

Energy Outlook for Asia and the Pacific

ADB's Energy Sector Plan

The logo for the Asian Development Bank (ADB), consisting of the letters 'ADB' in a white serif font centered within a dark square.

ADB

Coverage of the Outlook

- **Time Frame: 2010–2035**
- **Geographic Coverage:**
 - **Developing Asia**
 - Central and West Asia
 - East Asia
 - Pacific
 - South Asia
 - Southeast Asia
 - **Developed Group:** (Australia; Japan; and New Zealand)
- **Main Content:**
 1. Energy supply and demand outlook
 2. Electricity outlook
 3. CO₂ emissions outlook
 4. Energy investment outlook
 5. Policy implications
 6. ADB's ESG Plan

Outlook Cases

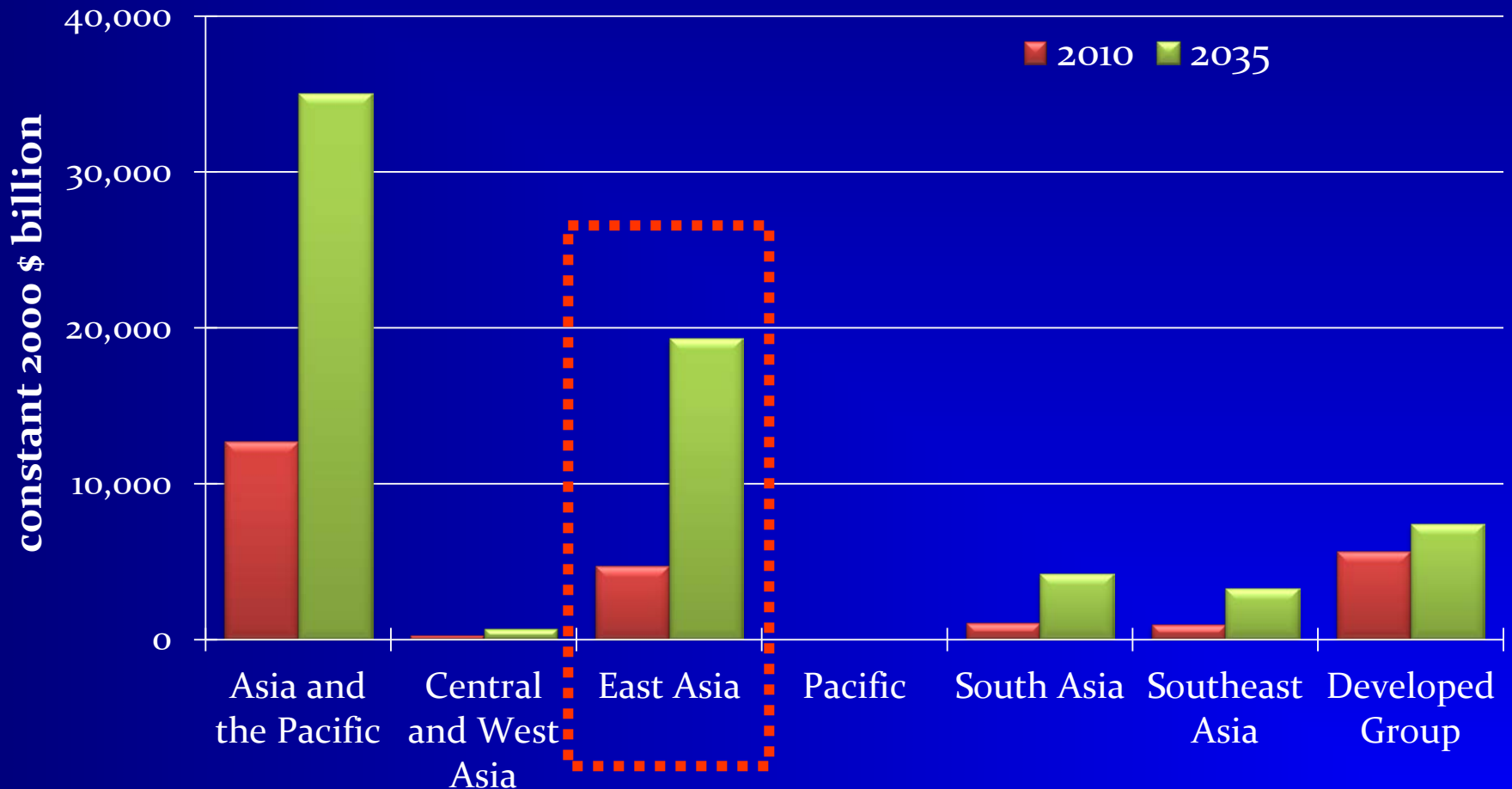
	Business-as-Usual Case	Alternative Case
Final Energy Demand	<ul style="list-style-type: none">• Current levels of technology applications• Reflects existing policies on future energy demand and energy choice	<ul style="list-style-type: none">• Deployment of advance technologies
Transformation Sector	<ul style="list-style-type: none">• Current trends in the development of new and renewable energy sources will continue• Nuclear development considered are those for which at least preparatory work for construction of power plants are already being made	<ul style="list-style-type: none">• NRE and nuclear development based on current government plans• Installation/deployment of highly efficient/advanced thermal power technologies
Investment Requirements	<ul style="list-style-type: none">• Supply-side investments requirements	<ul style="list-style-type: none">• Supply-side and demand-side (energy efficiency) investment requirements

Looking forward to 2035

- Economic Growth
- Population Growth
- Primary energy growth
- Energy intensity improvement
- Increasing energy demand
- Electricity doubled between 2010-2035
- Fossil fuel still dominant in electricity mix
- CO2 emission 2010-2035
- Projected investment in energy sector by 2015
- Energy savings and CO2 mitigation potential

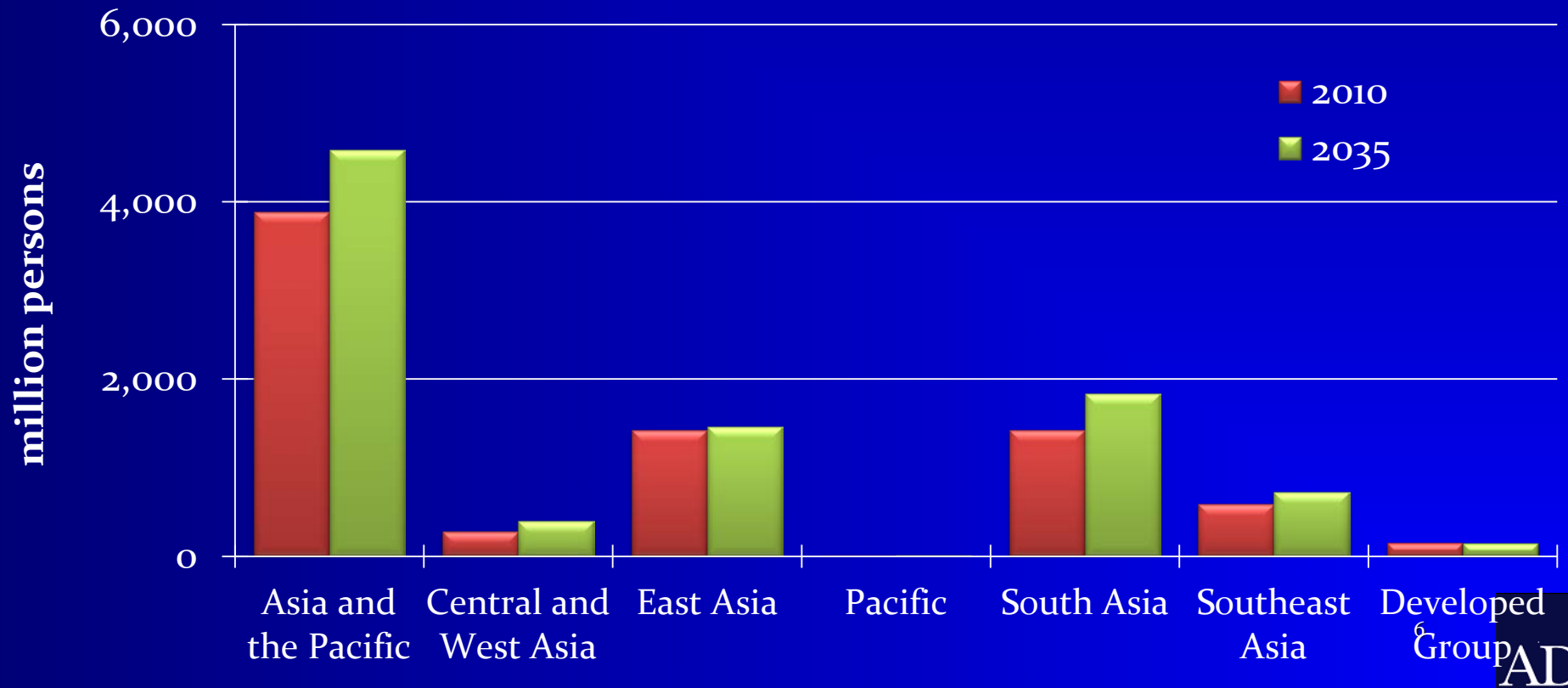
Fast Economic Growth (2010-2035)

Projection: Annual GDP Growth – 4.1% in the region



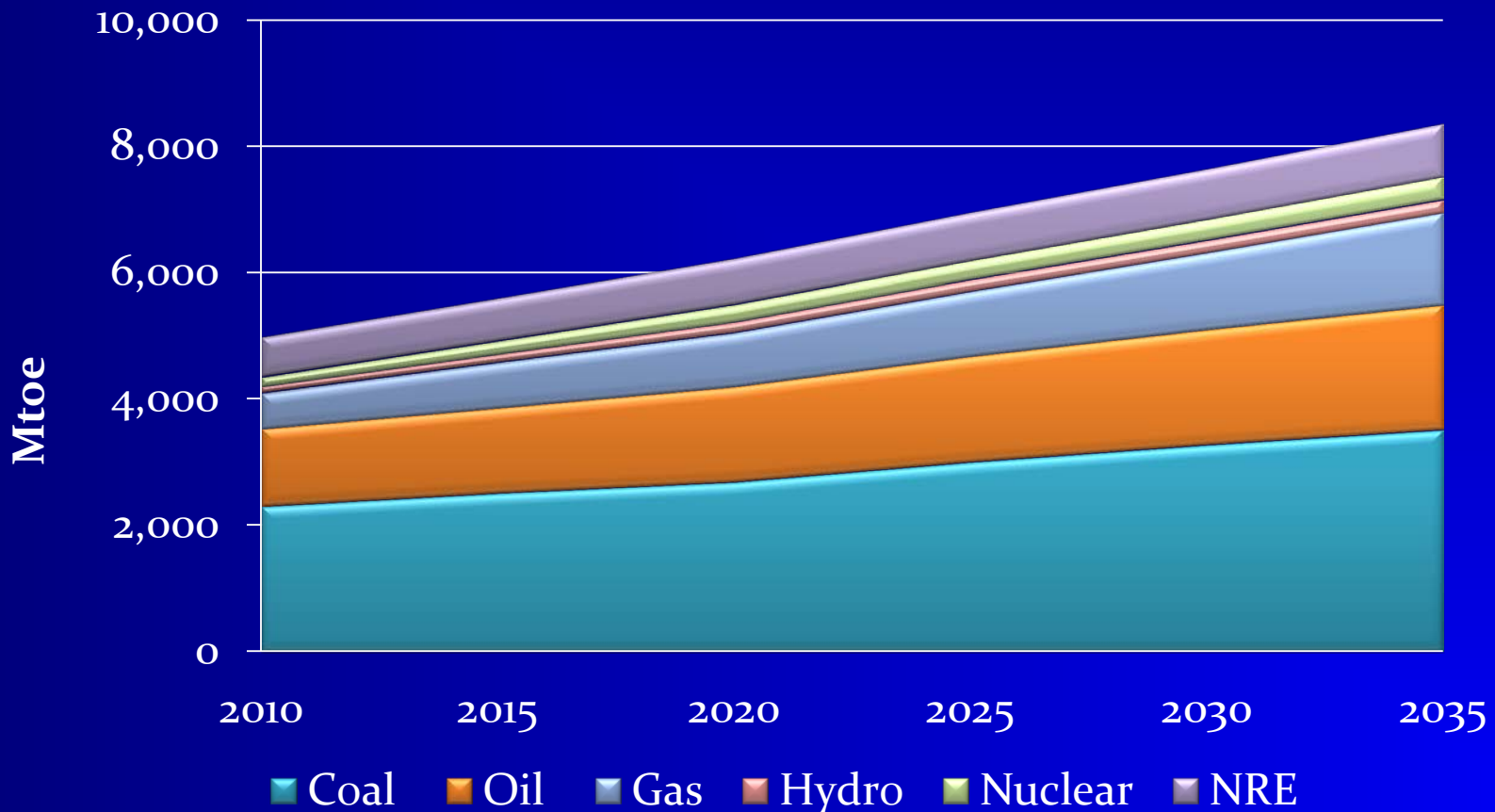
Population Growth-Asia and the Pacific

- Population in Asia and the Pacific will increase by 706 million persons, at an average rate of 0.7% per annum.

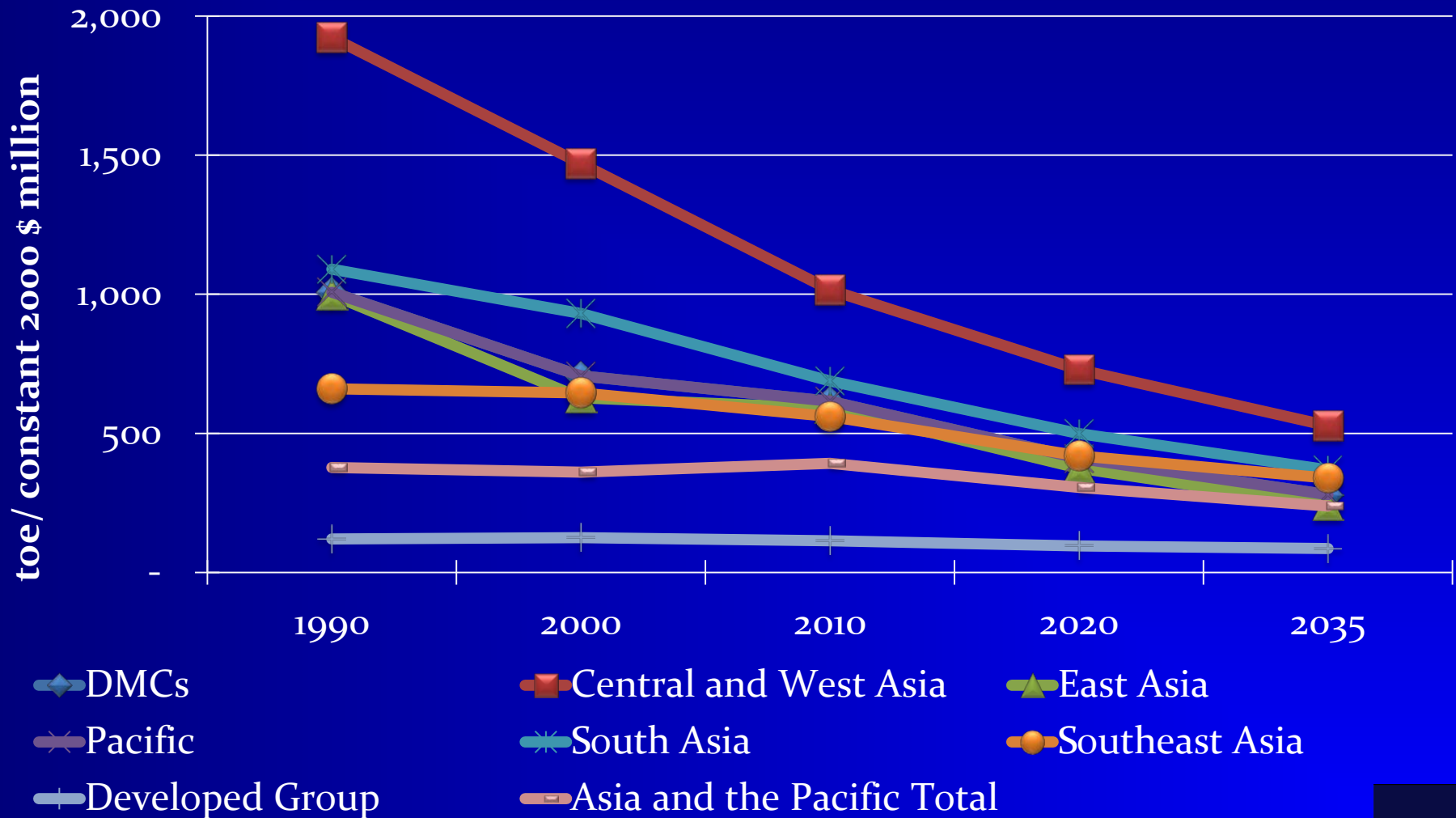


Primary Energy Growth at 2.1%/yr (2010-2035)

Fossil fuels still supply the majority



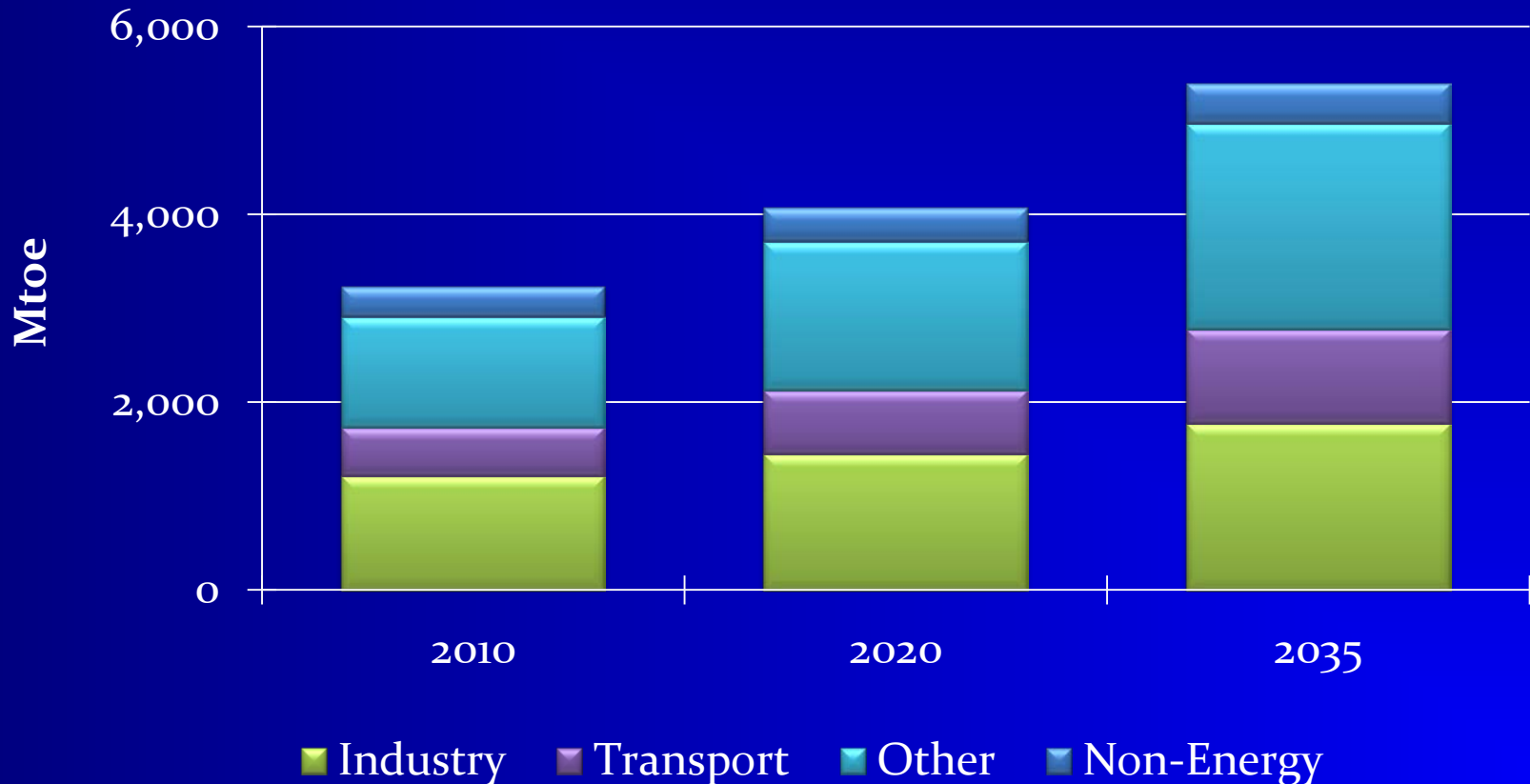
Energy Intensity Improvement Over Time



Increasing Energy Demand

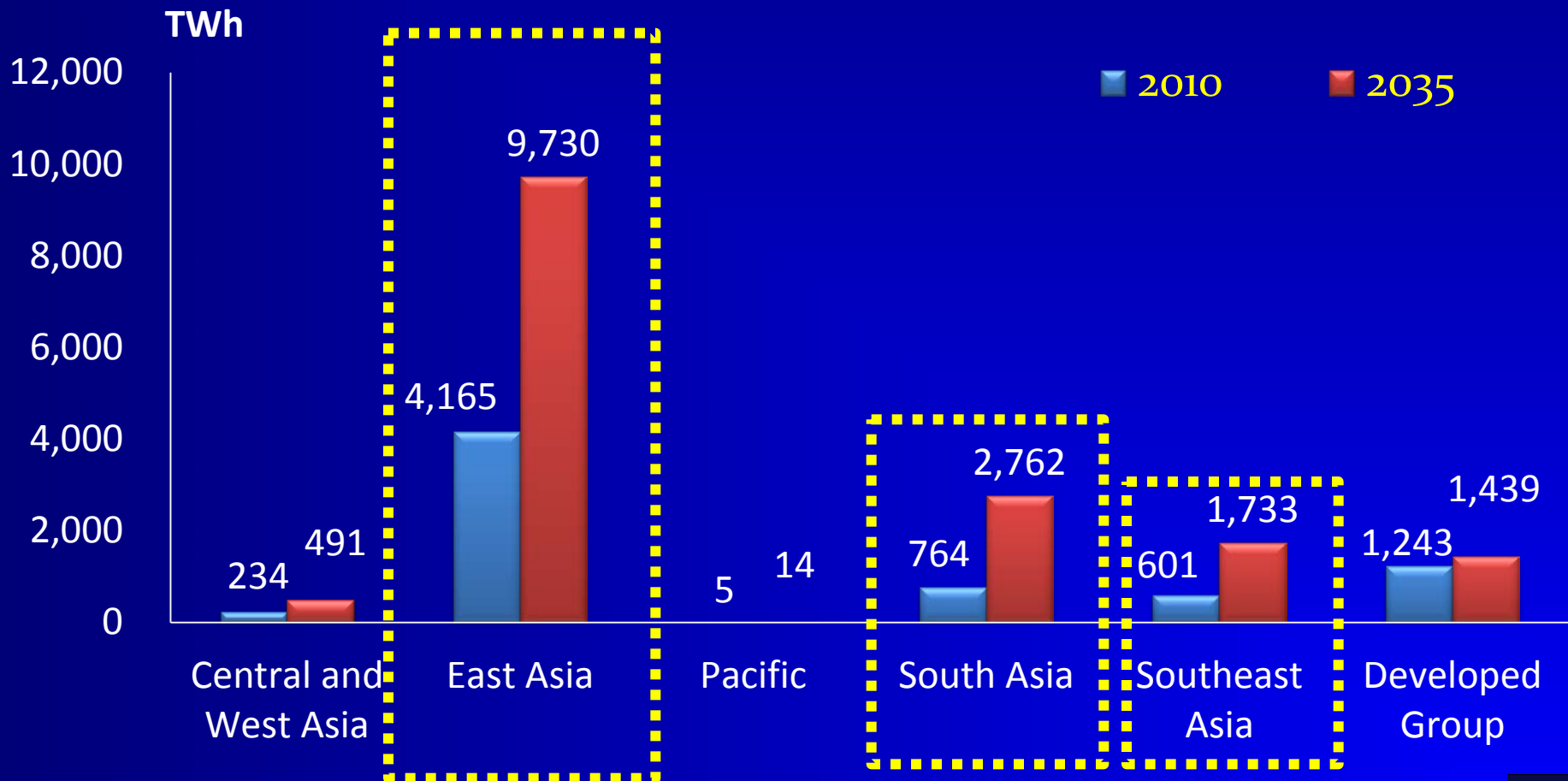
Projection: Final energy demand increase at 2.1% /yr

- 2010: 3,238.5 Mtoe ;
- 2035: 5,400.9 Mtoe;

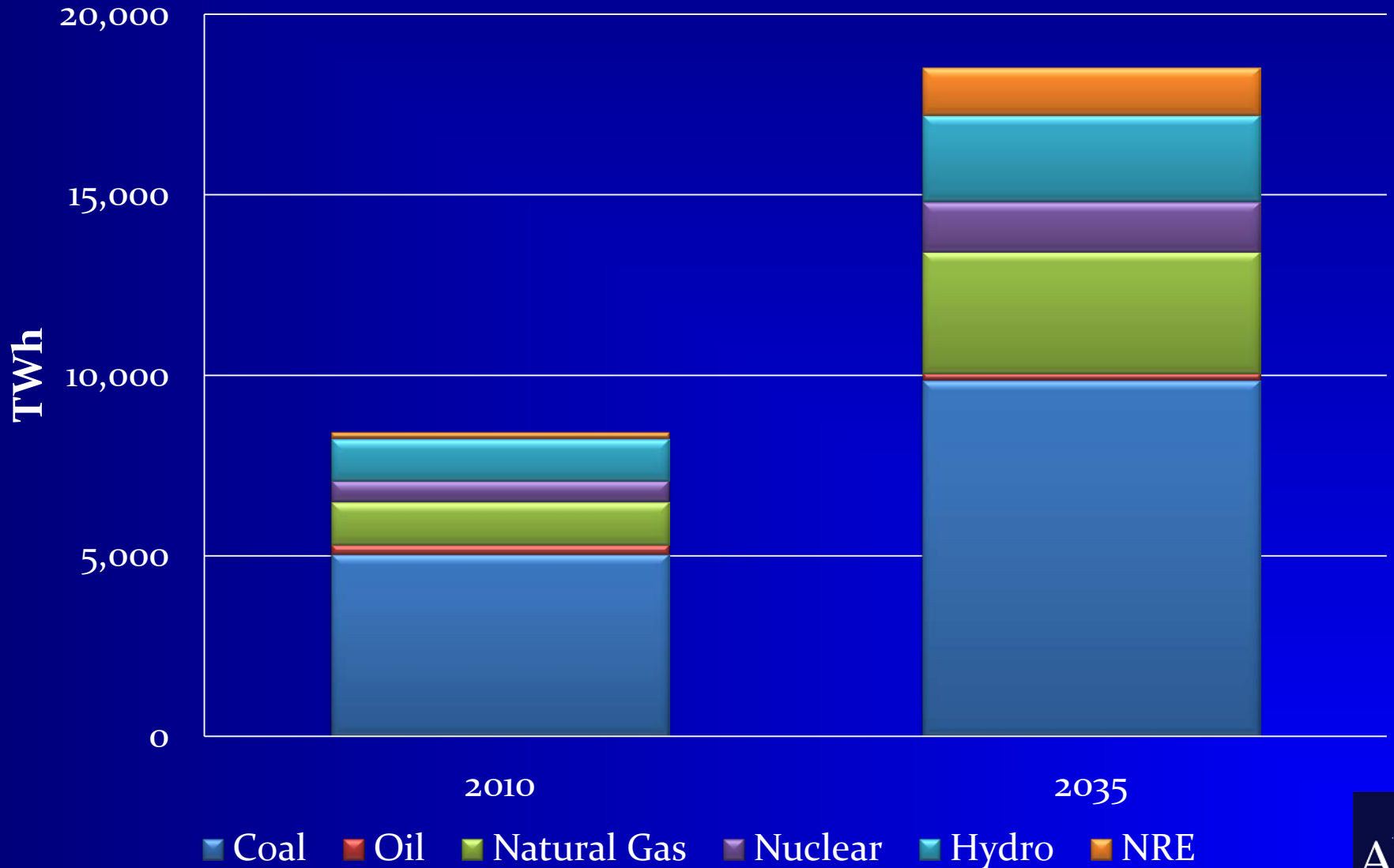


Electricity: Doubled btw 2010 & 2035 (3.4%/yr)

- 2010: 7,010 TWh;
- 2035: 16,169 TWh;



Fossil Fuels Still Dominates Electricity Mix

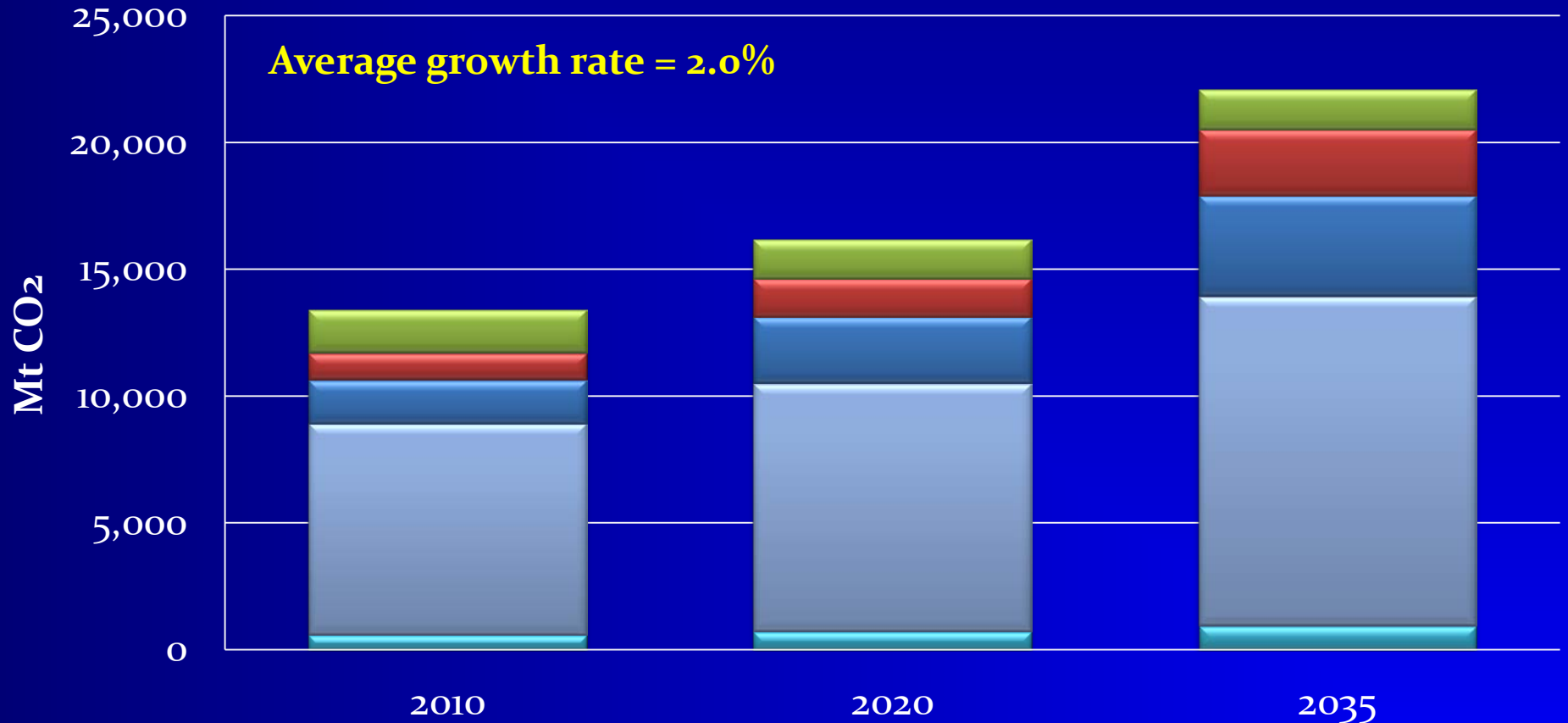


CO₂ Emission (2010-2035)

2010: 13,404.0 million tons

2020: 16,184.8 million tons

2035: 22,112.6 million tons



Central and West Asia

East Asia

Pacific

South Asia

Southeast Asia

Developed Group

Projected Investment in Energy Sector by 2035

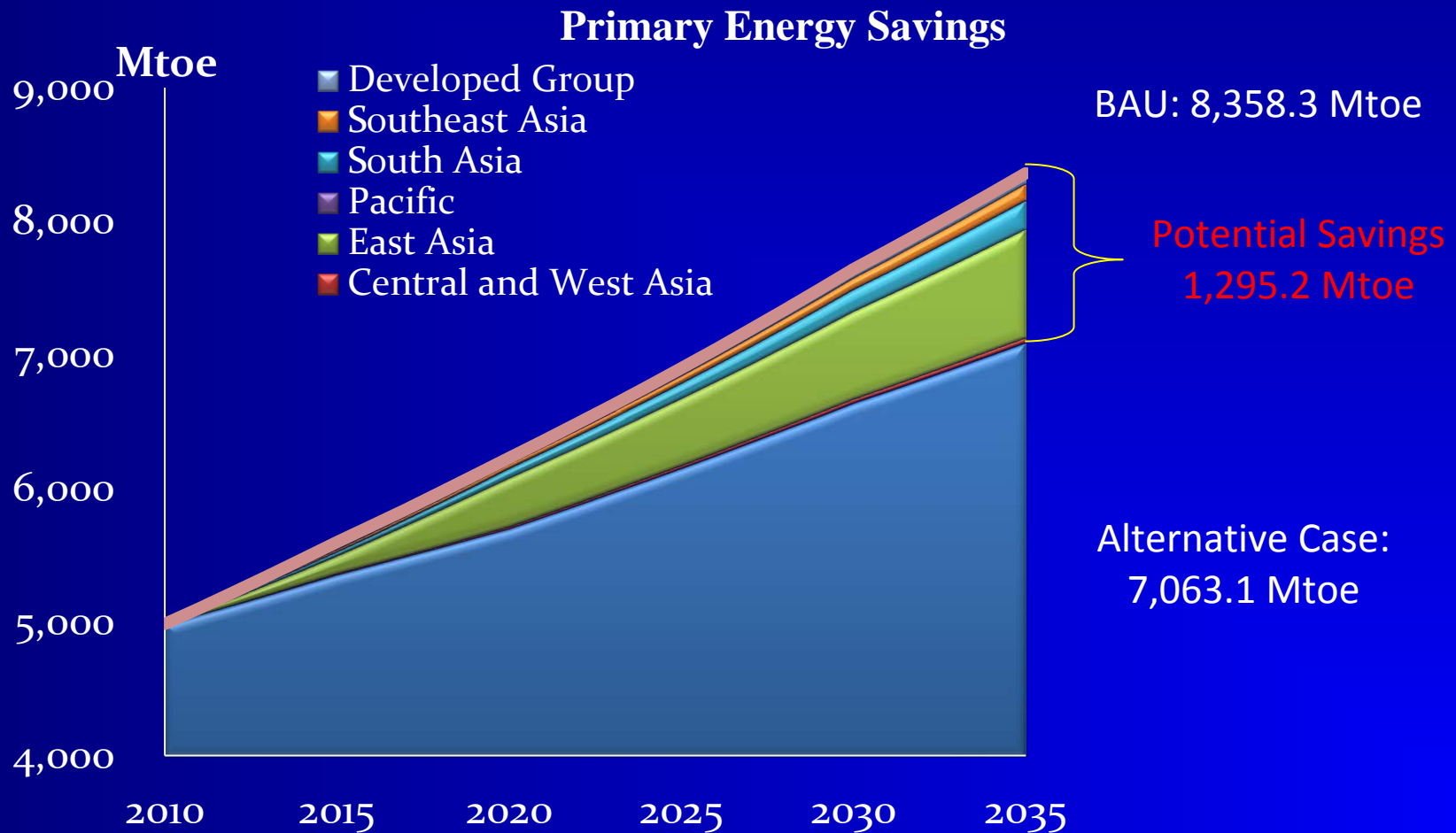
- **Cumulative investments by 2035 : \$11.7 trillion**
- **More investment in developing members**

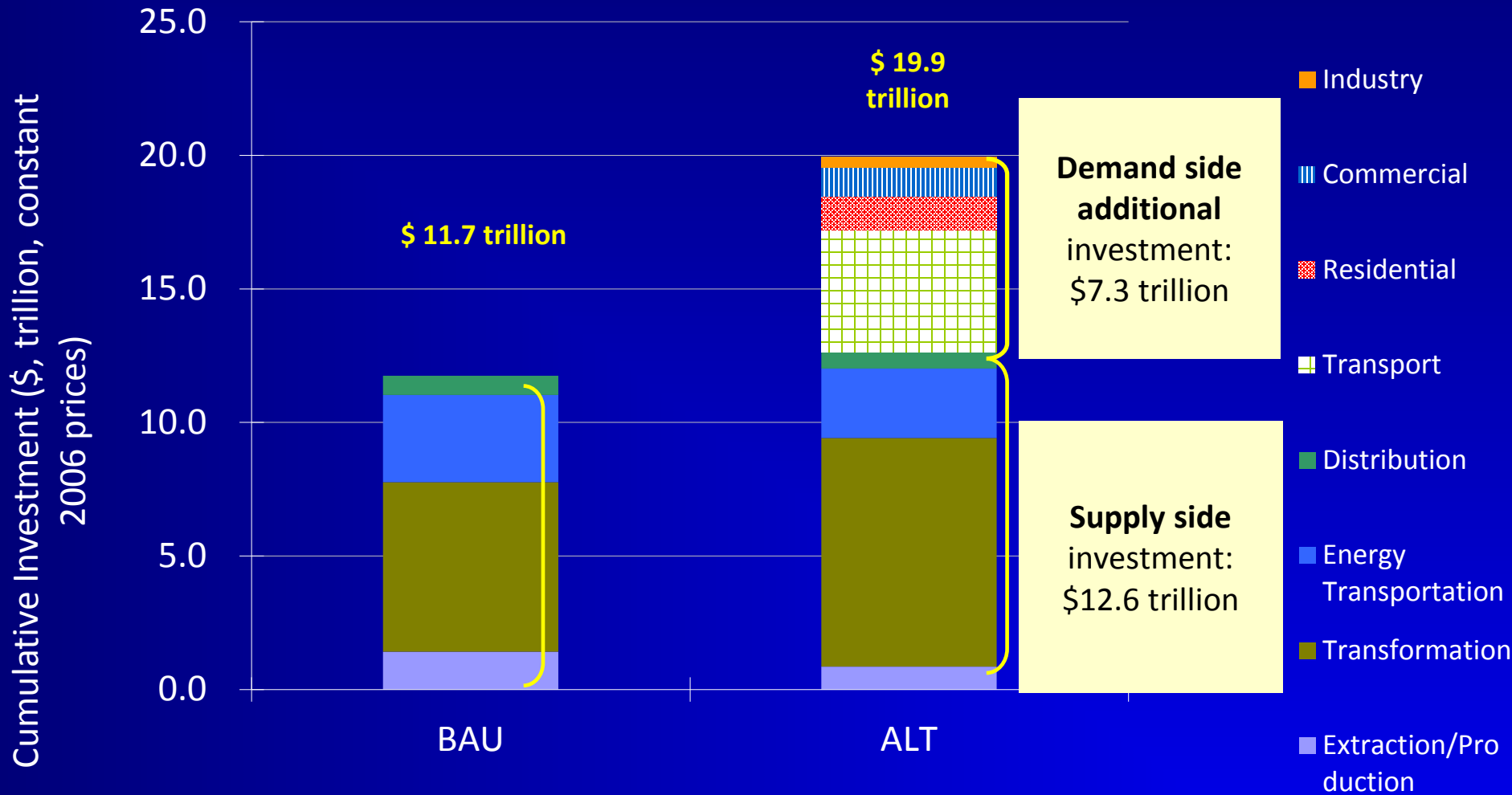


Energy Saving and CO₂ Mitigation Potential

By 2035, BAU vs Alternative

- **Primary energy savings: 1,295.2 Mtoe**
- **CO₂ emissions reduction: 6104.3 Mt**





Investment requirements for BAU and Alternative Cases

Policy Implications

- 1. Energy Security: continue rely upon imported fossil fuel, such as oil and gas**
- 2. Demand for coal will grow by 50% for economic and technical needs but at slower pace due to EE and RE development in PRC**
- 3. Demand side energy-efficiency is very important**
- 4. Rehabilitate and/or phase out aging, unreliable, and low efficiency power plants**
- 5. Regional cooperation is needed**
- 6. Large amounts of investments is required**

ADB'S Energy Sector Group Plan

- Expand energy sector operations
- Support new sustainable development goals on energy
- Use innovative technologies
- Use of innovative financing modalities
- Introduce new business models
- Optimize joint operations of sovereign and nonsovereign sectors
- Use of multisector approach
- Implement Cross border energy initiatives
- Scale up energy sector group support to operations departments

Expanding Energy Sector Operations

- Overall energy sector lending currently at over **\$5 billion** per year.
- With OCR/ADF merger, the lending in the energy sector is expected to increase.
- Clean energy lending increasing from **\$2 billion** towards **\$3 billion** per year beyond 2017.
- Mobilize climate and other co-financing (e.g. Green Climate Fund, Clean Investment Funds)
- **\$95 million** available for allocation under Clean Energy Financing Partnership Facility (CEFPF) to support Operations (grants, PPTAs, CDTAs, RETAs)

Energy SG Work Plan Highlights

- Support new Sustainable Development Goal on Energy (in addition to Poverty, Food, Health, Education, Gender, Water goals)

- Focused Areas

- *Energy access*
- *Renewable energy*
- *Energy efficiency*
- *Sector reforms*

- Expanding Operations with Innovations

- *Advanced technologies*
- *New financing instrument*
- *New business model*
- *“PPP” within ADB (joint PSOD/RD project)*
- *Multi-sector approach*
- *Cross border energy initiatives*



Technology Innovation

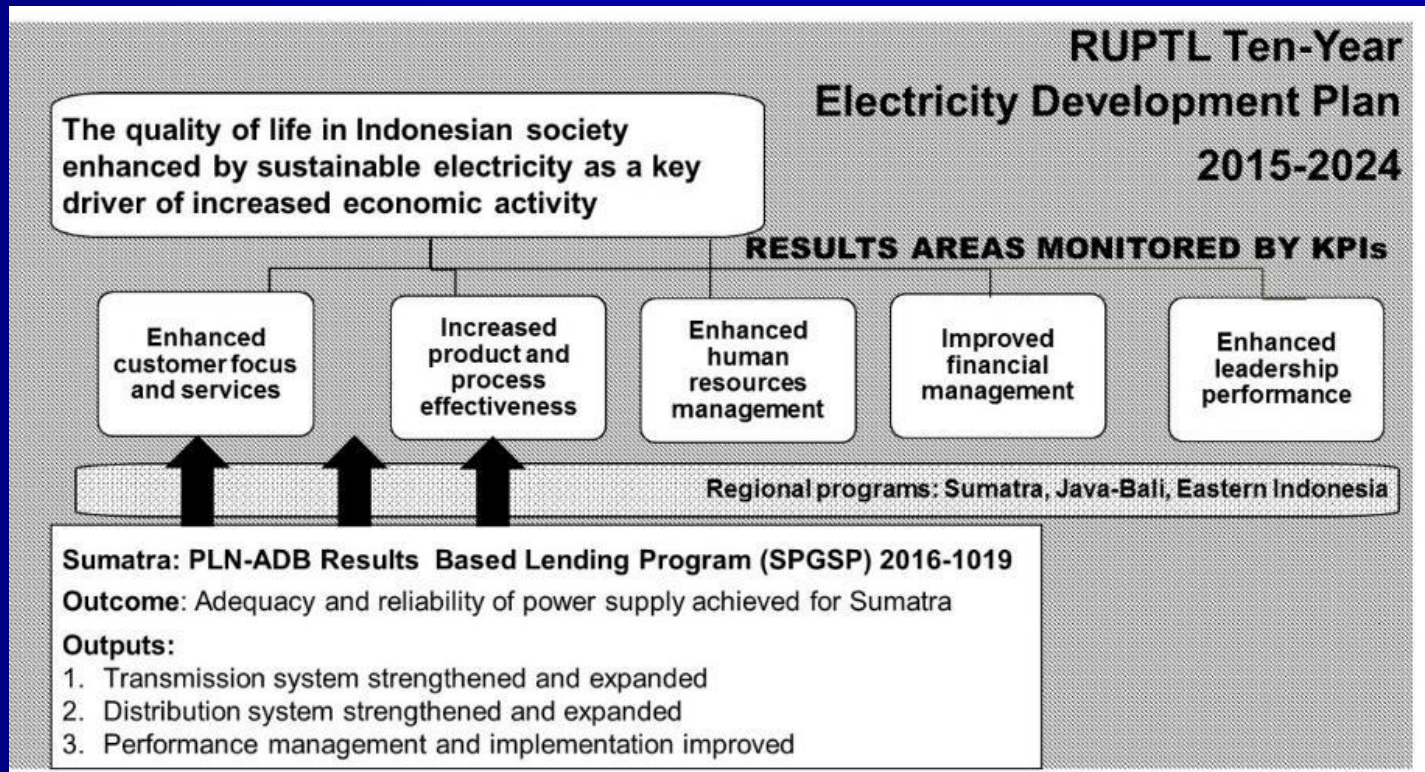
- **Distributed renewable (e.g. rooftop solar)**
 - *Supporting India's Solar Rooftop Program*
- **Smart grid/smart meters - promoting renewable energy and energy efficiency**
 - *Uzbekistan Advanced Electricity Metering Project*
- **Mini grid with storage – providing affordable renewable energy**
 - *Maldives Renewable Based Hybrid Mini-Grid Project*
 - *Solar Energy Development in Solomon Islands*
- **Cost Effective innovative transmission /distribution**
 - *Nepal Power Transmission Project/Myanmar Power Transmission Project (using aluminum compact core conductor)*
 - *Single Wire Earth Return in Mongolia*



HANDBOOK FOR ROOFTOP SOLAR DEVELOPMENT IN ASIA

Financing Innovation

- \$600 million for Indonesia Result Based Lending for Sumatra Power Grid Strengthening Project – the first RBL in the energy sector, effective way to expand the lending



Introducing New business models

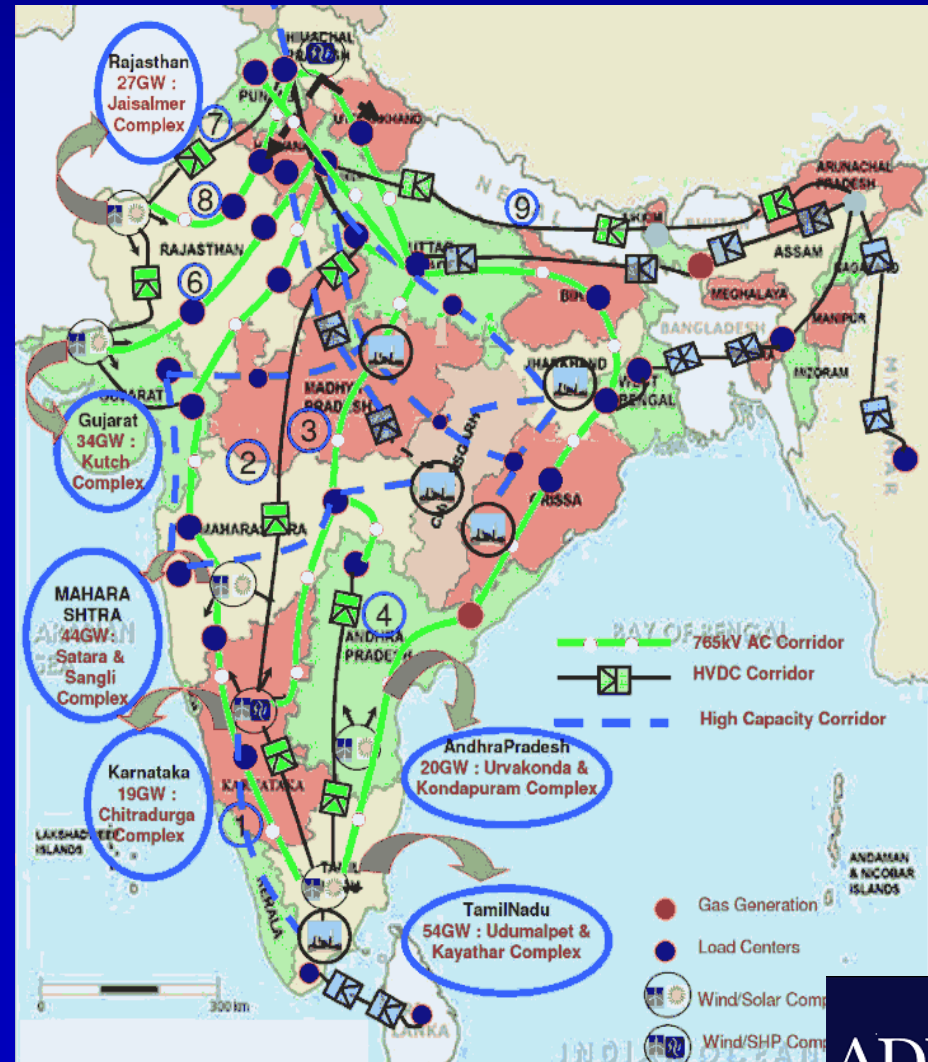


- Simpa Networks (“Off Grid Pay-As-You-Go Solar Project”) in India
 - **ADB Investment:** \$2 million equity investment in 2013, \$5 million CTF loan under preparation in 2015
 - **Investee:** Simpa Networks, a venture-backed technology company with a bold mission: to make modern energy simple, affordable, and accessible for everyone.
 - **Strategy:** Simpa offers an unique pay-as-you-go metering solution for off-grid solar home systems in rural India by using mobile phones technology to transform recurring energy expenditures into an eventual capital asset purchase. Scaling up of solar “leasing as a service” model.
 - **Development Impacts:** Increased access to affordable clean energy for base of the pyramid (BoP) consumers in rural India (10,000 systems installed as of April 2015), avoiding the greenhouse gas emissions by reducing kerosene usage.

Joint PSOD and RD Operations

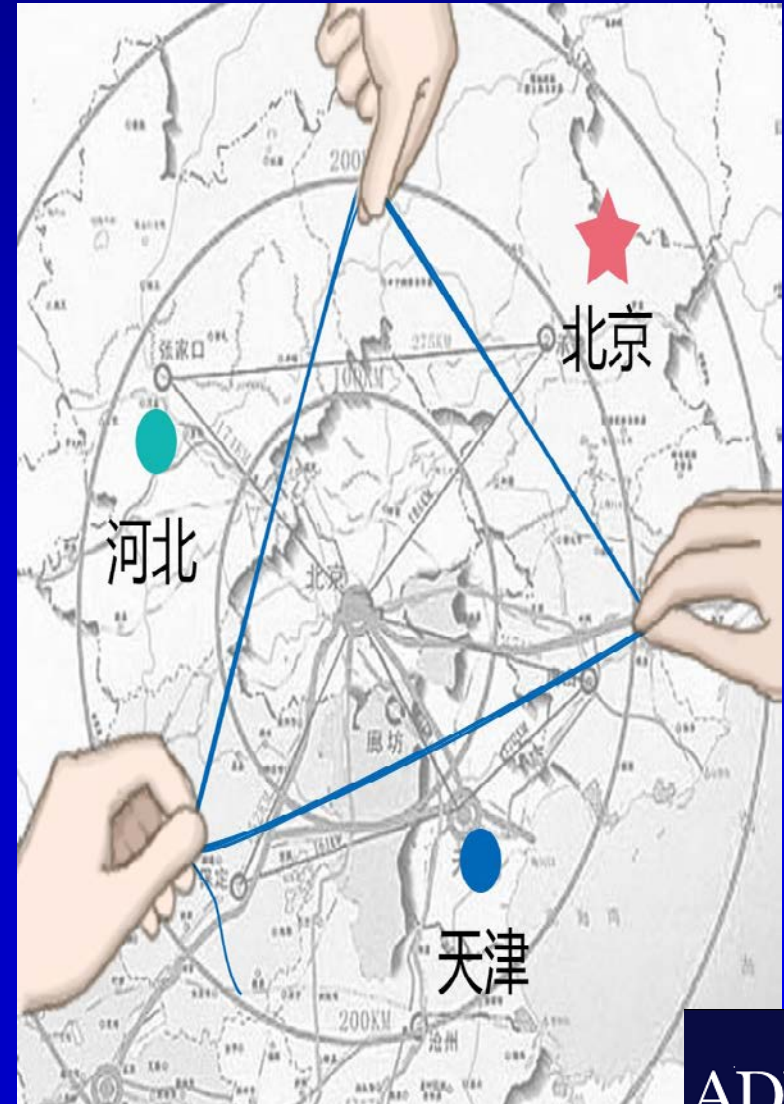
India Power Grid Green Corridor Development Project (up to \$800 million by SARD and PSOD)

- India's "Green Energy Corridor" facilitates the transfer of renewable energy to load centers
- Absorption and smoothing out of the RE intermittency
- Static compensators (STATCOMs) to enhance grid stability



Multi Sector Approach

- **PRC Beijing-Tianjin-Hebei Air Quality Improvement Program**
 - \$300 million programmatic policy-based lending with horizontal packaging to enhance Government's clean air action plan.
 - Policy actions for (i) reduced PM_{2.5} emissions from **energy, industry, transport, urban and agricultural sectors**; (ii) strengthening environmental policy and regulatory framework; and (iii) development of social protection system for inclusive industrial restructuring.
 - Project being peer reviewed by Energy, Transport and Urban SGs



Cross Border Energy Initiatives

- **CAREC**
 - *TUTAP (Turkmenistan, Uzbekistan, Tajikistan, Afghanistan, and Pakistan) Transmission Interconnection*
 - *TAPI (Turkmenistan, Uzbekistan, Pakistan and India) Gas Pipeline (ADB providing transaction advisory services)*
- **GMS**
 - *With progress in physical interconnections in GMS, a Regional Power Coordination Center (RPCC) is being established with ADB support*
- **SASEC**
 - *Bangladesh-India Interconnection*
 - *Nepal-India Interconnection*
 - *Bhutan Hydropower Export Project (first cross border CDM)*
 - *Sri Lanka – India Interconnection Study*
- **Northeast Asia Power Interconnection Study**



Energy SG Support to Operations Departments

Scaling up Project Lending with Innovative Features

- Grant/TA resources from Clean Energy Financing Partnership Facility
- Providing needed expertise through RETAs, e.g. Energy Efficiency Accelerator, Energy for All
- Rewarding staff for innovations (an E/SR ratee nominated by Energy SG?)

Knowledge Management and Sharing

- Capture and share knowledge from operations, e.g. Applicable smart grid technologies for DMCs, Lessons learnt from the Philippine power sector restructuring
- Work with KSSC for innovative technology transfer with the centers of excellence and private sector (developers, financier, technology and solution providers)

Optimizing Staff Resources

- Facilitating staff rotation, between Energy SG Secretariat and RDs, and among RDs
- Arranging staff training, e.g. energy efficiency training in International Energy Agency (IEA), Sustainable Energy Association of Singapore

Thanks