J., Lazarus, K., Kelley, S., Rethinking Investments in Natural Resources: China's Emerging Role in the Mekong Region, WWF & IISD, 2008 – p.87

⁵⁵ The price of Electricity in Vietnam, AsianPower article, September 30, 2012. Accessible at: <http://asian-power.com/power-utility/commentary/price-electricity-in-vietnam>

⁵⁶ Equitization refers to a partial privatization: the company is divided in shares, part of which are placed into publicly traded stock

⁵⁷ Rutherford, J., Lazarus, K., Kelley, S., Rethinking Investments in Natural Resources: China's Emerging Role in the Mekong Region, WWF & IISD, 2008 – p.87

completed the equitization of several power plants, and of a distribution company⁵⁸. To day, the power sector displays a competitive generation market⁵⁹, and unbundling has been initiated in the distribution segment, with some low voltage independent networks already owned by independent companies in rural areas (however, general transmission is still owned by EVN at 100%). Vietnam is one of the few countries in Southeast Asia to have established a regulatory body in the course of its restructuring. The main regulatory body, ERAV, is expected to “stir-up private investments”⁶⁰. As Vietnam still displays the highest growth rate in electricity demand in Southeast Asia, promoting private sector participation is part of the government strategy to increase the power sector capacity⁶¹. Yet, ERAV still control electricity pricing, with ceiled prices, hence those prices maintained at low levels which do not reflect existing demand and may deter foreign investors.

Vietnam is trading power with Cambodia and China via 220 kV lines (2 lines with China, opened in 2006 and 2011, one line with Cambodia opened in 2011)⁶². Vietnam exports power to Lao PDR at low voltage too (5 lines), as well as to Cambodia.

The control and ownership of the transmission grid is restricted to Electricite du Vietnam (EDV); the state monopoly is maintained even after liberalization reform. Only state-

⁵⁸ Ibid.

⁵⁹ Assessment of the Greater Mekong Subregion Energy Sector Development – Progress, Prospects and Regional investment priorities, 2013 Asian Development Bank, p.11

⁶⁰ Satheesh, A., Thacker, H., Why it's high time to invest in Vietnam's power transmission, distribution network – 30 Jan. 2014. Accessible at: <http://asian-power.com/power-utility/commentary/why-its-high-time-invest-in-vietnams-power-transmission-distribution-network>

⁶¹ World Bank note, Attracting Private Capital to Help Meet Vietnam’s Energy Needs, accessible at: http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21321729~menuPK:141310~pagePK:34370~piPK:34424~theSitePK:4607_00.html

⁶² VIETNAM POWER INDUSTRY, VP Bank Securities Review, December, 2013 – p.47

owned companies under EVN are licensed to provide transmission services (and hence infrastructure capacity building)⁶³.

3.3.2.2. Private participation

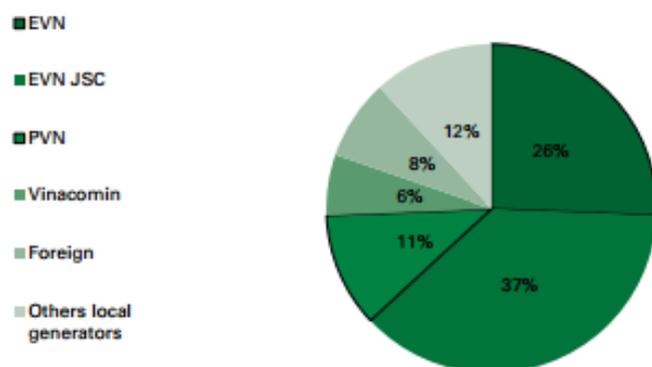
Private participation in Vietnam power sector was initiated in 2002 with a few Build-Operate-Transfer projects. Despite apparent “friendly” reform of the investment environment, foreign private activity in the power sector in Vietnam is still limited. Phu My 2.2 (EDF, Sumitomo, TEPCO involved) and Phu My 3 (BP, Sembcorp, Kyushu Electric involved) were the only BOT projects until 2011, when Mong Duong coal fire plant was developed conjointly by AES Corporation and POSCO Power Corp. as main investors. Initiatives are pursuing: during the summer of 2014, foreigners ACWA Power and Taekwang Power Holdings Company Limited agreed to jointly develop a coal-fired plant⁶⁴. Foreign investors can access Vietnamese power market in three ways: a 100% foreign owned company under a BOT; a joint-venture with a Vietnamese entity under a BOT; purchase share of an EVN entity or an IPP. Though foreign investors have demonstrated much interest, several obstacles have impeded the private sector participation through further BOT, obstacles which will be reviewed in the section 4. Still, in 2010, non-state-owned producers accounted for 32% of power generation in Vietnam, and IPPs account for 36% of power generation in 2013⁶⁵. Some of these IPP are actually owned by Petrovietnam and Vinacomin, two other major state-owned energy companies. Consequently, it is difficult to argue that IPP are consistently equivalent to private participation development.

⁶³ Electricity Regulation Report 2012, Law Business Research Ltd Publishing, 2012, accessible at <http://www.eurochamvn.org/Downloads/Electricity%20Regulation-%20Vietnam%20-2012.pdf>

⁶⁴ Modern power Systems Newsletter, ACWA Power aims for Vietnam IPP, June 25, 2014, accessible at: <http://www.modernpowersystems.com/news/newsacwa-power-aims-for-vietnam-ipp-4303254>

⁶⁵ VIETNAM POWER INDUSTRY, VP Bank Securities Review, December, 2013 – p.7

<Figure 6: Vietnam’s installed capacity breakdown, 2013>



Source: VPBS, Vietnam power Industry report, December 2013

3.3.3. Cambodia

3.3.3.1. Power Sector and cross-borders network

The Electric Authority of Cambodia (EAC), a legal public entity, acts as a regulator, under the Electricity Law, voted in 2000⁶⁶. It regulates the electricity market, gives approval on practiced tariffs, issues and allocates licenses for all generation, transmission, distribution and retail activity, following a master plan targeting the development of both generation and transmission capacity. Consolidated licensees enable both generation and distribution to consumers through the private actor own distribution system. Among the key components of the Law is the establishment of “favorable conditions for competition,

⁶⁶ Assessment of the Greater Mekong Subregion Energy Sector Development – Progress, Prospects and Regional investment priorities, 2013 Asian Development Bank, p.1

private investment, private ownership and commercial operation”⁶⁷. Hence, the power sector in Cambodia is, *at least according to the law*, fragmented (unbundled)⁶⁸. There are two types of licensees of Electricité du Cambodge (EDC), the state-owned company; the IPPs, and Rural Electricity Enterprises. Electricity rates are reported to vary depending on the generation source, and hydropower based generation fluctuates less compared to the prevalent fuel-generated electricity rate⁶⁹.

The priority remains on the development and strengthening of the national grid, as it is particularly underdeveloped in Cambodia. Major transmission lines connecting Phnom Penh to other provinces have to be completed⁷⁰. Consequently, Cambodia’s government has made official its call for private investors to develop the national grid, through special purpose transmission licenses emission ⁷¹. The Electricity Authority of Cambodia allocates licenses to a number of power plant operators. Also, EDC differentiates the national grid from four other grids, consisting of cross-border interconnections.

Thus, Cambodia already imports electricity with seven 22 kV line connections from Thailand, Vietnam (“largest” supplier, with 14 connections, adding to one 230 kV cross-border connection) and Lao PDR (one connection only). There exists also one 230 kV

⁶⁷ Poch, K. and S. Tuy (2012), ‘Cambodia’s Electricity Sector in the Context of Regional Electricity Market Integration’ in Wu, Y., X. Shi, and F. Kimura (eds.), Energy Market Integration in East Asia: Theories, Electricity Sector and Subsidies, ERIA Research Project Report 2011-17, Jakarta: ERIA, p.153

⁶⁸ Assessment of the Greater Mekong Subregion Energy Sector Development – Progress, Prospects and Regional investment priorities, 2013 Asian Development Bank, p.6

⁶⁹ Poch, K. and S. Tuy (2012), ‘Cambodia’s Electricity Sector in the Context of Regional Electricity Market Integration’ in Wu, Y., X. Shi, and F. Kimura (eds.), Energy Market Integration in East Asia: Theories, Electricity Sector and Subsidies, ERIA Research Project Report 2011-17, p.148

⁷⁰ Cambodia Outlook Brief, based on 2010 Cambodia Outlook Conference: A Partnership of CDRI and ANZ Royal Bank, 2010. Accessible at: <http://www.cdri.org.kh/webdata/policybrief/ocbrief10/ocb4e10.pdf>

⁷¹ “Private Investment Needed for National Power”, Grid Khmer Times, June 12, 2014. Accessible at: <http://www.khmertimeskh.com/news/2043/private-investment-needed-for-national-power-grid/>
Special Purpose Transmission License: right to construct, own and/or operate the specifically fixed identified transmission facilities in Cambodia that have the specified purpose and ensure the public interest. Article 33 of the Electricity Law.

line between Vietnam and Cambodia for Cambodian imports. EDC has signed a PPA with Vietnam power No.2 Company for imports from Vietnam, while imports from Thailand are to be developed through private companies' activity, since they have received the right from Ministry of Industry, Mines and Energy of Cambodia to purchase electricity from Provincial Electricity Authority of Thailand for Cambodia-Thai borders areas⁷².

3.3.3.2. Private participation

IPP are important actors in Cambodia, though the power sector is still underdeveloped. The EAC estimates that 90% of electricity in Phnom Penh is supplied by IPPs⁷³. Sources of private finance (commercial banks) and a major BOT project emerged to develop the transmission network in Cambodia⁷⁴, as building high-voltage transmission was the priority over the last years. Yet, BOT in transmission are rare. This 30-year BOT was also partially funded by the ADB private sector operations⁷⁵. BOT mainly regards large hydropower projects, main private finance originating from Chinese companies with funding from the PRC (China Electric Power Technology Import and Export Corporation, Sinohydro, China Electric Power Technology Import and Export Corporation⁷⁶)⁷⁷. Private participation in power generation and grid network is yet expected to grow through further BOT, with foreign bank financing (AusAID, World Bank, KfW, and China EXIM

⁷² Electricity Authority of Cambodia, Report on Power Sector of The Kingdom of Cambodia, 2014 Edition. Accessible at: <http://eac.gov.kh/wp-content/uploads/2014/08/report-2013en.pdf>

⁷³ Poch, K. and S. Tuy (2012), Ibid.

⁷⁴ Ibid, p.11

⁷⁵ Ibid, p.40

⁷⁶ Assessment of the Greater Mekong Subregion Energy Sector Development – Progress, Prospects and Regional investment priorities, 2013 Asian Development Bank, p.39/40

⁷⁷ Note here that such projects are designated as PPP, though they are conducted with state-owned Chinese companies. Indeed, these companies behave on foreign markets as private entities. The definition of PPP is challenged by Chinese SOEs.

Bank)⁷⁸. Private participation in EDC itself, however, is yet to be developed, as it could be an opportunity too to better meet electricity demand, for “potential lease operator, concessionaire, owner”⁷⁹. This could even allow private participation in the distribution network segment along with generation capacity; indeed the private sector participation in Cambodia is, for now, only existing in the generation segment, along with a few isolated transmission initiatives (BOT schemes).

3.3.4. Lao

3.3.4.1. Power Sector, reform and cross-borders network

The Ministry of Energy and Mines and the Prime Minister are responsible for the power market regulation. There is no independent regulator. The power sector is partially unbundled in generation⁸⁰, but the state-owned Electricité du Laos (EDL) owns and operates most of the generation, transmission and distribution in the country. Biggest actors besides EDL are Ratchaburi Electricity Generating Public Company, and EDL-Gen, 75% owned by EDL, 9% by Ratchaburi Electricity Generating Public Company. To date, EDL controls all exports, emanating from its stations. EDL also fixes electricity tariffs, yet “Electricity tariff is not used for projects that signed PPA importing indirectly”⁸¹, meaning that PPA prices are fixed case by case.

Designed for electrification of remote areas in Lao PDR (Lao PDR imports), there are currently: five low voltage (35 kV and 22 kV) cross-border transmission lines between

⁷⁸ Cambodia Outlook Brief, based on 2010 Cambodia Outlook Conference: A Partnership of CDRI and ANZ Royal Bank, 2010. Accessible at: <http://www.cdri.org.kh/webdata/policybrief/ocbrief10/ocb4e10.pdf>

⁷⁹ Private Solutions for Infrastructure in Cambodia - A Country Framework Report, PPIAF, The World Bank, 2002, p.23

⁸⁰ Assessment of the Greater Mekong Subregion Energy Sector Development – Progress, Prospects and Regional investment priorities, 2013 Asian Development Bank, p.7

⁸¹ EDL Electricity tariff as updated 3/2012 to 12/2017. Accessible at: http://www.edl.com.la/en/page.php?post_id=6

Lao and Vietnam; five low voltage (35 kV and 22 kV) cross-border transmission lines between Lao and Myanmar; and three low voltage (35 kV and 22 kV) cross-border transmission lines between China and Vietnam

A 230 kV line also exists between Xekaman 3 IPP and Thanh Muy substation in Vietnam. In the south, one low voltage line connects Ban hat substation to Cambodia. There are ten cross-border transmission lines with Thailand, exporting power to the Thai neighbor.⁸²

3.3.4.2. Private participation

Decentralized and off-grid power production has developed private participation in the power sector in rural areas⁸³. IPP projects have also boomed, in response to market opening, and motivated by the prospects of power sale to neighboring markets of Thailand and Vietnam. The boom of private sector participation is in the figures: in 2009, out of 10 power plants in operation, 2 were IPP. However, the 7 projects in construction in 2009 were all IPP, as were the projects in preparation for Thai (10 projects) and Vietnamese grid (7 projects).⁸⁴

The Nam Theun 2 hydropower plant mega-project is also a case study of complex financing scheme, with private finance originating from various foreign and domestic public holdings (world's largest private sector hydroelectric project financing). It is indeed the construction of hydropower plants that drives the more private finance in Lao PDR. Private finance from Vietnam, notably, is emerging in Lao PDR, as the resources of

⁸² See EDL official map: http://www.edl.com.la/uploads/images/Featured_Images/2013/Existing-2013-Map.png

⁸³ Assessment of the Greater Mekong Subregion Energy Sector Development – Progress, Prospects and Regional investment priorities, 2013 Asian Development Bank, p.40

⁸⁴ Presentation by Phomsoupha X., Director General of the Department of Energy Promotion and Development, Ministry of Energy and Mines of Cambodia
<http://cambodia.usembassy.gov/media2/pdf/energy_requirement_and_sector_development_in_lao.pdf>

Lao attract Vietnamese hydro-developers such as Song Da Corporation. A Viet–Lao Power Investment and Development Joint Stock Company (VLPC) was created in 2003, set up to invest in the construction of Xekanman3 Hydro-Power Project in Se Kong Province.⁸⁵ VLPC got further involved in two other large hydropower projects. On new finance modes emerging in generation projects in Lao (which is to say, hydropower projects), the Bangkok post was interestingly qualifying Lao as a laboratory for financial experimentations: “*the Lao hydropower sector has become a cross-border power trade and project finance laboratory, rich in sophisticated and innovative documentation and financing models*”⁸⁶.

Despite some success in developing PPP in Lao, it is important to note that these have developed out of a common legal framework for PPP, which, to date, do not exist (however, an initiative was taken in October 2014 to develop PPP decree and guidelines, see section 4). In total, 54% of power was generated by private generators in 2009⁸⁷.

⁸⁵ Vietnam Trade Promotion Agency news, *Viet - Lao Power Joint Stock Company*, retrieved from http://www.vietrade.gov.vn/en/index.php?option=com_content&view=article&id=936:viet-lao-power-joint-stock-company&catid=222:hanoi-city

⁸⁶ Exporting megawatts – Part III, 16 March 2014, Bangkok Post online
<<http://www.bangkokpost.com/print/400070/>>

⁸⁷ Presentation by Phomsoupha X., Director General of the Department of Energy Promotion and Development, Ministry of Energy and Mines of Cambodia, retrieved from:
http://cambodia.usembassy.gov/media2/pdf/energy_requirement_and_sector_development_in_lao.pdf

3.3.5. Analysis: Fit of the current picture with power trade development

<Table 5: Summary of private participation per sector>

	Large Scale Generation	Small-Scale generation	Transmission	Distribution
Thailand	Several IPP operating	Many SPP within normative agreements with EGAT	/	A few initiatives in rural electrification context
Vietnam	Few initiatives despite friendly political environment	Scarce	/	Initiatives in rural electrification context
Cambodia	IPP in long-term PPA, a few major BOT plants	Local private sector providers	A few innovative BOT-financed transmission lines	Initiatives both in town and rural electrification
Lao PDR	Several IPP mainly for export	Local private sector providers	/	Off-grid delivery models (associated with local private providers)

Source: Adapted from ADB⁸⁸

To what extent are private investors absorbing part of the necessary expansion and modernization investments in electricity generation and distribution networks?

- Reform towards competitive markets: assessment

The state ownership is strong in the region, despite the acknowledged cost of power infrastructures development. For the private sector to operate in national markets, a

⁸⁸ Assessment of the Greater Mekong Subregion energy sector development progress, prospects, and regional investment priorities, ADB Report, 2013 – p.45

license has to be obtained from the state entity, and tariffs are regulated. However, partial unbundling of the generation segment has been undertaken throughout the region, as states have difficulty to meet the level of investment required to develop generation capacity. In all countries, the state defines rules under which power production can be performed. Except for Cambodia, there is no participation of the private sector in the transmission segment, and even in Cambodia this situation isn't synonymous to a competitive transmission segment.

- Private sector in power generation

The interest for IPP and entrepreneurial initiatives of the GMS mentioned by Ward (2012) is verified. Though still limited in the total power sector activity, private sector participation is mainly represented in generation projects through IPP and very small projects in rural areas. These IPP are mainly local actors; they represent an opportunity for local entrepreneurship. However, the scheme is mostly a unique-buyer one (state company), within long-term contract.

PPP have been developed also for the major power generation developments of the past years, requiring significant investment. PPP projects have drawn foreign investment and expertise to the Greater Mekong Subregion. The future success and ruling of these projects is the best hope for further PPP in other sectors (transmission and distribution).

These projects lack a harmonized framework for administration, and most have been developed according to an *ad hoc* administration.

So what are, actually, the motivations of the private sector in developing the power generation capacity in the Mekong region? We can recall the three major motivations of

private investors for participating in hydropower generation projects identified by Merme (2014)⁸⁹.

- Returns on hydropower projects may be high, especially when local governments draw attractive investment conditions by alleviating taxes, for example, and maximizing protection.
- Risks for the private company are limited in PPP scheme. Meanwhile, private investors funding require less obligations than the public one, resulting in a win-win situation.
- Innovative financial processes and montages are attractive.

Yet, such incentives deserve to be further analyzed, as will be done in the next section.

- Transmission: “PPA locked”

So far, transmission lines almost only serve border areas, and except some high voltage lines linking Vietnam with its neighbors, those lines are very low voltage lines. The transmission lines are either linked to a specific generation plant or to a specific substation nearby the border. This means that such lines cannot serve regional grid purpose. According to SIDA, many of the cross-border linkages are “locked into” long-term PPAs. Even though cross-border lines so far may have enhance local power plants or contribute to the implementation of some very large scale project (Nam Theun dam is the main example), much remains to be done to connect countries. Recalling Woolf (2003) emphasizing that transmission segment should serve as price signals for the private sector, there is doubt this function is ensured by transmission lines so far.

⁸⁹ Merme, V., Ahlers, R., Gupta, J., Private equity, public affair: Hydropower financing in the Mekong Basin, *Global Environment Change* 24, 20-29, 2014. p.26

This pillar of power trade implementation, hence, is clearly underdeveloped twenty years after the launch of the initiative. Only Cambodia has launched licenses for transmission infrastructure, but in order to appeal to investors, these lines need to be backed by both concomitant generation projects as well as agreement with government-owned infrastructure from the neighbor country (in the case of cross-border electric current import).

4. Issues and obstacles in linking private participation and GMS Power Trade

The purpose of this section is to assess the private sector capacity to contribute to power trade development objective, hence to assess how the private sector participation can adequately *connect* countries and more efficiently *operate imports and exports of power*, and develop appropriate infrastructure; or, reversely, to identify elements hampering private sector role to answer connectivity and cross-border trade objectives. This section aims to deliver an understanding of the *compatibility* between power trade expansion and the modalities of private sector participation in power sector infrastructure, given current power market and industry specificities. It seeks to assess the relevance of the organizational framework prevailing and promoted by governments, which Banks (2006) identified as crucial for private actors participation in the power sector (2006).

Cross-border infrastructures are defined, according to the PPIAF definition, as “*any cooperation initiative between two or more countries to strengthen physical connectivity. Typically, cross-border projects need to bring additional benefits that are not achievable through two different sets of national infrastructure projects*”⁹⁰. This terminology is usually used in transport projects (roads construction). But, fundamentally, it refers to a dimension of connectivity.

Power infrastructures, designed to benefit power trade and regional power pooling, encompasses both generation of power for exports, and actual physical links. Two sets of infrastructure developed independently would either not reach expected outcome (trading

⁹⁰ Cross-Border Infrastructure Tool Kit, Program description, PPIAF & ADB, 2007. Accessible at: <https://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/Cross-Border-Infrastructure-Toolkit/Cross-Border%20Compilation%20ver%2029%20Jan%2007/cross-border%20booklet%2029%20jan%2007.pdf>

efficiently), or would generate additional costs when connected. Indeed, political, economic and financial, and institutional dimensions are interacting. Hence, it can be argued that **power infrastructures, within the development of a regional grid program, are cross-border infrastructures, and consequently cross-border investments.** The views of ADBI confirm this analysis:

“a ‘cross-border’ infrastructure project is defined to be either an infrastructure project with activities spanning two or more countries, or a national infrastructure project that has significant cross-border impact. Examples of national projects with significant cross-border impacts include transport infrastructure (land, sea, and air) projects that create international traffic, power projects involving sales of electricity to neighbor countries, and cross-border telecommunications networks.”⁹¹

Three questions will drive this section, reflecting the impact of this “cross-border” feature on private sector participation.

- What is needed to spur more appropriate power infrastructure investments?

Cross-border investments were tackled directly asked by Lakshmi Venkatachalam, ADB Vice President, in May 2011, during an institutional investors’ roundtable⁹². In the course of this study, I redirect the question to ask: what is needed to spur more private investment in cross-border power-infrastructures? This question seeks to assess macro and micro-environmental factors influencing private sector participation. It should

⁹¹ Fujimura, Manabu, and Adhikari, Ramesh, *Critical Evaluation of Cross-Border Infrastructure Projects in Asia*, ADBI Working Paper Series No. 226, July 2010, accessible at:

http://www.adbi.org/files/2010.07.06_wp226.evaluation.crossborder.infrastructure.projects.asia.pdf

⁹² Institutional Investors Roundtable on The Role of the Private Sector in Promoting Regional Integration: Trade and Cross-Border Infrastructure. Speech accessible at: <http://www.adb.org/news/speeches/role-private-sector-promoting-regional-integration-trade-and-cross-border-infrastructu>

directly tackle the nature of GMS-4 government and the “socialist market economy” of Vietnam and Lao PDR, notably.

- To what extent elements needed to spur more private cross-border infrastructure investments can be replicated and regionalized?

This questions the reliable framework for *interconnections* and hence regionalism, and will look into institutional harmonization as a necessity to settle a more private sector friendly environment. I seek to question current institutionalization of power trade regarding the relevance for private sector participation.

- Is what is needed to spur more cross-border infrastructure investments also favorable to development objectives of the region? Or is there a contradiction?

This third level of analysis relates to the region’s development objective of programs supported by the ADB. If private participation and upgraded life standards for the population might be contradictory, this would consist in a limitation for private participation.

The research conducted in order to solve these three sets of questions went through the review of a number of reports on investment environment and infrastructure project investment, in order to draw a comprehensive picture of private sector criteria for investment, and elements of additional complexity when considering cross-border infrastructure such as power interconnections. Two analysis frameworks developed by the Inter-American Development Bank for private investment in infrastructure will be used as a canvas for the present analysis.

4.1. What is needed to spur more cross-border infrastructure investments?

I postulate here that linking private sector participation and power trade requires focusing on projects which are designed to generate power trade possibilities. Indeed, the consideration of private sector participation in power sector in general, would lead us to consider the case of the very small producers and rural electrification actors who, whilst essential to rural development, do not contribute to the building of power-interconnected countries. Also, any projects designed to cater to domestic needs alone (extension of the national high voltage grid to previously excluded areas) does not fall into the GMS scope of regional development. With this clarification made, the starting point of our analysis should stem from the conclusion reached in section 3.

- Generation projects have recently developed within the GMS-4 through IPP and PPP schemes, both involving private sector participation, and counting for relatively high percentage of total power production. Most of these plants, however, function on the basis of an *ad hoc* administration, creating an opaque situation for new (foreign) investors to draw lessons from competitors already implemented.
- Meanwhile, though essential to the connection of GMS-4 countries, transmission and distribution infrastructures have not been de-bundled. Private sector participation thus doesn't encompass commercial operation in transmission and distribution. Private sector participation in cross-border infrastructure, as regulated by power market laws in the GMS-4, can only happen through special vehicles, licensing, service contract or study

contract, such as those delivered by AECOM company, world leader of integrated infrastructure and support services firm, in Lao PDR and Thailand⁹³.

- However, private participation in domestic-based generation projects is surging, with new complex patterns of project finance. This situation is specific to Lao PDR.

The previous statements have three implications. First, bundling is symptomatic of the current reluctance to move toward more private engagement in the power sector, and a prime obstacle to private sector participation expansion outside of the scope of PPP. Second, the take-off of private sector in generation projects designed to export power relies on investment environment within the country of development, but also within the importing country which conditions also impact future commercial contracts. Third, the compatibility of private sector participation with the development of power trade questions the relevance of regulatory frameworks, which entails the necessity for harmonization.

4.1.1. State hold and market structure

As noted in section 3, so far power sector in the GMS-4 is still largely bundled and working within single buyer / single transmitter scheme, operated by state owned companies. Main obstacles to private sector participation in power trade initiatives are quickly identified as the prevalence of “licensee” system (delivered by the state entity) to enter the market, and the need for further unbundling.

- Necessity for further unbundling

⁹³ See AECOM report, p.7, accessible at:
<http://www.aecom.com/deployedfiles/Internet/Capabilities/Energy/Transmission%20and%20Distribution/Transmission%20and%20Distribution%20Global%20Brochure.pdf>

Unbundling is arguably a necessity for opening up energy markets to private investment. The unbundling of generation, wholesale, transmission and distribution, as it is “the gateway to establishing competitive markets in generation and distribution”, and to set a clear commercial separation of generation, transmission and distribution functions (by competitive market, one implies the price fixing on a market supply and demand base, and the theoretical free entrance on the market for any power business). It is still a work in progress⁹⁴, settled as an official objective in Vietnam, notably, but reluctantly initiated in Lao PDR, as the state centralization and control is central to the Lao PDR political system. In the GMS-4, currently, as seen in section 3, wholesale⁹⁵, transmission lines and power stations are often controlled by one state-owned company. This makes it hard for businesses to get a foothold and for cross-border networks to develop. Cross-ownership of the state between generation and distribution/retail creates barriers to entry in the power market.

To give an illustration of the benefits of unbundling, it is worth mentioning the Asian financial crisis which had a huge impact on the power sector, as the crisis made the demand for electricity fall below planned levels. Since the market was vertically integrated and controlled by state-owned enterprise, there was no market adjustment to the situation, and IPP were underutilized by the government central administration and purchase of power. Yet, governments asked the IPPs to share the burden of depressed demand through the reduction of contractually agreed fees. This advocates for the necessity of a multi-buyer market scheme.

⁹⁴ Ibid, p.16

⁹⁵ Bundling in wholesale means that only one firm can supply electricity to distributors, hence that even private power producers must first sale to this centralizing single company.

What is more, separation between the network operation and power trading functions is necessary to enable free market prices to be fixed. The first and major issue in the region remains the reform of the power market structure, in order to create more opportunities for private investment⁹⁶, which is directly linked to the overall reform toward market economy (Vietnam, Lao PDR) and rule of the Electricity Law (Cambodia).

Interestingly, the reform of the market structure in the GMS-4 has known some ups and downs in Thailand as well, as some attempts have already been initiated. Thailand's case is an illustration of difficulty to reform. While a resolution in 1996 had initiated unbundling scheme and the privatization⁹⁷ of EGAT (divided in business units, and entering the stock market⁹⁸), the long reform process was finally halted in 2006, revoking the corporatization and reaffirming the state-enterprise status⁹⁹. Indeed, the “privatization-like” policy has been strongly opposed, from both civil society and labor unions¹⁰⁰. Thailand is a pivotal country for the reform of the electricity sector, as the largest importer of electricity within MOU signed with Lao (and Myanmar). Yet, Thailand presents an unusual situation as it has “failed” to reform the power sector, despite several attempts. In the nineties, the labor union of EGAT opposed the implementation of reforms aimed at decreasing investment cost of state enterprises. The Electricity Sector

⁹⁶ Fernando Manibog, Rafael Dominguez, Stephan Wegner: Power for development : a review of the World Bank Group's experience with private participation in the electricity sector, World Bank, Operations Evaluation Dpt, 2003, p.18

⁹⁷ *Corporatization: transformation of a public sector service provider into private company with commercial orientation*

⁹⁸ Sukkumnoed et al., *Governing the Power Sector: An Assessment of Electricity Governance in Thailand*, World Resources Institute, accessible at: http://electricitygovernance.wri.org/files/egi/egi_thailand_report_0.pdf p.6

⁹⁹ *Assessment of the Greater Mekong Subregion Energy Sector Development – Progress, Prospects and Regional investment priorities*, 2013 Asian Development Bank, p.9

¹⁰⁰ Sukkumnoed et al., *Governing the Power Sector: An Assessment of Electricity Governance in Thailand*, World Resources Institute, accessible at: http://electricitygovernance.wri.org/files/egi/egi_thailand_report_0.pdf

Restructuring Plan was released in 2003, but recommendations such as the creation of a Power Pool and the division of the EGAT in separate entities were not implemented. Currently, reforms have been put on a hold, and there has been no further privatization contrary to Minister Thaksin's intentions¹⁰¹.

- Commercially viable tariffs, cost-reflective pricing & payment enforcement

Associated with the need to unbundle the power sector, is the need for cost-reflective tariffs. With government fixation of the end-customer tariff, usually not covering the cost, there is a challenge for the private sector in being profitable. Power industry, notably in Vietnam, is significantly subsidized, maintaining prices at an artificially low level.

What has been the official line pursued by the GMS-4, regarding subsidized tariffs? In Lao, the state is already engaged in a subsidy policy which boasts of tremendous results, as the country shifted from a 15% of population with access to electricity in 1995 to 71% in 2010¹⁰². Additional cost to cover may endanger the electrification growth rate. While the situation is much different in more developed Thailand, the amount of subsidies to electricity let us assume that price increase would also have impacts to compensate. Quoting an IISD article: *“Thailand has stabilized and subsidized energy prices for decades in an effort to shield consumers from volatile energy prices and improve access to energy. Despite significant reforms to deregulate parts of its fuels market, Thailand’s subsidies for fuel and electricity totaled at least THB 195 billion (US\$ 6.8 billion) in 2012”*¹⁰³. In Vietnam, the government does provide subsidies to the power industry (to

¹⁰¹ Power Sector Reform In Thailand, finance.mapsofworld, Compare Infobase Limited, accessible at:

<http://finance.mapsofworld.com/economy-reform/thailand/power-sector.html>

¹⁰² Powering the Countryside: The Lao PDR Rural Electrification Success Story, The World Bank, accessible at: <http://go.worldbank.org/KN0XV85WV0>

¹⁰³ A Citizens' Guide to Energy Subsidies in Thailand, International Institute for Sustainable Development

the state company); subsidies which are debated among economists¹⁰⁴, because these subsidies aren't directed more especially at the poorest part of the population, and hence may rather be benefiting the rich. However in Cambodia, such subsidies mechanisms (directed at the industry or the population) haven't been implemented yet, maybe providing some explanation for the electrification differential between Lao and Cambodia. Subsidies are an option under study, as the Report on Power Sector for the Year 2013 from Electricity Authority of Cambodia attests it: *“To have near uniform tariff in whole country, urban areas and rural areas, a committee will be formed to study the legal, technical and financial aspects including provision of subsidy and formulate the mechanism to have uniform tariff in whole of Cambodia”*¹⁰⁵.

Along with the cost-reflective tariffs, private sector participation in power infrastructure and delivery involved another commercial modality, which is the buyer payment default. Simply, it is the need for legal obligation to end-customers to honor their bill, with power cuts or fines as enforcing practices. Procedures and legal frames are needed in case of a defaulting buyer, so that it doesn't affect the system stability¹⁰⁶. In exchange, cost-reflective tariffs are also expected to convey more transparency about the electricity price. These insights are confirmed by Izaguirre and Tenenbaum¹⁰⁷, experts on the electricity sector at PPIAF, who argue that successful private investment in the distribution segment

Global Subsidies Initiative, April 2013. Accessible at: <<http://www.iisd.org/gsi/citizens-guide-energy-subsidies-thailand>>

¹⁰⁴ Vietnamnet news, Should Vietnam continue power subsidies? , July 4, 2014, accessible at:

<http://english.vietnamnet.vn/fms/business/106610/should-vietnam-continue-power-subsidies-.html>

¹⁰⁵ Annual Report on Power sector of the Kingdom of Cambodia, 2014 Edition, Compiled by Electricity Authority of

Cambodia, accessible at: <http://eac.gov.kh/wp-content/uploads/2014/08/report-2013en.pdf>

¹⁰⁶ Tenenbaum, B., and Izaguirre, A. K., Private participation in electricity, GridLines Note No.21, PPIAF, May 2007, p.3

¹⁰⁷ Tenenbaum, B., and Izaguirre, A. K., Private participation in electricity, GridLines Note No.21, PPIAF, May 2007, p.3

in particular, relies on cost-reflective tariffs, subsidized tariffs for the very poor, significant improvements in the quality and reliability of the service (compared to the public actor, in order to legitimize private participation sector among a public unused to the private participation in public good), and enforceable legal rights to disconnect customers not paying their bill. Cost-reflectiveness is not automatically to be associated with price increase. So far in Cambodia, some tangible improvement from power imports from Independent Power Producer, have even already been identified, as the tariff of imported electricity has been reported to be cheaper than local plants tariff¹⁰⁸.

But in the GMS-4, there is opacity regarding the cost-reflectiveness of electricity tariffs, and subsidies go to the state companies except in the case of Lao special program (see section 3).

Those aspects are essential to open new opportunities for private investors and reassure about return on investment of the infrastructures. Yet, the attractiveness of the investment environment for cross-border projects has many other features that should be explored and visualized. Moreover, the cross-border feature of power trade should be further analyzed.

4.1.2. Attractiveness of the investment environment

4.1.2.1. Assessment tool presentation

¹⁰⁸ EAC, 2007 report, quoted in Poch, K., Tuy, S. (2012), Cambodia's Electricity Sector in the Context of Regional Electricity Market Integration, ' in Wu, Y., X. Shi, and F. Kimura (eds.), Energy Market Integration in East Asia: Theories, Electricity Sector and Subsidies, ERIA Research Project Report 2011-17, Jakarta: ERIA – p.149

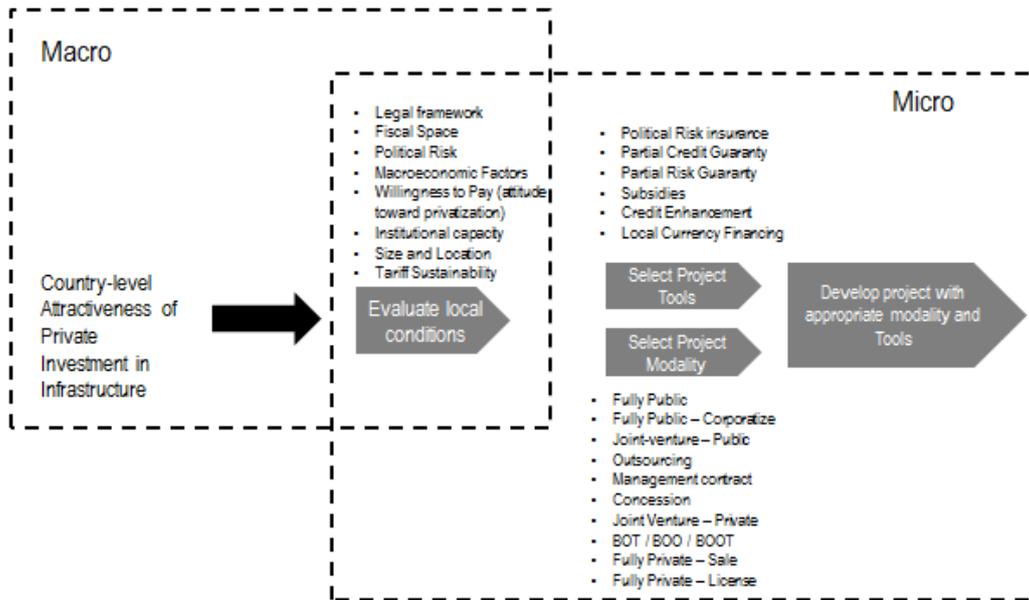
The question of attractiveness of investments in power sector infrastructure was the object of a survey from the IFC in the early 2002, “Private Power Investors in Developing Countries”, at a time coinciding with power market reform in GMS-4 countries, and resulting in partial unbundling of the generation sector. The survey was nonetheless more likely a *result* of the experiences undergone in various developing countries outside of Asia from the end of the eighties onwards, with various shades of privatization of the power sector.

Top priorities evaluated by investors, according to the survey, highlighted three dimensions of the investment’s attractiveness:

- Legal framework defining the rights and obligations of private investors
- Consumer payment discipline and enforcement
- Availability of credit enhancement or guarantee from government and/or multilateral agency

In order to better comprehend the investment environment for generation as well as transmission and distribution (T&D) projects, the GMS-4 case should be translated into a visual model. A framework developed by the Inter-American Development Bank, designed to capture the investor perspective for infrastructure projects, and the process through which investment decision is made, finds good applicability for the power infrastructure case of GMS-4.

<Figure 7: Model as defined by Vives Antonio et al. from the IDB>



Source: Model by Vives, Antonio et al. (2006), IDB, as presented by Mia, I et al. in a World Economic Forum Report ¹⁰⁹

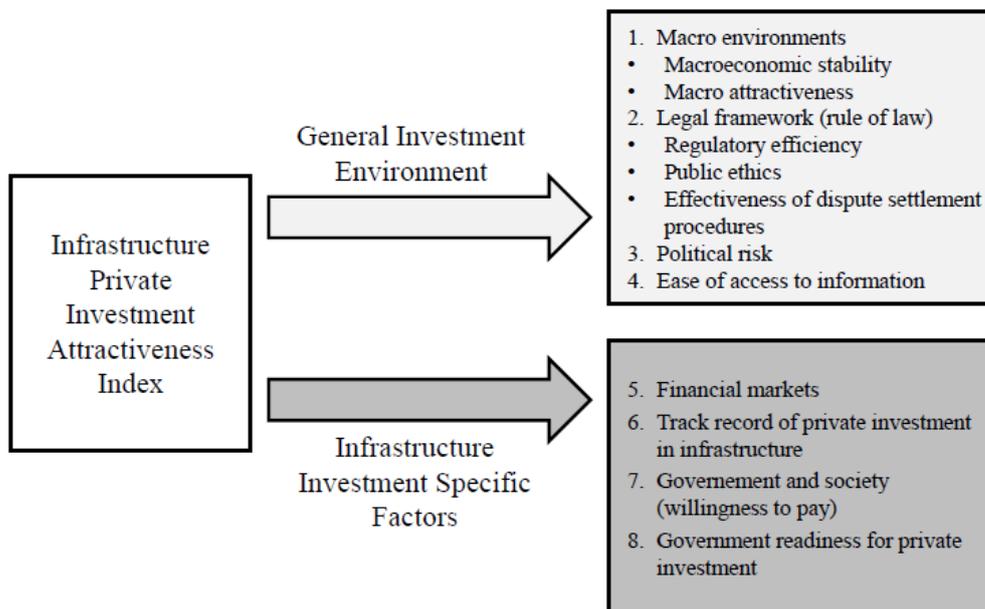
This model shows the impact of the country-level environment in investment decisions for infrastructure projects process. It displays a three-dimension framework for investors' assessment: local conditions, project tools availability and project modality option. Referring to the IFC survey mentioned above, we see how investors top priority concerns translate in this model:

¹⁰⁹ Benchmarking National Attractiveness for Private Investment in Latin American Infrastructure. Mia, I., Estrada, J., Geiger, T. (2007), World Economic Forum, The Global Competitiveness Network. Retrieved from: http://www.weforum.org/pdf/Global_Competitiveness_Reports/Benchmarking.pdf

- *Local conditions, macro environment & Project Modality*: Legal framework defining the rights and obligations of private investors.
- *Local conditions, macro environment*: Consumer payment discipline and enforcement.
- *Project tools*: Availability of credit enhancement or guarantee from government and/or multilateral agency.

The IDB then further group these country-level factors into a model differentiating general investment environment, from infrastructure investment environment, named Infrastructure Private Investment Attractiveness Index (IPIAI). It is composed of 8 pillars as represented below (each of the eight pillars encompassing its specific variables).

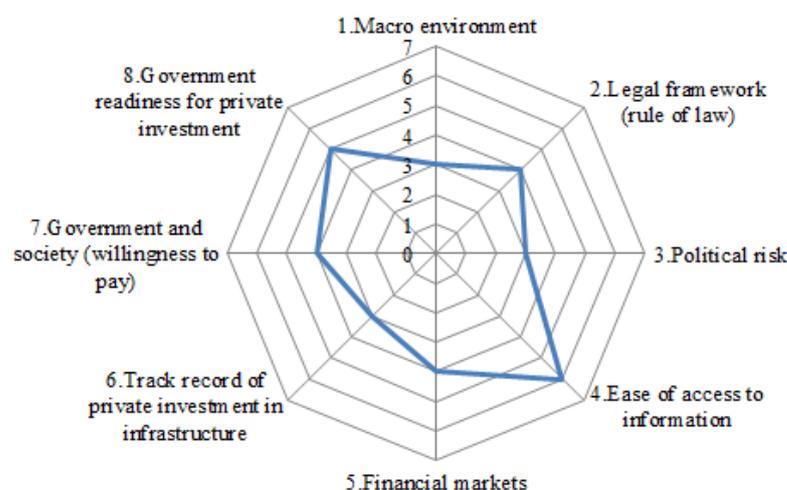
<Figure 8: Composition of the Infrastructure Private Investment Attractiveness Index developed by the IDB>



Source: Model by Vives, Antonio et al. (2006), IDB

From the assessment of these different components (pillars), the IDB draws charts of countries performances. It assigns the same weight and importance to all 8 pillars.

<Figure 9: Radar chart for IPIA Index of a country (example)>



4.1.2.2. Assessment tool adaptation to GMS-4 case

I defined in the beginning of this section the cross-border nature of power infrastructures designed to develop the regional power grid. As stated in a World Bank report on FDI in cross-border infrastructure projects¹¹⁰, transnational projects determinants are more numerous than for single country project, because external political and external financial determinants have to be taken into account. It is further complexity for private investors. All factors of uncertainties are multiplied: local and central governments, social customs,

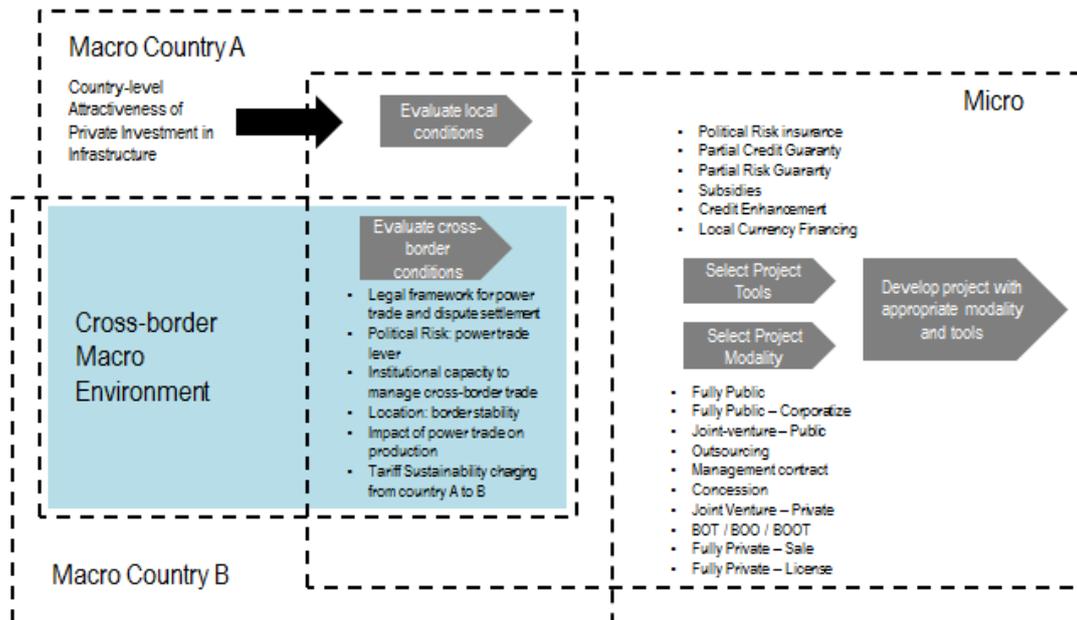
¹¹⁰ Fung, K.C., Garcia-Herrero, A., Ng, F., Foreign Direct Investment in Cross- Border Infrastructure Projects 1, Economic Research department N°0917, p.13

civil society groups, financial and political environments¹¹¹. As a consequence, guarantees expected for the project are higher.

Hence, for projects designed to promote exports to a country B (the most representative example being the building of a hydropower plant and associated substation in Lao, for exports in Thailand or Vietnam) – cross-border projects, the IDB model of investment decision process would need to integrate country B local conditions as well as trade impact on the project development. Two extensions of the model are suggested below, given variable scope of cross-border projects: the chart 1 is a suggested application of IDB model to of a generation project with power export to a country B, within a PPA contract framework. The second chart is a suggested application to a hypothetical project including private investment in T&D infrastructure.

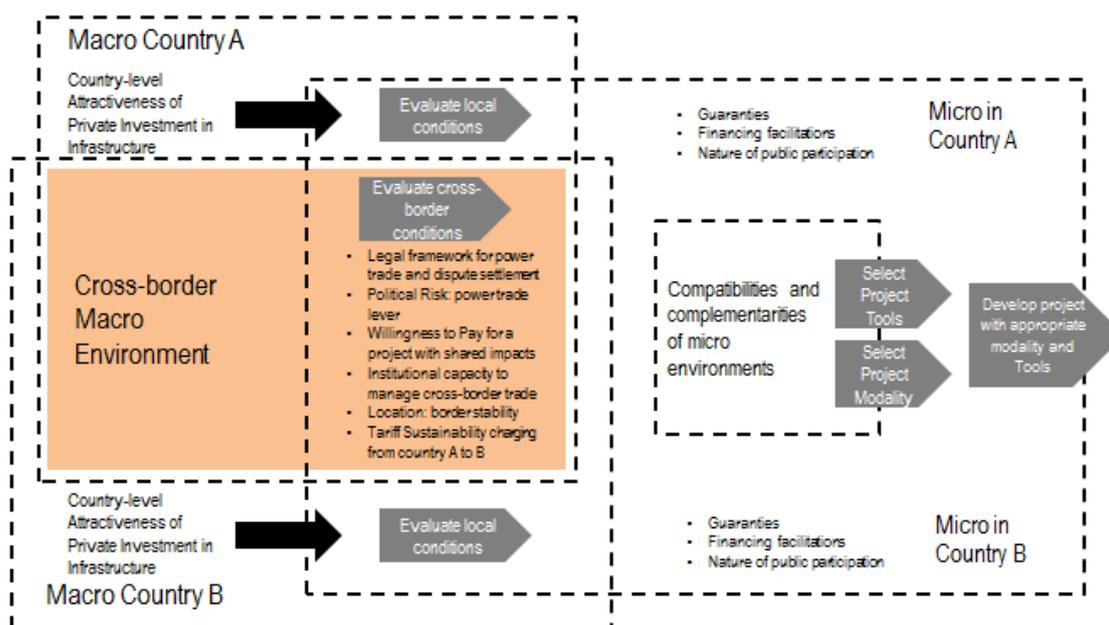
¹¹¹ Fung, K.C., Garcia-Herrero, A., Ng , F., Foreign Direct Investment in Cross- Border Infrastructure Projects 1, Economic Research department N°0917, p.14

<Figure 10: Model as defined by Vives Antonio et al. from the IDB – Impact of power trade contract (within PPA) on model>



Source: Author's extension of the model developed by Vives et al.

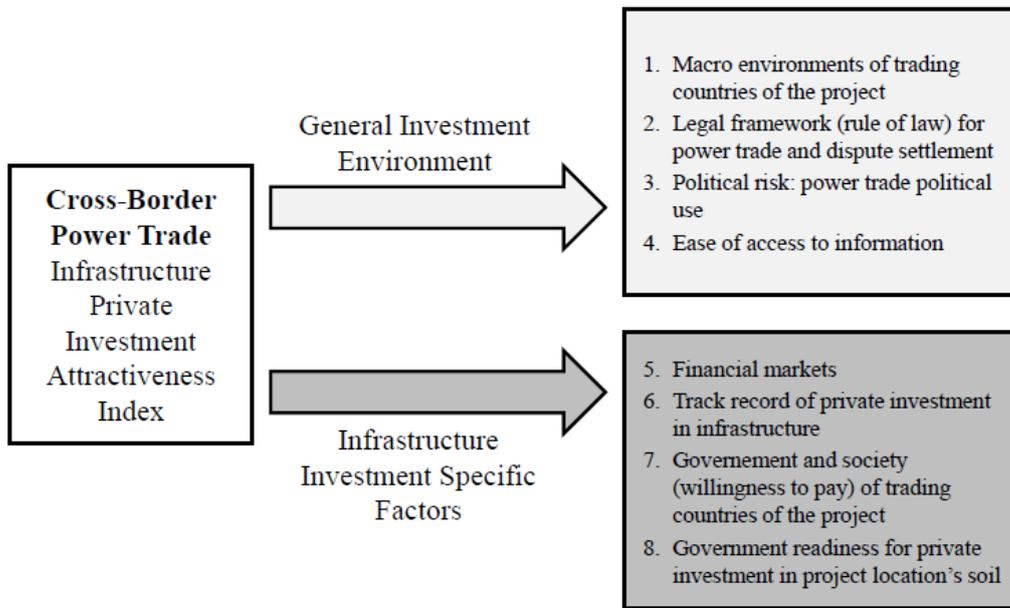
<Figure 11: Model as defined by Vives Antonio et al. from the IDB – Impact of Cross Border Infrastructure on model>



Source: Author's extension of the model developed by Vives et al.

Consequently, the IPIA framework presented above should be extended as well, in order to reflect the impact of cross-border power trade. The general investment environment must now include the two countries involved in power trade scheme (the situation in both countries may influence private investors decision), while the infrastructure investment specific factors are dependent on the area of development of the infrastructure (local, such as a generation plant and linkages to a national substation; or transnational, in the hypothesis of a project including transmission/distribution lines).

<Figure 12: Infrastructure Private Investment Attractiveness Index developed by the IDB
 – Impact of Cross Border Power Trade in the project>



Source: Author's extension of the model developed by Vives et al.

4.1.3. Application to the GMS-4 case: an understanding of the complex situation

With the IDB framework presented in the previous section, each of the 8 pillar of investment attractiveness are discussed for the GMS-4 case, in order to assess investment conditions “deterrent” impact. The focus is still made on projects designed to generate power trade possibilities.

4.1.3.1. Macro-environment for cross-border projects in the GMS-4

By macro-environment, we mean to evaluate the conditions for investment in the countries involved in power trade.

- Macro environment of trading countries

Macro-economic indicators in the GMS-4 region are heterogeneous. Both Lao and Vietnam boast with promising growth rate, relative political stability due to the single-party hold, and investment-friendlier environment in order to meet the growing demand; though issues remain in the transparency and governance. The Lao government strongly encourages foreign investment in the resource sector¹¹², notably. However, low skills and low labor productivity, especially in Lao and in Cambodia, can deter (foreign) private sector initiatives. Thailand has already settled a sound investment framework given its earlier take-off. Despite doubling the macroeconomic environment assessment, investment in cross border power infrastructure would not be mainly deterred by macroeconomic environment in these two countries. In the GMS-4, only Cambodia presents larger concerns in macroeconomic environment, given poor infrastructure and weak legal frameworks, which leads us to the second point.

- Legal framework and regulatory environment
 - o Regulatory efficiency

How attractive is the legal framework for power sector investment, and how do legal frameworks match between two distinct countries? Matching rules and regulation, and making formal framework compatible, may reduce transaction costs. On the contrary,

¹¹² Country Partnership Strategy: Lao PDR, 2012–2016, Private Sector Assessment (Summary), ADB, retrieved from: <http://www.adb.org/sites/default/files/linked-documents/cps-lao-2012-2016-psa.pdf>

rules and regulations which are not on the same page would increase transaction cost of the power trade scheme and may deter investment in power infrastructure.

I will focus on a bilateral relation within the GMS-4 to help identify points of complexity of investment environment. Vietnam and Lao PDR will be compared on a series of legal sections, and the comparison gives way to suggested implications regarding the match of the two legal frameworks.

<Table 6: Comparison of Vietnam and Lao PDR legal framework for power sector with a sample of criteria>

	Vietnam ¹¹³	Lao PDR ¹¹⁴	Implications
Policy and Law	Includes (issued by the national assembly): - Law on Electricity - Law on Conservation of Electricity	Electricity Law, strongly committed to private sector participation in power sector development and export promotion	Possibility of conflictual statements.
Organization of the market	EVN has a monopoly on generation, transmission and distribution. Generation and distribution have been opened up to other companies with liberalization policy.	EDL has a monopoly on generation, transmission and distribution. Generation has been opened up to other companies following market opening.	The unbundling and liberalization of the markets are at different stages.
Interconnection policies	A circular stipulated that the power generation facility must submit an application for interconnection to the National Power Transmission Corporation (NPT) under EVN	Managed by the Energy promotion Department ¹¹⁵ .	Interconnection to negotiate with state company in Vietnam VS ministry department in Lao. Administrative workload.

¹¹³ All Vietnam data retrieved from the Electricity Regulation Report 2012, Law Business Research Ltd Publishing, 2012, accessible at <http://www.eurochamvn.org/Downloads/Electricity%20Regulation-%20Vietnam%20-2012.pdf>

¹¹⁴ Lao PDR Electricity Law, accessible at: http://www.ilp.gov.la/lao_law/electricity_law.pdf

¹¹⁵ Ibid.

Construction and operation of transmission networks	A license granted by the MOIT is required.	Licensing approval to get from the government of Lao PDR for registered enterprise entity, in accordance with the Business Law ¹¹⁶ .	In the case of cross-border infrastructure, the license deliveries of the two countries should be compatible.
Eligibility to obtain transmission services	Under the Law on Electricity and related decree and decision, companies must obtain a license for power transmission if they comply with basic legitimacy requirements, but in practice state maintains a monopoly (only companies under EVN are licensed).	In practice, natural monopoly of EDL.	License VS national monopoly observed. Transmission service operation policies differ starkly.
Government incentives to transmission grid expansion	Projects to develop a transmission grid get tax exemptions and reductions	In practice, some dispensation is usually agreed between the GOL and developers. Excise taxes are dealt with under Part 4 of the Tax Law ¹¹⁷ .	In case of cross-border project, double tax reduction system to deal with. Harmonization mechanism absent.
Entities responsible for the regulating of the transmission grid	ERAV shall be responsible for regulating the transmission grid. Can request connection from transmission entity or clients, regulate generating entities as well as transmission grid.	There is no regulatory agency in Lao. Responsibilities continue to be undertaken by ministries and utilities. ¹¹⁸	Cooperation needed between ERAV and Lao ministry in the event of transmission project. Cross-country regulating institution preferable.
Construction and operation of distribution	The ERAV shall grant electricity licenses for wholesale electricity sale, electricity distribution and electricity retail, if companies	Licensing approval to get from the government of Lao PDR (under the directives of the Ministry of Industry	In case of cross-border distribution infrastructure: necessity of license deliveries' compatibility

¹¹⁶ Electricity Law, accessible at: http://www.ilp.gov.la/lao_law/electricity_law.pdf

¹¹⁷ Lao PDR Development Report 2010, Technical Note : Fiscal Regime in the Hydro Power Sector, prepared by Richard MacGeorge, James B. Stewart, and Ekaterina Vostroknutova Accessible at: http://siteresources.worldbank.org/LAOPRDEXTN/Resources/293683-1301084874098/LDR2010_Fiscal_Regime_Hydro.pdf

¹¹⁸ The Potential of regional power Integration – Greater Mekong Subregion Transmission and Trading Case Study, ESMAP Briefing Note 004/10 , June 2010, accessible at: http://www.esmap.org/sites/esmap.org/files/BN004-10_REISP-CD_Greater%20Mekong%20Subregion-Transmission%20&%20Trading.pdf p.38

-tion networks	comply with basic legitimacy requirements. Private and foreign-owned companies may obtain such access.	and Handicrafts) for registered enterprise entity, in accordance with the Business Law ¹¹⁹ .	between the two countries.
Policy setting	The MOIT is the government agency that mandates regulatory policy with respect to the electricity sector. The ERAV assists the MOIT.	Under the Ministry of Energy and Mines.	Supposed to respond to the same Intergovernmental General Agreement (GMS) recommendations. But operationalization may differ.
Transfers of control regulations	Vietnam does not have any specific regulations or provisions. Deals are at the discretion of the MPI and the MOIT.	Regulated by Lao Enterprise Law ¹²⁰ .	Grey area for cross-border infrastructure, ad hoc regulation.
Cross-border electricity supply	Under the existing regulations, cross-border supply or cross-border electricity purchases must be approved by the prime minister.	Exports are encouraged but imports need the government's approval. A Special Project Company is settled for negotiation (SPC). Trade agreed through MOU ¹²¹ .	Imports require government approval according to current regulation. Cross-border trade market legally bound to governments.

As we see from the comprehensive table above, the legal framework and regulations regarding cross-border power trade and power infrastructures and, by extension, cross-border power infrastructures, display large transaction costs, because of a complex nationally-centered system of licenses, regulated tariffs, transmission operation policy, and a policy setting at the discretion of the national government despite compliance with GMS guidelines regarding power sector. It results in largely discretionary regulations for

¹¹⁹ Electricity Law, accessible at: http://www.ilp.gov.la/lao_law/electricity_law.pdf

¹²⁰ Greenlee, William, Mergers & Acquisitions in Laos PDR, DFDL Legal & Tax update, accessible at: <http://www.dfdl.com/easyblog/entry/mergers-a-acquisitions-in-lao-pdr>

¹²¹ Phomsoupha, Xaypaseuth, Hydropower Development Plans and Progress in Lao PDR, in Hydro Nepal, Issue No.4, January 2009, accessible at: <http://www.mtnforum.org/sites/default/files/publication/files/6229.pdf>

each project. This advocates in favor of regulations harmonization in order to create a clear investment environment.

- o Public ethics

Public ethics is a big issue in the GMS-4, because both Lao and Cambodia, with the most power generation potential, are very poorly ranked by Transparency International, respectively 140th and 160th out of 177 countries ranked¹²². Cambodia's government is actually reported to be a case in point of *bad government*. Meanwhile, Thailand ranks 102nd and Vietnam 116th, which is not sufficient to enhance regional compliance. Low levels of transparency and trust in administration makes it either more complicated for the private sector to enter a very state-centered electricity sector in the GMS-4, or increases the risk that the better efficiency supposedly brought by the private sector be hampered by corruption. Further willful approach for transparency adds to the transaction cost for private investors.

- o Effectiveness of dispute settlement procedures

Further question regards existing institutions and process for eventual dispute settlement need. A deterrent for investors in emerging markets is the judiciary recourse they can apply to in case of a dispute with the state. Observing the bilateral Vietnam-Lao PDR example again: a Trade Competition Commission has been in operation for several years now in Lao; in Vietnam, disputes are settled by the Competition Authority. Both countries are now members of the WTO. Power trade still being a grey zone of trade

¹²² Transparency International, Corruption Perception Index 2013, accessible at <http://www.transparency.org/cpi2013/results>

law¹²³, eventual dispute could be brought to the WTO, but may as well be solved within power sector institutions of respective countries.

Still, GMS-4 countries increased integration in global institutions means that investors can more easily call upon international arbitration, and it is an additional security net for them. It improves their confidence to get involved in the emerging market¹²⁴.

Regarding power trade, the RPTOA (Regional Power Trade Operating Agreement) established a phased resolution process for Transmission System Operators especially. The first Memorandum Of Understanding applying to power trade initiatives gave guidelines for dispute settlement section of PPA signed between two countries in the Mekong, however those remain project-specific and it would be quite incorrect to speak of a general dispute settlement. It should also be noted that the fairness of the dispute settlement section of PPA has been criticized. The main example is that of the Xayaburi giant dam: a study from International Rivers (regardless of its militantism) highlighted that the PPA between Thailand and Lao PDR seemed quite Thailand interests biased: *“If there is a dispute over the PPA, the dispute resolution is held in Bangkok, in Thai language, and using Thai arbitration rules and Thai law. As a result, it would be difficult for the Lao government to represent its own interests or the interests of the Lao people.”*¹²⁵

¹²³ Pollitt, Michael, Power Pools: How Cross-Border Trade in Electricity Can Help Meet Development Goals, The Trade Post, World Bank blog, January 10, 2014, accessible at: <http://blogs.worldbank.org/trade/trade-electricity-how-cross-border-trade-can>

¹²⁴ Venkataraman Krishnaswamy, Gary Stuggins: Private sector participation in the power sector in Europe and Central Asia : lessons from the last decade, World Bank, 2003. p.22

¹²⁵ *Why did Laos proceed with the Xayaburi Dam, in the face of strong opposition from neighboring countries? New insight from the project's "power purchase agreement*, International Rivers, August 2013, accessible at: http://www.internationalrivers.org/files/attached-files/summary_of_ppa_analysis_august_2013.pdf p.3

- o Political risk

The political risk in the GMS-4 power trade would translate in the use of electricity exports as a lever for government against their neighbors, as the now well-known case of Russian gas with Europe. While such a risk cannot be completely excluded, it is yet limited, principally because there are no blatant ideological conflict or high commercial dependencies in the GMS-4. Political risk is limited, even though governance issue remains. In Lao and in Vietnam, the single, communist-inspired party paradoxically brings more certainty to the political environment, since opposition is prohibited¹²⁶. However, the political risk would rather emanate from non-governmental actors such as civil society groups given the environmental stakes of electricity generation expansion (*see section 4.3.*).

- o Information challenge: the need to reduce uncertainties

By information, it should be understood any knowledge which could be useful to a company to enter a market and operate its activity, such as competition status, culture, intermediaries, processes, tariffs, costs – overall, all elements which may provide elements to forecast the future of its activity to a private investor. Access to information helps to fix some variables and reduce uncertainties for the firm. If not the local governments themselves, guarantees (uncertainty reducing mechanisms) can come from international organization and aid oriented organization.

Since the two countries are involved in a power trade scheme, is the ease to access information hampered? Is there an impact from cross-border power trade? It seems it does.

¹²⁶ Global Edge, Michigan State University database, Lao PDR Risk Assessment, accessible at: <http://globaledge.msu.edu/countries/laos/risk>

With flows of electricity crossing borders, it is necessary that both countries disclose and share data on the grid flows, losses, infrastructure state, demand, and so on. Since the information crucial for the good dispatch of power (given fluctuations) is now held within a foreign grid, the process of getting information may be perceived as more complex, unless a coordination scheme is ensured.

In the GMS, the appropriate vehicle for information sharing between participating countries still needs to be created in order to reduce transaction costs. Even on the official GMS road map, though an objective to “strengthen information exchange and collaboration”¹²⁷ is stated, it rather refers to regional energy planning and energy mix. The region lacks a “push” for very practical exchange of operational information.

4.1.3.2. Power infrastructure investment specific factors

- Banking and financial markets

Banking system in Thailand has strengthened, and the financial situation is rather solid¹²⁸. Banking sector in Lao is associated with inadequate levels of capitalization and lack of independent supervision, hence remaining very weak. Credit-risk remains also important as well as foreign exchange rate in Vietnam, which is a highly dollarized financial market. The same applies to Cambodia, where private sector credit has boomed but which lacks supervision as well. The picture may seem a bit gloomy, but some reform has been initiated.

¹²⁷ Road Map for Expanded Energy Cooperation in the Greater Mekong Subregion (GMS), Accessible at: <http://www.gms-sef.org/docs/SEFspecial-annex7.pdf>

¹²⁸ Data on risk assessment collected on: <http://globaledge.msu.edu/>, Michigan State University Global Edge knowledge database, 2014 assessment.

The sophistication and development of financial market tools and institutions for infrastructure financing is crucial to the move of private sector participation in large scale projects. Variety of assets, credit channels, investment protection, coverage... all add to in the degree of sophistication of the financial market, and rely on appropriate regulatory frameworks. Capital market has developed in all GMS-4, and it is increasingly integrated¹²⁹. Yet, Dr Prasarn Trairatvorakul, Governor of the Bank of Thailand, was underlining in a June 2013 speech¹³⁰ that innovative financial instruments needed to be introduced in order for the funding requirements to meet market preferences. Supportive framework to private financing, too, needs to be developed¹³¹. Strengthening capital markets is still on the agenda for less developed countries where generation projects are expected to emerge, Lao and Cambodia. Since private companies can raise funds from capital markets through equity or infrastructure bonds, financial infrastructure strengthening may also facilitate large scale cross-border power infrastructure. Given the genuine interconnecting purpose of power trade, and benefits expected for both trading countries, the development of cross-country interconnectedness of financial markets would make sense too¹³². Linking capital markets and facilitating financial flow mobility may prove positive to attract cross-border purpose infrastructure investment. So, movement of capital should be facilitated with rules and regulations. Capital market cooperation is a new topic of cooperation, as shown by the establishment of the Mekong Capital Markets Cooperation which held its third meeting last July 2014.

¹²⁹ TMB Bank Public Company Limited news highlights online, Ministry of Finance of the Lao PDR successfully completes its debut baht-denominated bond offering in Thailand, June 5, 2013, accessible at: <https://www.tmbbank.com/newsroom/news-details-en.php?id=467>

¹³⁰ "Financing tomorrow – the Greater Mekong Subregion", Keynote address by Dr Prasarn Trairatvorakul, Governor of the Bank of Thailand, at the Euromoney Greater Mekong Subregion Investment Forum, Bangkok, 13 June 2013. Accessible at: <http://www.bis.org/review/r130619b.pdf>

¹³¹ Ibid.

¹³² Ibid.

Currently, private sector investment is still backed by international financial institutions rather to make up for lack of trust and financial infrastructures in the local financial markets. An example of innovative financial scheme (and also very complex) is the financing montage that was realized for Nam Theun 2 dam construction in Lao PDR. NPTC Limited, a limited liability company under the Lao PDR law, was created, owned by four participating private and public companies. Equity investors then bought shares of the company¹³³. The initial involvement of the international financial institutions (IFIs) has enabled the financing of the Nam Theun 2 dam, with International Financial Institutions introducing appropriate investment incentive such as guarantees provided to private commercial banks loans to the project (guarantees provided both by multilateral development banks and export credit agencies), and loans to state-owned agencies themselves funding the NPTC power company with equity funding.

- Track record of private investment

Regarding the PPP option for private sector participation, PPP model has long been discussed, but the implementation of this model is still a trial-and-error practice¹³⁴. Hence, most private sector participation is still in the first years of operation, and it only regards generation industry in the power sector, with the exception of transmission PPP in Cambodia that was signed in 2005. Moreover, these generation projects were first developed to supply local market rather than encompassing the power trade objective. So there is still a first mover approach for many private sector actors willing to get involved in the GMS grid ambitions. Current record track of existing PPP in the power sector are a

¹³³ Merme, V., Ahlers, R., Gupta, J., Private equity, public affair: Hydropower financing in the Mekong Basin, *Global Environment Change* 24, 20-29, 2014

¹³⁴ “Financing tomorrow – the Greater Mekong Subregion”, Keynote address by Dr Prasarn Trairatvorakul, Governor of the Bank of Thailand, at the Euromoney Greater Mekong Subregion Investment Forum, Bangkok, 13 June 2013. Accessible at: <http://www.bis.org/review/r130619b.pdf>, p.2

mixed picture. A report by the ADB and the AFD reported that the Vietnamese government saw the plant projects of Phu My 2.2 and Phu My 3.0 as unsatisfactory, specifically regarding the risk-sharing mechanism¹³⁵. Private sector itself shares concerns too. Meanwhile, the transmission BOT project from Cambodia was evaluated in 2013 by the ADB¹³⁶ a highly successful project on criteria of development impact and outcome, and, importantly for the private sector perspective, successful according to the investment profitability criterion.

- Government and society: willingness to pay

Willingness to pay for good-quality, uninterrupted power should be high enough to justify investment project. This variable is a difficult one to assess because it relies on the determination of a demand function for proper electricity supply. Moreover, demand from industry and business may differ from individuals' demand. Willingness to pay is also questioned at the electricity supply chain level, given the monopoly of domestic state utilities. Still, one-off studies revealed high willingness to pay in areas most deprived of electricity in the GMS-4. For instance, a 2011 study revealed that the share of new connection costs paid by Vietnamese households was equivalent to at least a full month's income, if not twice a full month's income¹³⁷.

Society attitude towards private sector engagement is yet mixed. In Thailand, the troubled privatization of EGAT revealed a conflict between political will and citizens negative

¹³⁵ Assessment of Public–Private Partnerships in Viet Nam, Constraints and Opportunities, Asian Development Bank, 2012. P.17

¹³⁶ Project Performance Evaluation Reports, Cambodia: (Cambodia) Power Transmission Lines Co., Ltd., Power Transmission Project, ADB, Dec. 2013., <http://www.adb.org/documents/cambodia-cambodia-power-transmission-lines-co-ltd-power-transmission-project>

¹³⁷ State and People, Central and Local, Working Together: The Vietnam Rural Electrification Experience, The International Bank for Reconstruction and Development/The World Bank, 2011, p.12

perceptions of a privatization results, including a change in applied electricity tariffs. Meanwhile, the emergence of private entrepreneurs for small-scale electricity supply was boosted by the government in Cambodia, with the acknowledgment of the benefits of private investment to meet electricity demand¹³⁸.

The willingness-to-pay in the GMS, given unmet demand for electricity in all countries, creates a shared interest across countries engaged in power trade. The willingness-to-pay yet relies on the satisfied expectation for continued power, with perceived upgrade in comparison to the mere state service.

- Government readiness for private investment

Finally, what about the government readiness to facilitate private investment? Overall incentive investment should not inhibit private sector participation, including tax regime, import restrictions, foreign investment restrictions, etc.

For certain, all GMS-4 governments have increasingly turned to private investment to develop infrastructure by reforming investment laws and, more specifically, have formulated more or less formal regulations and directives for the use of PPP. In Vietnam, the government has tried since the early nineties to attract private investment in infrastructure in the context of Doi Moi, with a series of reform aimed at improving the business environment: enactment of a comprehensive decree for BOT (Build-Operate-Transfer) projects, announcement of phased increases in the tariffs for electricity bringing prices significantly closer to the estimated long run marginal cost of supply, allocation of some responsibilities to line ministries to develop and negotiate with private

¹³⁸ See: Private Solutions for Infrastructure in Cambodia - A Country Framework Report, PPIAF, The World Bank, 2002, p.19

infrastructure investors, among others¹³⁹. In the beginning of the 00s, the government of Lao PDR has taken steps to improve, notably, the investment climate in the country, defining the responsibilities of relevant ministers and authorities at central and local level, the investment application procedures and processing time, and a revision of the Investment Law in 2004¹⁴⁰. Both these countries are adapting, to some extent, their “socialist model” towards socialist oriented market economy, with the limitation that the state keeps a strong say and control over private sector entry and operation. Cambodia has adopted a free-market economy from the early nineties onwards, so that foreign-direct investment could contribute to its development¹⁴¹; however, the PPIAF highlighted a number of constraints to private investment in infrastructure¹⁴²: lack of transparency and communication, gaps in legal frameworks depending on the sector, bypassing of law, lack of auditing... The government of Cambodia has been willingly developing serious reforms in the years 2000, such as the Financial Sector Development, the Public Financial Management Reform, and other governance reforms, but many foreign investment projects are yet likely to be affected by Cambodia’s “bad government”.

¹³⁹ Vietnam Country Framework Report on Private Participation in Infrastructure, The International Bank for Reconstruction and Development, 1999. Accessible at:

http://www.ppiaf.org/sites/ppiaf.org/files/publication/Vietnam-CFR_0.pdf

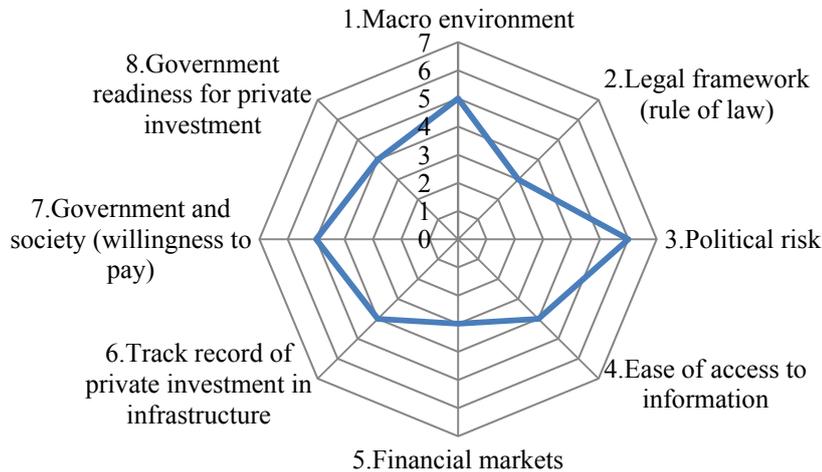
¹⁴⁰ Gunawardana, Pemasiri J., An Overview of Foreign Investment Laws and Regulations of Lao PDR, International Journal of Business and Management, Vol 3, No 5, May 2008

¹⁴¹ Chheang, Vannarith, Wong, Yushan, Cambodian Institute for Cooperation and Peace, Cambodia-Laos-Vietnam: Economic Reform and Regional Integration

¹⁴² PPIAF Assistance in the Kingdom of Cambodia, October 2012, accessible at:

http://www.ppiaf.org/sites/ppiaf.org/files/documents/PPIAF_Assistance_in_Cambodia.pdf

<Figure 13: Suggested “radar” for the GMS-4 region>



4.1.3.3. Compatibilities for project micro-environment: PPP case in the GMS-4

As the main driver for private investment for large projects, a specific case of PPP projects in the GMS follows (many IPP consisting of local low scale power plant, see section 3). Regarding PPP implementation, the UNDP¹⁴³ has identified a number of possible constraints to be lifted:

- **Legislative and regulatory environment, effective regulation.** This includes decreasing the levels of discretion, enhancing accountability and improving transparency in governments’ procurement policy and transparency for all stakeholders.

¹⁴³ UNDP Public-Private Partnerships for the Urban Environment, PPP Management Module - Accessible at: http://pppue.undp.2margraf.com/en/05_2.htm

- **Institutional constraints** (poor planning, lack of leadership, lack of commitment...).
- **Financial constraints** (access to capital market, sufficient private and public financing, investment policies...).
- **Contract-related constraints** (lack of cost-benefit analysis, bid which fails to be competitive...).
- **Capacity constraints – government capacity.** It includes the lack of understanding between the private and the public party, and the difficulties in contract specification and administration. It implies the necessity to develop cross-sectoral professional units dedicated to PPP projects.
- **Public sector experience** (from the private sector side). There is a need to build consensus for PPPs (consensus among stakeholders on the benefits of private sector participation).
- **Perception** (dealing with the mistrust and misunderstanding).
- **Time frame** (eventual political constraints).

From this set of criteria, what is the specificity for PPP compared to the basic framework for private investment discussed? While financial constraints, effective regulation or cost recovery are standards for private sector participation, the **government capacity and the contract related factors make the difference for the attractiveness of PPP from the private sector’s perspective.** The need for dedicated institutional tools and strong government role is also emphasized in the UNDP list of constraints.

Indeed, as mentioned in section 3, PPP entails a dimension of risk sharing. Since the role of government isn’t to be minimized in a PPP scheme, an issue is raised in the partnering

of the private sector with “weak” government such as Cambodia and Lao PDR. As noted by the ADB, “Governments need sufficient capacity to undertake analyses and road maps of sectors that have potential for PPPs and that are consistent with the overall policy and development framework of the country”¹⁴⁴. In Cambodia and Lao, especially, where the government already has to consolidate its national development framework, coordinating PPP with development framework is even more complex. In the event that the government is not able to honor its share of risk, PPP attractiveness decreases from the private sector point of view, as the risk allocation becomes under-optimal, hence the significance of the government capacity factor to define PPP attractiveness. Also, as the risk sharing is reflected in the long-term contract of the PPP, contract related constraints gain more weight as well.

In Lao, the PPP topic is still very new, and was fostered by the initiatives taken precisely in the power sector. The PPP framework is still murky and to engage in PPP requires assistance of international agencies, since, as mentioned in the above, Lao state is still in a consolidation process. As a consequence Lao issued an official announce for PPP policy development on October 6, 2014, on the Ministry of Planning and Investment website: “The Lao Government is developing the framework for PPPs in Lao PDR, led by the Investment Promotion Department of the Ministry of Planning and Investment (MPI) with support of the Asian Development Bank”¹⁴⁵. The framework includes a PPP decree as well as a PPP guidelines and manual. The completion is expected mid-2015.

¹⁴⁴ Public–Private Partnership Operational Plan 2012–2020, ADB, 2012, p.10, accessible at:

<http://www.adb.org/sites/default/files/institutional-document/33671/files/ppp-operational-plan-2012-2020.pdf>

¹⁴⁵ Note from the Lao PDR Ministry of Planning and Investment, *Development of PPPs in the Lao P.D.R.*, October 6, 2014, accessible at: http://investlaos.gov.la/show_lacontent.php?contID=67

Such capacity building initiative is lacking still in Cambodia, though trends and applicability seminars are held in Cambodia regularly in the past few years. Most PPP policies and regulatory environment so far have been suggested by the ADB to be implemented following a “road map” in Cambodia, but the main issue remains in consolidating the overall government capacities in order to properly share risks in PPP schemes.

Back in 1992, Thailand pioneered the design of public-private partnerships with the Private Participation in State Undertakings (PPSU) Act which fostered a number of infrastructure projects. Thailand developed a PPP Law/Policy and created a special agency, SEPO, to oversee PPP Projects and PPP Law, which took effect in April 2013¹⁴⁶. A national committee will thus be responsible for projects, including feasibility study and planning. Thailand has thus taken some steps in the creation of PPP-friendly environment.

In Vietnam, PPP regulatory initiatives are quite focused on BOT cases. In 1992, Vietnam amended the Law on Foreign Investment in order to make way for the first BOTs. Then, PPP and Private Participation in Infrastructure were recognized by decree in 1993. Nowadays, the prevailing legislation governing PPP practices in Vietnam is a decree signed in 2007, stipulating conditions, procedures, incentives applicable to Build & Operate type of projects.

With the exception of Cambodia, all countries have taken a step to provide private sector with uncertainty reducing policies and institutions regarding the specificity of PPP. As these observations draw the heterogeneous national patterns for PPP implementation in

¹⁴⁶ “New PPP law for Thailand should deliver planned "mega projects", says expert”, note from Pinsent Masons advisors, May 10, 2013, accessible at: <http://www.out-law.com/articles/2013/may/new-ppp-law-for-thailand-should-deliver-planned-mega-projects-says-expert/>

the GMS-4, it **inevitably raises the question of the harmonization of PPP policies in the event of cross-border infrastructures**, which will be discussed in the next section.

4.1.3.4. Hybrid financing and special purpose vehicles companies: bypassing the obstacles?

Following the discussion on PPP, a special case should be made of the generation capacity development, centered on dams and hydropower plant development, which took place over the last years. Most projects have been initiated in Lao PDR. These huge projects illustrate the complex organizations that have emerged out of the will to develop large electricity production center with private and foreign investment.

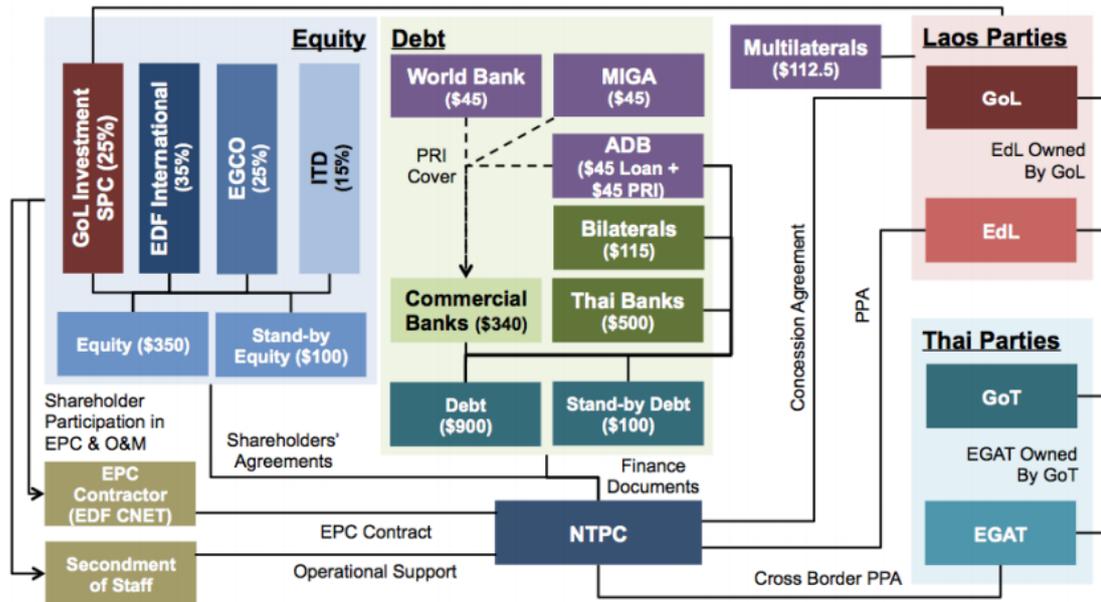
Actually, the companies involved in hydropower development in the GMS are, for many, state owned enterprises behaving like private companies. This comment is valid for foreign companies, as in the case of Sinohydro, a main Chinese developer of dam projects; and for domestic companies, such as LHSE, a Lao holding company primarily involved in energy financing.

The main features are the creation of a new legal entity (of multiple ownership) to operate the hydropower projects, the complexity of financial montage and ownership, and the necessary assistance of development banks and development agencies in the process. Private participation rather translates in equity supply, along with the debt provided by the development agencies, rather than in the operation of the utility.

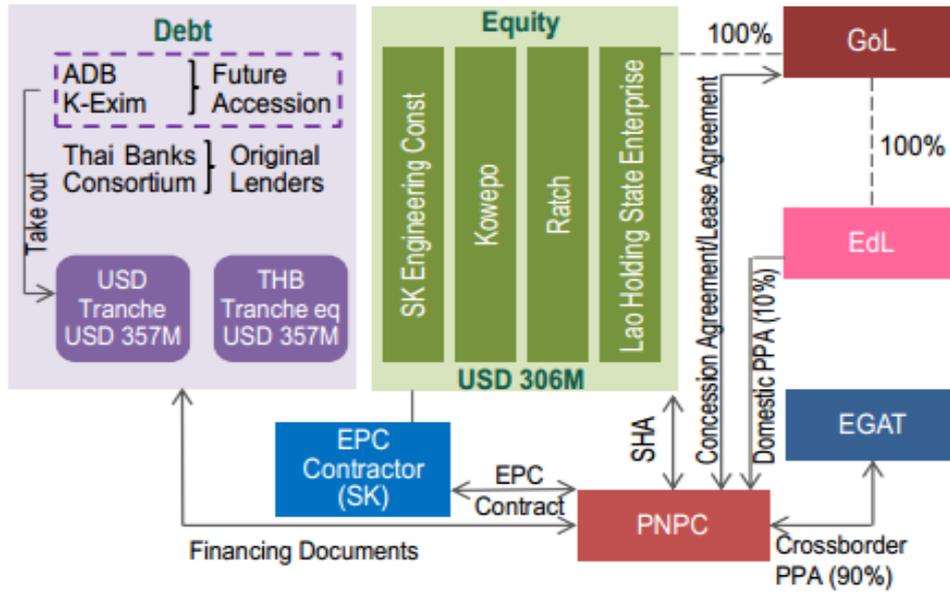
As displayed in the two following charts, shareholders agreement (involving private equity), finance documents (including development banks as well as commercial banks) and concession agreement (involving the SOEs of the power exporting country). This form of complex multi-owners project has been made possible by ADB support for

hydropower development as a pillar to the regional power grid expansion, the level of investment required as well as the expertise required. However, such projects have a much extended timeline, and such specific treatment is difficult to replicate for each significant development of the power infrastructure capacity. This is further justification for a reform of the investment environment, as well as a regulatory framework for other needed cross-border infrastructures investment, as will be discussed in the next section.

<Figure 14: Nam Theun 2 dam case>



<Figure 15: Xe-Pian Xe-Namnoy dam case>



Source: UNESCAP, Presentation by DFDL, September 20, 2014, Project Experience in the Lao PDR Electric Power Sector: UN Workshop on Public-Private Partnerships (PPPs) for Infrastructure Development in the Lao PDR.

Conclusion

I conclude from the screening of the investment environment that private sector participation, in infrastructures designed to foster cross-border power trade, faces a number of weaknesses in legal and financial aspects which add to the deterrent uncompetitive power market and could prevent the spur in investment. Though private participation in generation has been developing through complex schemes, such arrangements question the regional dimension of power supply development due to the

opacity of the deal between two countries (Thailand and Lao PDR), disregarding impacts on third country parties.

Uncertainties reducing mechanisms and vehicles have been developed for financial aspects of private participation, stimulated by engagement of the multilateral cooperation agencies and international financial institutions (which provides multiple guarantees and credit solutions). But bodies and processes to share information directly regarding power flows, fluctuating demand, national grid regulating mechanisms, are barely on the agenda. Dispute settlement regulation applicable to power infrastructure is included in PPA, adding to the *ad-hoc* characteristic of power infrastructure development. Public ethics have also been identified as risky, especially in the two countries expected to develop the more generation projects in the coming years, Cambodia and Lao PDR.

Even though, on the financial side, the private sector still requires the support of international organizations and development banks (given the lack of strength and supervision of financial sector in Cambodia and Lao mainly), further openness to private investment from the government is undeniable in the region. It has resulted in series of reform within the GMS-4 (with Thailand already displaying a sound environment for private business) and the move towards market economy.

Because the competition in the power sector is in any case limited by the bundling of the sector, so far private investors in the power sector undertake “special” projects, along with special contracts. A lot of hope for the development of power infrastructure has rooted in the PPP scheme, which attracts GMS-4 countries (and particularly communist parties in Lao and Vietnam) for keeping the private sector accountable to the government under a contractual relation. Most PPP projects are still quite recent in the power sector,

and lessons that can be drawn from them are thus limited, but success stories in other industries that opened up to the private sector participation may provide some incentive. Still, in Thailand and Vietnam, the legal frame for foreign investment and PPP went through a change in the 90s, building a clearer environment for private sector investment.

A main issue also lies in shared regulation and process in the region. Indeed, adding to an investment environment “under work”, governments approaches to appeal to private investment differ and more importantly, regulatory frameworks differ. The cross-border nature of power infrastructure in the Mekong is potentially complicated. The harmonization of standards seems necessary to provide a real regional frame, but what does it entails? What are the institutional solutions provided so far in the GMS?

4.2. Harmonization, regulation and standards: cross-border complexity

How would the harmonization for interconnection become concretized? Harmonization is both a physical and an institutional capacity issue. Cross-border infrastructure and cross-border power trade require collaboration and cooperation at different levels: at the government institutional level, at the industry level, and between public and private partners¹⁴⁷. Within the GMS, institutions have developed since 1995 in order to accompany the regional energy challenge and power trade initiatives. We define institutions as formal regulations, rules and agreements; but also political and justice body structures. Gruber (2007) highlighted the impacts of pre-liberalization regulations

¹⁴⁷ Cross-Border Infrastructure Tool Kit, Program description, PPIAF & ADB, 2007. P.12. Accessible at: <https://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/Cross-Border-Infrastructure-Toolkit/Cross-Border%20Compilation%20ver%2029%20Jan%2007/cross-border%20booklet%2029%20jan%2007.pdf>

and infrastructures on cross-border trade. How is this difficulty tackled by GMS institutions?

4.2.1. Landmarks of the institutional development

Power trade in the GMS region originates in the Power Purchase Agreement (PPA) signed between Thailand and Lao PDR in 1971, following the construction of one of the first hydropower plant in Lao PDR, and supplying Northeastern Thailand. It was continued throughout the 70s and the 80s, despite political disturbances. Later, other GMS countries engaged in small cross-border power trade. According to the World Bank, this contributed to the electrification of remote areas¹⁴⁸. Bilateral power trade gained some momentum with the rise of power trade on the GMS agenda and the institutionalization of this type of trade, finally reaching a series of regional inter-governmental Memoranda of Understanding in the 00s.

First was formed the Subregional Electric Power Forum (EPF) in 1995, responsible for overseeing the program. It provides the framework for the GMS energy cooperation. Sponsored by the World Bank, a group of expert was formed to support the EPF, the Experts Group on Interconnection and Trade (EGP), which work was effective from 1998 to 2003. With these developments, Policy Statement on Regional Power Trade in the GMS was signed in 1999 and endorsed during the Inter-Ministerial conference of 2000. The first regional Indicative Master Plan on Power Interconnection was signed in 2002, recommending the building of an interconnecting grid, hence of transfer capacities, in order to benefit from a form of “energy pooling”.

¹⁴⁸ Energy Sector in the Greater Mekong Subregion, ADB Evaluation Study, Reference Number: SAP: REG 2008-51, December 2008

While the Master Plan was about recommendation, higher level of commitment from participating countries came with the signature in November 2002 of the “Inter-Governmental Agreement on Regional Power Trade in the GMS” (IGA). The IGA provided an institutional framework. GMS members committed to promote regional power trade, and to take steps toward a competitive electricity market. Two years later, after all countries had ratified the IGA, in 2004, a regional body was formed, the Regional Power Trade Coordination Committee (RPTCC), with responsibility to coordinate efforts toward implementation of the power trade scheme. The RPTCC has two sub-groups: the Focal Group (FG) and the Planning Working Group (PWG). The RPTCC drafted the Regional Power Trade Operating Agreement (RPTOA), as well as it defined a various range of actions to be undertaken in order to achieve power trade objectives. Under the IGA, a transmission line project linking Cambodia and Vietnam was notably initiated as of 2003, despite later difficulties in the project implementation¹⁴⁹.

In July 2005, a landmark event was the signature of a memoranda of understanding, the MOU 1 (Memorandum of Understanding on the Guidelines for the Implementation of the RPTOA – Stage #1) thus approving the drafted RPTOA. It resulted in an agreement on guidelines for Bilateral Agreements and it defined responsible entities (service supplier). However, by 2008, barely any progress having been made toward further country-to-country power transactions, the MOU 2 was signed in March 2008 (Memorandum of Understanding on the Road Map for Implementing the Greater Mekong Subregion Cross-Border Power Trading). The MOU provided an indicative timeline (road map) for setting up the Stage 1 of the regional power market development, covering a five-year period to

¹⁴⁹ Trading away the future – The Mekong Power grid, International Rivers Publication, Sept. 2006, <<http://www.internationalrivers.org/files/attached-files/mekongpowergrid092506.pdf>>

2012, encompassing investment environment and power sector reform¹⁵⁰. This master plan is designated under “Regional Indicative Master Plan on Power Interconnection” (RIMPPI). The MOU also defined 7 studies to be conducted in order to better comprehend challenges ahead. However, the realizations of these studies didn’t imply concrete development of bilateral trading¹⁵¹. Finally, in 2013, signatures were completed for the creation of the RPCC (Regional Power Cooperation Centre). The RPCC is an institution with legal entity, fully dedicated to managing cross-border power infrastructures and trade, fully owned by the GMS countries.

4.2.2. Gradual Approach

Regional power market development has been defined according to 4 stages, agreed with the two MOUs. Currently, the GMS regional power trade is at stage 1 out of the 4 stages identified, with bilateral trade via power purchase agreements (PPA), and it is largely opportunistic. Only country-to-country transactions are possible. Those PPAs imply agreement on the price of purchase, as well as supply traded. This is negotiated on a bilateral basis. Stage 2 requires cross-border capacities, as it encompasses the possibility of power trade between any two countries in the region using third-country transmission facilities, relying on surplus capacity. Stage 3 plans the development of interconnections for further cross-border trading, and the possibility for non-national actors to trade power. The stage 4, far ahead, is the establishment of a competitive power market.

These four stages follow a “gradual approach” to enable an evolution toward a regional market. In the near term, following the signature of MOU 2, with development of small

¹⁵⁰ World Bank. 2006. Options for the Structure of the GMS Power Trade Market: A First Overview of Issues and Possible Options. ESMAP Technical Paper 108/06. Washington, DC. p.6

¹⁵¹ Review of the Greater Mekong Sub-Region Regional Power Trade, Final Report, SIDA Review 2011:9, 2011.

scale trade (borders exchanges). The intermediate term is expected to bring more bilateral trade, with a move toward investment in transmission and interconnections, and expansion of the connections through long and short-term contracts. The long-term objective is the formation of a strong network, with a central regional market administration.¹⁵² Yet, the stages 3 and 4 are little detailed, documented and their modalities haven't been settled upon.

<Table 7: Summary of GMS institutions evolution>

Year of launching	Institution
1995	EPF (Electric Power Forum)
1998	EGP (Experts Group on Power Interconnection)
2002	IGA (Inter-Governmental Agreement)/ RPTCC (Regional Power Trade Coordination Committee)
2005	RPTOA (Regional Power Trade Operating Agreement) / MOU-1 (Memorandum of Understanding on the Guidelines for the implementation of stage-1)
2008	MOU-2 (Memorandum of Understanding on the Road Map for Implementing the GMS Cross-Border Power Trading)
2012	WGPG (Working Group on Performance standards and Grid code) / WGRI (Working Group on Regulatory Issues)
2013	RPCC (Regional Power Cooperation Center) (creation undergoing)

¹⁵² World Bank. 2006. Options for the Structure of the GMS Power Trade Market: A First Overview of Issues and Possible Options. ESMAP Technical Paper 108/06. Washington, DC. p.6 & 67

The first two initiatives actually only provided a rationale for power interconnections, and set the basis for regional planning. Frameworks for operational harmonization started with the first inter-governmental agreement signed in 2002.

The two following sections will discuss aspects of cross-border power trade for which institutional arrangements are needed: operational capacity and regulatory framework. Relevance for the private sector participation should be assessed as well.

4.2.3. Operational capacity for interconnection

Several barriers to be lifted and which require coordination between participants (countries) of power trade have been identified. These are specific troubles to solve in order for the private sector to project its cross-border impact.

- Right allocation of the existing capacity
- Capacity purchases: purchase process may need to be facilitated so that supply meets demand
- Lack of transmission capacity – if so, there is a loss of energy
- Eventual losses should be tracked to render the system more efficient
- Synchronization issue between two systems (regarding voltage standards – for example, Cambodia voltage is 230 V while Vietnam standard is 127 V)
- Grid code (technical requirements for facilities connected to the electric network to ensure proper functioning of the electric system) harmonization, in order to get truly “regional” grid
- Security standards and operational protocols

For now, dedicated interconnectors associated with export projects are controlled by the dispatch centers of the importing country; there is no regional dispatch authority. Barriers to interconnection mainly regard defaulting transmission capacity. Poor transmission capacity both originates from domestic capacity and transmission capacity at the border. It is important to ensure as well that integrated infrastructures share common service standards at the physical level. As a consequence, there is a need for a common framework to deal with interconnection standards.

Technical issues require coordination, which has to translate into dedicated institutions. Within the Regional Power Trade Coordination Committee, a **Working Group on Performance Standards and Grid Code (WGPG)** was agreed to be created in 2011¹⁵³. The duties of the WGPG encompass the several barriers to interconnection enunciated above. Definition of technical and operational criteria, data exchange systems between TSO, procedures for scheduling and balancing power transfers, and a broad range of technical criteria are listed to be defined by the Working Group.

Its first task, undergoing, was to analyze the gap on technical performance standards and grid code access, which results were presented during the 14th RPTCC Meeting in June 2013¹⁵⁴. This gap analysis led to suggest a plan for harmonization, and WRPG is now moving to a study on transmission regulation, next on the agenda¹⁵⁵, to define the policy

¹⁵³ Summary of Discussions, Fourteenth Meeting of the Regional Power Trade Coordination Committee (RPTCC-14), Kunming, Yunnan Province, People's Republic of China, 18–19 June 2013, p.2. Accessible at: <http://www.adb.org/sites/default/files/pub/2013/gms-rptcc14-summary-discussions.pdf>

¹⁵⁴ Ibid. Point 26.

¹⁵⁵ Anthony Jude, Greater Mekong Subregion (GMS) Market Coordination Regional & Sustainable Development Department, Sustainable Energy Training, Bangkok, Thailand, 27 November 2013 (Presentation). Accessible at: https://www.iea.org/media/training/bangkoknov13/Session_9a_ADB_GMS_Regional_Market.pdf

on communication infrastructure, on data exchanges, on scheduling and accounting, and on coordinated operational planning.

While this is all well incorporating the challenges identified, WGPG is nonetheless a working group, leaving much room for question about the Mekong countries capacities to reform and transform according to the WG recommendation. How to enforce common grid code, security standards, tracking of losses, without the establishment of a dedicated authority?

4.2.4. Institutional capacity: lifting the barriers to cross-border trade

The importance of institutional arrangements to facilitate cross-border trade in electricity has been the object of a specific study by the World Bank released in June 2014¹⁵⁶. In 2012, Amnuay Thongsathitya (Chief Inspector General, Ministry of Energy, Thailand) was acknowledging that regional cooperation among nations and their neighbors is an endeavor of inherent complexity and risks. Greater harmonization of standards between countries is the hurdle to greater cooperation among countries. In order to reduce uncertainties and risk, a formal institutional process is necessary¹⁵⁷. The inadequacy between grid infrastructure and regional authorities' coordination as per identified by Steinbach (2013) should be assessed in the light of private participation to the grid infrastructure.

¹⁵⁶ Oseni, Musiliu O., Pollitt, Michael G., Institutional Arrangements for the Promotion of Regional Integration of Electricity Markets, International Experience, Policy Research Working Paper No. 6947, The World Bank

Development Research Group, Environment and Energy Team, June 2014

¹⁵⁷ Innovative generation powering a prosperous Asia, A report from the Pacific Energy Summit in Hanoi, March 20–22, 2012, Accessible at : http://www.nbr.org/downloads/pdfs/eta/PES_2012_summitreport.pdf , p.29

From section 4.1., a number of issues impacting the private sector participation, to which institutions should answer, have been identified: conditions for private sector entry; compatibility of power sector (market) structures; third-party access regulations¹⁵⁸ and synchronization of regimes for approval of the private sector involvement¹⁵⁹; regional power infrastructure requires coordinated power pricing for uniformity on cross-border tariffication¹⁶⁰; effective cross-border trading contracts¹⁶¹. All of this should be a reflection of harmonized regulatory and policy framework.

The need for organizations and rules for market operation results from the multiple regulatory decisions affecting more than one country. Indeed, the cross-border regulatory decisions include: license to the transmission company, license to the importer, license to the exporter, sales and purchases agreements, wheeling agreement¹⁶² (in the hypothetical situation that transmission of power goes through a third country). Institutions are also expected to encompass this whole regulatory spectrum.

According to the World Bank¹⁶³, the basic of regulatory harmonization is “a basic minimum set of regulatory principles, for example - transmission network access and pricing, congestion management and dispute resolution”, which needs to be “designed

¹⁵⁸ Best Practices in Investment for Development, How to utilize FDI to improve infrastructure – electricity Lessons from Chile and New Zealand

¹⁵⁹ Cross-Border Infrastructure Tool Kit, Program description, PPIAF & ADB, 2007. P.12. Accessible at: <https://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/Cross-Border-Infrastructure-Toolkit/Cross-Border%20Compilation%20ver%2029%20Jan%2007/cross-border%20booklet%2029%20jan%2007.pdf>

¹⁵⁹ Tenenbaum, B., and Izaguirre, A. K., Private participation in electricity, GridLines Note No.21, PPIAF, May 2007, p.3

¹⁶⁰ Eberhard, A., Rosnes, O., Shkaratan, M., Vennemo, H., Africa’s Power Infrastructure - Investment, Integration, Efficiency, The International Bank for Reconstruction and Development/The World Bank, 2011, p.49

¹⁶¹ Eberhard, A., Rosnes, O., Shkaratan, M., Vennemo, H., 2011

¹⁶² *Wheeling* designates the transportation of power over transmission lines.

¹⁶³ Accessible at: <http://siteresources.worldbank.org/INTTHAILAND/Resources/333200-1211794042917/gms-wb-strategy.pdf>

and implemented to facilitate an enabling framework for a regional investment perspective in the longer term”. Such basic regulatory principles are thus a key issue to be addressed.

Existing GMS institutional development should be reviewed according to **five criteria of harmonization**, defined from all the above discussion, and which impact how private sector could potentially more efficiently develop appropriate power infrastructures, and operate imports and exports of power.

4.2.4.1. Institutional capacity to manage cross-border power trade regionally

The body which coordinates the implementation of power trade is the RPTCC, representing all countries. Currently the RPTOA sets out guidelines for bilateral cross-border agreements, creating minimum common standards to facilitate future regional trade. Yet, the RPTOA does not have enforcement capacity regionally.

Current institutions are mostly framing bilateral arrangements already initiated (“building on” bilateral arrangements) rather than designing a new market or investment environment. The MOU-1, signed within the RPTOA draft, set rules and guidelines for bilateral power trading, but did not suggest any market institution design. A lot of emphasis was made on coordinating national governments instead of creating regional institution and regulation. Later on, the MOU-2 launched a study on power rules,

including resolution mechanisms for disputes outside existing PPAs by 2010 for implementation during Stage 1¹⁶⁴.

These moves were significant to build capacity to manage cross-border power trade, but none had translated into a physical institution to refer to, until the new RPCC [Regional Power Coordination Center]. The establishment of RPCC tackles the need for a permanent based institution to overview regional power trade. So far, meetings were rotating between member countries. Following the 14th meeting of the RPTCC back in June 2013, a number of milestones were expected to be achieved in the same year, including “the establishment of the RPCC (including the finalization of its Articles of Association), and the continued investment of development partners in sustaining these initiatives”¹⁶⁵. The RPTCC was expected to meet institutional expectations and provide “a sound institutional framework for RPCC”¹⁶⁶. Currently, the RPCC is actually still “in progress”. The issue during the 16th GMS Regional Power Trade Coordination Committee Meeting in June 2014 was the bids submitted from countries to become host of the RPCC headquarter. Curiously, this has been the sole main issue discussed in the past two RPTCC Meetings. The sound institutional framework to be built hasn’t been the object of any report of progress. The RPCC may well confirm Aalto (2014) postulate that states’ sovereignty, in East Asia, hamper integration, which is detrimental to power trade.

¹⁶⁴ Draft TORs for the working groups on “regulatory issues” & “performance standards and grid code”, 12th Special Meeting of the RPTCC in Bangkok, 28-29 March 2012 (Presentation by M. Caubet). Accessible at: <https://fr.scribd.com/doc/95828818/GMS-RETA-6440-Draft-TORs-for-Working-Groups-on-Regulatory-Issues-and-Performance-Standards-and-Grid-Code>

¹⁶⁵ Summary of Discussions, Fourteenth Meeting of the Regional Power Trade Coordination Committee (RPTCC-14), Kunming, Yunnan Province, People’s Republic of China, 18–19 June 2013, p.2. Accessible at: <http://www.adb.org/sites/default/files/pub/2013/gms-rptcc14-summary-discussions.pdf>

¹⁶⁶ Summary of Discussions, Fourteenth Meeting of the Regional Power Trade Coordination Committee (RPTCC-14), Kunming, Yunnan Province, People’s Republic of China, 18–19 June 2013, p.2. Accessible at: <http://www.adb.org/sites/default/files/pub/2013/gms-rptcc14-summary-discussions.pdf>

4.2.4.2. Independent regulator, especially regarding transmission

The RPTCC role had been defined by the IGA to provide general policy and day-to-day management recommendation. With the increasing bilateral power trade, however, further institutionalization was required, including rules (or protocol) to access the transmission network¹⁶⁷. The GMS has worked toward the development of RPCC, conceived as an independent legal entity, including all entities connected to the GMS Power System. There could be a significant progress toward independent regulation with the RPCC, but it will not be matched with further liberalization (part of the stage 4). Transmission is planned to remain sovereign.

It has been highlighted by the ESMAP that while a Regional Regulatory Board was to be established from the Stage 1 on, to encourage consistency and to restrict the national regulations inhibiting the cross-border power trade, such Regulatory Board was not implemented, thus not even possibly laying the basis for a future Regional Regulatory Agency¹⁶⁸. The regulatory functions are still operated by national regulatory agencies or ministries, depending on the country. A cross-border power infrastructure must thus deal with a double set of regulations.

4.2.4.3. Market structures, conditions for private sector entry

It was discussed previously that market structures are differentiated among the GMS-4, and that so far it is considered a distant objective (stage 4, in the gradual approach) to

¹⁶⁷ Shrestha, Omkar L., Chongvilaivan, Aekopol, Greater Mekong Subregion – From Geographical to Socio-economic Integration, ISEAS Publishing, 2013, p.221

¹⁶⁸ The Potential of regional power Integration – Greater Mekong Subregion Transmission and Trading Case Study, ESMAP Briefing Note 004/10 , June 2010

harmonize markets through the liberalization of generation and distribution segments, in order to create a competitive regional market. We see here that the cross-border nature of infrastructures to develop the power grid is conflicting with “institutionalized” market structures boundaries.

4.2.4.4. “Tariffication”

Currently access to transmission systems is negotiated on a case by case basis. Structuring cross border power tariff is not operated by any institutional arrangement in the Mekong yet. There is no regional transmission operation system or tariff coordination initiative, as tariffication for now is settled within bilateral agreements. The WGRI study priority, as defined in November 2012 (and according to ADB top priority), is to define the cross-border trade pricing mechanism¹⁶⁹. However, WGRI’s enforcement capacity, in the event of a recommendation formulation, is dubious.

4.2.4.5. Commercial standards as reflective of harmonized regulation and policy?

It is the RPTCC’s task is to establish regional trade arrangements to be adopted by the GMS countries for cross-border power trade, which it did through the RPTOA¹⁷⁰. The RPTOA defines rules for regional power trade. So it does settle commercial standards. The guidelines can be summarized as follow:¹⁷¹

¹⁶⁹ Summary of Discussions, Fourteenth Meeting of the Regional Power Trade Coordination Committee (RPTCC-14), Kunming, Yunnan Province, People’s Republic of China, 18–19 June 2013, ADB, point 29. Accessible at: <http://www.adb.org/sites/default/files/pub/2013/gms-rptcc14-summary-discussions.pdf>

¹⁷⁰ *Ibid.*

¹⁷¹ *Ibid.*, p.41

- Communications and coordination protocols are established.
- A database of transactions should be held by transmission system operators (TSOs)
- The contracting parties agree on a transit charge (if any)
- Monthly billing
- Dispute resolution recommendations

The guidelines do not include scheduling nor operation procedures. Also, as indicated in point 4.2.4.4., RPTOA doesn't tackle pricing issue. Thus in principle, pricing may differ much from one contract to another. Indeed, the RPTOA commercial guidelines are designed for bilateral agreement, thus reflective of a harmonization which won't favor future liberalization.

While WGPG doesn't show much internal conflict with a focus on technical coordination, WGRI entails much more political views on the future of power trade and the stand-still of its progress were subject to debate on the 14th meeting of the RPTCC. As noted in the point 30 and 33 of the meeting report:

*“30. Chair, WGRI observed that there has been minimal movement since the 2nd Meeting of the WGRI at Yangon, Myanmar in November 2012. **PRC reasoned that WGRI's TOR and role is not clearly defined because the GMS countries are still unclear on the path towards a regional power market. All countries submitted responses to a questionnaire on regulatory barriers, and are presently waiting on the results.**”¹⁷²*

¹⁷² Summary of Discussions, Fourteenth Meeting of the Regional Power Trade Coordination Committee (RPTCC 14), June 2013, ADB, <http://www.adb.org/sites/default/files/pub/2013/gms-rptcc14-summary-discussions.pdf>

*Is the basic set of the World bank satisfied?*¹⁷³

There are a number of institutional bodies which have been settled to frame the GMS power trade. Those rather ensure coordination than harmonization, but the recent WGRI and WGPG are currently studying harmonization options and shared standards, especially on a technical aspect, key to the operation of power trade. For now, while many guidelines have been formulated, regulation is still quite sovereign. The “right combination of regulation” identified by Oseni & Pollitt (2014) that would match private sector participation has yet to be developed.

Actually, when considering the example given for the basic set of regulation by the World Bank –transmission network access and pricing, congestion management and dispute resolution, we see that it is all at a study stage, since regulation is held nationally though theoretically responding to guidelines and MOU applying to the whole region. An issue can then originates from the lack of political will to adjust with other neighboring countries. As it was noted in the RPTCC 14th summary of discussions (point 33):

*“Chair, RPTCC-14 recognized that **harmonizing regulations and regional technical standards** are big tasks not only in the GMS but in the entire ASEAN. ADB added that there have been several studies completed under RETA 6440, but **GMS countries have a weak absorptive capacity for them.**”*¹⁷⁴

The extent to which WGRI and WGPG recommendations, and the new RPCC, will manage replication and harmonization of standards, is yet to be observed.

¹⁷³ “basic minimum set of regulatory principles, for example - transmission network access and pricing, congestion management and dispute resolution”

¹⁷⁴ Summary of Discussions, Fourteenth Meeting of the Regional Power Trade Coordination Committee (RPTCC-14), Kunming, Yunnan Province, People’s Republic of China, 18–19 June 2013, ADB, <http://www.adb.org/sites/default/files/pub/2013/gms-rptcc14-summary-discussions.pdf>

We find here a conundrum: harmonization horizon is, according to the GMS Road Map, encompassed in stage 4, along with market liberalization. Yet, in order to reach stage 4, further costly development of the grid has to be undertaken, possibly by private investment, which requires harmonization.

4.2.5. Engaging the dialogue with the private sector

Harmonization and institutions building power sector regional structure and environment for private sector participation would entail one last dimension: engaging dialogue with the private sector and including private sector in policy making (the last being much more disputed). For instance, dialogue can take shape in the institutionalization of a private sector unit in one of the committee or group managing the power program in the GMS.

A key organization to engage private sector in the GMS is arguably the Greater Mekong Subregion Business Forum (GMS-BF), a multi-country, independent, non-governmental and not-for-profit organization, and a joint initiative of the Chambers of Commerce of the six GMS countries. It is supported by the ESCAP¹⁷⁵ and the ADB. Its members include multinational companies operating in the Mekong Subregion. An official activity of the GMS-BF is to “provide feedback to senior officials and leaders of the GMS countries on trade and investment”¹⁷⁶. Also, so far, the GMS-BF has concentrated efforts in the implementation of the Cross Border Transport Agreement (CBTA), the implementation of GMS Freight Transport Association, and in promoting legal frameworks favorable to business operations. However, this instance is operating from private sector toward

¹⁷⁵ The United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) is the regional development arm of the United Nations for the Asia-Pacific region”. See <https://business.un.org/en/entities/52>

¹⁷⁶ Activities statement, <http://gmsbizforum.com/>

governments, rather than being an involvement of private sector within public-led institutions.

In 2008, the GMS-BF organized the GMS Business and Investment Dialogue (BID) in Vientiane, within the GMS Summit, with the target to “enjoin the private sector in GMS discussions and endeavors”¹⁷⁷. And yet, the dialogue was actually mainly a head of states dialogue, proof of the mismatch between the awareness for private investment needs, and the actual involvement of the private sector in discussing development options. Also, after a momentum in 2008, the GMS-BF is going under quite a silent phase.

Only two Forums on Business Participation were held in 2005 and 2009 within GMS Summit, as an internal initiative to hold a meeting between government and business representatives.

Discussing the involvement of the private sector in decision and strategy process for the development of the power infrastructure, a specific case should be made of the PPP model. What is the prospect for regional PPP framework, which would facilitate cross-border projects?

4.2.6. Case for PPP – Cross-border rationale

Section 4.1.3. underlined how PPP specificities raise the level of deals complexity by treating with public entities, especially as government are still weak. And yet, in the event of a cross-border network, another problem arouses, as identified by the PPIAF, which is

¹⁷⁷ Leaders of GMS Share Views with Business Community on Trade and Investment, 23 May 2009, Asean-China Free Trade Area website, accessible at: <http://www.asean-cn.org/Item/591.aspx>

the lack of coordination and harmonization of the PPP rationale between countries involved in the future power trade scheme.

We discussed in the previous sections how, so far, projects encompassing power trade in the GMS-4 were established within an *ad hoc* frame. However, as stated in a PPIAF/World Bank report on ways to engage the private sector in PPP in emerging markets¹⁷⁸, successful PPP require time and effort, but preferably by establishing a framework for PPP implementation rather than an *ad hoc* administration.

As noted by PPIAF searchers, private investors will always look at the legal and regulatory framework when they want to ensure the viability of a long-term PPP contract¹⁷⁹: clarity about the price policy, nature of the contract, what institutions to oversee the project, determination of who approves what and when... All those dimensions get increasingly complex in the event of a cross-border infrastructure.

Risk mitigation and risk allocation, as it was previously described, could need to be coordinated with two public entities in the event of a cross-border project, as two countries would be engaged in contractual relation with a private entity. The risk allocated to the public entity, such as guarantees, funding, land acquisition, adds to the risk sharing complexity, and advocates for a common framework for cross-border power infrastructure. The risk allocation design is even more important that, in the case of cross-border infrastructure, it must seek to avoid a free-rider situation for one of the public entities involved in the project. The project-risk is higher in the case of cross-border infrastructures, in the absence of a single jurisdiction. Since cross-border infrastructures

¹⁷⁸ Farquharson, E., Torres de Mästle, C., and Yescombe, E.R.; with Encinas, J., How to Engage with the Private Sector in Public-Private Partnerships in Emerging Markets, PPIAF / World Bank, 2011, p.26

¹⁷⁹ Ibid, p.17

can face larger risks than national infrastructure¹⁸⁰, the coordination and harmonization of government's framework will matter to reduce transaction cost, all the more that they have an impact on the long-term cash flow of the project¹⁸¹.

What is the prospect for the establishment of regional guidelines consistent with countries specificities, in order to better encompass cross-border infrastructures? Actually quite low, it seems. While some have emphasized the importance of PPP guidelines applicable to the whole ASEAN¹⁸², and the idea of a Regional PPP Center of Excellence, such regional vision hasn't been voiced for the GMS. A Public Private Partnership (PPP) Technical Workshop entitled "Towards Tailored Approach to Establishing PPP Guidelines in South East Asia" was held end of August 2014 jointly by the Lao Ministry of Planning and Investment, but again, the political will was merely voicing broad (and quite anonymous) South-East Asian interest for private-public partnership.

A Forum for the Promotion of Public-Private Cooperation in the Mekong Region was held in February 2014, displaying a regional view of the Public-Private partnership challenge. However, this forum, first of its kind, was promoted by the Government of Japan (Ministry of Foreign Affairs), within a summit of Japan-Mekong cooperation¹⁸³. In reaction to this, the 4th Mekong-Republic of Korea Foreign Ministers' meeting held in July also presented the bilateral relation as a "driving force of private-public

¹⁸⁰ Cross-Border Infrastructure Tool Kit, Program description, PPIAF & ADB, 2007. Accessible at: <https://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/Cross-Border-Infrastructure-Toolkit/Cross-Border%20Compilation%20ver%2029%20Jan%2007/cross-border%20booklet%2029%20jan%2007.pdf>

¹⁸¹ Ibid, p.9

¹⁸² Economic Research Institute for ASEAN and East-Asia, Press release, *ASEAN Connectivity, Region's Future Economic Backbone*, accessible at: http://www.eria.org/Press%20Release%204th%20ASEAN_Connectivity%20Symposium.pdf

¹⁸³ Chair's Summary on the Forum for the Promotion of Public-Private Cooperation in the Mekong Region, The Fourth Mekong-Japan Meeting, Tokyo, Japan, 18 February, 2014. Accessible at: <http://www.mofa.go.jp/files/000028293.pdf>

cooperation”¹⁸⁴. So far, the promotion of a regional discourse on PPP has taken shape through developed countries partners’ initiatives, rather than within the GMS region. The ownership of PPP projects in GMS-4 countries can thus be questioned, and so is the regional consensus.

Conclusion

What conclusions can we draw from the regional institutional framework and regional facilitation for private sector to step in cross-border infrastructures? The requirements for effective and simplified participation of the private sector in power trade-related infrastructures are summarized in three points:

- Harmonization of technical standards and information sharing between participants
- Formulation of regional institutional arrangements for cross-border electricity trade, including financial incentives, tariffs and market-entry modalities
- Harmonization of legal and regulatory framework for cross-border power interconnection and trade

WGRI and WGPG stand for tools which finally give shape to the commitments taken by countries within the IGA signed in 2002, “commitments to advance power trade and harmonize their power systems development with interconnection in mind”¹⁸⁵.

¹⁸⁴ Mekong - Republic of Korea Plan of Action (2014 – 2017), accessible at:

<http://www.korea.net/koreanet/fileDown?fileUrl=/upload/content/file/1406780276688.pdf>

¹⁸⁵ ADB News, Mekong River Countries to Start Preparing for Regional Power Trading Arrangements, 5 July 2005, accessible at: <http://www.adb.org/news/mekong-river-countries-start-preparing-regional-power-trading-arrangements>

Especially, technical harmonization is now the object of comprehensive study to lift some of the barriers to cross-border power trade. The regulatory situation is more debatable. While a lot has been implemented, it mostly helped to build bilateral agreements, and settle guidelines for case by case contracts. There is no regional regulation of market power. The development of interconnections is actually on the agenda of the stage 3 of the regional power market development, as defined in the RPTOA, and the harmonization of a competitive market a faraway objective of stage 4.

But, while the regional electricity market has been set as a long-term objective in the GMS, when considering the further integration of the private sector to the region capacity building, it seems that market harmonization is more of a *prerequisite* for cross-border power trade private investors to step in more easily, even at the stage of bilateral trade agreements. Contrasts are stark in the region. Vietnam has issued a road map to liberalization since it intends to gradually achieve competitive generation segment, competitive wholesale, and competitive retail in the long run. However, Thailand, after some attempts, has put liberalization target on hold and the current road map relies on a national single-buyer structure. Hence, calling for further participation of the private sector for now cannot but go through partnership with the public entity, but the PPP so far is not a regional approach. “Regional” elements to back up private sector investment aren’t much developed, despite the cross-border aspect of power trade.

4.3. Development of the private sector and regional development objectives: any contradiction?

Another element of understanding of the challenges of private sector participation in power trade development is the persistence of perceived and feared impact of the private sector involvement in delivering a basic commodity such as electricity. It is a classic tug-of-war of interests between profit and ethical considerations in doing business. The objectives of private sector are largely perceived at odds with the delivery of cheap electricity to the largest number. Adding to that, building power trade capacity is perceived as falsely answering development objective of the GMS also because of the environmental injustice created, to which the private sector is not willing to be accountable for.

4.3.1. Price

The necessity of cost-reflective tariffs for successful private investment in the distribution segment in particular has been underlined by Izaguirre and Tenenbaum¹⁸⁶. Cost-reflectiveness is yet an imperative not only for the distribution segment, but overall an imperative for private sector to forecast a profitable activity, keeping in line with market principles. However we see here that this may contradict the ‘developmental’ objective of power trade, as security for the private investor seems largely incompatible with ensuring electricity at a fair price to all. Determining tariffs in favor of private companies can lead to higher market price of the electricity as a reflection of “real” cost, whereas the state control is often likely to maintain artificially low prices for public goods such as

¹⁸⁶ Izaguirre, Ana Karina, Tenenbaum, Bernard, Gridlines No. 21, Public-Private Infrastructure Advisory Facility (PPIAF), May 2007

electricity. In the GMS-4, it is unclear how cost-reflective electricity tariffs are¹⁸⁷. Still, in order to be politically acceptable, the move to cost recovery (price increase) should be gradual and must be accompanied by efforts to reduce inefficiencies¹⁸⁸.

In any case, Vives (1997) pinpointed that commercial and social goals of infrastructure should not be mixed as a command for successful private participation in infrastructure¹⁸⁹. The private sector may have control over costs, revenues and investments of the strictly commercial activities; however it shouldn't undertake income redistribution concerns. A suggested solution to the apparent contradiction may lie in subsidized tariffs for the very poor (instead of subsidies to the industry), which mixes both cost-reflective tariffs and social impact considerations. In Bhutan, for instance, export revenue has been directed toward promoting low energy prices and access to energy in remote areas¹⁹⁰. Trade itself is expected to bring economic activity to local areas, while reducing the price of energy goods.

Yet, if the state is to provide subsidies to poorest consumers, then the benefits of the private sector (supposed to make up for the financial gap) may be nuanced. In the meantime, as service is provided by the private sector, customers expect an increase in the quality of the service (here, delivery of power). Managing this relationship entails accountability from the private sector part.

The GMS IGA signed in November 2002 included three key objectives:

¹⁸⁷ The Potential of regional power Integration – Greater Mekong Subregion Transmission and Trading Case Study, ESMAP Briefing Note 004/10 , June 2010, p.12

¹⁸⁸ Bhatia, Bhavna & Gupta, Neeraj, Lifting constraints to public-private partnerships in South Asia - The way toward better infrastructure services, GridLines Note No. 6 – May 2006

¹⁸⁹ Vives, Antonio, Private Infrastructure: Ten Commandments for Sustainability, The Journal of Project Finance (Spring), 20-30, 1997

¹⁹⁰ Ibid

- Cost minimization in planning and operation of power systems
- Full cost recovery and equitable sharing of benefits of investments
- Provision of reliable and economic electricity to all.

So the tension between the need for cost-reflectiveness and the access to electricity for the larger number is encompassed by the IGA resolutions. Yet, the responsibility for policy direction was later assigned to relevant ministers in each GMS country¹⁹¹. Hence, **countries are left to conduct domestically the recovery of cost-reflectiveness. It reinforces the contradiction with the cross-border nature of power investments.**

4.3.2. The incorporation of environmental and social issues: environmental injustice and private sector

The sub-objective of increasing power generation capacity in developing power trade in the GMS is closely associated with hydropower development, along with further extractive activity for coal and gas power resource development. By stepping in this power generation capacity development, private actors become responsible for environmental damage and social damage, sources of numerous critics of the GMS power grid ambitions.

The threat for environment and local livelihood are numerous and many authors have arouse concern over hydropower development sustainability, given the perturbation of the

¹⁹¹ World Bank Resources, March 2007 presentation on GMS power trade program, accessible at: http://siteresources.worldbank.org/INTTHAILAND/Resources/333200-1089943634036/475256-1151398858396/2007mar_gms_power-trade.ppt

river flow and consequent threat for food security (Goh (2004)¹⁹², Pearse-Smith (2012)¹⁹³, Belay et.al., (2009)¹⁹⁴). There is also an extreme sensitivity on environmental and resettlement issues for dam reservoir schemes.¹⁹⁵ According to Middleton (2012), the case of energy trade between Thailand and two energy providers, Myanmar and Lao PDR, is an example of environmental injustice¹⁹⁶. It refers to the flaw in the distribution of environmental harms, benefits and risks stemming from an activity – such fair distribution could be designated as distributive justice (Pederson, 2010¹⁹⁷). In the case discussed by Middleton¹⁹⁸, his main argument is that while Thailand benefits from electricity imports generated by hydropower plants in Lao or Myanmar, those countries alone face environmental and social harm from the hydropower activity, while Thailand's electricity utilities and construction companies are not bearing any social cost. We understand here that the damage and its justice issue are directly linked to the cross-border nature of the power generation project. Supposedly, the incorporation of social and environmental issue is an inherent part of ADB guidelines, at least on the strategic agenda¹⁹⁹. Social and environmental impact assessments (the most commonly known

¹⁹² Goh E., China in the Mekong River basin: the regional security implications of resource development on the Lancan Jiang, IDSS, Nanyang Technological Institute, 2004

¹⁹³ Pearse-Smith, S. W. D., Lower Mekong Basin hydropower development and the trade-off between the traditional and modern sectors: 'Out with the old, in with the new', The Asia-Pacific Journal: Japan Focus, Vol 10, Issue 23, No 1, June 4, 2012

¹⁹⁴ Alebel Abebe BELAY et al., The Challenges of Integrated Management of Mekong River Basin in Terms of People's Livelihood, Journal of Water Resource and Protection, 2010, 2, 61-68

¹⁹⁵ Head, Chris, Financing of Private Hydropower Projects, World Bank Discussion Paper No. 420

¹⁹⁶ Middleton, C. (2012). Transborder Environmental Justice in Regional Energy Trade in Mainland South-East Asia. ASEAS - Austrian Journal of South-East Asian Studies, 5(2), 292-315.

¹⁹⁷ Pedersen, O. W. (2010). Environmental principles and environmental justice. Environmental Law Review, 12(1), 26-49

¹⁹⁸ Ibid.

¹⁹⁹ The Greater Mekong Subregion Economic Cooperation Program Strategic Framework 2012–2022, Asian Development Bank, 2011, p.5

designation being the SEA, for Strategic Environmental Assessment) have been more recently incorporated in ADB financed; GMS power grid- related projects²⁰⁰.

Assessments such as SEA are meant to enhance best practices in hydropower development, and provide a “sustainable” framework for companies getting involved in the hydropower business. A SEA would look into the net benefits and their distribution of the projects, along with the risks. SEA can directly concern private sector activity. It is applicable to any projects undertaken which activity is allegedly having an impact on environment (use of resources, landscape reshaping, and so on). It is seen by the OECD as a major tool to link development and environment, to build public engagement and reduce mistakes²⁰¹. The two main regional coordinating agencies for assessing and managing environmental impacts are the Mekong River Commission (MRC), and the GMS Environment Operations Center (EOC). Those SEA, however, are not legally binding. Nonetheless, growing concern for environmental impact of the generation capacity development had led companies to consider more seriously such assessments. While it is a necessity to base investments on realistic opportunities and risks, it may also be an operational obstacle for private investors since it can delay the project start and flaw the initially calculated commitment²⁰².

²⁰⁰ Eurasia Review online, China and its southern neighbors: Issues in power connectivity, October 18, 2011, accessible at: <http://www.eurasiareview.com/18102011-china-and-its-southern-neighbours-issues-in-power-connectivity/>

²⁰¹ Applying Strategic Environmental Assessment, Good Practice guidance for development co-operation, DAC Guidelines and Reference Series, OECD Publishing, 2006, p.41-48

²⁰² Such consequences have been identified for other industries with similar features with hydropower industry, such as construction industries. The case of construction industry in Taiwan notable, gives some insight: “a number of major construction projects have been delayed or blocked, some spurring violent public protests.” Wang, Ming-shen, and Huang, Gow-liang, Environmental Impact Assessments for major construction projects in Taiwan: Problems and solutions, Pacific Rim Law and Policy Journal, Vol. 3, p.145-176, 1994

The question of how private sector can be held accountable for environmental sustainability is a debated topic in the Mekong region. Companies are now expected to lift their social and environmental standards to ensure more sustainable projects²⁰³, whereas early comers were relatively deprived of such monitoring by international community and organizations (such as the IFC and the World Bank, as financial sponsors). The difficulty being, in the case of power trade oriented projects, and as highlighted by Middleton, that the **impacts are “cross-border” impacts**. Hydropower projects on the Mekong raise concerns partly because the hydropower activity upstream is expected to have negative consequences downstream, in a different country from the one in which the project was developed and the one which is importing the generated power (this is the case of power produced in Lao and sold to Thailand, with a resulting disturbed eco-system in Cambodia).

The generalization of environmental and social assessment is both an opportunity and a hinder for private sector. On the one hand, it provides more systematic mechanism for corporate social responsibility approach, but on the other hand, it adds to the pre-investment requirements and accountability requirements for the private actor, hence adding up its costs. This might result either in a harmful bypassing of the SEA requirements, or in deterrence to private sector participation.

²⁰³ Involving the Private Sector in Mekong Hydropower Development, IFC News, accessible at: http://www.ifc.org/wps/wcm/connect/lao_ext_content/sustainable_hydropower/sustainability_hydropower/news/involving+the+private+sector+in+mekong+hydropower+development

4.4. Conclusion: Assessing the private sector capacity to contribute to the Power Trade objective

For power trade to happen, differences in legal systems and difference in trade rules have to be harmonized in order to prevent issues and to be sure that trade is not curtailed. Since private sector participation is dependent on certainty, security and information provided by the market and institutional environment in order to determine production sale estimate; it is understood that differences in legal systems, differences in trade rules and certainty gap have to be reduced to enhance private sector participation. It is all the more important that, as discussed, power infrastructures designed for power trade are likely to be are to behave like cross-border infrastructures. Then, at least two countries investment environment and regulation harmonization will matter. For now, the regulation issue has been bypassed by complex financial and organizational structures, mainly in projects developed in Lao PDR.

Regarding the GMS-4 case, the findings of this section support the argument of a certain degree of incompatibility between the political will – and the need – to involve the private sector in the development of regional power infrastructure and power trade, and the current features of the institutional environment. Incompatibilities are manifest through four main aspects.

First, legal framework and domestic financial to support to the private sector is still too weak to be independent from international organizations and development agencies, which are actors that usually transfer resources through officials – government. This being said, a lot of improvement is undergoing, and macroeconomic conditions are

relatively encouraging, and there is both readiness to pay and openness to private investment on its way in the GMS-4 (more especially Cambodia, Lao and Vietnam).

Second, the targeted interconnectedness of the region has undergone tremendous progress in the last 10 years. A number of studies to design future coordination and concrete steps towards technical harmonization (with the WGPG, notably) enhance positive expectations for a regional power market. However, lifting the barrier to cross-border trade finds obstacles in the absence of independent transmission system to connect multiple actors, and disagreement between GMS parties on the idealized regional market.

The above is directly linked to the third conclusion. Despite the very positive development of a planning body, which coordinates studies and provides guidelines as well – the Regional Power Trade Cooperation Committee, created within the GMS in 2002, and the undisputable use of Memorandum of Understanding signed to institutionalize the purchase of electricity between countries, this institutionalization of power trade in the GMS seems to go against fertile grounds for the private sector involvement. Indeed, the road map defined plans to draw on bilateral agreements defined ad-hoc, aiming at competitive markets in generation and distribution of electricity in a distant time. Yet, competitive markets and liberalized power trade under harmonized regulation are reversely a pre-condition for the private sector to step in.

Fourth and last, the development of power generation contends a critical impact on environment, and contentious issues of negative externalities on population not directly benefiting from the development of power supply. It is unsure how private utilities are willing to cope with environmental risks, and human rights related issues. This might

hamper foreign investment. Also, the current development situation of the Mekong implies that cost-reflective price may be unrealistic for now.

The preferred option for the Mekong, as testified by recent development, is to develop public-private partnerships. While those enable private sector to reinforce presence on new markets and to share rationalization process, it is not a form of market liberalization; moreover, as infrastructures to develop power trade are cross-border infrastructures, the harmonization of PPP rationale at the regional scope should be initiated, as well as the regional dialogue between the GMS and its power trade program institutions.

It is, however, not specific to the Mekong region to display highly nationalized power sector, as power is considered an essential service to the population, ultimately falling down on governments' responsibility²⁰⁴. Utilities are operated by state entities in developed countries as well, including in France, which model of vertically integrated, electricity state company (Electricité de France) has been applied to the three countries of the former Indochina French colony. It is not specific to the GMS-4 to be reluctant to reform its power sector toward more competition in the different power sector segments. And yet, limited competition becomes a specific issue for the GMS-4 because while it is seen as a distant achievement, it is also a condition to spur private investment (especially foreign investment) and enhance market efficiency. This market efficiency is key to implement cost-reflective, low electricity price. It is also specific to the GMS-4 that the main actor of power trade so far, Thailand, also be the country facing the more difficulties to reform its power sector and related institutions, despite several attempts to leverage privatization. Since Thailand has a lead say in power trade arrangements, it may provide

²⁰⁴ International Labour Organization, Note on Utilities (water, gas, electricity) sector, accessible at: <http://ilo.org/global/industries-and-sectors/utilities-water-gas-electricity/lang--en/index.htm>

counter-incentives. It is also specific to the GMS-4 to deal with private sector involvement in a context in which two countries follow communist rule, progressively integrating market economy.

5. Lessons from other regional power trade initiatives

The economic rationale of cross-border power trade and, as an extension, power pooling, has developed in various location, both in developed and in developing countries. This section of the research will review other regional power trade initiatives, to take a look at the approach they have conducted toward the private sector, and its inclusion in power trade capacity building.

5.1. European initiatives

5.1.1. Situation: Are there European level institutions?

The Europe case is of interest because it provides a view of the difficulties encountered to create an integrated electricity market in the context of the most advanced form of economic integration. Economic integration isn't the panacea to electricity market integration, as the difficult progress made in Europe proves. The Institute of International and European Affairs website states the following²⁰⁵: “At present, investments in energy infrastructures in Europe are not on track, particularly the cross-border links needed for the increase in energy trade and energy security cooperation which will underpin any cost-effective transition to a competitive, low-carbon energy system in Europe”. In November 2012, an agreement was reached, defining guidelines for trans-European Energy Infrastructure.

The European Single Market project, which started back in 1986, was aiming to remove barriers to electricity trade, with a series of decrees. In 1996, the European Community

²⁰⁵ Donoghue, Helene, The Institute of European and International Affairs blog, Agreement on New Energy Infrastructure Regulation, January 31, 2013, accessible at: <http://www.iea.com/blogosphere/agreement-on-new-energy-infrastructure-regulation>

Directive 96/92/EC promoted competition and created common rules between countries for the electricity market, laying basis for further liberalization. It notably required all European community states to implement regimes with third party access. But it made no recommendation regarding institutions designed to overview electricity trade mechanisms²⁰⁶. This means that there were no stipulations made on how power exchanges should be established. Instead, the European market displayed several and diverse arrangements between two neighbor countries²⁰⁷.

It should be clarified here that power trade takes a different meaning in Europe, as it rather cover the “trading” reality (on wholesale markets). Nevertheless, while this pooling of electricity is a much more advanced form of cross-border electricity trade (common electricity market), it also requires the interconnections²⁰⁸ and rationalization of electric markets and systems in the first place (or the lack of it can be a source of inefficiency). Hence, Europe rather mentions power exchanges than power trade, because it is already organized as an electricity pool, at least for the most advanced initiatives such as the Nord Pool.

There is no coordination of national regulators and regulatory regimes in Europe. Some regulators are sector specific, some are not. A main issue identified in Europe is the congestion of the network. To overcome these obstacles to efficient integrated electricity market, a European-level institution is yet to be created.

5.1.2. Specificity: Exchanges as corporations

²⁰⁶ Roggenkamp, Martha M., Boisseleau, François, *The Regulation of Power Exchanges in Europe*, Chap. 10: The legal form of power exchanges: a comparative overview, Intersentia nv, 2005, p.287

²⁰⁷ Roggenkamp & Boisseleau, p.291

²⁰⁸ Electricity interconnection refers to cross border transmission capacity connecting different European member states.

Roggenkamp and Boisseleau have observed a shift in the form of power exchanges in the European area to “exchanges created as corporations”, meaning that the power exchange is the commercial activity of a corporation. In this scheme, the corporation is a principal of the power exchange and not an agent. Representative of this is the Nord Pool ASA, owned at equal shares by the transmission companies of Norway and Sweden. Also, the European Energy Exchange in Germany and Powernext in France, are private companies, with a mixed ownership of energy industry and companies, and yet they are regarded as institutions under public enterprise law.

How did the Nordic market (Denmark, Norway, Sweden, Finland) emerge? The first step was the abolition of border tariffs between Norway and Sweden in 1996. In each of these countries, state-owned companies were in dominant positions, and the market was very concentrated. The key institution is the Nord Pool, which govern transmission pricing and interconnection congestion. **The Nordic market still works with the four national TSOs (Transmission System Operator), which closely cooperate²⁰⁹. This cooperation in the Nordic pool is the key to its success to allocate supply.**

Considering broader European power trade ambitions, **there is actually insufficient investment in interconnections in Europe, despite a strong need for investments in transmission capacity.** This behavior can be explained by the imperfect coordination between TSO²¹⁰. Indeed, each TSO decides interconnection investments following its own incentives, and the regulation generally doesn't provide incentive for investments in

²⁰⁹ Glachant, Jean-Michel, Electricity Reform in Europe: Towards a Single Energy Market, Edward Elgar Publishing, 2009

²¹⁰ Investment in electricity infrastructure. Focus on EU cross-border interconnections, Microeconomix analysis presentation, Training Course on Regulation of Energy Markets for Regulatory Staff of MEDREG Countries, accessible at: <http://www.microeconomix.fr/sites/default/files/import2/110520%20Saguan%20-%20Investment%20in%20electricity%20infrastructure.pdf>

interconnections. In some countries, current regulation also gives counter-incentives concerning interconnections, if there is an incentive to reduce national costs, for example. One suggested solution to this is the use of “merchant” interconnectors, meaning the opening of EU interconnection capacity business to private (merchant or not regulated) investments. The risks are that investments be suboptimal, and the coordination between merchant and regulated investments²¹¹ too poor. This is what has been done between England and Ireland. Still, there is a big question mark on how to create or reproduce (for the electricity market) a strong multilateral institution.

Barry Barton²¹² advocates that power exchanges have become a familiar element of the electricity sector in Europe, resulting from the removal of monopoly of electricity generation, the possibility to buy electricity from any source – at least at the wholesale level, and the operation of intermediaries such as traders and wholesalers to operate.

5.1.3. Challenges: Incentives deficit

- As noted by Bielecki et al.²¹³, **transmission operators may not have incentive to enter into pooling arrangements** “which will complicate, and possibly endanger, the operation of network”. What is suggested instead is the creation of a Pan-European transmission system entity, which would be financed by a tax on energy consumption. *(However, as it was discussed regarding the pricing issue (see section 4) c)), such financing system in the developing GMS-4 is not only a resource problem but also an ethical issue).* **Europe is also facing a regional transmission issue.**

²¹¹ Ibid.

²¹² Quoted in Roggenkamp and Boisseleau, *The Regulation of Power Exchanges in Europe*, Chap. 10: The legal form of power exchanges: a comparative overview, Intersentia nv, 2005

²¹³ Veneyre, François, *Electricity Trade in Europe ; Review of Economic and Regulatory Challenges*, ed. By Bielecki and Desta, Kluwer Law International, 2004

- Also, Europe electricity market ambition is **suffering from an “exemption regime”** in the words of Hancher²¹⁴, meaning that despite a relevant regulatory framework competition on the national market, a series of exemptions from the pillars of the EU market guidelines have been enabled (exemption from the third party access on a regular basis, for example). With state monopolies shaping the electricity sector in the GMS, this exemption regime is a risk to prevent in order to provide certainty in the investment environment.
- A special focus can be made on the case of South Europe as well. The Energy Community of South East Europe, regrouping Albania, Bosnia-Herzegovina, Bulgaria, Croatia, Kosovo, Macedonia, Montenegro, Romania and Serbia, signed a MOU in 2005. It implemented an inter-TSO compensation mechanism²¹⁵. Yet, despite secretariat and other multilateral decision making processes, **there is no regional entity dedicated to managing the coordination of power utilities**. Electricity trade is quite impeded in the region given sovereignty issue and the reluctance of South-Eastern European countries to give up “power” to regional overlooking agencies. Interestingly, the situation echoes that of the GMS region (region which underwent civil war, fragile or absent democracy, uneven development status of the countries involved, long history of electricity trading between some of the countries, as in the case of Lao PDR and Thailand). This creates a situation of uncertainty for the private sector involvement, and is symptomatic of a difficulty to reach consensus.

²¹⁴ Hancher, Leigh, Cross Border Infrastructure Projects: The EU Exemption Regime (January 27, 2011). TILEC Discussion Paper No. 2011-006; Tilburg Law School Research Paper No. 10/2011

²¹⁵ Oseni, Musiliu O. and Pollitt, Michael, Institutional arrangements for the promotion of regional integration of electricity markets: International Experience, Cambridge Working Paper in Economics 1428, July 2014

- Gallagher identified the following issue in the European Single Market project: **each country evaluates individually**, focusing on the state interest, **the cost and benefit of cross-border infrastructures investment**²¹⁶. However, regarding the financing of cross-border infrastructures, the European Investment Bank is expected to provide guarantees in assistance circumstances²¹⁷.

5.2. EAPP (Eastern African Power Pool)

5.2.1. Situation: Heterogeneous region

Similar to the GMS goal, the EAPP aims to interconnect member countries to share power and avoid (or ease) shortages. Seven countries are part of this initiative launched in 2005: Burundi, Democratic Republic of Congo, Egypt, Ethiopia, Kenya, Rwanda and Sudan.

According to IRENA, Africa lags behind when it comes to attracting private sector investment in energy. The situation is heterogeneous in the EAPP, but there are some relative successes of the private sector participation in the power sector. Private generators produce 10% of the total electricity in Egypt²¹⁸, under purchase agreements with the state utility company. In the recent years, the China EximBank has been a major financier in the Sudan power infrastructure²¹⁹. But most significant is Kenya case. The

²¹⁶ Gallagher, Catherine, How does Europe seek to promote investment in electricity infrastructure against the backdrop of a liberalizing electricity market?

²¹⁷ Ibid. p.13

²¹⁸ ESMAP data, accessible at:

<https://www.esmap.org/sites/esmap.org/files/Egypt%20Power%20Sector%20the%20Findings%20of%20Power%20Sector%20Vulnerability%20Assessments.pdf>

²¹⁹ Eberhard, Anton, et al., *The State of the Power Sector in Sub-Saharan Africa*, World Bank report, accessible at: <http://www.eu-africa-infrastructure-tf.net/attachments/library/aicd-background-paper-6-power-sect-summary-en.pdf>

Electric Power Act was promoted in 1997, which introduced independent economic regulation in the electricity sector, creating a more favorable environment for the private sector participation. Further on, the generation sector was unbundled in 1998, and an autonomous Energy regulatory Commission was settled²²⁰. Today, it oversees all IPP purchase agreements. There are five IPP participating in the country's generation. Thus, the profile of private participation shares similar characteristics with that of the GMS presented in section 3. The Kenyan success in involving the private sector through a series of reform and implementation of an independent authority is key in providing an example of reliable and fairly priced power.

5.2.2. Specificity: Scale

In the case of the EAPP, the distances to be covered are huge (2000 – 3000 km to be covered by transmission lines), which can only be economically viable once the generation capacities have been fully developed (hydropower resources mainly)²²¹. Hence, the first priority for the EAPP initiative lies in power generation projects.

The strong commitment of the EAPP mostly relies on the hydro resources of the Nile Basin, and on the premise that there is an incentive in enlarging the national markets by interconnecting the countries (regrouping rather limited power demand). **However, interconnection (or preliminary network) in the center of the region is missing.** Notably in Ethiopia, generation is expected to increase from a roughly 2000 MW of installed generation to a 37000 MW, for power export. The US Aid, supporter of

²²⁰ Eberhard, A., Rosnes, O., Shkaratan, M., Vennemo, H., Africa's Power Infrastructure - Investment, Integration, Efficiency, The International Bank for Reconstruction and Development/The World Bank, 2011, p.83

²²¹ Prospects for the African Power Sector- Scenarios and Strategies for Africa Project, IRENA, 2012

Ethiopian power development, emphasizes on the private sector investment necessity to reach this target²²².

5.2.3. Challenges

Priority projects of the EAPP Master Plan are directed at strengthening existing interconnections and also at tapping into Ethiopia hydropower. The ICA²²³ gives the following challenge to attaining such goals:

- Implementing an information system
- Mobilizing the required funding for investment
- Strengthening the capacity of EAPP and utilities staff

There is a **challenge in capital mobilization and information sharing**. However, the ICA notes that the only action undertaken by the EAPP so far consisted in donors meeting, including national and regional stakeholders: agencies, specialized institutions, governments)²²⁴. So far PPP haven't been subject to much talk for financing sources. Recalling the investment attractiveness model presented in section 3, however, it seems clear that the EAPP zone would end up with low scores in all macro-environment aspects given the region instability.

Regarding institutions, the EAPP has already settled an Interconnection Code in 2011, providing rules and standards for technical planning and operation. Regional market rules

²²² What Power Africa means for Ethiopia, US Aid note, May 2014, Accessible at:

[http://www.usaid.gov/sites/default/files/documents/1860/Ethiopia%20fact%20sheet%20\(June%201\).pdf](http://www.usaid.gov/sites/default/files/documents/1860/Ethiopia%20fact%20sheet%20(June%201).pdf)

²²³ Regional Power status in African power pools Report – Infrastructure Consortium for Africa (ICA), November 2011. Accessible at:

http://www.icafrica.org/fileadmin/documents/Knowledge/Energy/ICA_RegionalPowerPools_Report.pdf p.49

²²⁴ Regional Power status in African power pools Report – Infrastructure Consortium for Africa (ICA), November 2011. Accessible at:

http://www.icafrica.org/fileadmin/documents/Knowledge/Energy/ICA_RegionalPowerPools_Report.pdf p.47

are still being discussed. The ESMAP pinpoints, however, that the physical investments in the EAPP area are actually rather covered by the Nile Basin Initiative. There are hence two bodies involved in regional systems planning.

5.3. SAPP (Southern African Power Pool)

5.3.1. Situation: Southern African Development Community incentives

The SAPP is a mandate from the SADC, Southern African Development Community, regrouping twelve countries. The SAPP formed in 1995, and the first SAPP Energy Plan was issued in 2001, and revised in 2005 and 2009. The SAPP initiative is meant to coordinate electric power systems and utilities among the member states. South-Africa is the major power exporter in the initiative, with about 13750 GWh exported in 2010²²⁵. From its creation, the SAPP included a long-term vision for the formation of a competitive power pool, with free-market based determination of prices²²⁶. The SAPP vision is to develop a *competitive* electricity market in Southern Africa. Hence, the move to unbundled power sectors with private sector participation is included in the “competitive pool” vision. Many SAPP projects have been directed at **extra-high voltage transmission connections, to foster the cross-border allocation of power.**

Similar to EAPP, most generation projects in SAPP are considering the participation of private partners. Helped by a number of international cooperation programs and agencies, the SAPP has undertaken several trainings and forums on various topics such as

²²⁵ Regional Power status in African power pools Report – Infrastructure Consortium for Africa (ICA), November 2011. Accessible at:

http://www.icafrica.org/fileadmin/documents/Knowledge/Energy/ICA_RegionalPowerPools_Report.pdf p.53

²²⁶ South African Power Pool (SAPP) Case Study, Regional Power Sector Integration: Lessons from global case studies and a literature review, ESMAP Briefing Note 004/10, June 2010

reliability, commercialization of power utilities, PPP development, institutional reform, etc. The first PPP forum for infrastructure in Southern Africa was held in October 2013, launched by the Southern African Development Community (SADC)²²⁷. Few but massive PPP have been developed in the SAPP: SPV (Special Purpose Vehicle) for Mozambique network, ZIZABONA (Zimbabwe-Zambia-Botswana-Namibia Interconnector) and Western Corridor. ZIZABONA and WestCor are PPP based on the SPV model.

The funding of transmission projects is also an area of experimentation and research. The ICA put an emphasis on the ZIZABONA project as a key regional priority project. **The case of ZIZABONA is interesting because it displays an alternative financing approach involving the private participation: a Special Purpose Vehicle company is created, called ZIZABONA Private Limited; PPP is promoted among the major state actors, and a wheeling tariff is to be defined** to ensure viability of the project²²⁸. The shareholders of the ZIZABONA project are BPC, NamPower, ZESCO Limited, ZESA, ESKOM and Copperbelt. Except for Copperbelt, the companies are all national power utilities. There is truly a **regional scope** to this project.

Another point of interest in the SAPP region is the Copperbelt Energy Corporation of Zambia, a private sector owned Transmission Company (it used to be a public owned company). Fifty years of existence and large portfolio makes it the advocate of the performance of the private sector in the transmission segment.

5.3.2. Specificity: STEM & DAM

²²⁷ Douglas, Kate, HowWeMadeItInAfrica.com, *Getting the private sector involved in infrastructure development in SADC*, November 4, 2013, accessible at: <http://www.howwemadeitinafrica.com/getting-the-private-sector-involved-in-the-development-of-infrastructure-in-the-sadc/32050/>

²²⁸ Regional Power status in African power pools Report – Infrastructure Consortium for Africa (ICA), November 2011. Accessible at: http://www.icafrica.org/fileadmin/documents/Knowledge/Energy/ICA_RegionalPowerPools_Report.pdf p.63

The SAPP has been developing a STEM (short term energy market), which operation began in 2001, and a DAM (day ahead market), which operation began in 2009.

The STEM was designed to enable the trading of power surplus in excess compared to what was defined in cross-border PPA contracts. Hence, as noted by the ESMAP, the STEM set the basis for full competition, introducing bidding made on an Internet platform²²⁹. However, bidding operation would be hampered by bilateral contracts. Consequently, the DAM scheme implemented in 2009 is supposed to provide participating countries knowledge of the impacts of a competitive market place in electricity. **It is an auction market opened to all actors from all segments of the power sector.**

What is interesting with the DAM system is that it tends to reconcile dominating bilateral contracts, and the operation of a competitive market. The reconciliation relies on separate arrangements as defined by the DAM, promoting market-clearing prices, with free matching of buyers and sellers. As the DAM is very demanding in information and electricity data exchanges, it enhances information sharing. In order to facilitate the operation of the DAM, a Markets Subcommittee was formed in 2008 within the SAPP Cooperation Center, responsible for the governance of the DAM.

A Regional Electricity Regulators Association of Southern Africa was created in 2002, aiming at facilitating the harmonization of regulations and practices between member countries. **Also, the SAPP has been mandated to mobilize funding for regional projects.** This is a unique approach.

²²⁹ South African Power Pool (SAPP° Case Study, Regional Power Sector Integration: Lessons from global case studies and a literature review, ESMAP Briefing Note 004/10, June 2010, p.29

5.3.3. Challenges: Open to private investment in principle only...?

- **Despite short-term and day ahead markets development, power trading is dominated by bilateral trading**, accounting for the quasi-totality of power traded. **STEM and DAM are still restricted to a low percentage of total trading in the area (5% in June 2013)²³⁰.**

- What is more, SAPP project also suffer from a **cost-reflective tariff issue**: ESKOM, the major actor in the SAPP from South-Africa, practices very low prices, which are not enough to cover the cost of hydro-power or fossil-fuel generation new development²³¹.

- **However, as noted by the PPIAF, for many years the membership into the SAPP power pool was only possible for state owned national utilities.**

Though the review of the power pool rules and the implementation of DAM lifted some obstacles, some remain. Out of 16 members of the SAPP in 2013, only 2 were independent entities: one Independent Transmission Company, the Copperbelt Energy Corporation, and one IPP, the Lunsemfwa Hydro Power station, both developed in Zambia. One could argue that at least, there *are* a few independent entities in the board, contrary to the GMS situation. Overall, participation of the private sector in building assets for the SAPP is very limited, and power trade is limited as well because of the concentration of such trade between South-Africa and Mozambique. Yet, the SAPP case provides alternative mode of development to the one currently observed in the GMS.

²³⁰Current plans for regional transmission reinforcements in Southern Africa, IRENA Executive Strategic Workshop, Africa Clean Energy Corridor Initiative, 22-23 Jun 2013, accessible at: http://www.irena.org/DocumentDownloads/events/2013/July/Africa%20CEC%20session%205_IRENA_Man_gwengwende_230613.pdf, slide 16

²³¹ Oseni, Musiliu O. and Pollitt, Michael, Institutional arrangements for the promotion of regional integration of electricity markets: International Experience, Cambridge Working Paper in Economics 1428, July 2014

- Overall regarding African initiatives: the PPIAF emphasizes on three types of inefficiencies that need to be minimized in order to create a better investment environment:

- Utilities inefficiencies, such as system losses
- Underpricing of power
- **Poor budget execution** (transparency and accountability issue)

We are down here to the investment attractiveness model, with issues concentrated on governments' readiness for private investment.

However, it should be noted here that the **SADC brings a much more voluntary action to involve private sector**, compared to the GMS (see section 4) c)). Indeed, the SADC has taken concrete actions²³². Within the SADC, the Regional Indicative Strategic Development Plan is the one institution which integrates the private sector participation in a "wholesome" manner. Consultative practices of the private sector have been launched already, among other:

- Institutionalization of a private sector unit within the SADC secretariat
- Development of private sector participation policy
- Mechanisms representation of private sector in decision mechanisms

So it is clear that political will can trigger more or less private sector inclusion, regardless of the homogeneity or the level of development of the area.

²³² Palm, Reinhard, Private Sector Involvement in African Regional Economic Integration, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, May 2011, accessible at: http://www2.gtz.de/wbf/4tDx9kw63gma/GIZ_NEDA_PS_Involvement_in_REI_final.pdf

5.4. SIEPAC Transmission Project (Sistema de Interconexión Eléctrica de los Países de América Central) & Central America Regional Electricity Market (MER)

5.4.1. Situation : Regional transmission backbone

The SIEPAC focus went to the SIEPAC line, the first regional transmission system spanning along Central America, from Guatemala to Panama, supported by the IADB. The SIEPAC initiative proceeded from the building of a connecting line to the regulation of a regional market.

A Framework Treaty for the Central American Electricity Market was signed in 1996 to gather Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama around the double objectives of an institutional infrastructure for a regional electricity market, and the development of electric interconnection infrastructures²³³. Three regional entities emerged out of the Treaty: the CRIE, a regional commission for electric interconnection, a regional system operator (the EOR), responsible for the grid expansion plan; and a special purpose company set up to be the regional transmission owner (EPR). The EPR falls under private law and is designed to engineer and construct the grid connecting 15 stations in Central America.

The treaty provides a consistent and strong commitment for member countries, which is key to the progress of power trading in Central America. Indeed the Treaty translated into a binding commitment for the member countries, even though the six

²³³ International Experience with Cross-border Power Trading, Report to the Regional Electricity Regulators' Association (RERA) and the World Bank, Castalia Advisory Group, September 2009, accessible at: http://www.esmap.org/sites/esmap.org/files/P111483_AFR_International%20Experience%20with%20Cross-Border%20Power%20Trading_Hughes.pdf

countries display heterogeneous electricity sector structure from totally bundled market structure (Honduras, Costa Rica), to competitive generation sector in other countries (Guatemala, El Salvador, Nicaragua). Private investment legal framework and opportunities, also, is very different from one country to another. As a consequence, Guatemala mainly displays private-sector power generation, whereas public sector operates most of Costa Rica's. Also, tariffs vary greatly from one country to another, in a similar pattern as GMS-4.

The EOR is an entity which works jointly with national entities of electric transmission, with the mission to coordinate national systems with an efficiency criterion (economic criterion). It is in charge of the technical operation of the Regional Electricity System.

The CRIE has its own juridical personality, and has been entitled to enforce international public law to participating countries and national electric market entities.

5.4.2. Specificity: The Regional Electricity Market, 2013 milestone

The SIEPAC rationale relies on three main regional benefits: the increase in private investment, economies of scale, and increasing reliability thanks to the interconnection. Medium and long-term contracts cohabit with the spot-market trading (less than 20% of the total trading).

A milestone was attained in June 2013, as the regulatory framework of the Central American Regional Electricity Market (MER) entered into effect, once the SIEPAC-line was finally completed. It is the application of a regulation that was defined back in 2005 (December 2005, according to available documents on EOR website). The MER is a unique regional market worldwide because it has its own regulatory body (CRIE) and

system operator (EOR). It is specified to be a “market with its own rules, independent from the national markets of the member countries, which transactions are to be realized through both the RTR (Red de Transmission Regional) infrastructure and national grids.” **The MER can be assimilated to a 7th market that adds itself to the six pre-existing national markets.**

The MER is expected to be the needed boost to private investment in Central American power sector, for projects regional in scope²³⁴, both in generation and in transmission segments **but especially in investment in large power plants to supply the regional market²³⁵. The MER regulation notably ensure markets’ agents free access to the regional transmission grid, and the possibility to settle generation projects anywhere in the region for regional dispatch of the electricity produced²³⁶.** Hence, the rationale is truly that private sector should foster interconnection between countries, thanks to the transmission core line established. **The logic here is that of a “push” in transmission and regional market regulation, to boost national production.** Scholars from the LBJ School of Public Affairs of the University of Texas support this logic (which is actually reverse to the one for the GMS): the interconnection “could also affect the regional mix and perhaps opportunities for large-scale renewable energy projects”²³⁷. From the present research author’s understanding, **however, the private sector, however, wasn’t mobilized to build the transmission line.**

²³⁴ See the IADB communique accessible at: <http://www.iadb.org/en/news/webstories/2013-06-25/energy-integration-in-central-america.10494.html>

²³⁵ 052-i. Transboundary and Regional Impacts of the SIEPAC Transmission Line Project - Central America, Advisory reports and projects, Netherlands commission for environmental assessment <http://www.eia.nl/en/publications/advisory-reports/052-i>

²³⁶ Reglamento del Mercado Eléctrico Regional, Libro I - De los aspectos generales, Diciembre 2005, accessible at: www.enteoperador.org

²³⁷ Zarnikau, Jay, Partridge, Ian, Dinning, John & Robles, Daniel, Will the SIEPAC Transmission project lead to a vibrant electricity market in Central America?

The points of connection between MER and the national markets are RTR's nodes. Tariffs of transmission are defined according to nodal pricing²³⁸, in a transparent process. The CRIE regulates the functioning of the MER and the relations between agents (entities dedicated to generation, transmission, distribution and commercialization of electricity) in conformity with the Treaty, Protocol and regulations²³⁹. It is formed with representatives of every member states, with rotating presidency²⁴⁰.

5.4.3. Challenge: Reserve on the MER

- Actually, despite most advanced moves toward an integrated regional market, power exchanges remain largely dominated by bilateral contracts, with rather long-term agreements for power injection in the regional transmission network (bilateral agreement between generator and the Red de Transmisión Regional usually)²⁴¹.
- In the case of the SIEPAC, Zarnikau et al.²⁴² underline the possibility that some nations perceive a risk of destructive competition with other national generation markets, in the case of the removal of trade barriers.

²³⁸ “Nodal Pricing is a method of determining prices in which market clearing prices are calculated for a number of locations on the transmission grid called nodes. Each node represents the physical location on the transmission system where energy is injected by generators or withdrawn by loads”. Locational differences may be caused by differential in losses and transmission congestion. It is a cost-reflective tariff. Definition according to the Independent Electricity Market Operator of Canada, accessible at: http://www.ieso.ca/imoweb/pubs/consult/mep/LMP_NodalBasics_2004jan14.pdf, sl. 3

²³⁹ Reglamento del Mercado Eléctrico Regional, Libro I - De los aspectos generales, Diciembre 2005, p.21, accessible at: www.enteoperador.org

²⁴⁰ Oseni, Musiliu O. and Pollitt, Michael, Institutional arrangements for the promotion of regional integration of electricity markets: International Experience, Cambridge Working Paper in Economics 1428, July 2014, p.15

²⁴¹ Oseni, Musiliu O. and Pollitt, Michael, Institutional arrangements for the promotion of regional integration of electricity markets: International Experience, Cambridge Working Paper in Economics 1428, July 2014, p.15

²⁴² Zarnikau, Jay, Partridge, Ian, Dinning, John & Robles, Daniel, Will the SIEPAC Transmission project lead to a vibrant electricity market in Central America?

- The MER came into effect very recently. Whether the expected boost of the private sector participation will be realized remains to be proof-checked in the future.

It should be noted as well that the MER was developed a long way ahead of its actual implementation (almost fifteen years).

5.5. Regional Transmission Operator

A model that has developed into the United-States is that of the RTO, Regional Transmission Organization. RTOs are defined by the EIA as “independent, membership-based, non-profit organizations that ensure reliability and optimize supply and demand bids for wholesale electric power”²⁴³. RTO encourages competition in the generation market by enabling any third party to access the transmission system, and in the case of unbundled distribution market, any third party can also connect to the RTO and operate dispatch. This fair transmission access is supposed to benefit the consumer, by enhancing price competition. RTO can also lift transaction costs existing in utility border crossing²⁴⁴. The RTO scheme is in line with Hogan (1995) recommendation²⁴⁵. Hogan highlighted the importance of an independent system operator, specifying that power trading should be associated with such independent regulator responsible for the operating of the transmission system in real time.

²⁴³ U.S. Energy Information Administration, Today In Energy news, About 60% of the U.S. electric power supply is managed by RTOs, April 4, 2011, <http://www.eia.gov/todayinenergy/detail.cfm?id=790>

²⁴⁴ What Are RTOs and Organized Markets?, EPISA, <https://www.epsa.org/industry/primer/?fa=rto>

²⁴⁵ Hogan, W. W., Electricity Transmission and Emerging Competition, Prepared for the Public Utility Research Center

Annual Conference "Market and Technological Convergence: Implications for Regulation" University of Florida, April 1995, accessible at: <http://www.hks.harvard.edu/fs/whogan/purc0495.pdf>

RTO can either be owned by multiple entities (such as state owned companies) or be an independent organization (then Independent System Operators). In the last situation, it requires a higher degree of sovereignty loosening from participating countries (or States, in the case of the United-States – such sovereignty issue is yet favored by the federation model).

In the GMS, it is not an RTO which is sought to be implemented. In the stage 2 of the GMS regional power market development, a Regional Transaction Coordinator should be established, which “*would determine the availability of cross-border transmission capacity and match offers and bids for cross-border trade*”²⁴⁶. The RTC would further be superseded by a RMO in stage 3 (Regional Market Operator).

The main difference between RTO and the GMS RTC is that RTC allocates trade bids, while the RTO rather functions as a “market place”, integrating all sources of power generation to be then dispatched.

5.6. Lessons for private sector participation in power trade infrastructure

From the observation of the five regional initiatives we can derive four main insights about the private investment environment in power infrastructures and regional arrangements to enhance it: there is a possibility to diversify of purchases arrangements, there is a challenge in regulators coordination, there are possibilities to implement binding commitments, and the transmission entity has a pivotal function. There can be specific regional discourse directed at the private sector as well.

²⁴⁶ Greater Mekong Subregion (GMS) Case Study, Regional Power Sector Integration: Lessons from Global Case Studies and Literature review, ESMAP Briefing Note 004/10, June 2010

5.6.1. Diversifying purchase agreements

Having day-ahead markets and spot markets, such as the case of SAPP, may favor competition because competitors will seek to offer attractive prices for electricity – in order to sale efficiently the surplus. Hence it can favor private sector participation (provided that investment environment is favorable as well, see section 4)) and generate more IPP schemes, notably. We see from the SAPP experience as well that this is not incompatible with the maintenance of bilateral trade, and that both type of trade can be developed concomitantly.

However, such auction market should be open to all segments not only theoretically but also in practice. In the case of SAPP, barriers to entry were elevated toward non-state actors. This situation brings us back to the institutional arrangements necessary, in order to prevent barriers and obtain the commitment of all countries involved.

In order to by-pass counter-incentives concerning interconnections, a new type of commercial actor (likely to be a private actor) can emerge: “merchant” interconnectors, dedicated to building interconnection capacity as a business. A new kind of commercial agreements can emerge with those actors. However, in the GMS case, their emergence would require regulatory adjustment.

5.6.2. Developing transmission capacity to foster private participation in generation?

Transmission capacity, generally system infrastructure, is an issue to any power market development, whether national or regional. When discussing private sector participation, it is even more important that the private sector will evaluate and plan return on its investment and commercial viability depending on market absorption of the generated

power, and purchasing schemes. A transmission infrastructure connecting national markets effectively can enlarge the generator final market.

Actually, “cross-border” investments in transmission infrastructure, in the case of SAPP and SIEPAC, have all been supported by development agency (Inter-American Development Bank, World Bank...), aiming at leveraging the participation of the private sector by developing the infrastructure, but not including private participation in the transmission projects.

The SIEPAC experience thus entails a big question for the development of power trade in the GMS: should there be a prior transmission artery infrastructure to develop further the regional electricity market? Or would private investors (finance and engineering) find a way to develop generation capacity first (through PPP or by pressuring government regulations) if there is enough incentives?

Also, the existence of a Regional Transmission Operator entity to operate the regional transmission can free access to third-parties in generation and distribution alike. Brunekreeft et al. (2005), through economic modelisation, highlighted the main role of Transmission System Operators in building the power market, encompassing market rationale and efficiency. The transmission entity can function as “market place” as seen with the RTO entity, designed to connect a region. From the private sector participation perspective, a RTO ensures fairer operation, and more efficient allocation (provided that nodes are operated efficiently).

In stage 3, the GMS Road Map plans a high-voltage transmission links to connect all countries. Attaining such a goal within a RTO should be considered.

5.6.3. Institutional independent arrangements and regulators coordination

Directly in relation with the previous point, a set of coordinated operators and regulators are necessary to settle a regional market, with the direction of a power pool. The Transmission Service Operators of the Nord Pool in Northern Europe is an example of coordination of regulators. The Regional System Operator (EOR) in the SIEPAC is also an independent entity, operating jointly with national operators. Within those institutional and regulatory frameworks, the private sector can blend in quite willingly. Issues would rather originate from sovereignty and national interest conflict, such as in the case of European electricity market. Indeed, the coordination of regulators requires a high degree of cooperation between national entities seems necessary, and it is unsure it exists in the GMS.

“Safety catches” to avoid exemption in any regime implemented appears as a recommendation from the European case. It is essential to ensure trust in the electricity infrastructure market. The SIEPAC, for example, has enforced a binding commitment among its members, with the approval of the SIEPAC treaty and its modalities by national parliaments of member countries. The SIEPAC example shows that it is possible to build a cross-border power market while coping with different national power market structures, like in the case of GMS.

Also, as illustrated by the case of EAPP, and necessary to the functioning of markets, information sharing mechanism and institution to channel information should be established. Currently in the GMS, a GMS Database has been developed to follow up

development plans²⁴⁷, but it is a centralized information gathering. A public venue for information sharing would be welcomed.

5.6.4. Regional discourse

Finally, it should be noted that the “regional” dimension of the discourse seems to be a lever for new innovative initiatives. Both SIEPAC and SAPP hold regional oriented discourses. The SAPP is remarkable because, despite present concentration of trade between South Africa and Mozambique currently, SOEs of four countries have grouped to carry on the ZIZABONA project (pooling the resources). Also the SAPP is mandated by all member countries to find funding for the development of the grid, a manifestation of loosened sovereignty. Furthermore, the SADC voluntarily include the private sector in talks regarding power cooperation.

The interpretation of such an initiative for the inclusion of private sector is however uncertain. An entity such as ZIZABONA owned by several SOE gives a regional dimension to capacity development, and sends positive signals regarding cooperation in the region for a secure investments environment. Yet, with the exception of the private owned Copperbelt, which has small ownership in the ZIZABONA project as well, the state control nature of the project may not incentivize private sector.

5.6.5. Reserve

It should be noted that the review of a selected number of regional initiatives do not allow the present research to provide much insight about quantified efficiency gain evaluation, or evolution of price within regional schemes. Moreover, overall, despite early start

²⁴⁷ ICEM note, *ICEM study indicates that 25% target for renewable energy by 2025 is realistic and sustainable in the GMS*, accessible at : <http://icem.com.au/25-target-for-renewable-energy-is-realistic-and-sustainable-in-the-gms/news/>

(SIEPAC) in the end of the eighties with regulation and supervising organization creation (to really become effective in the 2000s), the operational development of regional electricity markets is still quite new and “under work”.

6. Comments on GMS Power Trade prospects

6.1. Gaining consensus toward a regional electricity market

It was observed in the previous sections that the homogenization of the power market (more specifically, the electricity market) on technical and regulatory issues is an issue newly tackled by the WGRI and WGPG work groups. However, while technical harmonization (still potentially requiring large amount of investments) presented some significant progress from the first studies, regulatory harmonization was reported to be challenging, as “GMS countries are still unclear on the path towards a regional power market”²⁴⁸. Second, the RPTCC 14th meeting highlighted an issue in “absorptive capacity”²⁴⁹ of the countries for both technical and regulatory aspects. This statement can be understood both as an acknowledgment of institutional deficit, but also as an acknowledgment of a lack of political will.

Going through the 15th RPTCC summary, it is clearly stated that it is a World Bank led Technical Assistance which should support, if not undertake, the power market development:

*“35. World Bank TA. Mr. Dejan Ostojic [...] presented WB’s proposed TA for Regional Power Market Development in the GMS, aiming to: (i) develop open access to power transmission grids, including common rules for **nondiscriminatory treatment** of cross-border transactions; and, (ii) develop a regulatory framework **conducive for public and***

²⁴⁸ Summary of Discussions, Fourteenth Meeting of the Regional Power Trade Coordination Committee (RPTCC 14), June 2013, ADB, <http://www.adb.org/sites/default/files/pub/2013/gms-rptcc14-summary-discussions.pdf>

²⁴⁹ Ibid.

*private investments in the regional power market, including transmission interconnections.*²⁵⁰

This point is important because it is understood that regulation and reform to allow third party entry in the power market, is exogenously led so far. The benefits of power market opening haven't been *absorbed* yet by the GMS countries, despite friendlier investment frameworks that have developed. Probably the World Bank TA first goal is to foster such consensus.

Regarding the approach to competition, it can be argued that broad commitment to free trade may be still lacking, though a pre-condition to the exchange of power as a commodity. Indeed, free trade is relatively new to most countries of the GMS-4, as their late membership to the WTO can illustrate.

A more critical stance on PPP development from the ADB and the WB could be expected as well, so that the nature of private participation is not distorted. Private partners answer to competition. If PPP schemes are not faced with competition, they are likely to be less effective²⁵¹ than what is expected from private participation, other than finance and risk sharing. This is also why there is no contradiction in maintaining a state actor in the market, which efficiency may be driven up as well.

²⁵⁰ Summary of Discussions, Fifteenth Meeting of the Regional Power Trade Coordination Committee (RPTCC 15), December 2013, ADB, <http://www.adb.org/sites/default/files/pub/2013/gms-rptcc15-summary-discussions.pdf>

²⁵¹ Starting a Pro-Poor Public Private Partnership For a Basic Urban Service, United Nations Development Programme, Public-Private Partnerships for the Urban Environment,

6.2. About power exchange governance, following the RPCC creation

- With the Regional Power Coordination Center role to manage cross-border power infrastructure and trade, it is interesting to relate this new institution to the models (or categories) of power exchange governance developed by Barker, Tenenbaum and Woolf in 1997 in “Governance and regulation of power pools and system operators”. They determined 4 models:
 - Multi-class stakeholder board (representative of different class of participant – generators, buyers, marketers, etc)
 - Non-stakeholder board of independent directors (board members who have no financial interest in any of the market participants)
 - Single-class board (all decisions are controlled by one class, such as the generators)
 - A single for-profit corporation not affiliated with market participants

Documents to understand the composition of the RPCC are very scarce. However, findings suggest that the first stage of RPCC includes only vertically integrated National Power Utilities or Public Services. The RPCC has been conceived as an independent legal entity, closer to the multi-class stakeholder board model. But other findings suggest that the RPCC board would be in interaction, in a final stage, with a regional regulation body, hence non-stakeholder board.²⁵²

- Drawing on the RPCC role, a further question to bring up is the consideration of the Energy Charter Treaty (ECT) as a horizon for the GMS cross-border power trade.

²⁵² Lefèvre, T., CEERD, Facilitating Regional Power Trading and Environmentally Sustainable Development of Electricity Infrastructure in the Greater Mekong Subregion: The Case of “ADB/GMS RETA No 6440 – GMS Power Master Plan, presented at the 5th Capacity Building Programme for Officers of Electricity Regulatory Commissions in Bangkok, October 2012

The ECT is a political initiative launched in Europe in the early 1990, providing multilateral rules to signatories. It is a legally binding multilateral instrument directed at inter-governmental cooperation in energy. It is a framework for shared interests and markets complementarity. The treaty also provides resolution mechanisms for investment disputes. It provides protection of investments, facilitation of energy trade and transit²⁵³. According to Gallagher²⁵⁴, the capital-intensive settlement of interconnections can be achieved through the medium of the Energy Charter Treaty (ECT), since it has developed “a framework of rules for the energy sector to deal with the investment process, and extends to the transport and trade of energy product across numerous markets”.

Such treaty would make both economic and rationale sense to the GMS countries. It would provide power trade mechanism and investment protection already experimented and developed in other regional power markets. For the GMS to adopt a global discourse benefiting a regional ambition, it may be a route to explore to build the future power market and provide a sound environment for private investors. Inclusion in the ECT is however far from simple and immediate. The GMS would first get an observer status.

²⁵³ Arif, Muhammad, Energy Charter Treaty – Implications on Cross Border Energy trade in Asia, LAP LAMBERT Academic Publishing, 2010

²⁵⁴ Gallagher, C., How does Europe seek to promote investment in electricity infrastructure against the backdrop of a liberalizing electricity market?, study for the Centre for Energy, Petroleum and Mineral Law and Policy (CEPMLP), University of Dundee

6.3. Comments on ADB's set of actions given our observations on the inclusion of private sector

As the ADB is the main advocate of the power trade program and of private sector participation in the region, how do its actions and objectives for the next decade relate with our observations?

Since the inclusion of the power development in the GMS agenda, the ADB has put the emphasis on power generation projects for exports, which has concentrated in the North of Lao notably. The ADB has co-financed several of the hydropower dams in the GMS.

Below are the GMS Regional Investment Framework Pipeline of Potential Projects (2013–2022), investment and technical assistance projects falling under the Energy part of the Economic Cooperation Program.

- <Table 8: GMS Potential Investment Projects (2013-2022)>

	Project title/ Country coverage	Description	Indicative timeline	Cost estimate (\$ million)	Priority
1	Design and Funding of a Backbone Grid for the Lao PDR	Strengthen capacity of the national network to stimulate power integration in the medium term (single-circuit line and two sub-stations)	2016-2020	400	High
2	Reinvestigation of Thailand-Lao PDR-Viet Nam Interconnection	Interconnection between Thailand and Viet Nam via Lao PDR	2016-2020	278	Medium
3	Continued projects in Rural electrification and Off-grid Power Development (Cambodia, Lao)	Grid extensions and implementation of off-grid projects in remote areas	2014-2017	100	Medium

4	Conventional Rural Electrification Programs in Myanmar	Grid extensions in Myanmar	2015-2018	60	Medium
5	500kV Line from Mawlamyine to the main Grid (Myanmar)	Connect isolated grid at Mawlamyine to the main grid	2020	640	Low
6	Demonstration of the Second Generation Biofuel Technologies and Associated Biomass Value Chains	Build pilot plants within PPP framework	2018-2020	80	Low
7	Extension of Energy Access in Myanmar from Nodes in Thailand and in the PRC (Grid extension)	Grid extension from the Thailand and PRC borders using generation plants in these two countries. Ideally, such project would build on the successful BOT model of the transmission project in Cambodia.	2017-2020	10 to 60	Medium
8	Feasibility study and Extension of the east-West Corridor to Mawlamyine in Myanmar (connection Thailand/Myanmar)	Transmissions interconnections to stimulate economic development of the EWEC	2020	250-400	Medium
9	Nabong 500kV Substation Transmission Facility Project	Line to transfer power from several hydropower projects in the Central-1 area of the Lao PDR to Thailand	2014	106	High
10	Lao PDR-Viet Nam Power Transmission Interconnection	Transmission lines and substation construction. This project will enable the transmission of production from eight small hydropower plants (with a total capacity of 1,013 MW) in southern Lao PDR, which will be developed by independent power producers.	2015	218	High
11	East-West Corridor Power Transmission and Distribution Project in the Lao PDR	T&D system to expand the T&D network of EDL - Rural electrification objective	2015-2017	50	Medium

12	PRC-Lao PDR-Thailand 500kV Interconnection	Supply electricity to Thailand from the PRC	2014-2019	600-800	High
13	Viet Nam-PRC 500kV Power Interconnection	Construct a double circuit 500kV high-voltage direct current transmission line. Feasibility study is under consideration by EVN and China Southern Power Grid Co.	After 2020	400-600	Low

Source: Adapted from Greater Mekong Subregion Economic Cooperation Program: Regional Investment Framework Pipeline of Potential Projects (2013–2022), ADB Report, June 2014, p.29-35

By observing the investment projects above, we see that the ADB is moving away from its past focus on generation plant investment (even though it is likely to remain a main participant in financial montages related to hydropower), and has shifted its focus to transmission and interconnection capacity building, representing about 90% of the projects²⁵⁵. The projects with highest priority aim toward fostering connections from local generation to neighbor networks, and building high-voltage cross-border transmission.

This orientation is consistent with the need for transmission links to be developed in order to unify GMS-4 power markets. However, it is arguable that these initiatives rather extend and stich together transmission systems, instead of aiming toward a regional transmission support.

²⁵⁵ Summary of Proceedings: 15th Meeting of the GMS Regional Power Trade Coordination Committee (RPTCC-15), December 2013, point 31.

- <Table 9: GMS Potential Technical Assistance Projects (2013-2022)>

	Project title/ Country coverage	Description	Indicative timeline	Cost estimate (M\$)	Priority
1	Support to RPTCC in Completion of performance standards, grid codes, market rules, and subregional transmission expansion plan	Supports the reaching of a clear basis for regional market rules comprising agreed rules and agreed indicative planning of interconnections	2013-2015	1,5	High
2	Scoping study on the Future of the Trans-ASEAN Gas Pipeline (TAGP)	Critical investments to be identified	To be confirmed	1	Low
3	Deployment of coherent renewable energy action plans across the Subregion	Preparing national renewable energy action plans according to a common format	2016-2018	1	High
4	Development of Coherent energy-efficiency action plans across the Subregion	Preparing national energy efficiency action plans according to a common format	2017-2019	1	High
5	Provision of Continuing Institutional Support for the Subregional Energy Forum	This will create a secretariat that would support the SEF through position papers, analysis, dialogue with donors...	2014-2018	1	High
6	Development of GMS Coordination Center for Regional Power Trade	Help to set up the RPCC, and build the capacity of national and subregional bodies that will work with RPCC in implementing and overseeing cross-border power exchanges	2014-2016	3	High
7	GMS: Renewable Energy Development (Phase 2)	Support follow-up activities from the Phase I regional technical assistance (RETA)	2014-2016	2	High
8	Facilitating Regional Power Trading and Environmentally Sustainable Development of Electricity Infrastructure in the GMS (Phase 2)	Support efforts of the RPTCC to forge agreements among GMS countries on technical/institutional/operational aspects	2014-2016	1	High

Source: Adapted from Greater Mekong Subregion Economic Cooperation Program: Regional Investment Framework Pipeline of Potential Projects (2013–2022), ADB Report, June 2014, p.36-37

Interestingly, much more projects are judged to be of high priority among technical assistance, which demonstrates a will of the ADB to turn towards more support to GMS-4 settled governance and institutions, than project finance.

However, what about the nature of the technical assistance? Several priorities are centered in the planification. However, the ADB both plans to help the supervisory body RPCC to settle, finally providing the GMS with a permanent entity to refer to on power trade and infrastructure matters, and to back the RPTCC to develop the regional power trading infrastructure with shared standards and agreements. **Specific technical assistance for transmission synchronization isn't on the agenda either, rather mentioning a broad support for "subregional transmission expansion plan".**

- Reminding the observations made on the SIEPAC case and the benefits of regulatory harmonization, it should be expected from the ADB plans that the several transmission capacity building initiatives be combined into a broader and official regional transmission backbone. The fragmentation of the transmission capacity building may results in efficiency loss, whereas if a regional transmission capacity is supported, designed to contract with any third party, the gain could be significant and the private sector participation facilitated, coping with diverse national power sector structures.
- Supporting the efforts of the RPTCC to "forge" arrangements among the GMS countries should be targeting the harmonization of market structure and be accompanied by specific support to Thailand power market structure reform. As the main source of electricity demand in the region, Thailand national power market impacts the purchase and sale of power mechanism of other economies, and may have a considerable impact on arrangements form.

7. Conclusion

This research aimed at confronting the rationale for increasing private sector participation in power infrastructures in the GMS-4, along with the Asian Development Bank's calls to involve the private sector, with the current picture of private sector in power infrastructures, and with the existing constraints to private sector participation in building cross-border linkages. It aimed at identifying levers to foster private participation in the regional power infrastructure development.

This research has sorted out the initial puzzle in three aspects: first, it argues that power infrastructures designed to enhance regional power connectivity and power exchanges have a cross-border nature. Further on, and consequently, this research argues that, while the private sector participation limitation derives from usual investment-environmental constraints and reluctances from states and possibly civil society, in the GMS-4 the cross-border nature of power infrastructures is an additional source of complexity, and an obstacle to efficient and transparent private investment.

Power markets are not free markets in the GMS-4. Mostly unbundled, the power sector also suffers from an uncertain cost-reflectiveness, with a subsidization system which can exclude private sector entrance *de facto*. So far, the private participation has mainly developed through power generation capacity development, both with independent power producers, and within Public-Private Partnerships (PPP) models. Yet, the efficiency of such PPPs to contribute to the power grid has been questioned. PPP models can, by definition, take various shapes. This paper argues that, since PPP projects aiming to develop power exchanges are likely to be cross-border like projects, the

harmonization of PPP policies would constitute an improvement to the legal and regulatory framework of the private sector investment.

The cross-border nature of infrastructures results in more complex investment initiatives, with higher transaction costs, as the set of legal requirements and macroeconomic risks is doubled. The cross-border nature of infrastructures also justifies the need for the regulatory and institutional harmonization in the region, because regulatory decisions are affecting more than one country. In evaluating the existing institutional and regulatory framework, the research casted light on several limitations: first, previous institutions were almost exclusively designed to allow *ad hoc* PPA agreement. Second, recent developments are aligned with the need for technical and regulatory harmonization (with the creation of working groups), but prospects for an agreement on the power market structure are disputable. Also, transmission systems and regulation harmonization, as well as interconnections are missing for private sector to perceive the benefit of a regional market. Private sector participation in the transmission segment is yet unlikely, because of the vertical bundling largely prevailing in the power sector of the Mekong region.

Overall, as far as the private sector contribution to developing the regional power grid is concerned, the research highlighted an inconsistency. Expecting the private sector to leverage the development of power grid is at odds with reaching later a stage of hypothetical market harmonization and liberalization. Market liberalization and harmonization are a pre-condition to private sector sound and transparent involvement. The very objective of including private sector in the power grid development requires further harmonization.

The Mekong area presents some specificities regarding the inclusion of private investment sources to develop the power grid. Mainly, this paper identified: the level of state control of Vietnam and Lao, the under-development of institutions in poor Lao and Cambodia, and the peculiarity of Thailand which is reticent to change in power market structure, although it is a lead energy consumer influential to power market design.

This research has put the power trade institutional model in perspectives with other existing initiatives, to highlight the existing alternative options in order to further incentivize the private sector contribution to the power exchange scheme. If the regional backbone transmission capacity is a common issue encountered in all regions implementing a regional grid or power pooling system, the research has discussed how different approaches of the transmission capacity coexist. Especially, the approaches of the SIEPAC (Central America) and of the U.S.A.'s states were highlighted. Both approaches have brought transmission system based promotion of private sector participation in power generation as well as power distribution.

This research, of course, is not exhaustive in its understanding of private sector inclusion in the regional grid development. An educated guess is that an extension to the critical approach adopted in the present research would take three directions: a survey-based approach toward infrastructures operators and prospectors of the private sector in the GMS-4; second, a thorough understanding of the dynamics of the state electricity companies and the degree of their “corporatization”; third, a more political approach of the forces shaping the power market in the GMS. A large field of research remains for further studies.

Way forward

Building a more efficient and reliable electric grid in the region could significantly foster development in the region. Since Power Trade development is still undergoing within the GMS, including the consolidation of some institutional tools reviewed in the course of this study, the purpose of this research is also to suggest directions to further power trade capacity, building on the benefits of private sector participation.

A regional transmission backbone accessible to any third parties can function as a “market place” coexisting with national power market structures. Since a main issue consists in GMS countries’ difficulties to reach a common ground in electricity market design, partly due to recent “marketization” and communist rule, this paper argues that such scheme is an option deserving serious attention from the GMS. The ADB fundings directed at projects in transmission capacity building could be revised to support the regional backbone, in the event that GMS countries find common ground with this 7th market place that does not endanger their own sovereignty, but may reinforce GMS ownership over the power trade project.

Further on, assistance to develop common frameworks for power sector reform is necessary, along with the assistance to regional institutions building, such as the new RPCC. There is a role for the new RPCC to relay guidelines regarding private sector market entry and private sector inclusion, on the model of what the South-African Power Pool has developed. Importantly, the new RPCC should also prevent the risk to build an institutional system that fails to adapt to stage 3 and stage 4 of further liberalization, and does but accommodate the dialogue between state entities.

Referring to the models of power exchange governance developed by Barker, Tenenbaum and Woolf in 1997 in “Governance and regulation of power pools and system operators” can be of some use to discuss RPCC role. The inclusion of the private sector in the power infrastructure development, at stake in the course of this research, would advocate for the non-stakeholder board model for the RPCC, or multi-class stakeholder model inclusive of participants of different nature. Further representation of IPPs, or consultation with private actors, would be beneficial to the RPCC.

As the GMS is reported to lack a common vision for its regional electricity market, the consideration of the Energy Charter Treaty (ECT) could be brought forward as a horizon for the GMS cross-border power trade. A political initiative, the ECT provides multilateral rules directed at inter-governmental cooperation in energy to signatories, with an international scope. As the GMS is also willing to further integrate in the globalized world for its own development, compatibilities between the ECT and GMS institutions could deserve some attention.

Finally, there is a lack of connection between the renewable energy generation and the extension of the GMS power grid. The two are developed within distinct channels, as the review of ADB projects reveals. Acknowledging the environmental and social impact of hydropower development, the development of other renewable sources of electricity at a large scale could be supported by an investment-fund approach²⁵⁶, supported by the ADB or better, multilaterally. Such fund could further engage private-public partnerships, or help to strengthen the institutional and investment environment relevant to renewable energy investments.

²⁵⁶ Roberts, David, No More Dams on the Mekong, The New York Times online, September 3rd, 2014

8. References

Literature

- Aalto, P. (2014). Energy market integration and regional institutions in East Asia, *Energy Policy* 74, 91–100.
- Aalto, P. (2014). Institutions in European and Asian energy markets: A methodological overview, *Energy Policy* 74, 4–15.
- Andrés, L. A. et al. (2008). The impact of private sector participation in infrastructure: lights, shadows, and the road ahead. *World Bank, PPIAF*.
- Annamalai T. et al. (2012). Does private involvement (including public private partnerships) in delivery of water, telecommunication and electricity services lead to improved access and quality of service in developing countries? *Protocol. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London*.
- Arif, M. (2010). *Energy Charter Treaty – Implications on Cross Border Energy trade in Asia*, LAP LAMBERT Academic Publishing
- Banks, J. P. (2006). Privatization of the Electricity Sector in Emerging Markets: The Organizational Challenge for Governments. *The Electricity Journal*, 19 (9)
- Barker, Jr. et al. (1997). Governance and regulation of power pools and system operators: an international comparison, *World Bank technical paper No. 382*
- Barnett, A. (1992). Financing of electric power projects in the LDCs. *Energy Policy*, 20 (4), 326-334.
- Barnier, M. (2003). Guidelines for successful public-private partnerships, European Commission
- Belay, A. et al. (2010). The Challenges of Integrated Management of Mekong River Basin in Terms of People's Livelihood, *Journal of Water Resource and Protection* 2, 61-68.
- Bhatia, B., Gupta, N. (2006). Lifting constraints to public-private partnerships in South Asia - The way toward better infrastructure services, *GridLines Note No. 6*
- Billette de Villemeur, E., Pineau, P.-O. (2012). Regulation and electricity market integration: When trade introduces inefficiencies. *Energy Economics* 34, 529–535.
- Brunekreeft, G. et al. (2005), Electricity transmission: An overview of the current debate. *Utilities Policy* 13, 73-93.

- Cepeda, M. et al. (2009). Generation adequacy and transmission interconnection in regional electricity markets. *Energy Policy* 3, 5612–5622.
- Daxhelet, O., Smeers Y. (2007). The EU regulation on cross-border trade of electricity: A two-stage equilibrium model. *European Journal of Operational Research* 181, 1396–1412.
- Eberhard, A., Rosnes, O., Shkaratan, M., Vennemo, H. (2011). Africa's Power Infrastructure - Investment, Integration, Efficiency, *The International Bank for Reconstruction and Development/The World Bank*.
- Farquharson, E., Torres de Mästle, C., and Yescombe, E.R. with Encinas, J. (2011). How to Engage with the Private Sector in Public-Private Partnerships in Emerging Markets. *PPIAF / World Bank*
- Fung, K. C., A. Garcia-Herrero, and F. Ng. (2011). Foreign Direct Investment in Cross-Border Infrastructure Projects. *ADB Working Paper 274*. Tokyo: Asian Development Bank Institute. Retrieved from: <http://www.adbi.org/files/2011.04.01.wp274.fdi.crossborder.infrastructure.proj.pdf>
- Gallagher, C., How does Europe seek to promote investment in electricity infrastructure against the backdrop of a liberalizing electricity market?, study for the Centre for Energy, Petroleum and Mineral Law and Policy (CEPMLP), University of Dundee. Retrieved from: http://www.dundee.ac.uk/cepmlp/gateway/files.php?file=cepmlp_car13_71_583551912.pdf
- Gadde, B., Ganesan, K., Tharakan, P. (2012). Status of energy use, power sector expansion plans and related policies in the GMS: challenges and opportunities, in *International Conference on GMS 2020: Balancing Economic Growth and Environmental Sustainability, Focusing on Food-Water-Energy Nexus*.
- Glachant, J.-M. (2009). *Electricity Reform in Europe: Towards a Single Energy Market*. Edward Elgar Publishing
- Goh E. (2004). China in the Mekong River basin: the regional security implications of resource development on the Lancan Jiang. IDSS, Nanyang Technological Institute
- Gruber, T. (2007). Cross-Border Trade in Electricity and Gas. Obstacles to Effective Competition from a Regulatory Standpoint. *ERA Forum* 8, 417–426 (based on a presentation given by the author at the ERA conference The Opening Up of European Energy Markets held in Brussels on 26 –27 March 2007).
- Gunawardana, P.J. (2008). An Overview of Foreign Investment Laws and Regulations of Lao PDR, *International Journal of Business and Management*, 3 (5).

- Hancher, L., (2011). Cross Border Infrastructure Projects: The EU Exemption Regime. *Tilburg Law School Research Paper No. 10/2011*.
- Head, C. (2000). *Financing of Private Hydropower Projects*, World Bank Discussion Paper No. 420
- Hogan, W. W. (2012). *Electricity Market Design Financial Transmission Rights, Up To Congestion Transactions and Multi-Settlement Systems*. Retrieved from: http://www.hks.harvard.edu/fs/whogan/Hogan.UTC_071612.pdf
- Hogan, W. W. (1995). *Electricity Transmission and Energy Competition*. Prepared for the Public Utility Research Center Annual Conference "Market and Technological Convergence: Implications for Regulation", University of Florida.
- Jiang, Y., et al. (2014). Privatization, governance, and survival: MNE investments in private participation projects in emerging economies, *Journal of World Business*.
- Manibog, F. et al. (2003). Power for development : a review of the World Bank Group's experience with private participation in the electricity sector, World Bank, Operations Evaluation Dpt.
- McKenzie, D., Mookherjee, D. (2003). The Distributive Impact of Privatization in Latin America: Evidence from Four Countries. *Economia*, 3 (2), 161-218
- Merme, V., Ahlers, R., Gupta, J. (2014). Private equity, public affair: Hydropower financing in the Mekong Basin, *Global Environment Change* 24, 20-29.
- Middleton, C. (2012). Transborder Environmental Justice in Regional Energy Trade in Mainland South-East Asia. *ASEAS - Austrian Journal of South-East Asian Studies*, 5 (2), 292-315.
- Osborne, S. (2000). *Public-Private Partnerships, Theory and practice in international perspective*, Chapter 19. Edited by Stephen P. Osborne, Routhledge, London.
- Oseni, M.O., Pollitt, M. (2014). Institutional Arrangements for the Promotion of Regional Integration of Electricity Markets, International Experience. *Policy Research Working Paper No. 6947, The World Bank Development Research Group, Environment and Energy Team*.
- Palm, R. (2011). Private Sector Involvement in African Regional Economic Integration, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from: http://www2.gtz.de/wbf/4tDx9kw63gma/GIZ_NEDA_PS_Involvement_in_REI_final.pdf

- Pearse-Smith, S. W. D. (2012). Lower Mekong Basin hydropower development and the trade-off between the traditional and modern sectors: 'Out with the old, in with the new'. *The Asia-Pacific Journal: Japan Focus*, 10 (23), No 1.
- Pedersen, O. W. (2010). Environmental principles and environmental justice. *Environmental Law Review*, 12(1), 26-49
- Phomsoupha, X. (2009). Hydropower Development Plans and Progress in Lao PDR. *Hydro Nepal, Issue No.4*. Retrieved from:
<http://www.mtnforum.org/sites/default/files/publication/files/6229.pdf>
- Poch, K. and S. Tuy (2012). Cambodia's Electricity Sector in the Context of Regional Electricity Market Integration, in Wu, Y., X. Shi, and F. Kimura (eds.), *Energy Market Integration in East Asia: Theories, Electricity Sector and Subsidies*, ERIA Research Project Report 2011-17.
- Richter, J., Viehmann, J. (2014). The value of information in explicit cross-border capacity auction regimes in electricity markets. *Energy Policy* 70, 74–84.
- Roggenkamp, M. M., Boisseleau, F. (2005). The legal form of power exchanges: a comparative overview, in *The Regulation of Power Exchanges in Europe, Chapter 10*, Intersentia nv.
- Rutherford, J., Lazarus, K., Kelley, S. (2008). *Rethinking Investments in Natural Resources: China's Emerging Role in the Mekong Region*, WWF & IISD.
- Saroha, S., Verma, R. (2013). Cross-border Power Trading Model for South Asian Regional Power Pool, *Electrical Power and Energy Systems* 44, 146–15.
- Sheng, Y., Shi, X. (2013). Energy market integration and equitable growth across countries. *Applied Energy* 104, 319–325.
- Shrestha, O. L. et al. (2013). *Greater Mekong Subregion – From Geographical to Socio-economic Integration*, ISEAS Publishing.
- Srivastava, L., Misra, N. (2007). Promoting regional energy co-operation in South Asia. *Energy Policy* 35, 3360–3368.
- Steinbach, A. (2013). Barriers and solutions for expansion of electricity grids—the German experience, *Energy Policy* 63, 224–229.
- Sukkmnoed et al., Governing the Power Sector: An Assessment of Electricity Governance in Thailand, *World Resources Institute*, retrieved from:
http://electricitygovernance.wri.org/files/egi/egi_thailand_report_0.pdf

- Tenenbaum, B., Izaguirre, A. K., (2007). Private participation in electricity. *GridLines Note No.21*, PPIAF
- Torrity J. (2014). Privatisation and cross-border electricity trade: From internal market to European Supergrid? *Energy October 2014*.
- Veneyre, F. (2004). *Electricity Trade in Europe ; Review of Economic and Regulatory Challenges*, ed. by Bielecki and Desta, Kluwer Law International.
- Venkataraman K., Gary S. (2003). *Private sector participation in the power sector in Europe and Central Asia : lessons from the last decade*, World Bank publishing.
- Vives, A. (1997). Private Infrastructure: Ten Commandments for Sustainability, *The Journal of Project Finance (Spring)*, 20-30. Retrieved from:
<http://publications.iadb.org/bitstream/handle/11319/4572/Private%20Infrastructure%3a%20Ten%20Commandments%20for%20Sustainability.pdf;jsessionid=574BFA248F596E525152EE028D7CFE8C?sequence=1>
- Ward, J. et al (2012). Mekong energy metabolism: connecting energy demand into the nexus of food-water-energy security, in *International Conference on GMS 2020: Balancing Economic Growth and Environmental Sustainability, Focusing on Food-Water-Energy Nexus*
- Wang, M., Huang, G. (1994). Environmental Impact Assessments for major construction projects in Taiwan: Problems and solutions, *Pacific Rim Law and Policy Journal*, 3, 145-176.
- Woo, P. Y. (2005). Independent Power Producers in Thailand. *Program on Energy and Sustainable Development At the Center for Environmental Science and Policy, Stanford University, Working Paper No. 51*.
- Woolf, F. (2003). Chapter 1, *Global Transmission Expansion, recipes for Success*, Pennwell Corp. publishing.
- Wu, Y. (2013). Electricity market integration: Global trends and implications for the EAS region. *Energy Strategy Reviews* 2, 138-145.
- Xuegong, S. et al. (2013). Market entry barriers for foreign direct investment and private investors: Lessons from China's electricity market. *Energy Strategy Reviews* 2, 169-175.
- Yun, W.-C., Zhang, Z. X. (2006). Electric power grid interconnection in Northeast Asia. *Energy Policy* 34, 2298–2309.

Zarnikau, J., Partridge, I., Dinning, J. & Robles, D. (2013). Will the SIEPAC Transmission project lead to a vibrant electricity market in Central America? *International Association for Energy Economics, Fourth Quarter 2013*.

Zhai, Y. (2013). Energy Sector Integration for Low Carbon Development in Greater Mekong Sub-region: Towards a Model of South-South Cooperation, in *Greater Mekong Subregion: from geographical to socio-economic integration*, Chapter 11, ISEAS Publishing.

ADB Reports

ADB Evaluation Study, Energy Sector in the Greater Mekong Subregion, 2008.

Retrieved from: <http://www.oecd.org/countries/mongolia/42222387.pdf>

Assessment of Public–Private Partnerships in Viet Nam, Constraints and Opportunities, Asian Development Bank, 2012

Assessment of the Greater Mekong Subregion Energy Sector Development – Progress, Prospects and Regional investment priorities, Asian Development Bank, 2013

Energy Sector in the Greater Mekong Subregion, ADB Evaluation Study, Reference Number: SAP: REG 2008-51, 2008

Critical Evaluation of Cross-Border Infrastructure Projects in Asia, (Fujimura, M., and Adhikari, R.), ADBI Working Paper Series No. 226, July 2010, retrieved from: <http://www.adbi.org/files/2010.07.06.wp226.evaluation.crossborder.infrastructure.projects.asia.pdf>

Greater Mekong Subregion Power Trade and Interconnection, 2 Decades of Cooperation, Asian Development Bank Publication, 2012.

Infrastructure for a Seamless Asia, A Joint Study of the Asian Development Bank and the Asian Development Bank Institute, 2009. Retrieved from: <http://www.adbi.org/files/2009.08.31.book.infrastructure.seamless.asia.pdf>

Project Performance Evaluation Reports, Cambodia: (Cambodia) Power Transmission Lines Co., Ltd., Power Transmission Project, ADB, 2013. Retrieved from: <http://www.adb.org/documents/cambodia-cambodia-power-transmission-lines-co-ltd-power-transmission-project>

Public–Private Partnership Operational Plan 2012–2020, ADB, 2012. Retrieved from: <http://www.adb.org/sites/default/files/institutional-document/33671/files/ppp-operational-plan-2012-2020.pdf>

The Greater Mekong Subregion Economic Cooperation Program Strategic Framework 2012–2022, Asian Development Bank Report , 2011.

The Greater Mekong Subregion Economic Cooperation Program Strategic Framework 2012–2022, Asian Development Bank, 2011.

World Bank Reports

Infrastructure, How the private sector helps. IFC Telling our story Report.

Lao PDR Development Report 2010, Technical Note : Fiscal Regime in the Hydro Power Sector, prepared by Richard MacGeorge, James B. Stewart, and Ekaterina Vostroknutova, retrieved from:

http://siteresources.worldbank.org/LAOPRDEXTN/Resources/293683-1301084874098/LDR2010_Fiscal_Regime_Hydro.pdf

Options for the Structure of the GMS Power Trade Market: A First Overview of Issues and Possible Options. ESMAP Technical Paper 108/06. Washington, World Bank, 2006

South African Power Pool (SAPP Case Study, Regional Power Sector Integration: Lessons from global case studies and a literature review, ESMAP Briefing Note 004/10, June 2010

State and People, Central and Local, Working Together: The Vietnam Rural Electrification Experience, The International Bank for Reconstruction and Development/The World Bank, 2011

The Potential of regional power Integration – Greater Mekong Subregion Transmission and Trading Case Study, ESMAP Briefing Note 004/10 (2010). Retrieved from:

http://www.esmap.org/sites/esmap.org/files/BN004-10_REISP-CD_Greater%20Mekong%20Subregion-Transmission%20&%20Trading.pdf

Vietnam Country Framework Report on Private Participation in Infrastructure, The International Bank for Reconstruction and Development (1999). Retrieved from:

http://www.ppiaf.org/sites/ppiaf.org/files/publication/Vietnam-CFR_0.pdf

World Bank Report No: 37455, Project appraisal document on proposed IDA grants in support of the Mekong Subregion Trade Projects

PPIAF Works

- Cross-Border Infrastructure Tool Kit, Program description, PPIAF & ADB, 2007.
Retrieved from:
<https://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/Cross-Border-Infrastructure-Toolkit/Cross-Border%20Compilation%20ver%2029%20Jan%2007/cross-border%20booklet%2029%20jan%2007.pdf>
- Developing a Public-Private Partnership Framework: Policies and PPP Units, PPIAF, Note 4, 2004. Retrieved from:
<http://www.ppiaf.org/sites/ppiaf.org/files/documents/Note-Four-Developing-a-PPP-Framework.pdf>
- Toolkit for Public-Private Partnerships in Roads and Highways, PPIAF, 2009. Retrieved from:
<https://www.ppiaf.org/sites/ppiaf.org/files/documents/toolkits/highwaystoolkit/6/pdf-version/5-36.pdf>
- PPIAF Assistance in the Kingdom of Cambodia, October 2012, retrieved from:
http://www.ppiaf.org/sites/ppiaf.org/files/documents/PPIAF_Assistance_in_Cambodia.pdf

Other Reports

- Aid for Trade at a glance 2013: Connecting to value chains, Chapter 2, Aid for trade flows and financing, OECD, WTO 2013, retrieved from:
http://www.wto.org/english/res_e/booksp_e/aid4trade13_chap2_e.pdf
- Annual Report on Power sector of the Kingdom of Cambodia, 2014 Edition, Compiled by Electricity Authority of Cambodia, retrieved from: <http://eac.gov.kh/wp-content/uploads/2014/08/report-2013en.pdf>
- Applying Strategic Environmental Assessment, Good Practice guidance for development co-operation, DAC Guidelines and Reference Series, OECD Publishing (2006)
- Benchmarking National Attractiveness for Private Investment in Latin American Infrastructure. Mia, I., Estrada, J., Geiger, T. (2007), World Economic Forum, The Global Competitiveness Network. Retrieved from:
http://www.weforum.org/pdf/Global_Competitiveness_Reports/Benchmarking.pdf
- Best Practices in Investment for Development, How to utilize FDI to improve infrastructure – electricity Lessons from Chile and New Zealand, Investment

- Advisory Series - Series B, number 1, United Nations Conference on Trade and Development, 2009. Retrieved from:
http://unctad.org/en/Docs/diaepcb20091_en.pdf
- Conférence Européenne des Directeurs des Routes, Partenariats Public-Privé, redacted by Groupe de Projet Financement CEDR, main author : Robles, O. A., 2009
- Cross Border Energy Trade and its impact on the Poor, Regional Energy Programme for Poverty Reduction (REP-PoR), UNDP Regional Centre in Bangkok, Thailand (2008)
- Economic Research Institute for ASEAN and East-Asia, Press release, ASEAN Connectivity, Region's Future Economic Backbone, retrieved from:
http://www.eria.org/Press%20Release%204th%20ASEAN_Connectivity%20Symposium.pdf
- Electricity Authority of Cambodia, Report on Power Sector of The Kingdom of Cambodia, 2014 Edition. Accessible at: <http://eac.gov.kh/wp-content/uploads/2014/08/report-2013en.pdf>
- Electricity Regulation Report 2012, Law Business Research Ltd Publishing, 2012, retrieved from: <http://www.eurochamvn.org/Downloads/Electricity%20Regulation-%20Vietnam%20-2012.pdf>
- Global Subsidies Initiative, April 2013. Retrieved from: <http://www.iisd.org/gsi/citizens-guide-energy-subsidies-thailand>
- Greenlee, William, *Mergers & Acquisitions in Laos PDR*, DFDL Legal & Tax update, retrieved from: <http://www.dfdl.com/easyblog/entry/mergers-a-acquisitions-in-lao-pdr>
- International Experience with Cross-border Power Trading, Report to the Regional Electricity Regulators' Association (RERA) and the World Bank, Castalia Advisory Group (2009)
- International Rivers, Sizing up the grid : How the Mekong Power Grid Compares Against the Policies of the Asian Development Bank, January 2004
- International Rivers, Trading away the future – The Mekong Power Grid, retrieved from: <http://www.internationalrivers.org/files/attached-files/mekongpowergrid092506.pdf>
- Regional Power status in African power pools Report – Infrastructure Consortium for Africa (ICA), November 2011. Retrieved from:
http://www.icafrica.org/fileadmin/documents/Knowledge/Energy/ICA_RegionalPowerPools_Report.pdf p.49

Review of the Greater Mekong Sub-Region Regional Power Trade, Final Report, SIDA Review 2011:9 (2011)

VIETNAM POWER INDUSTRY, VP Bank Securities Review, December (2013)

What Power Africa means for Ethiopia, US Aid note, May 2014, retrieved from:

[http://www.usaid.gov/sites/default/files/documents/1860/Ethiopia%20fact%20sheet%20\(June%201\).pdf](http://www.usaid.gov/sites/default/files/documents/1860/Ethiopia%20fact%20sheet%20(June%201).pdf)

Why did Laos proceed with the Xayaburi Dam, in the face of strong opposition from neighboring countries? New insight from the project's "power purchase agreement, International Rivers, August 2013, retrieved from:

http://www.internationalrivers.org/files/attached-files/summary_of_ppa_analysis_august_2013.pdf

Keynotes & Summary of discussions

Innovative generation powering a prosperous Asia, A report from the Pacific Energy Summit in Hanoi, March 20–22, 2012, retrieved from:

http://www.nbr.org/downloads/pdfs/eta/PES_2012_summitreport.pdf

"Financing tomorrow – the Greater Mekong Subregion", Keynote address by Dr Prasarn Trairatvorakul, Governor of the Bank of Thailand, at the Euromoney Greater Mekong Subregion Investment Forum, Bangkok, 13 June 2013. Retrieved from: <http://www.bis.org/review/r130619b.pdf>

Keynote address by Dr Prasarn Trairatvorakul, Governor of the Bank of Thailand, at the Euromoney Greater Mekong Subregion Investment Forum, Bangkok, 13 June 2013. Retrieved from: <http://www.bis.org/review/r130619b.pdf>

Chair's Summary on the Forum for the Promotion of Public-Private Cooperation in the Mekong Region, The Fourth Mekong-Japan Meeting, Tokyo, Japan, 18 February, 2014. Retrieved from: <http://www.mofa.go.jp/files/000028293.pdf>

Institutional Investors Roundtable on The Role of the Private Sector in Promoting Regional Integration: Trade and Cross-Border Infrastructure. Speech retrieved from:

<http://www.adb.org/news/speeches/role-private-sector-promoting-regional-integration-trade-and-cross-border-infrastructu>

Reglamento del Mercado Eléctrico Regional, Libro I - De los aspectos generales, Diciembre 2005, p.21, retrieved from: www.enteoperador.org

Summary of Discussions, Fifteenth Meeting of the Regional Power Trade Coordination Committee (RPTCC 15), December 2013, ADB, retrieved from:
<http://www.adb.org/sites/default/files/pub/2013/gms-rptcc15-summary-discussions.pdf>

Summary of Discussions, Fourteenth Meeting of the Regional Power Trade Coordination Committee (RPTCC-14), Kunming, Yunnan Province, People's Republic of China, 18–19 June 2013. Retrieved from:
<http://www.adb.org/sites/default/files/pub/2013/gms-rptcc14-summary-discussions.pdf>

Note from the Lao PDR Ministry of Planning and Investment, Development of PPPs in the Lao P.D.R., October 6, 2014, retrieved from:
http://investlaos.gov.la/show_laocontent.php?contID=67

News Releases

Agreement on New Energy Infrastructure Regulation, Donoghue, H., The Institute of European and International Affairs blog, January 31, 2013, retrieved from:
<http://www.iiea.com/blogosphere/agreement-on-new-energy-infrastructure-regulation>

Attracting Private Capital to Help Meet Vietnam's Energy Needs, World Bank note, retrieved from:
<http://web.worldbank.org/WBSITE/EXTERNAL/NEWS/0,,contentMDK:21321729~menuPK:141310~pagePK:34370~piPK:34424~theSitePK:4607,00.html>

China and its southern neighbors: Issues in power connectivity, Eurasia Review online, October 18, 2011, retrieved from: <http://www.eurasiareview.com/18102011-china-and-its-southern-neighbours-issues-in-power-connectivity/>

Exporting megawatts – Part III, Bangkok Post online, March 16, 2014, retrieved from:
<http://www.bangkokpost.com/print/400070/>

Getting the private sector involved in infrastructure development in SADC, Douglas, Kate, HowWeMadeItInAfrica.com, November 4, 2013, retrieved from:
<http://www.howwemadeitinafrica.com/getting-the-private-sector-involved-in-the-development-of-infrastructure-in-the-sadc/32050/>

Involving the Private Sector in Mekong Hydropower Development, IFC News, retrieved from:
http://www.ifc.org/wps/wcm/connect/lao_ext_content/sustainable_hydropower/susta

- [inability_hydropower/news/involving+the+private+sector+in+mekong+hydropower+development](#)
- Leaders of GMS Share Views with Business Community on Trade and Investment*, 23 May 2009, Asean-China Free Trade Area website, retrieved from: <http://www.asean-cn.org/Item/591.aspx>
- Mekong Development Forum in Tokyo to Focus on Infrastructure Partnerships*, ADB News Release, July 7, 2005
- Mekong River Countries to Start Preparing for Regional Power Trading Arrangements*, ADB News, 5 July 2005, retrieved from: <http://www.adb.org/news/mekong-river-countries-start-preparing-regional-power-trading-arrangements>
- Ministry of Finance of the Lao PDR successfully completes its debut baht-denominated bond offering in Thailand*, TMB Bank Public Company Limited news highlights online, June 5, 2013, retrieved from: <https://www.tmbbank.com/newsroom/news-details-en.php?id=467>
- New PPP law for Thailand should deliver planned "mega projects", says expert*, note from Pinsent Masons advisors, May 10, 2013, retrieved from: <http://www.out-law.com/articles/2013/may/new-ppp-law-for-thailand-should-deliver-planned-mega-projects-says-expert/>
- No More Dams on the Mekong*, Roberts, David, The New York Times online, September 3rd, 2014
- POSCO E&C Begins Construction of Nam Lik 1 Hydroelectric Power Plant in Laos*, Yahoo Finance News, July 18, 2014, retrieved from: <http://finance.yahoo.com/news/posco-e-c-begins-construction-122700129.html>
- Power Pools: How Cross-Border Trade in Electricity Can Help Meet Development Goals*, Pollitt, M., The Trade Post, World Bank blog, January 10, 2014, retrieved from: <http://blogs.worldbank.org/trade/trade-electricity-how-cross-border-trade-can>
- Private Investment Needed for National Power*, Grid Khmer Times, June 12, 2014. Retrieved from: <http://www.khmertimeskh.com/news/2043/private-investment-needed-for-national-power-grid/>
- Private Sector Must Fill Infrastructure Investment Gap in Mekong, ADB VP Tells Tokyo Forum*, ADB News Release, July 14, 2005
- Should Vietnam continue power subsidies?*, Vietnamnet news, July 4, 2014, retrieved from: <http://english.vietnamnet.vn/fms/business/106610/should-vietnam-continue-power-subsidies-.html>

- The price of Electricity in Vietnam*, Asian-Power.com article, September 30, 2012.
retrieved from: <http://asian-power.com/power-utility/commentary/price-electricity-in-vietnam>
- Theun-Hinboun hydro expansion project powers up*, Vientiane Times online, January 12, 2013, retrieved from:
http://www.vientianetimes.org.la/FreeContent/FreeContent_Theun_hinboun.htm
- Today In Energy news, About 60% of the U.S. electric power supply is managed by RTOs*, April 4, 2011, U.S. Energy Information Administration, retrieved from:
<http://www.eia.gov/todayinenergy/detail.cfm?id=790>
- Viet - Lao Power Joint Stock Company*, Vietnam Trade Promotion Agency news, retrieved from:
http://www.vietrade.gov.vn/en/index.php?option=com_content&view=article&id=936:viet-lao-power-joint-stock-company&catid=222:hanoi-city
- Why it's high time to invest in Vietnam's power transmission, distribution network*, Satheesh, A., Thacker, H., January 30, 2014. Retrieved from: <http://asian-power.com/power-utility/commentary/why-its-high-time-invest-in-vietnams-power-transmission-distribution-networ>

국문 초록

Helene Tabuteau

국제대학과 국제통상전공

서울대학교 국제대학원

메콩경제권(GMS) 경제협력 프로그램속 2012-2022 전략 체제에서 주목하고 있는 여덟 가지 항목 중 하나는 상호적 인프라 개발 및 전력 무역에 의존도가 높은 에너지 및 전력 시장의 통합이다. Asian Development Bank 가 적극적으로 추진하고 있는 전력 무역은 전력 공급을 보다 원활히 배분하고 메콩 지역 성장에 기여 할 것으로 기대 되고 있다. 하지만 이 야망을 이루기 위해서는 대규모 투자가 필요하고 이에 대해 '민간 부문'이 전력 부서 및 전력 무역 전반의 발전을 위한 결정적인 요소로 대두 되고 있다.

본 연구는 GMS-4 국가들에 집중해서 민간 영역의 전기 영역 참여가 현재 어떻게 이루어지고 있는 지와 지역적 송전망과의 적합성 여부를 자세히 살펴보고자 한다. 그리고 본 연구는 국경을 넘는 사회기반시설 투자 특수성의 관점에서 민간 부문이 지역적 전기 무역 발전에 참여하는 것의 한계를 검토해보고자 한다. 본 논문은 전기 시장의 구조와 전력 무역 기관들과의 관계, 또 배전관 행위자들의 다양화에 대한 폭넓은 이해를 제공하며, RPTCC 에 의해 주도된 GMS 기관들의 통합된 전기 시장에 대한 점진적 접근이 지역적 송전망에 민간 부문의 투자를 포함하는 것과 대비된다고 주장한다.

국가 간의 이질적인 거시경제 및 사법 체계에 대한 대응과 더불어, 국경 간 사회기반 시설 발전에 있어 현재 민간 부문의 참여를 독려하는 지역 단위의 제도적 진취성이 뒷받침되어 있지 않다. 현 제도는 국유 에너지 기업이 타 국가

국유기업과 양자 협약을 체결하는 형태를 띄고 있다. 타 지역 에너지 교역과의 사례 비교 연구 결과 송전 계통의 중요성 또는 에너지 구매 협약의 다양화가 메콩경제권 이니셔티브(GMS initiative)에 통합될 필요가 있다.

키워드 : 메콩경제권, 전력시장, 전력 무역, 국경 간 사회기반 시설, 사기업 참여, 조화

학번: 2014-24239