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Costs and Benefits of a Greener Alternative for the Development of Vietnam's power sector

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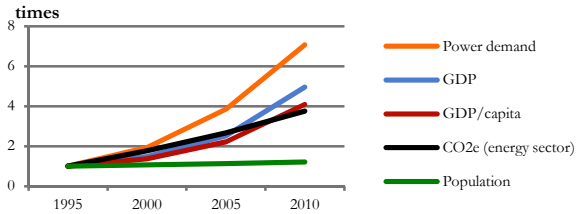
Abstract— In this study, BAU (a scenario based on current trends) and ALT (a greener alternative with more renewables, higher energy efficiency) are developed. The external costs of CO_2, NOx, SO_2 and PM_{10} in the Vietnamese power sector are estimated at 20, 1328, 2047 and 1460 US$/ton, respectively. The authors find that the electricity price and the domestic trade balance in ALT are less sensitive to fluctuations in the international price of coal than in BAU. The total costs accumulated between period 2010-2040 would be lower in ALT: 632 billion US$ compared with 974 billion US$. This difference arises from several factors: lower investment in new capacity (226 vs 306 billion US$); lower local pollution costs (73 vs 137 billion US$); and lower expenditures on imported fuels (57 vs 115 billion US$). The outcomes of ALT are in accord with the targets in the most recent Green Growth Strategy of Vietnam.

Key words: energy planning, energy efficiency, dynamic modelling, LEAP, Vietnam

1. Power consumption increase 1.5 times higher than GPD growth



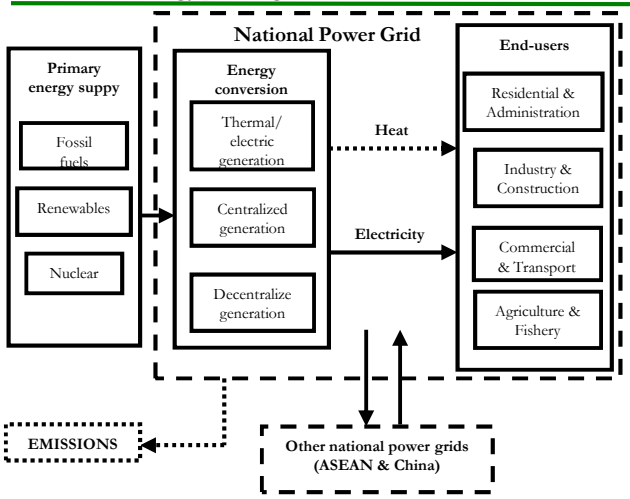
2. Domestic primary energy sources

	Potential / Reserve	Depletion at 2010 rate
Coal	3,390 Mil.tons (91.5 Bil. GJ)	2087
Gas	610 Bil. m3 (21.1 Bil. GJ)	2086
Oil	460 Mil.tons (2.6 Bil. GJ)	2038
	Potential capacity	**2012 capacity**
Hydro	21,000 -24,000 MW	13,000 MW
Wind	400,000 MW	40 MW grid-connected
Solar	20,000 MW	(mostly not connected)
Bio-energy	5,000 MW	(mostly not connected)
Geothermal	2,000 MW	

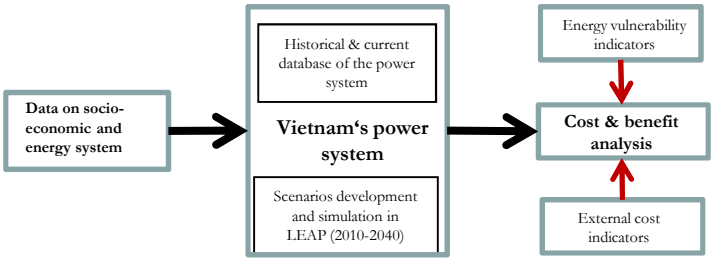
3. Assumptions of the two scenarios

Scenarios		Demand side	Supply side
Business As Usual scenario	BAU	Medium demand forecast by the PDP VII	Continuation of Current Policies for power development in Vietnam
Alternative scenario	ALT	Reduce power intensity (based on low-demand forecast of PDP VII)	No electricity generation from nuclear, less coal import and more renewables as compared to BAU

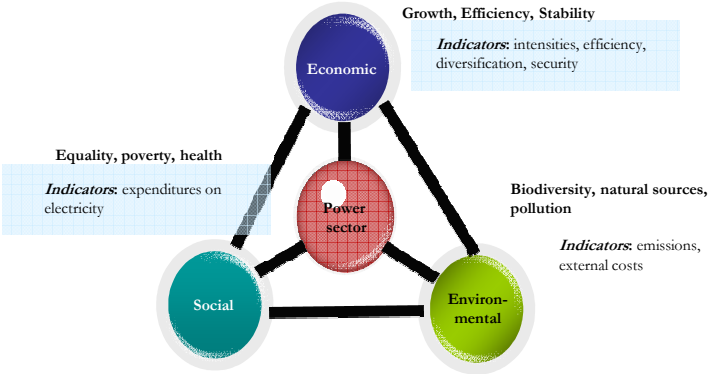
4. National energy planning: LEAP Model



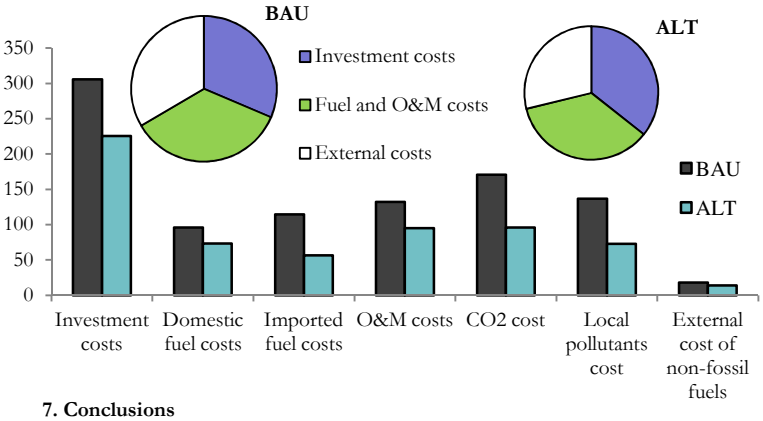
5. Method to assess the total costs of electricity



6. Sustainability and Extenality analysis



6. Breakdown of total cost by scenario (billion US$2008)



7. Conclusions

✓Vietnam's power system would be more vulnerable to fluctuations of imported fuel price, depletion and scarcity of fossil energy in next 2030

✓Under the proposed alternative scenario, the sector would be less vulnerable with its less costs

✓External costs of electricity generation are as important as their production costs