Greater Mekong Subregion (GMS) Market Coordination

Anthony Jude
Regional & Sustainable Development Department

27 November 2013

Sustainable Energy Training, Bangkok, Thailand
Overview

Participating Countries: Cambodia, People’s Republic of China, Lao PDR, Myanmar, Thailand, and Viet Nam

GMS projects – totaled $15.5 billion as of December 2012

Strategic Priorities:

- Vision – a more integrated, prosperous, and harmonious subregion
- “3Cs” – Connectivity, Competitiveness, Community

Recent estimates:

~229 GW annual hydropower potential

~1.2 bn cubic meter of natural gas

~0.82 bn tons of oil

~28.0 bn tons of coal

GMS is well endowed with energy resources, but they are unevenly distributed.

GMS Energy Resources (2009/latest)

<table>
<thead>
<tr>
<th>Energy Resource</th>
<th>GMS</th>
<th>Cambodia</th>
<th>Lao PDR</th>
<th>Myanmar</th>
<th>Thailand</th>
<th>Viet Nam</th>
<th>Guangxi Zhuang Autonomous Region, PRC</th>
<th>Yunnan Province, PRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydro (MW*)</td>
<td>229,031</td>
<td>9,703</td>
<td>17,979</td>
<td>39,669</td>
<td>4,566</td>
<td>35,103</td>
<td>17,640</td>
<td>104,370</td>
</tr>
<tr>
<td>Coal (MT)</td>
<td>28,065</td>
<td>10</td>
<td>503</td>
<td>2</td>
<td>1,239</td>
<td>150</td>
<td>2,167</td>
<td>23,994</td>
</tr>
<tr>
<td>Natural gas (BCM)</td>
<td>1,179</td>
<td>n.a.</td>
<td>–</td>
<td>590</td>
<td>340</td>
<td>217</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>Crude oil and natural gas liquids (MT)</td>
<td>819</td>
<td>n.a.</td>
<td>–</td>
<td>7</td>
<td>50</td>
<td>626</td>
<td>173</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

BCM = billion cubic meter, GMS = Greater Mekong Subregion, Lao PDR = Lao People’s Democratic Republic, MT = million ton, MW = megawatt, n.a. = not available, PRC = People’s Republic of China.

* Refers to technically exploitable capability. The World Energy Council data for hydropower has been converted from terawatt-hours per year to megawatts, using the World Energy Council assumption of 0.40 capacity factor.

## Energy Use

### GMS Energy Use (kilotons of oil equivalent)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>n.a.</td>
<td>3,373</td>
<td>3,978</td>
<td>4,779</td>
<td>5,182</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>1,150</td>
<td>1,322</td>
<td>1,454</td>
<td>1,733</td>
<td>n.a.</td>
</tr>
<tr>
<td>Myanmar</td>
<td>10,656</td>
<td>11,768</td>
<td>12,500</td>
<td>15,996</td>
<td>15,062</td>
</tr>
<tr>
<td>Thailand</td>
<td>42,028</td>
<td>62,442</td>
<td>72,228</td>
<td>97,226</td>
<td>103,316</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>24,325</td>
<td>30,052</td>
<td>37,066</td>
<td>51,188</td>
<td>64,048</td>
</tr>
<tr>
<td>Guangxi Zhuang Autonomous Region, PRC</td>
<td>9,157</td>
<td>15,796</td>
<td>18,685</td>
<td>34,080</td>
<td>49,525</td>
</tr>
<tr>
<td>Yunnan Province, PRC</td>
<td>13,679</td>
<td>18,484</td>
<td>24,278</td>
<td>42,168</td>
<td>52,576</td>
</tr>
<tr>
<td>Indonesia</td>
<td>103,923</td>
<td>133,650</td>
<td>155,444</td>
<td>179,444</td>
<td>201,999</td>
</tr>
<tr>
<td>Malaysia</td>
<td>21,988</td>
<td>37,112</td>
<td>47,271</td>
<td>62,070</td>
<td>66,826</td>
</tr>
<tr>
<td>Singapore</td>
<td>11,456</td>
<td>18,851</td>
<td>18,068</td>
<td>23,896</td>
<td>18,476</td>
</tr>
</tbody>
</table>

Lao PDR = Lao People’s Democratic Republic, n.a. = not available, PRC = People’s Republic of China.

Peak Power Demand
[1/2]

GMS Peak Load Demand Profile (megawatt)

<table>
<thead>
<tr>
<th>Year</th>
<th>GMS</th>
<th>Cambodia</th>
<th>Lao PDR</th>
<th>Myanmar</th>
<th>Thailand</th>
<th>Viet Nam</th>
<th>Guangxi Zhuang Autonomous Region, PRC</th>
<th>Yunnan Province, PRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>26,126</td>
<td>114</td>
<td>167</td>
<td>780</td>
<td>14,918</td>
<td>4,890</td>
<td>n.a.</td>
<td>5,257</td>
</tr>
<tr>
<td>2010</td>
<td>83,259</td>
<td>467</td>
<td>618</td>
<td>1,573</td>
<td>23,936</td>
<td>16,165</td>
<td>16,300</td>
<td>16,400</td>
</tr>
<tr>
<td>2015</td>
<td>148,371</td>
<td>1,008</td>
<td>1,911</td>
<td>2,533</td>
<td>31,734</td>
<td>30,084</td>
<td>31,600</td>
<td>30,100</td>
</tr>
<tr>
<td>2020</td>
<td>212,005</td>
<td>1,610</td>
<td>2,665</td>
<td>3,898</td>
<td>42,024</td>
<td>47,608</td>
<td>41,800</td>
<td>39,000</td>
</tr>
<tr>
<td>2025</td>
<td>277,220</td>
<td>2,401</td>
<td>2,696</td>
<td>5,596</td>
<td>54,588</td>
<td>71,280</td>
<td>50,290</td>
<td>47,970</td>
</tr>
</tbody>
</table>

GMS = Greater Mekong Subregion, Lao PDR = Lao People’s Democratic Republic, n.a. = not applicable, PRC = People’s Republic of China.

Note: GMS total includes projected export to rest of PRC from the GMS provinces of PRC.


2010 (Actual):

- Total: ~ 83 GW
- Thailand: ~ 29%
- Guangxi, PRC: ~ 20%
- Yunnan, PRC: ~ 20%
- Viet Nam: ~ 20%

2025 (Forecast):

- Total: ~ 277 GW
- Thailand: ~ 20%
- PRC*: ~ 50%
- Viet Nam: > 25%
- * Guangxi + Yunnan

Cambodia, Lao PDR, Myanmar will benefit from developing power experts given their resource potential vs. their electricity needs.
Peak Power Demand

GMS Demand Growth

Annual actual and forecast demand growth data is not available for China and Myanmar. Vietnamese projections are available for 2010, 2015 and 2020 and interpolated for other years.

## Power Trade [1/2]

### GMS Power Flows, 2010a (gigawatt-hour [GWh])

<table>
<thead>
<tr>
<th>From</th>
<th>Cambodia</th>
<th>Lao PDR</th>
<th>Myanmar</th>
<th>Thailand</th>
<th>Viet Nam</th>
<th>PRCb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lao PDR</td>
<td>6.6c</td>
<td></td>
<td></td>
<td>6,938d</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myanmar</td>
<td></td>
<td>1,042a,d</td>
<td>385c</td>
<td></td>
<td>1,720e</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>1,155c</td>
<td>163a,f</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viet Nam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5,599g</td>
<td></td>
</tr>
<tr>
<td>PRCa</td>
<td></td>
<td>112.5oe</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---


Note: The table refers to net power flows as recorded by the receiving country.


b Refers to power dispatched to and from interconnection in Yunnan Province, PRC.


e China Southern Power Grid Co. Ltd. (CSPG). http://eng.csg.cn/

f 2009 data. Electricity Regulating Authority of Viet Nam (ERAV). www.erav.vn/


Source: CSPG (2011); EAC (2011); EGAT (2011); ERAV (2011); EVN (2011).

## Established trade flows (circa year):

- To Cambodia from Lao PDR-south (2010); Thailand (2009); Viet Nam (2008)
- To Lao PDR-north from Thailand (1990s); Yunnan, PRC (2009)
- To Thailand from Lao PDR (hydropower, 1971)
- To Viet Nam-north from Yunnan, PRC (2004)
- To Yunnan, PRC from Myanmar (hydropower, 2008)
Power Trade [2/2]

GMS Power Trade and Net Imports, 2010 (GWh)

<table>
<thead>
<tr>
<th></th>
<th>Imports</th>
<th>Exports</th>
<th>Total Trade</th>
<th>Net Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>1,546</td>
<td>–</td>
<td>1,546</td>
<td>1,546</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>1,265</td>
<td>6,944</td>
<td>8,210</td>
<td>(5,679)</td>
</tr>
<tr>
<td>Myanmar</td>
<td>–</td>
<td>1,720</td>
<td>1,720</td>
<td>(1,720)</td>
</tr>
<tr>
<td>Thailand</td>
<td>6,938</td>
<td>1,427</td>
<td>8,366</td>
<td>5,511</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>5,599</td>
<td>1,318</td>
<td>6,917</td>
<td>4,281</td>
</tr>
<tr>
<td>PRC</td>
<td>1,720</td>
<td>5,659</td>
<td>7,379</td>
<td>(3,939)</td>
</tr>
<tr>
<td>Total</td>
<td>17,069</td>
<td>17,069</td>
<td>34,139</td>
<td>–</td>
</tr>
</tbody>
</table>

( ) = negative, – = nil, GWh = gigawatt-hour, Lao PDR = Lao People’s Democratic Republic, PRC = People’s Republic of China.

Note: The table refers to trade within the Greater Mekong Subregion only and does not consider power flows from the Guangxi Zhuang Autonomous Region and Yunnan Province to the rest of the PRC, and Thailand’s power imports from Malaysia.

Source: Calculated from table on GMS Power Flows, 2010.

**Highlights:**

- Total electricity trade = ~ 34,139 GWh
- Net exporters = PRC, Lao PDR, Myanmar
- Lao PDR = largest volume exporter + most competitively priced supplier
- Thailand and Viet Nam meet large and rapidly growing demand with imports from Lao PDR and PRC
- Cambodia can access more affordable power from neighbors vs. own power production
- Remote border regions of Cambodia, Lao PDR, Viet Nam benefit from cross-border access
### Tariffs [1/2]
GMS Average Power Trade Tariffs, 2010/latest
(United States cents per kilowatt-hour [USc/kWh])

<table>
<thead>
<tr>
<th>From</th>
<th>Cambodia</th>
<th>Lao PDR</th>
<th>Myanmar</th>
<th>Thailand</th>
<th>Viet Nam</th>
<th>PRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lao PDR</td>
<td></td>
<td>7.02$b$</td>
<td></td>
<td>4.80$^c$</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myanmar</td>
<td></td>
<td></td>
<td>(1.45 baht)</td>
<td></td>
<td></td>
<td>n.a.</td>
</tr>
<tr>
<td>Thailand</td>
<td>10.29$b$</td>
<td></td>
<td>6.20$d$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(3.10 baht)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viet Nam</td>
<td>6.14$b$</td>
<td>6.00$^e$</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PRC</td>
<td>6.21–9.39$^e$</td>
<td>(0.41–0.62 yuan)</td>
<td></td>
<td></td>
<td></td>
<td>5.10$f$</td>
</tr>
</tbody>
</table>

$^a$ = nil, Lao PDR = Lao People’s Democratic Republic, n.a. = not available, PRC = People’s Republic of China.

Note: The table indicates the average import and export price for intra-Greater Mekong Subregion power trade, weighted by the volume of power trade. The specific prices for bilateral cross-border trade vary by project, either set under power purchase agreements (PPAs) or according to the supply price applicable per customer category by the power utilities and suppliers. The table is indicative and does not consider future application of escalation factors as may be provided for in PPAs.

$a$ ADB reference rates, 31 Dec 2010: $1.00 = 30.13$ baht; $1.00 = 6.60$ yuan.
$c$ Electricity Generating Authority of Thailand (EGAT). 2011. *EGAT Annual Report 2010*. Average tariff calculated from total baht and gigawatt-hour purchases from the Lao PDR.
$d$ ADB. 2005. *Loan to the Lao PDR for Nam Theun 2 Hydroelectric Project*. Manila. Cites weighted average cost of the Lao PDR’s imported electricity, including EGAT sales to the Lao PDR grid and Provincial Electricity Authority cross-border sales.

GMS Power Import/Export Tariffs, 2010/Latest (USc/kWh)

<table>
<thead>
<tr>
<th>Country</th>
<th>Average Import Tariff</th>
<th>Average Export Tariff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cambodia</td>
<td>71.70</td>
<td>–</td>
</tr>
<tr>
<td>Lao PDR</td>
<td>6.17–6.33</td>
<td>4.81</td>
</tr>
<tr>
<td>Myanmar</td>
<td>–</td>
<td>n.a.</td>
</tr>
<tr>
<td>Thailand</td>
<td>4.80</td>
<td>7.30</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>5.10</td>
<td>6.12</td>
</tr>
<tr>
<td>PRC</td>
<td>n.a.</td>
<td>5.11–5.15</td>
</tr>
</tbody>
</table>

– = nil, kWh = kilowatt-hour, Lao PDR = Lao People’s Democratic Republic, n.a. = not available, PRC = People’s Republic of China.

Note: The table refers to average import and export price for power trade within the Greater Mekong Subregion only, weighted by the volume of power trade.

Source: Calculated from table on GMS Average Power Trade Tariffs, 2010/latest.
4 Stages of Regional Power Development

Stage 1: Bilateral cross-border connections through power purchase agreements (PPAs)

Stage 2: Grid-to-grid power trading between any pair of GMS countries, eventually using transmission facilities of a third regional country

Stage 3: Development of transmission links dedicated to cross-border trading

Stage 4: Most GMS countries with multiple seller–buyer regulatory frameworks, towards the implementation of a wholly competitive regional market

GMS is in Stage 1 transitioning to Stage 2

Source: http://www.gms-powertrade.net/.
Policy & Institutional Framework

Guiding Framework: GMS Expanded Energy Road Map

Aim: Integrated approach to delivering sustainable, secure and affordable energy in the GMS.

Strategic Objectives:

i. Enhance energy access for all sectors and communities

ii. Develop and efficiently utilize indigenous, low carbon and renewable resources

iii. Improve energy supply security through cross-border trade

iv. Promote public-private partnerships (PPP) and private sector participation (e.g., SME)

Note: The GMS Expanded Energy Road Map further identified priority regional initiatives across the energy sector and in the three subsectors of power, oil and gas, and coal
### Milestones in Power Trade Cooperation [1/2]

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992</td>
<td>• Greater Mekong Subregion (GMS) Economic Cooperation Program is initiated.</td>
</tr>
</tbody>
</table>
| 1994 | • The Subregional Energy Sector Study is completed and published in the subsequent year.  
• The 3rd and 4th Ministerial Meetings in Ha Noi and Chiang Mai endorse subregional priority projects, which include eight hydro and transmission line projects, two oil and natural gas projects, and one institutional project, as recommended by the subregional energy sector study. |
| 1995 | • The subregional Electric Power Forum (EPF) is established in April 1995. |
| 1998 | • The Experts Group on Power Interconnection and Trade (EGP) is established by the EPF, drawn from utilities and GMS member governments. |
| 1999 | • The Policy Statement on Regional Power Trade in the GMS is adopted at the 6th EPF in December 1999. |
| 2000 | • The Policy Statement on Regional Power Trade in the GMS of 1999 is endorsed by the 9th GMS Ministers’ Meeting. |
| 2002 | • The regional indicative master plan on power interconnection is completed and endorsed in May 2002.  
• The intergovernmental agreement (IGA) on regional power trade in the GMS is signed at the First GMS Summit in November 2002.  
• The Regional Power Trade Coordination Committee (RPTCC) is established to coordinate the implementation of regional power trade pursuant to the IGA. |
| 2004 | • The IGA on regional power trade is ratified by all six GMS countries.  
• The Guidelines for the RPTCC is adopted at the 1st meeting of the RPTCC in July 2004. |
| 2005 | • The Memorandum of Understanding on the Guidelines for the Implementation of Stage 1 of the Regional Power Trade Operating Agreement (MOU-1) is signed. |
| 2008 | • The MOU on the Road Map for Implementing the GMS Cross-Border Power Trading (MOU-2) is signed.  
• The update of the regional master plan on power interconnection is completed. |
| 2009 | • The study on building a sustainable energy future in the GMS is published (RETA 6301). |
| 2010 | • The second update of the GMS regional master plan is completed by RTE International (RETA 6440). |
| 2011 | • Discussions on the establishment of the Regional Power Coordination Center (RPCC), the dedicated coordination center for regional power trade, are initiated. |
| 2012 | • Two working groups are set up: (i) performance standard and grid code, and (ii) regulatory issues.  
• Intergovernmental MOU is initialed by all members. |

### Institutions:

- **EPF**
- **EGP**
- **IGA**
- **RPTCC**
- **MOU-1**
- **MOU-2**

**WGPG / WGRI**

**ADB**
Regional Power Coordination Centre (RPCC). An institution with legal identity fully dedicated to managing cross-border power infrastructure and trade in the GMS, and fully owned by GMS countries. Signatures will be completed by end-2013.
Interim technical groups:

- Working Group on Performance Standards and Grid Code (WGPG)
- Working Group on Regulatory Issues (WGRI)
Interim Technical Groups: WGPG

- Chair – Thailand, Co-chair – PRC; Overseeing:
  - Gap analyses on technical performance standards and grid code across 6 GMS countries
  - Implementation plan for harmonization of countries’ performance standards and grid code into a regional standard
  - Studies on transmission regulation: (i) policy on scheduling & accounting; (ii) coordinated operational planning; (iii) communication infrastructure; (iv) data exchange
  - Metering arrangements
Interim Technical Groups: WGRI

- Chair – PRC, Co-chair – Viet Nam; Overseeing:
  - Study on regulatory barriers to power trade development and Stage 2 implementation.
  - Study on Stage 2 Transmission Regulations enabling third party access to interconnections, prioritizing contracts / PPAs, including Stage 2 power trade rules, and Dispute Resolution Mechanism.

- Task forces for transmission pricing mechanism, including wheeling charge for third party access (Chair: PRC, Co-Chairs: LAO & THA)

- Task force for power trade rules in short term cross-border trading (Chair: VIE, Co-Chairs: CAM and THA [TBC])
Absorbed the Australian Agency for International Development [AusAID]
Facilitating Regional Power Trading and Environmentally Sustainable Development of Electricity Infrastructure in the GMS

Sida grant: $5 million

Key outputs:

- Regional power master plan updated (2010)
- Cambodia PDP completed
- Various reference documents generated on performance standards, transmission regulations, metering and communication arrangements
- **RPCC related documents prepared:** (i) inter-government MOU framework, (ii) RPCC governance structure, (iii) RPCC headquarters selection criteria
- **WGPG + WGRI established**
- Regional review of existing environment policies, legislation, regulations and capacity (continued under RETA 7764)
- Study tour to the Southern African Power Pool
- Various capacity-building activities
Gap analysis on frequency control and operating reserves, was conducted across 6 GMS countries for cross-comparison.

Analysis on GMS regulatory barriers was also conducted.

Frequency control and operating reserves
RET A No. 7764 (AFD)

[1/3]

Ensuring Sustainability of GMS Regional Power Development (Phase I)

AFD grant: €1 million subsidy (+ €1 million available from French GEF)

Strategic environmental assessment (SEA) is an analytical and participatory approach that aims to:

- Integrate environmental considerations into **policies, plans** and **programmes**
- Evaluate inter linkages with economic and social considerations
- Compare between the plan and alternative scenarios – as a planning tool

Phase I:

- SEA on baseline scenario
- Scenario analysis with energy security consideration:

  More aggressive EE, RE, DSM.
  Combined with supply risk analysis.
  Final report under review.
GMS renewable energy resource potential locations

Power development scenarios used in impact analysis:

1. Business as usual
2. Renewable energy-focused power development trajectory
3. Energy efficiency-focused power development trajectory
OptGen power sector modeling software outputs for 2011 – 2025 (DRAFT)

Two-way flows possible
Export projects-only zone (only one-way flow)
Input (not modelled) imports to sub-region

<table>
<thead>
<tr>
<th>Interconnection</th>
<th>Current PDP</th>
<th>RE-Regional</th>
<th>RE-Global</th>
<th>EE-Regional</th>
<th>EE-Global</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laos_VN - Vietnam_N</td>
<td>808</td>
<td>193</td>
<td>808</td>
<td>87</td>
<td>808</td>
</tr>
<tr>
<td>Laos_N - Vietnam_N</td>
<td>0.0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Laos_SE - VN_C</td>
<td>698</td>
<td>698</td>
<td>698</td>
<td>482</td>
<td>698</td>
</tr>
<tr>
<td>Laos_S - Vietnam_S</td>
<td>2400.0</td>
<td>1500</td>
<td>1500</td>
<td>500</td>
<td>0</td>
</tr>
<tr>
<td>Laos_N - Thailand</td>
<td>0.0</td>
<td>600</td>
<td>600</td>
<td>0</td>
<td>300</td>
</tr>
<tr>
<td>Laos_NW - Thailand</td>
<td>3916</td>
<td>3916</td>
<td>3375</td>
<td>3916</td>
<td>3375</td>
</tr>
<tr>
<td>Laos_SW - Thailand</td>
<td>1445</td>
<td>1445</td>
<td>1445</td>
<td>1445</td>
<td>1445</td>
</tr>
<tr>
<td>Laos_S - Thailand</td>
<td>1300.0</td>
<td>1300</td>
<td>1300</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Laos_S - Cambodia</td>
<td>60.0</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>Cambodia_VN - Vietnam_S</td>
<td>405</td>
<td>405</td>
<td>405</td>
<td>405</td>
<td>405</td>
</tr>
<tr>
<td>Cambodia - Vietnam_S</td>
<td>216.0</td>
<td>216</td>
<td>216</td>
<td>216</td>
<td>716 (2018)</td>
</tr>
<tr>
<td>Cambodia - Thailand</td>
<td>80.0</td>
<td>500 (2017)</td>
<td>500 (2017)</td>
<td>500 (2017)</td>
<td>80</td>
</tr>
<tr>
<td>Myanmar - Thailand</td>
<td>2050.0</td>
<td>1623</td>
<td>2050</td>
<td>1623</td>
<td>2050</td>
</tr>
</tbody>
</table>
Next Steps \([1/5]\)

**Sida Support Phase II: Harmonizing GMS Power Systems to Facilitate Regional Power Trade**

Amount: $1.5 million (TBC)

Implementation Period: Jan 2014 – Dec 2016

Executing Agency: ADB & GMS members

Aim: To continue support for the RPTCC and eventually the RPCC, WGPG and WGRI

Outputs:

- RPCC established and operations commenced
- GMS-wide performance standards and grid code considered for implementation by WGPG
- GMS-wide regulatory framework guidelines proposed by WGRI

GMS member focal points:

- Energy Sector Country Coordinators to RPTCC, Chair WGPG, Chair WGRI
Next Steps [2/5]

AFD Support Phase II: Ensuring Sustainability of GMS Power Sector Development

Amount: €1.0 million

Implementation Period: ~18 months [TBD]

Executing Agency: ADB & GMS members

Aim: To strengthen policy dialogue on SEA among GMS countries

Components/interventions:

- Capacity building
- SEA approach applied to a national PDP
- Best practices to increase the share of intermittent energy (including smart grids)
- Further integration of energy efficiency as negawatt

Complements work of Subregional Energy Forum (SEF) on energy development, especially in RE, EE and CF
Next Steps [3/5]

GMS Regional Investment Framework (RIF) Implementation [1/2]

The RIF:

- Operationalizes the GMS Economic Program Strategic Framework (GMS-SF), 2012-2022
- Translates the GMS-SF 2012-2022 into a pipeline of investment and technical assistance projects for the 3rd decade of GMS, 2013-2022
- Comprises 10 sector pipelines amounting to about $51.4 billion in potential projects

The energy pipeline covers 21 projects with an estimated cost of $3.2 billion, including:

- 13 investment projects at $3.2 bn
- 8 technical assistance projects at $11.5 mn
Next Steps [4/5]

Energy Investments by Subsector (as % of Total Project Cost)

- Transmission & Distribution: 92%
- Renewable energy: 3%
- Energy access: 5%

Strategic thrusts and priorities, part 1:
- Regional power integration and interconnection projects (e.g., T&D projects)
- Regional market development projects
- Hydropower project development
- Grid development projects for economic corridor and rural development
Strategic thrusts and priorities, part 2:

- Pilot plants under PPP framework
- Establishment of RPCC; and harmonized performance standards, grid codes, market rules, and the like
- Coherent RE and EE plans, and environmentally sustainable development of GMS electricity infrastructure
- Continued support to SEF
Economic Corridors
Thank You

For More Information:

Anthony Jude

ajude@adb.org

Web site:

www.adb.org/gms