

# Energy-Economy-Environment Scenarios for the Greater Mekong Subregion

Rita Nangia<sup>1</sup>, Leo Schrattenholzer<sup>2</sup>, Manfred Strubegger<sup>2</sup>

<sup>1</sup>Asian Development Bank

<sup>2</sup>IRM Consulting & Services GmbH

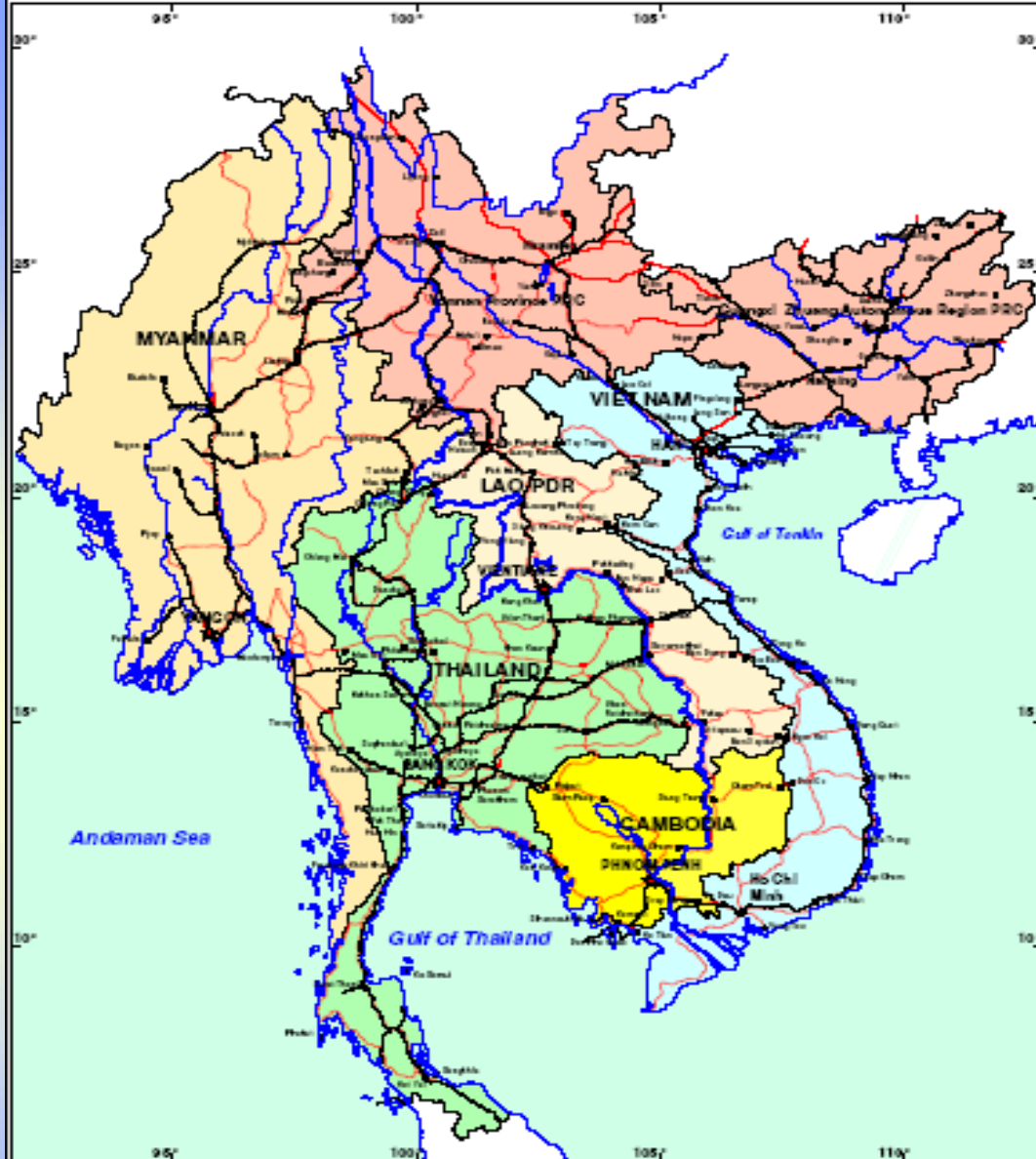
[gmsenergystrategy@adb.org](mailto:gmsenergystrategy@adb.org)

[Leo.Schrattenholzer@IRM.at](mailto:Leo.Schrattenholzer@IRM.at)

[Manfred.Strubegger@IRM.at](mailto:Manfred.Strubegger@IRM.at)

# Outline

- The present situation
- Emerging challenges in the GMS
- Economics of energy integration
- Energy trade under 'GMS Integrated'
- Shared Energy Future – Priority projects



- Legend :
-  Shoreline
  -  Major Highway
  -  Railway
  -  Major River Network
  -  National Capital
  -  City/ Town

Map 1  
**The Greater Mekong Subregion**

✱

0 150 300  
 Scale 1 : 15,000,000  
 Kilometers



# The GMS, Present Situation

- GMS has a high level of economic growth but also uneven levels of human development.
- Energy services are crucial for economic development and for improving the quality of life.
- Large community of energy poor: 74 million or over 20% with no access to electricity
- Growing energy demand is met by importing almost one-fifth of its energy needs.

# Emerging Challenges in the GMS

- High and rising energy demand
- Energy poverty
- High energy vulnerability
- Environmental and social issues
- Energy productivity
- Institutions and policy regimes

# Brief Project Description

The energy strategy model MESSAGE is used to develop a regional energy sector strategy. The model outputs are used to formulate alternative energy supply strategies, each of them optimized under different assumptions reflecting future uncertainties.

These strategies are assessed for robustness of policy options, and policy recommendations are based on these analyses. The advantages of expanded cooperation among the GMS countries is assessed by *comparing country strategies with integrated strategies* for the GMS.

# MESSAGE

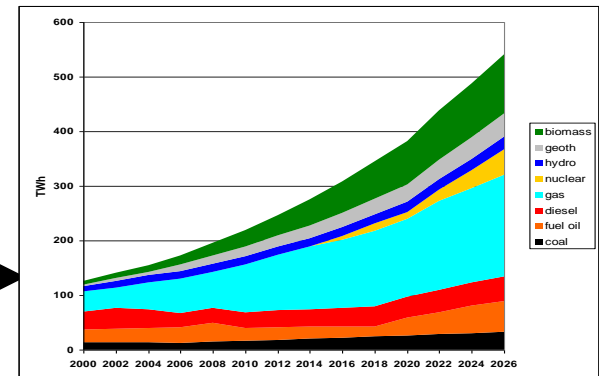
## Model for Energy Supply System Alternatives and their General Environmental impacts

### INPUT

- Energy system structure (including vintage of plant and equipment)
- Base-year energy flows and prices
- Energy demand projections
- Technology and resource options & their techno-economic performance profiles
- Technical and policy constraints



### OUTPUT



- Primary and final-energy mix
- Emissions and waste streams
- Health and environmental impacts (externalities)
- Resource use
- Land use
- Import dependence
- Investment requirements

# MESSAGE Applications

- *Energy in a Finite World* (IIASA, 1981)
- *Global Energy Perspectives* (IIASA-WEC, 1995 & 1998)
- IPCC-SRES (2000)
- IPCC-TAR (2001)
  
- Energy planning in Silesia (Poland)
- Energy strategies for Central America (ongoing)

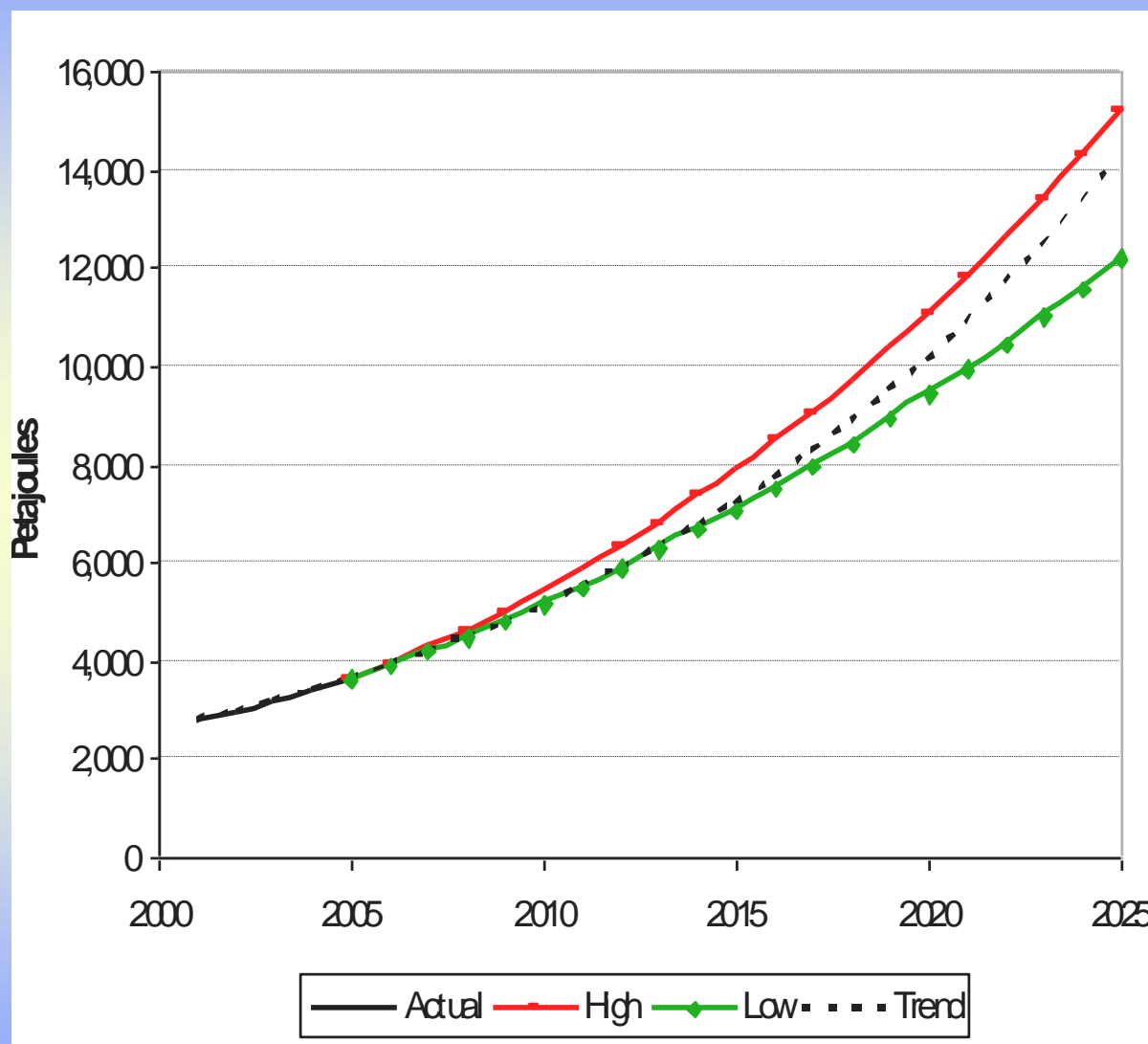
# Useful-Energy Demand Sectors

- Agriculture
- Urban households, electric
- Urban households, thermal
- Urban space conditioning
- Rural households, electric
- Rural households, thermal
- Rural space conditioning
- Service sector, electric uses
- Service sector, thermal uses
- Industry, electric uses
- Industry, thermal
- Transportation, freight
- Transportation, passengers
- Non-energy use (Feedstocks)

# Four Scenarios

- Base Case
- GMS Integrated
- High Growth – High Risk
- Low Carbon

# GMS Energy Demand 2001–2025



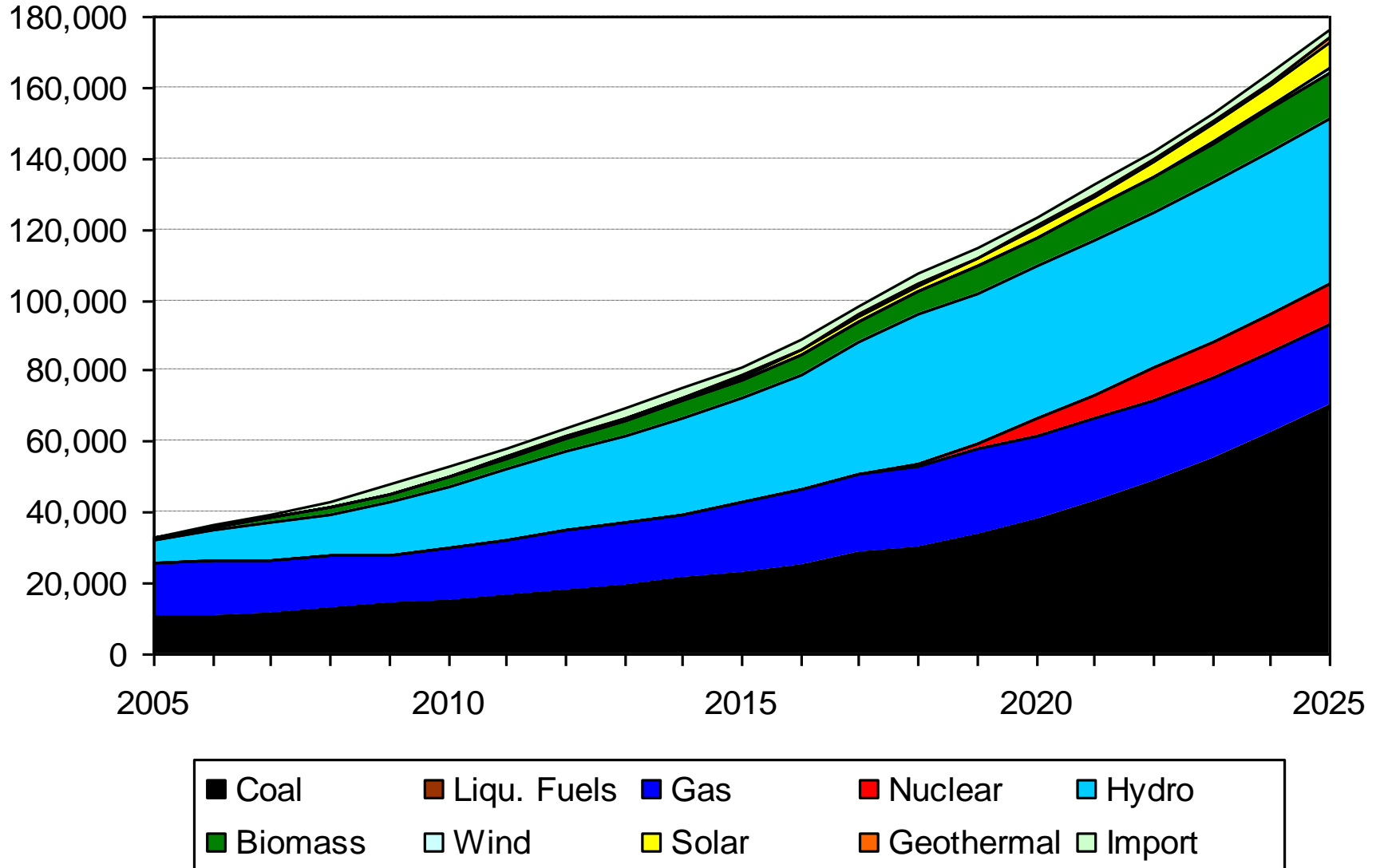
# GDP and Energy Demand Growth

---

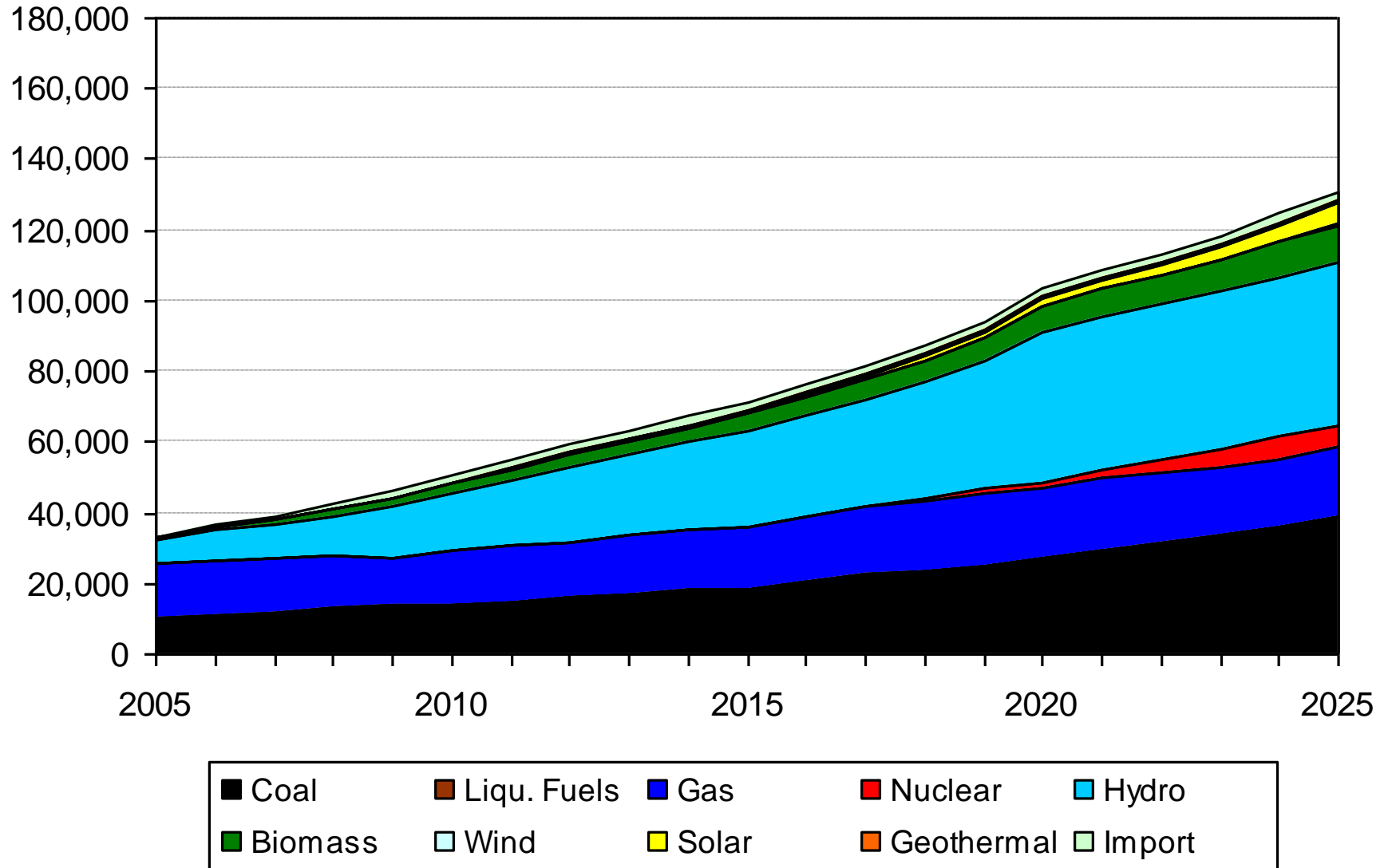
	Past Trend Rates	Low Growth Scenario	High Growth Scenario
UED	6.8%	6.0%	7.1%
GDP	7.8%	6.3%	7.6%
UED-GDP Elasticity	0.87	0.95	0.93

---

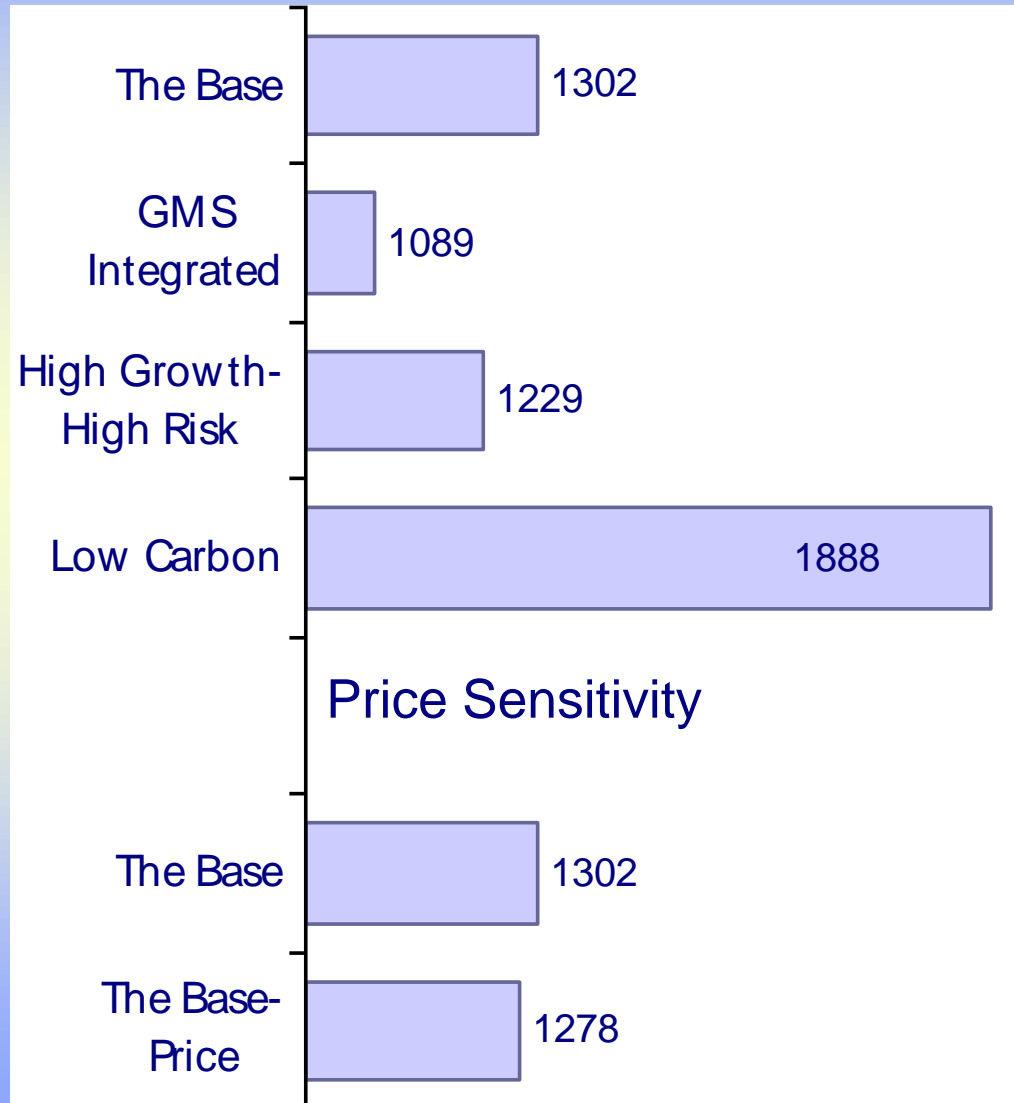
# GMS: Electricity Mix (High)



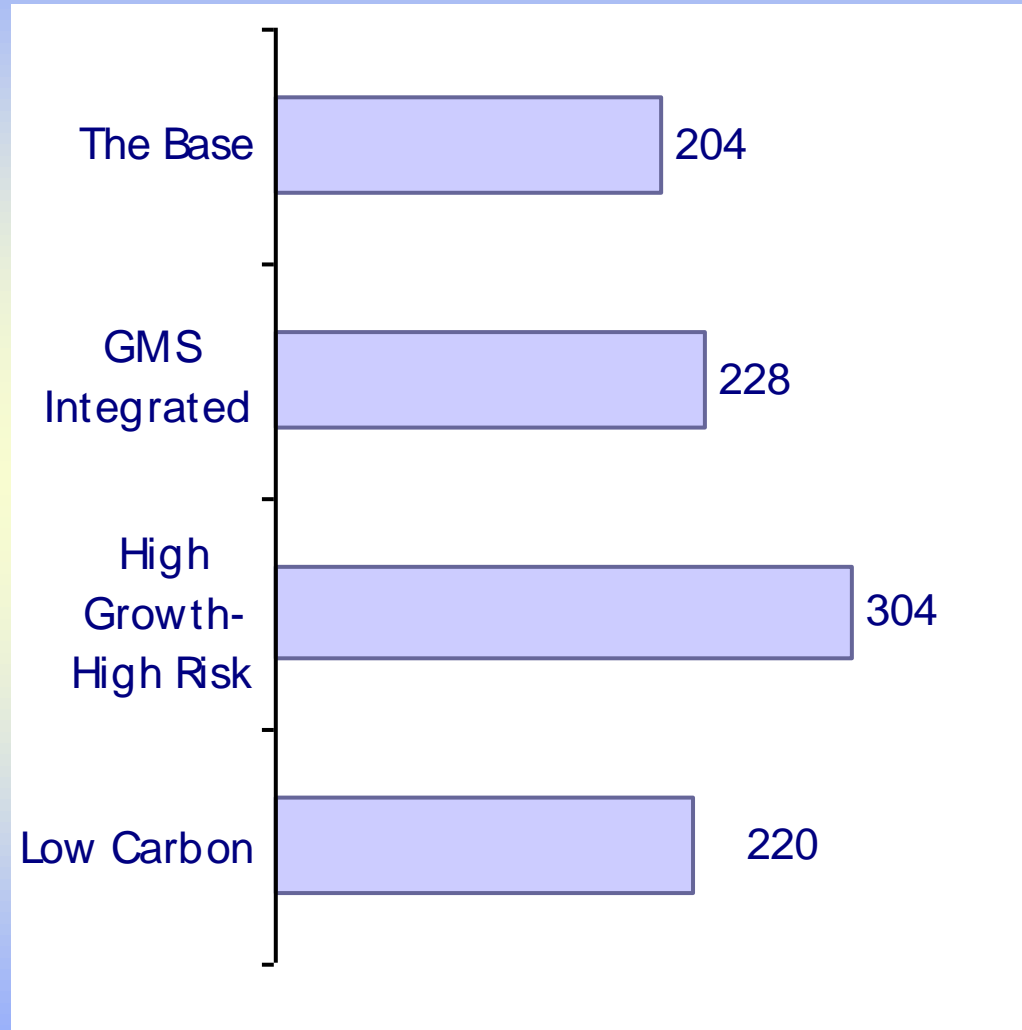
# GMS: Electricity Mix (Low)



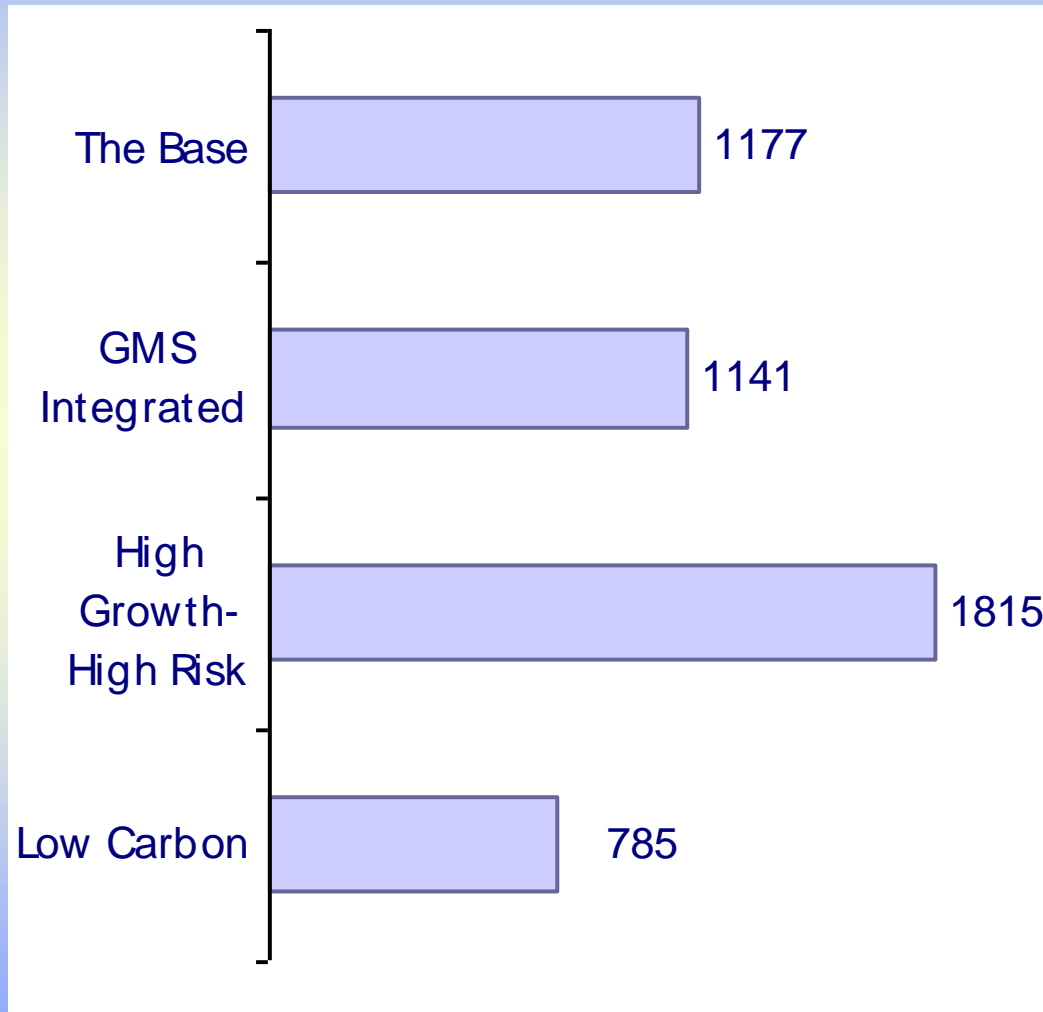
# Total Costs of Different Scenarios (\$ billion, discounted)



# Capacity Additions (GW)



# Increase in GHG Emissions (2005-2025, Mt of CO<sub>2</sub> equivalent)



# Priority Projects

- Refineries
- Coal liquefaction plants
- Biofuel plants
- Biomass (agricultural residues) power plants
- Off-grid power production

For more information visit

<http://www.adb.org/Projects/GMS-Energy-Strategy/news.asp>

**Thank you!**