



Sustainable Power Sector Development in the GMS

- Update on RETA 9003 -

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Project Overview

- **TA background:**
 - GMS economic growth has been strong; demand for electricity growing even faster
 - Current PDPs presents high environmental and social pressures in the GMS; expected installed capacity of 210 GW by 2025 contributed by large hydro and coal-fired generation
- **TA objective:** Strengthen power sector planning in the GMS countries using IRP and SEA, which will reflect
 - i. full economic costs including environmental and social costs
 - ii. a full range of investment options in power system, not only supply-side, but also demand-side options and
 - iii. national policies and targets for RE, EE, and climate change

Project Overview

- **TA budget:** 1 million euro cofinanced by AfD
- **TA implementation period:** March 2016 - December 2018
- **TA implementing agencies**
 - Energy ministry responsible for power sector planning, renewable energy, energy efficiency, and power trade
 - National electric power utilities
 - Environmental and social safeguard regulation agencies

Project Progress

1. Vietnam IRP and SEA

- Review of integration of SEAs in PDP (completed)
- Report on feasibility of including externalities in Vietnam's IRP modelling (Nearly completed)
- Strengthening the Policy Framework for Power Sector Planning in Vietnam for PDP VIII (under progress)

2. Capacity Building in GMS countries

- Gap analysis and training needs assessment (completed)
- Regional and country workshops (2 completed, 2 to be completed by July 2018, out of 6 workshops)
- 3 twinning programs (2018)

3. Knowledge Products (KPs)

- KP1 - Vietnam's SEA in PDP (draft completed)
- KP2 - Integrated Power Sector Planning (2018)
- Country Guidelines and Briefing Notes (2018)

Highlights from Vietnam component (SEA experiences) #1

No experience of SEA in 2007 to where SEA is now significantly integrated into the PDP process

- **The first SEA was for the Hydropower Master Plan in PDP VI, 2007-2008:**
 - 21 large-scale hydropower schemes
 - 5 scenarios to assess and understand the full range of potential risks associated with hydropower for people and the environment
- **The development of the SEA in PDP VII, 2011-2012 :**
 - The PDP VII SEA (2012) assessed all environmental and social impacts
 - The largest potential impact was air pollution from thermal power stations, especially coal

Highlights from Vietnam component (SEA experiences) #2

- **Awareness of the above impacts and concerns that the demand projections were too high led to a revision of PDP VII, 2014-2015:**
 - progressively increased the proportion of renewable energy
 - reduced the amount of coal-fired generation accordingly
 - responded to government requirements to reduce air pollution impacts
 - Considered Energy Efficiency in power demand forecasting
 - the revised version was approved in 2016
- **Currently the preparation for PDP VIII ongoing for 2020 approval**

Highlights from Vietnam component (SEA experiences) #3

However, challenges remain that need to be addressed before Vietnam can be said to have a fully developed strategic PDP with SEA process:

- Improving power system modelling to:
 - reflect the move from conventional large-scale generation to a more diversified portfolio based on the increased renewable generation
 - Internalize relevant environmental and social costs and benefits into the optimization process
 - include input databases with a more detailed definition of cost of investments, externalities and related benefits
- Improving the relationship and linkage between national and subnational development and energy sector goals
 - national development policies and targets (such as those in the IDNC and the Green Growth Strategy) and targets and priorities specific to the energy sector (including those on RE and EE)
 - The relationship between the national-level and the provincial level, especially in relation to developing renewable energy

The evolution of SEAs in the PDP process has brought considerable benefits

- Fully-integrating SEAs into the strategic planning process resulted in more sustainable plans
- Plans are based on the more complete understanding of the implications for the economy, society and environment of Vietnam

SEA as a process of evidence-based analysis of social and environmental issues within the context of strategic planning:

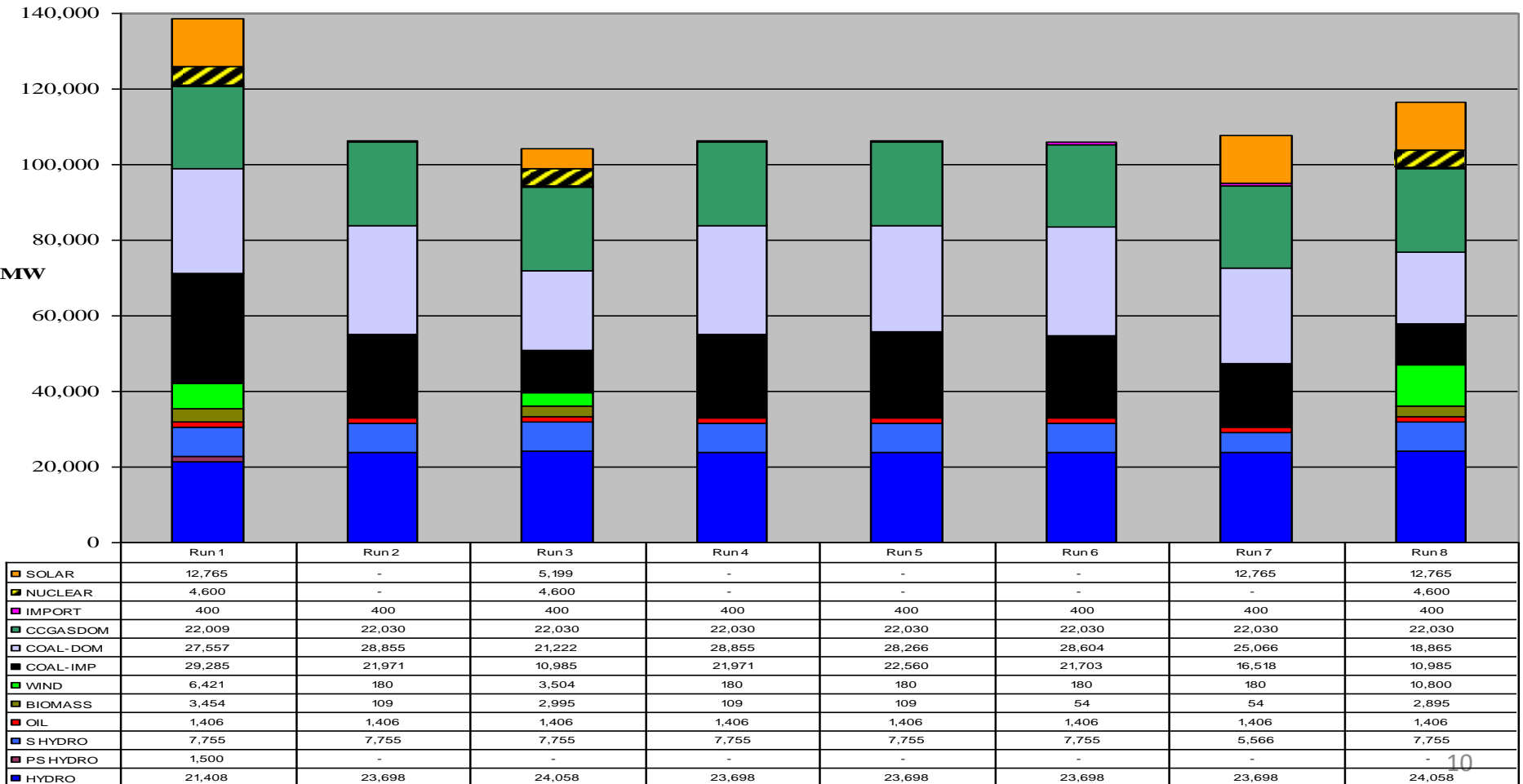
- SEAs are decision-oriented and strike a balance between technical analysis and structured consultations with the aim of building a consensus on ways to achieve planning goals
- SEAs assess the potential impact of risks and costs for mitigation actions and include quantitative analysis of social and environmental impacts, with economic valuation where possible under various scenarios
- A key SEA innovation was the development of a framework for the internalisation of environmental and social impacts (and mitigation measures) in the assessment of the economic feasibility

The IRP study outlined the advances in PDP in terms of the following analytical tasks within the optimisation analysis:

- Multiple electricity demand areas, potentially with different unserved energy costs and supply benefits, and high-level transmission (load flow) constraints.
- Externally specified costs of CO₂ emissions and/or the imposition of annual limits on such emissions.
- The implementation of Energy Efficiency measures, as reflected in quantified reductions in electricity demands and associated investment costs.
- Increased environmental costs, particularly those associated with large hydropower developments.
- Adequate representation of newer types of RE generation (e.g. wind, PV and biomass).
- Demand management measures (e.g. planned supply reductions in the event of droughts and reduced hydroelectric plant outputs).
- Imports and exports of electrical energy, subject to differential tariffs

Highlights from Vietnam component (IRP modelling) #2

The IRP study provided 8 runs to demonstrate different scenario analysis including Optimised Expansion Plan with 4.4% reduction in CO2 (Run 3) and 9.8% reduction in CO2 (Run 8) compared with PDP7R; Maximum investment limited to 10,000 million US\$ per year (Run 4); Hydrological condition included (Run5); alternative energy demand reflecting energy efficiency savings (Run 6&7)



Reflecting the magnitude of required investments in the power sector, the study recommendations included:

- power system expansion planning should be undertaken on an integrated basis, with the simultaneous optimisation of generation plant and transmission line commissioning dates and installed capacities with detailed characteristics of energy resources and reflecting energy efficiency savings
- organisations responsible for power system development planning should be provided with the resources and personnel necessary to regularly produce and revise integrated expansion plans, with or without external assistance, whenever there are significant changes to the assumptions made during their derivation
- there are a number of computer programs designed to optimise power system expansion plans, and their detailed capabilities and attributes should be assessed before decisions are made to enable internalization of externalities and IPR approach for the PDP

China Gap Analysis – Key Findings

China has started applying Environmental Impact Assessments to development plans since 2003

- Implemented through the passing of the EIA Law.

The process intensified upon passing the 2009 PEIA Ordinance

- provided more comprehensive guidance on the practical application of the Plan EIAs (PEIAs)

The Chinese PEIA is equivalent to an SEA in the other GMS countries

China Gap Analysis – Key Findings (part 2)

The application of the PEIAs was facilitated by the strategic change of the country's development priorities in 2012

- shift from a high rate economic development growth to a quality Green Growth with strong consideration for protecting the environment towards a sustainable development path.

China has developed strong institutional, technical, planning, scientific and research capabilities to:

- apply the PEIA approach to PDP
- assist other GMS countries in this field

There is a good understanding throughout government about the need to apply SEAs to the PDP process

- The application of PEIA is mandatory and is an integral part of the documentation package of the entire development plan

China Gap Analysis – Key Findings (part 3)

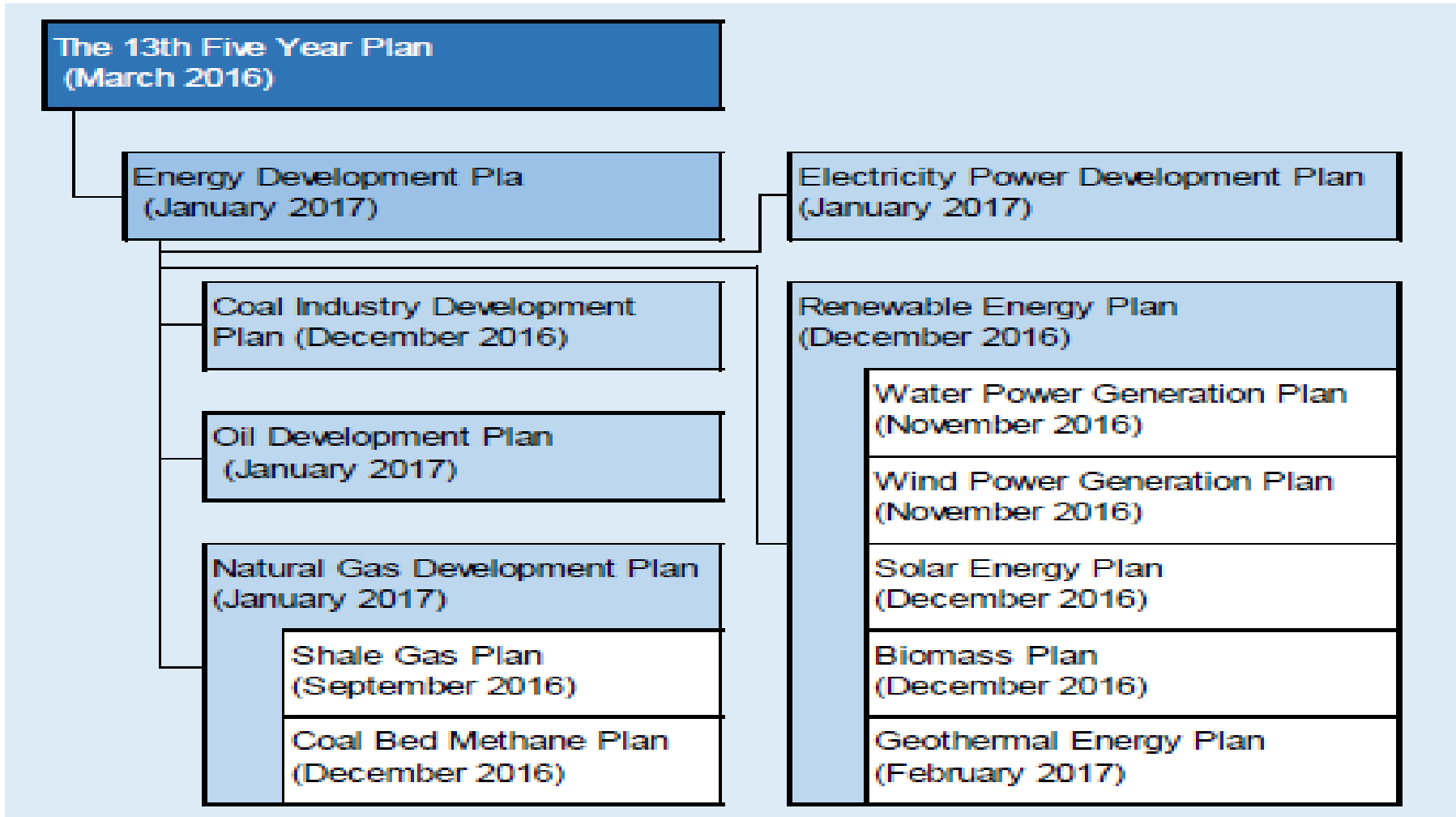
- **Very good monitoring and verification system** – periodic review of implementing environmental activities from central to provincial authorities
- **Personal accountability** of relevant officials for achieving environmental results

In addition to PEIAs, China's power sector planning process includes components related to RE and EE:

- Cross border interconnection is less prominent in China's planning process (power trade is less than 1% of the overall power generation mix)
- Experience in integrating RE in the power system and management of grid operations

China Gap Analysis – Key Findings (part 4)

China has developed a well coordinated planning system



Source: Mitsui Global Strategic Studies Institute Monthly Report April 2017
https://www.mitsui.com/mgssi/en/report/detail/_icsFiles/afieldfile/2017/07/19/170406c_yatsui_e_1.pdf

China Gap Analysis – Key Findings (part 5)

China has developed a well coordinated planning system

The key energy efficiency targets in the 13th Five-Year plans (2016-2020)

	National plan	Energy plan	Energy Plan	Average Annual Growth	Power plan	Power plan	Average Annual Growth
	2020	2015	2020		2015	2020	
Reduction of energy consumption per unit of GDP relative to 2015 level	15%						
Average coal consumption of New Coal power generating unit (g standard coal equivalent) / kWh)						300	
Average coal consumption of Existing Coal power generating unit (g standard coal equivalent) / kWh)		318	<310	[-8]	318	<310	[-8]
Rate of electricity loss from transmission lines		6.64%	6.50%		6.64%	6.50%	
Reduction of carbon emission per unit of GDP from 2015 level	18%		18%				

Source: 13th 5 years national, energy and power sector development plans

Gap Analysis identified possibilities for further:

- (i) refinement of approach and methodologies in the analysis of certain aspects of an environmental impact
- (ii) streamlining of the guidelines and regulations to facilitate their practical application
- (iii) co-ordination between the development planning and environmental authorities

Remaining Activities in 2018

Country Workshops :

- Myanmar (June)
- Thailand (July)
- Cambodia (October [TBC])
- Vietnam (December [TBC])

Country Specific Guidelines on IRP with SEA:

- A generic set of guidelines reflecting the principles and tailored to individual countries (dates to follow Country Workshops)

Knowledge Product 2 - Strategic Power Development Planning through Integrating SEA into an IRP Approach in the GMS Region

- A discussion that sets out the basic concepts of IRP and SEA and their applicability in the GMS countries (development in parallel with Country Guidelines)

Remaining Activities in 2018 (part 2)

Three twinning programs with potential hosting countries:

- **Vietnam:**
 - Experience in applying SEA in PDP development (IE/MOIT)
 - Experiences in reviewing SEAs (MONRE)
- **Thailand:**
 - Experience in integrated power sector planning (RE and alternative energy targets, GHG mitigation targets, EE/DSM targets, oil and gas plans, energy security targets (EGAT)
 - Preparation of SEA guidelines and development of an SEA reform process (MONRE)
- **Peoples Republic of China:**
 - Experiences in RE grid integration and management
- **Twinning approach:**
 - under review and likely to be a workshop organized by hosting countries and facilitated by an International Expert

Thank you

