

Energy Investment Outlook for the APEC Region

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Naoko DOI

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About APEC and APERC

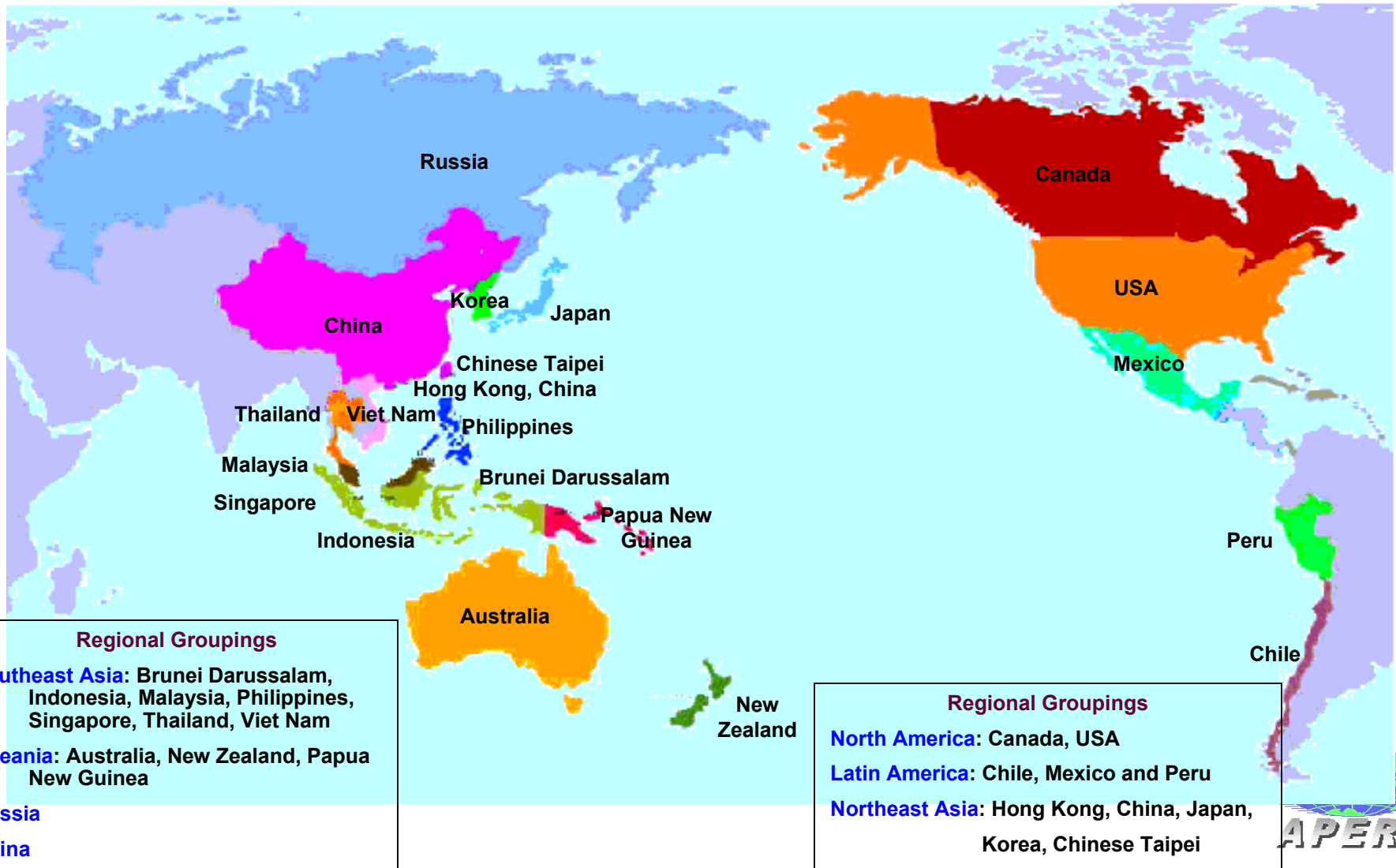


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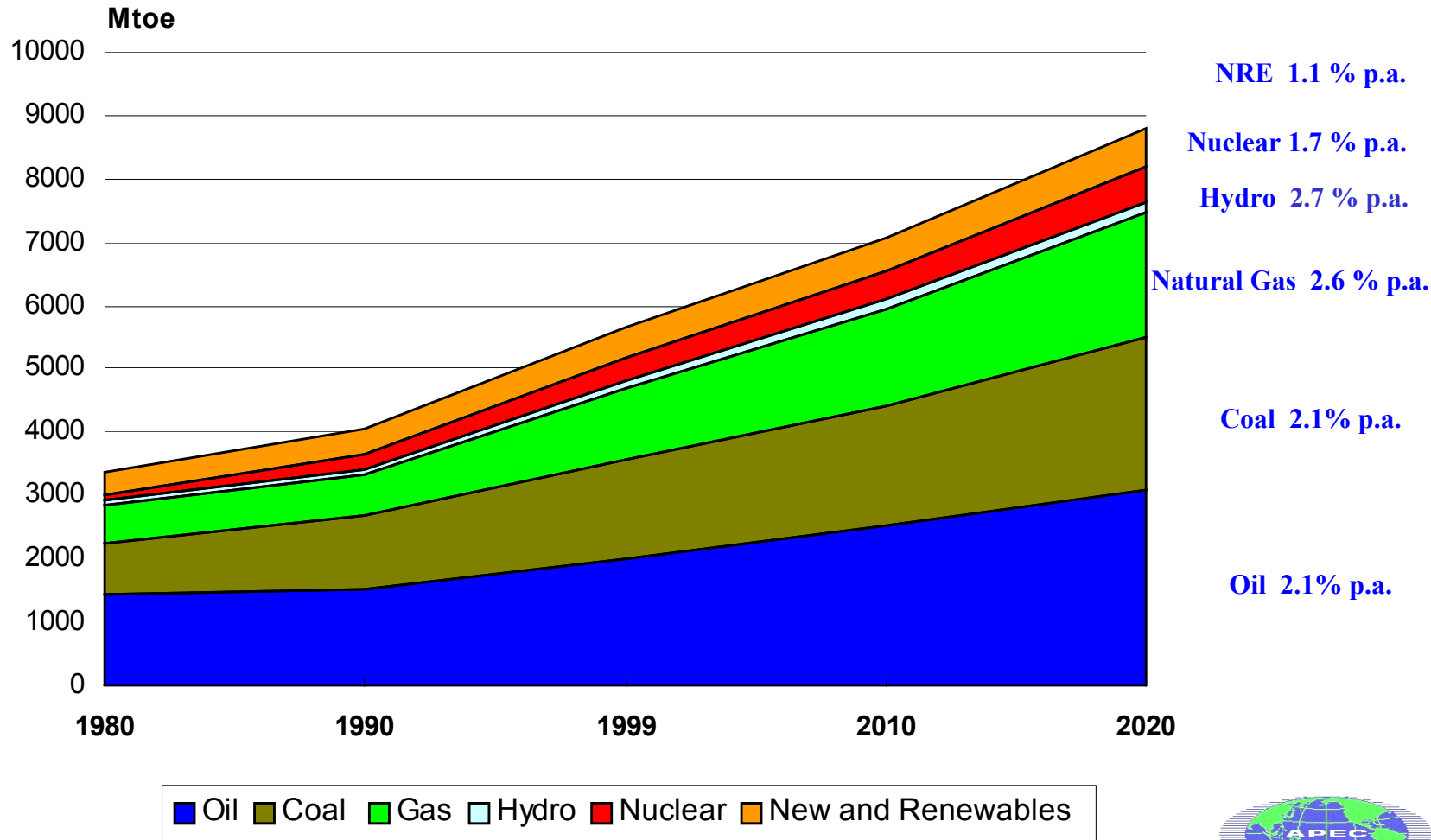
- **Study Objective**
- **Summary of Energy Investment Outlook**
- **Drivers of Energy Investment**
- **Risks of Energy Investment**
- **Issues on Financing**
- **Role of Host Governments**
- **Implications**

Study Objectives

- **To estimate the energy investment requirements for the coming 20 years**
- **To highlight the barriers and enabling activities in relation to the energy investment**
- **To lay out a framework that can bridge the gap between investors' preference and host economies' needs**

Total Primary Energy Demand in APEC (1980-2020)

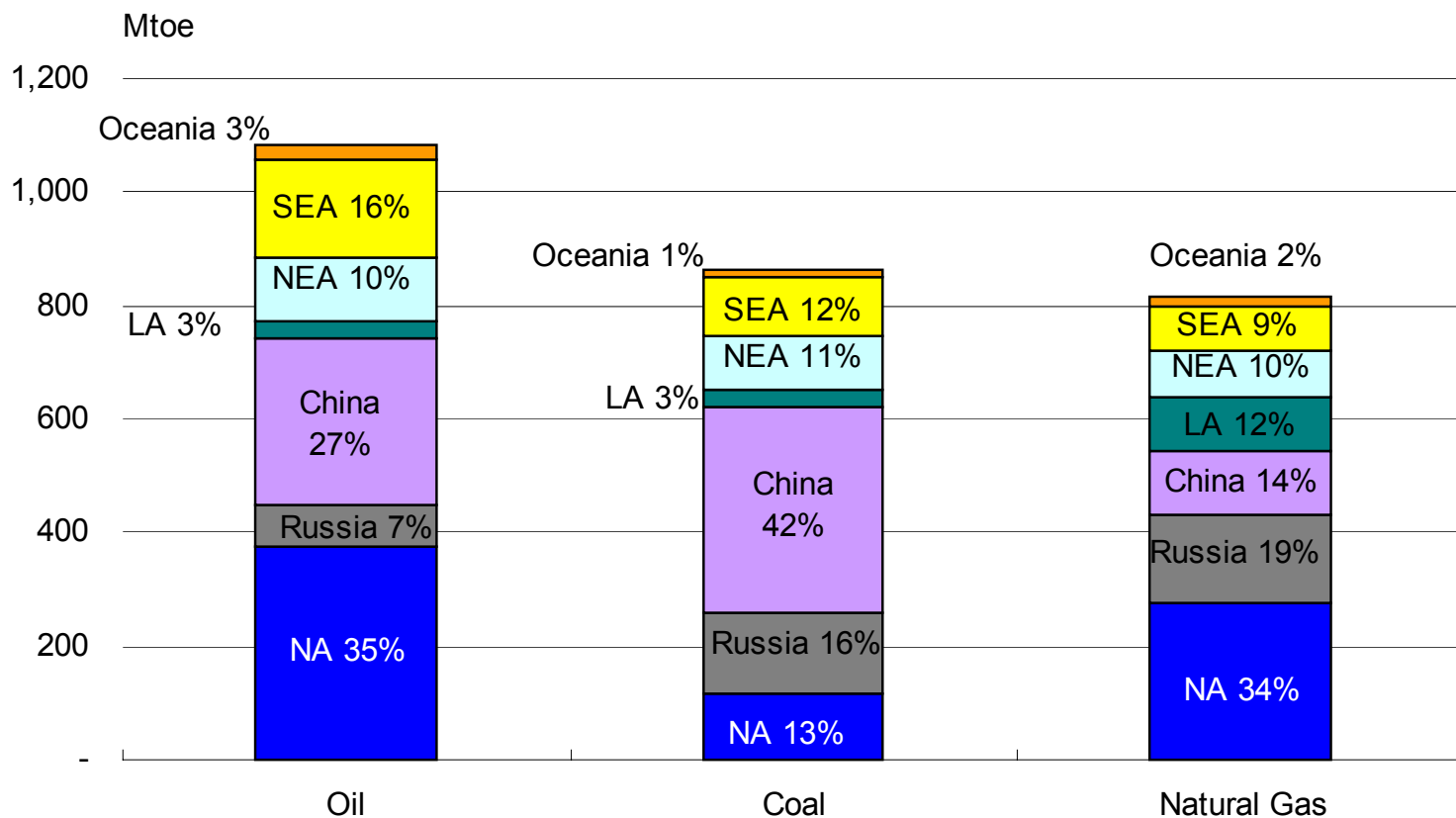
TPED is expected to grow at an annual rate of 2.1 percent (1999-2020) and it is translated into \$3.3 trillion to \$4.4 trillion of new investment requirement.



(Source) APERC (2002), "Energy Demand and Supply Outlook 2002"

Energy Growth by Region (1999-2020): Oil, Coal and Natural Gas

Significant proportion of new investment will be required in developing economies.

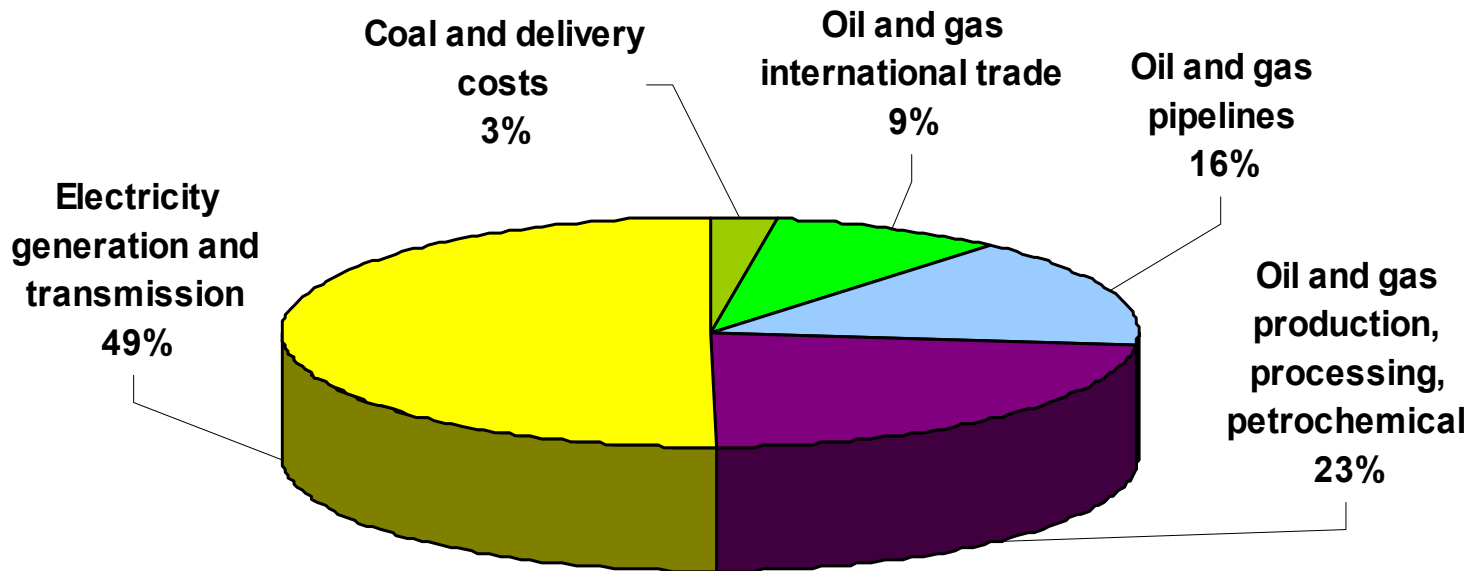


■ North America
 ■ Russia
 ■ China
 ■ Latin America
 ■ Northeast Asia
 ■ Southeast Asia
 ■ Oceania



Total Investment Requirements 2000 – 2020, by Infrastructure

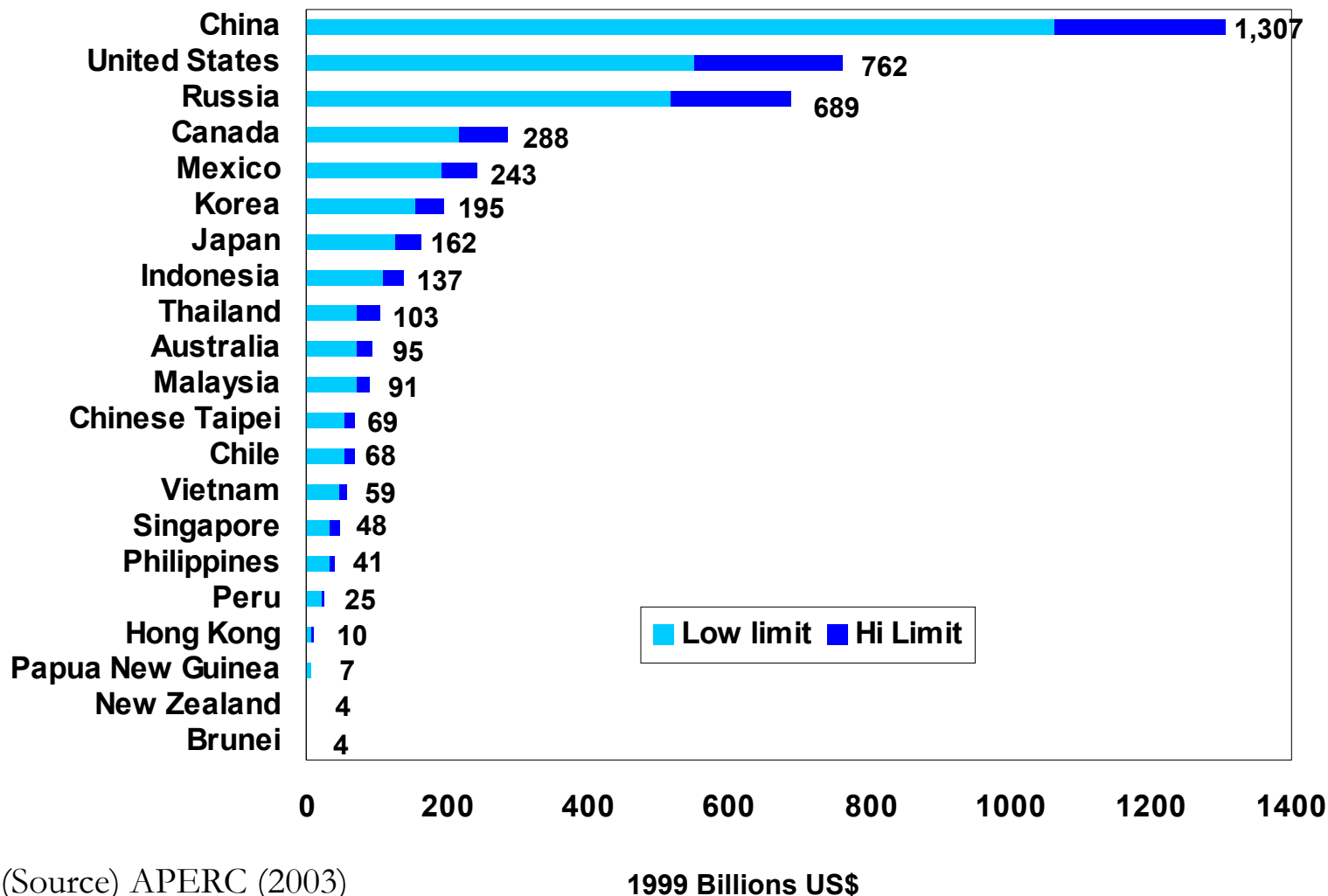
Total = Trillion 1999 US\$ 3.4 to US\$ 4.4



(Source) APERC (2003)



Total Investment Requirements 2000 – 2020, by Economy



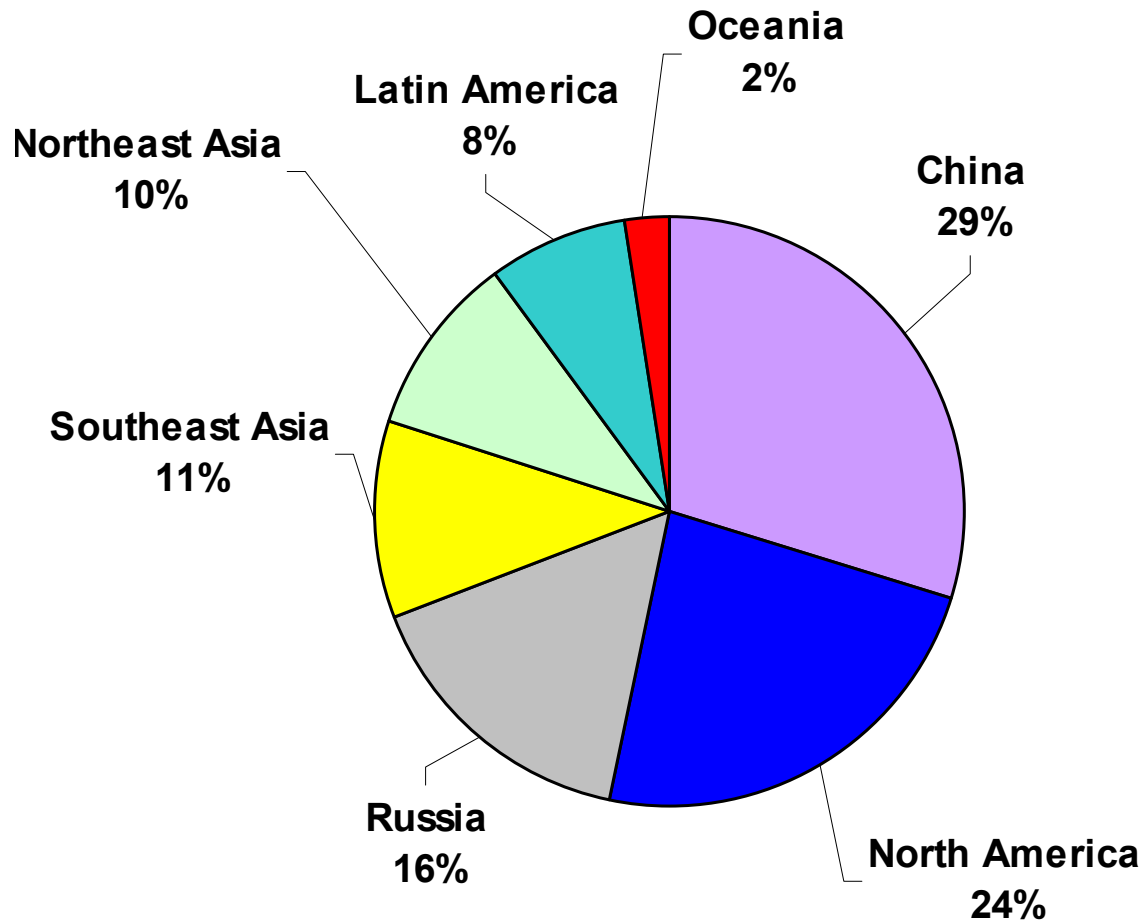
(Source) APERC (2003)

1999 Billions US\$



Energy Investment Requirements by Region (2000-2020)

China takes the largest share (29%), followed by North America (24%) and Russia (16%).

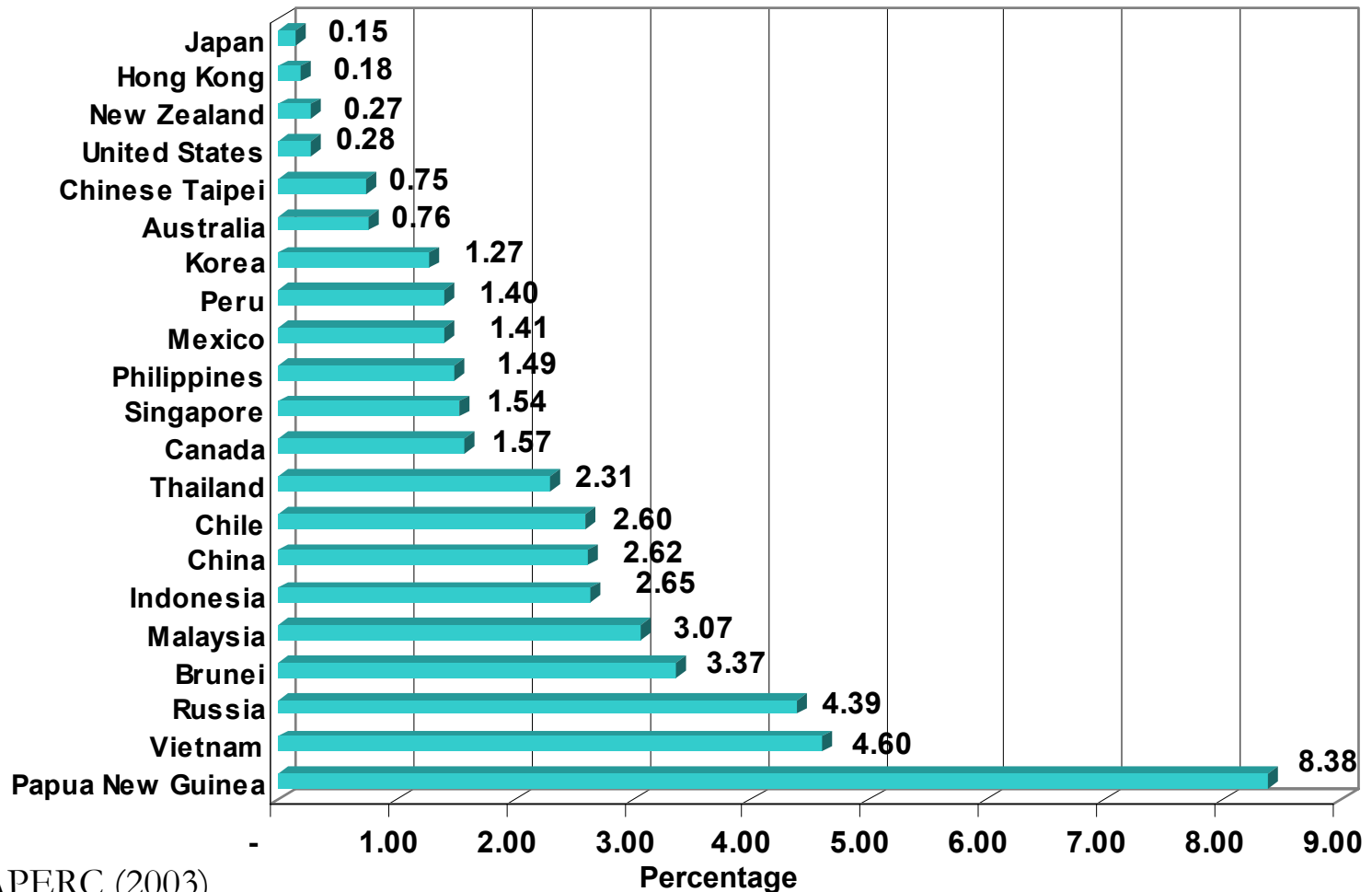


(Source) APERC (2003)



Share of Energy Investments Relative to the Size of Economy (2000-2020)

Developing economies of APEC will require larger size of energy investment relative to GDP.

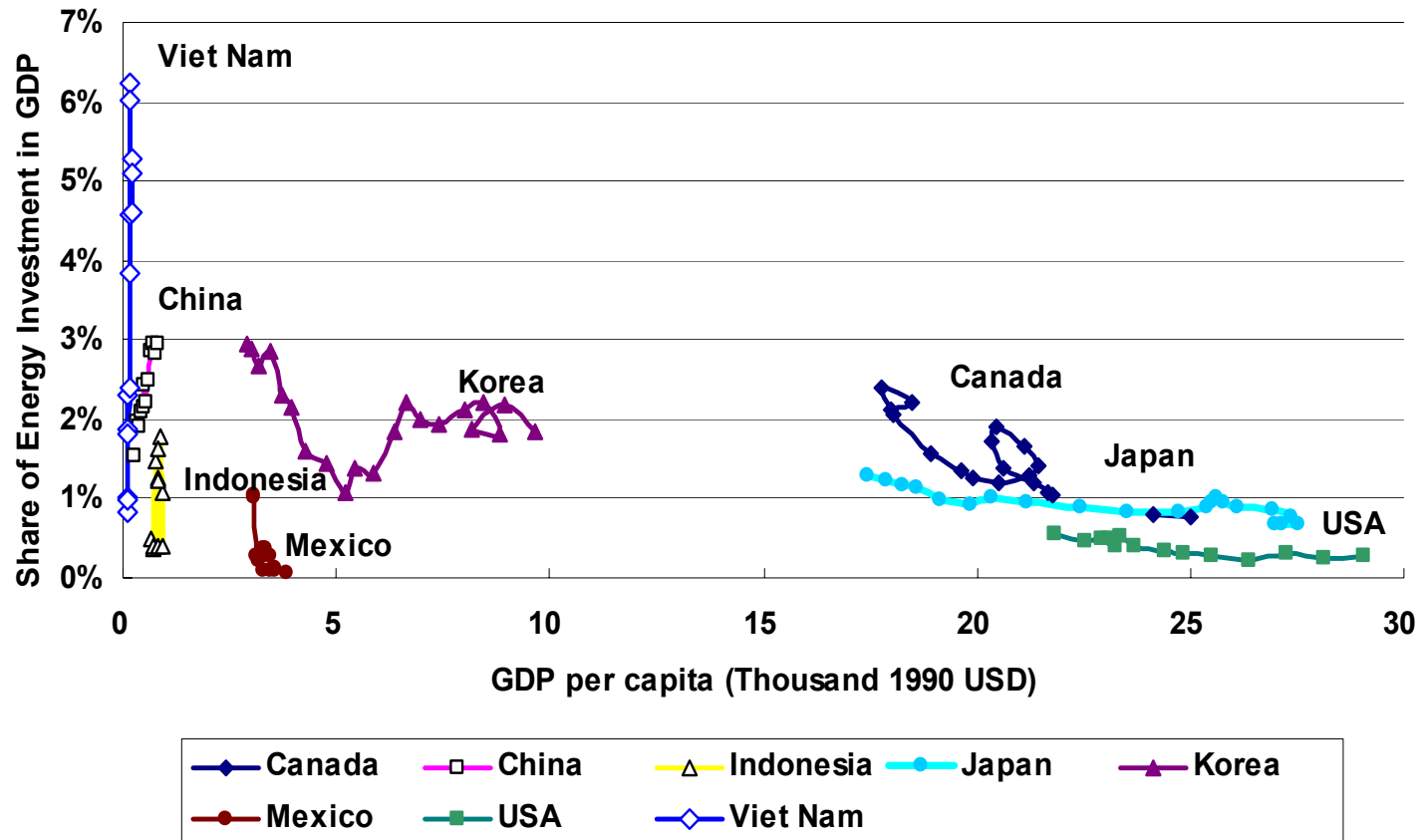


(Source) APERC (2003)

Drivers of Energy Investment

Historical Trend of Energy Investments for Utilities in Selected Member Economies

The relative size of energy investments greatly vary depending on the level of economic development, industry structure and living standards.

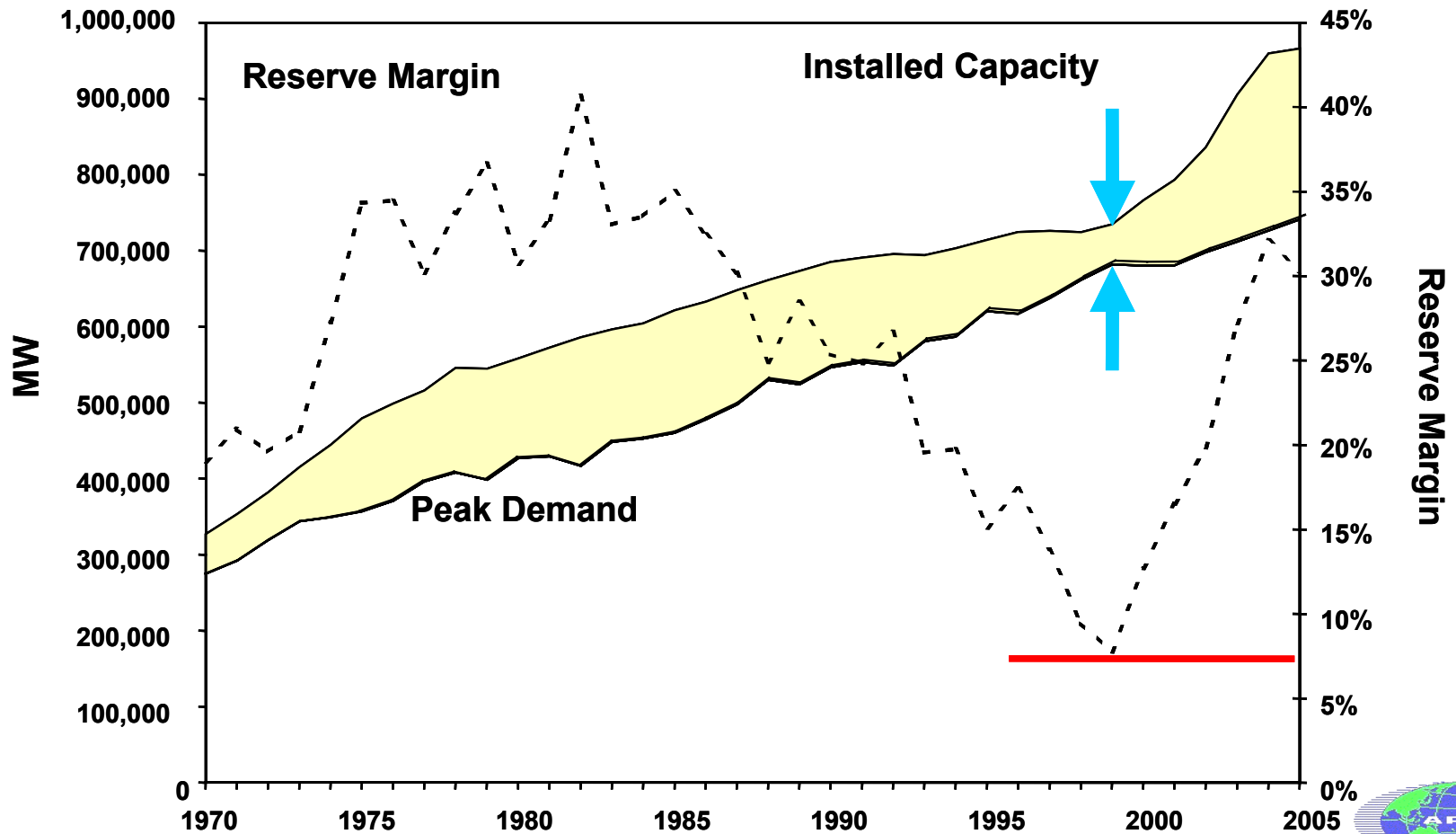


(Source) APERC (2003)



Deregulation and Power Sector Investment: A Case of USA

Under the deregulated environment, appropriate incentives should be given to invite investments.

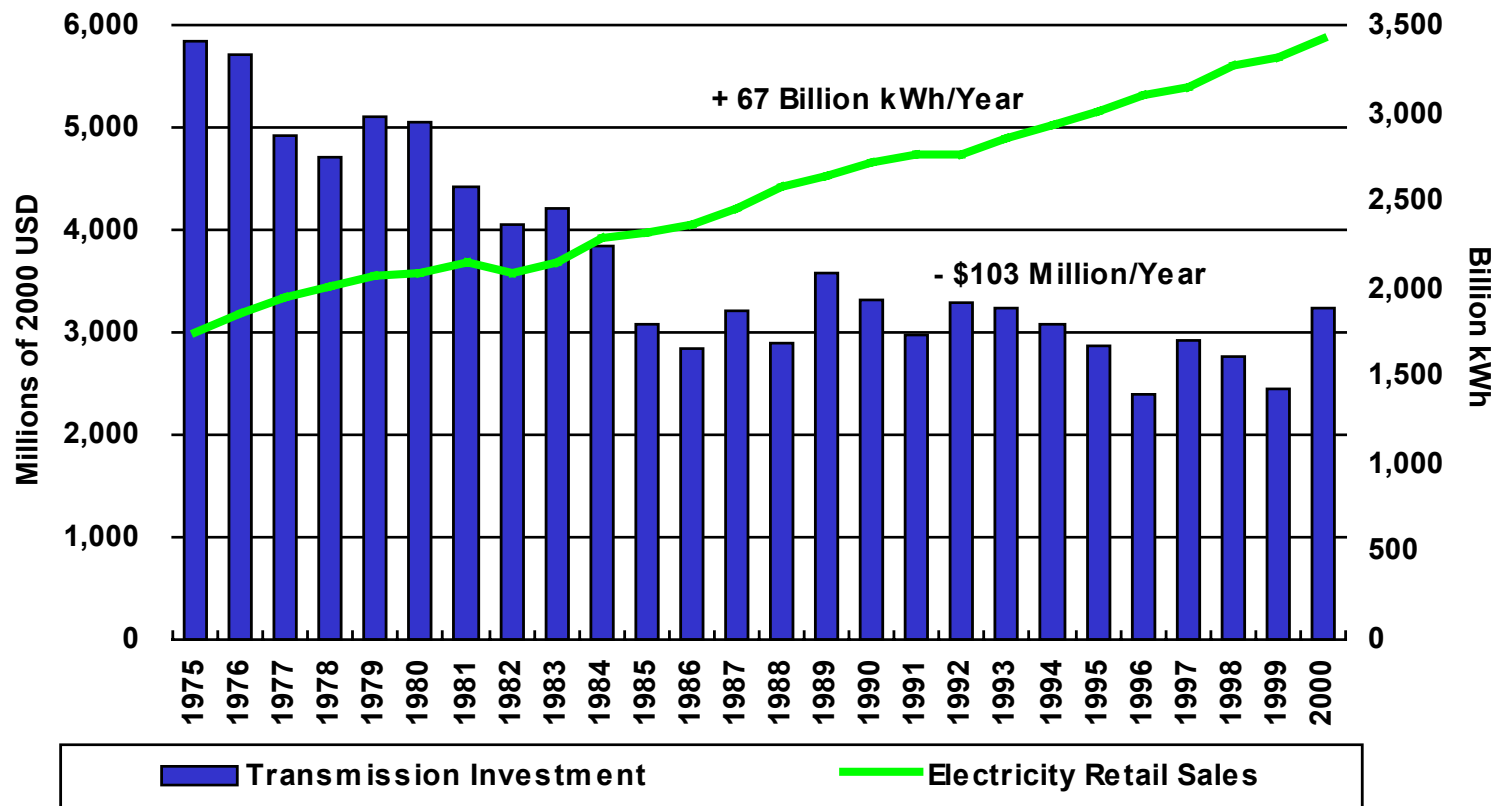


(Source) APERC (2003)



Investment for Transmission in the US (1975-2000)

Investments for transmission are declining, while retail electricity sales are on the rise.

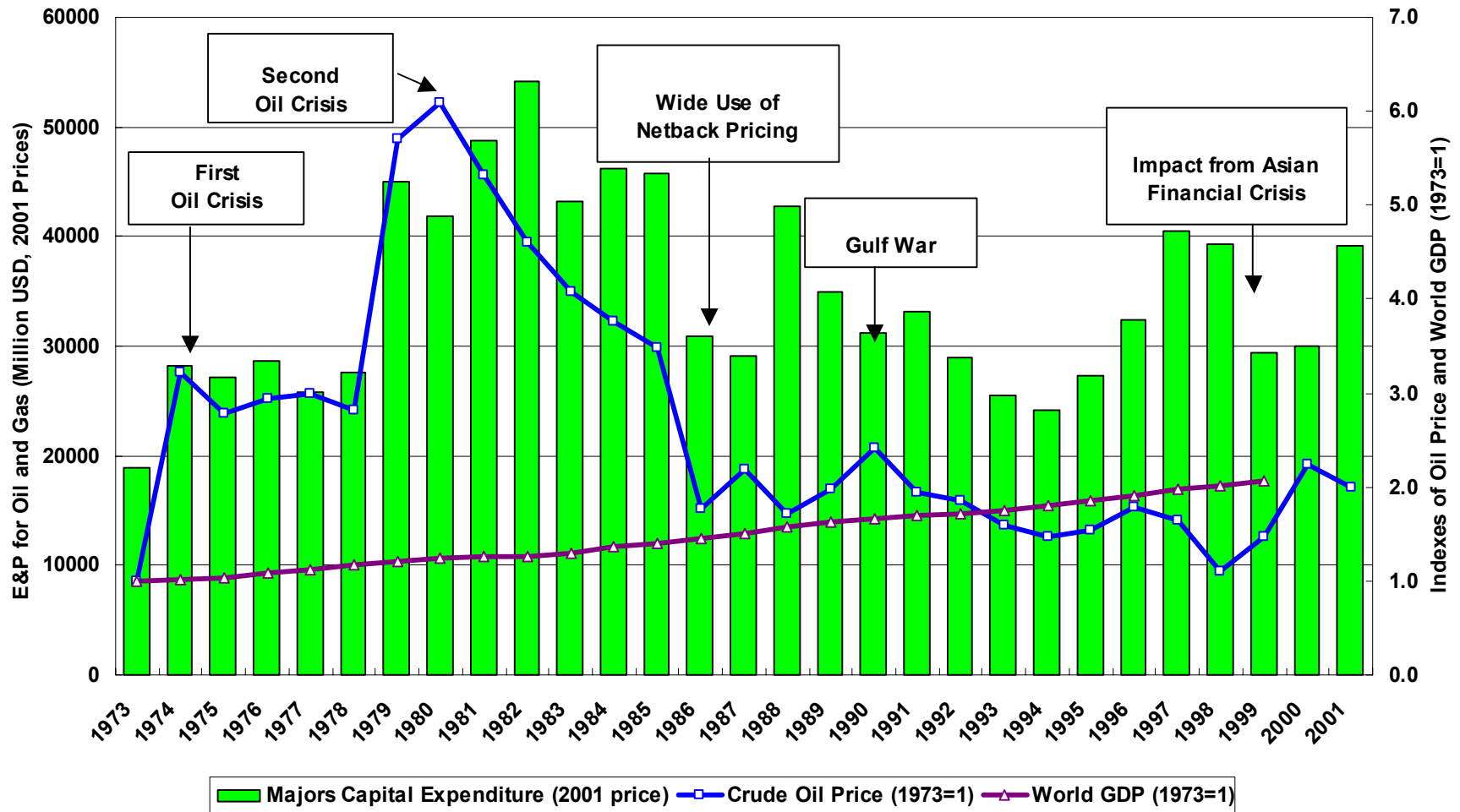


(Source) Edison Electric Institute (2001), "Construction Survey"



Oil Price and Investments for Oil and Gas E&D

Crude oil price movement and investments for upstream oil and gas E&D share long term common trend.

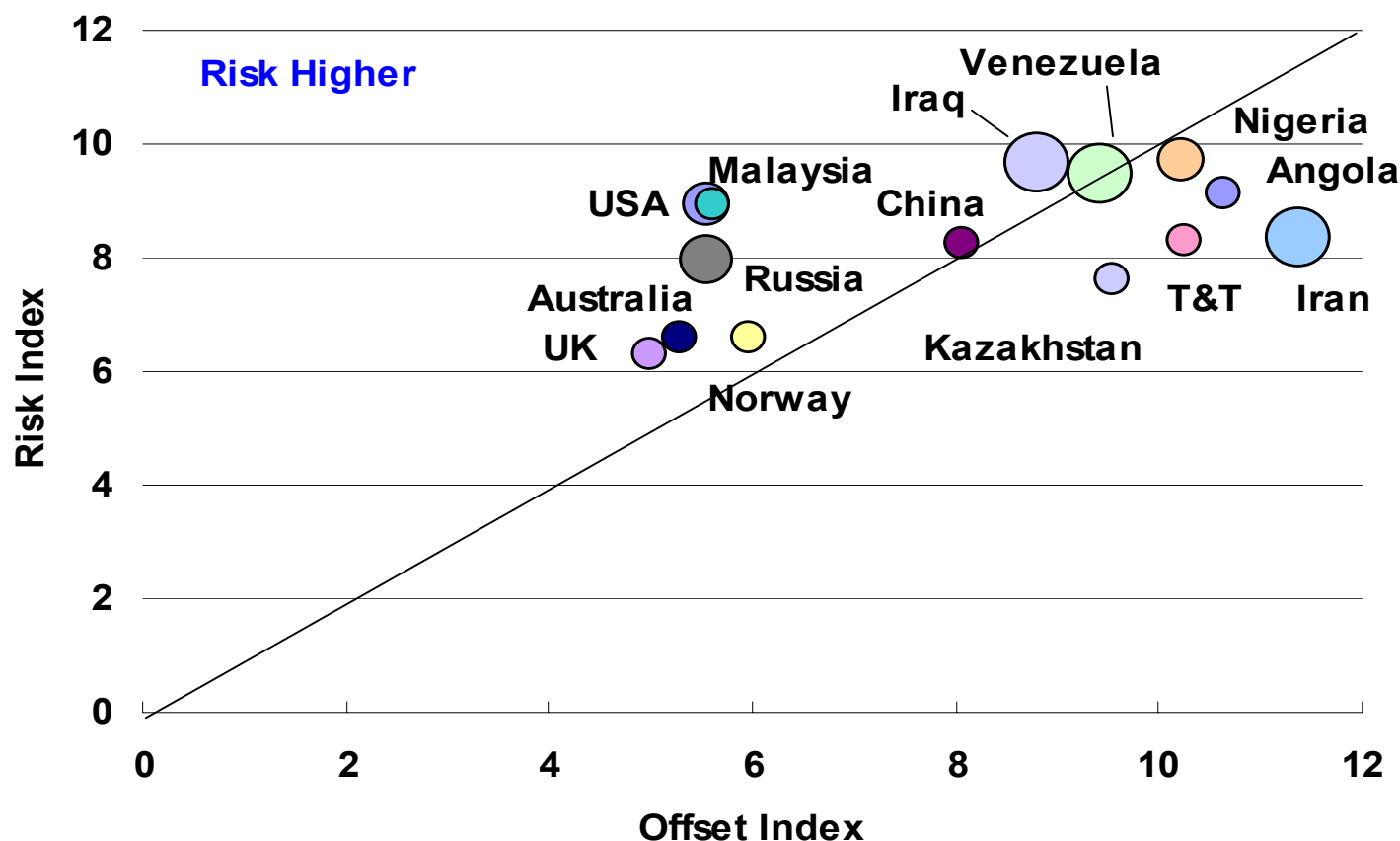


(Source) APERC (2003)



Risk and Returns in Oil and Gas Exploration and Development

The host economies of APEC are faced with the challenge of how they can best create attractive conditions for investors.



Barriers of Energy Investment

Risks for Energy Sector Investment

- **Economic Risks**
 - **Completion Risk**
 - **Discount Rate Risk**
 - **Currency Risk**
 - **Environmental Risk**
 - **Raw Material Supply Risk**
 - **Infrastructure Risk**
- **Political Risks/ Institutional Risks**
 - **Political Violence**
 - **Expropriation Risk**
- **Force Majeure**

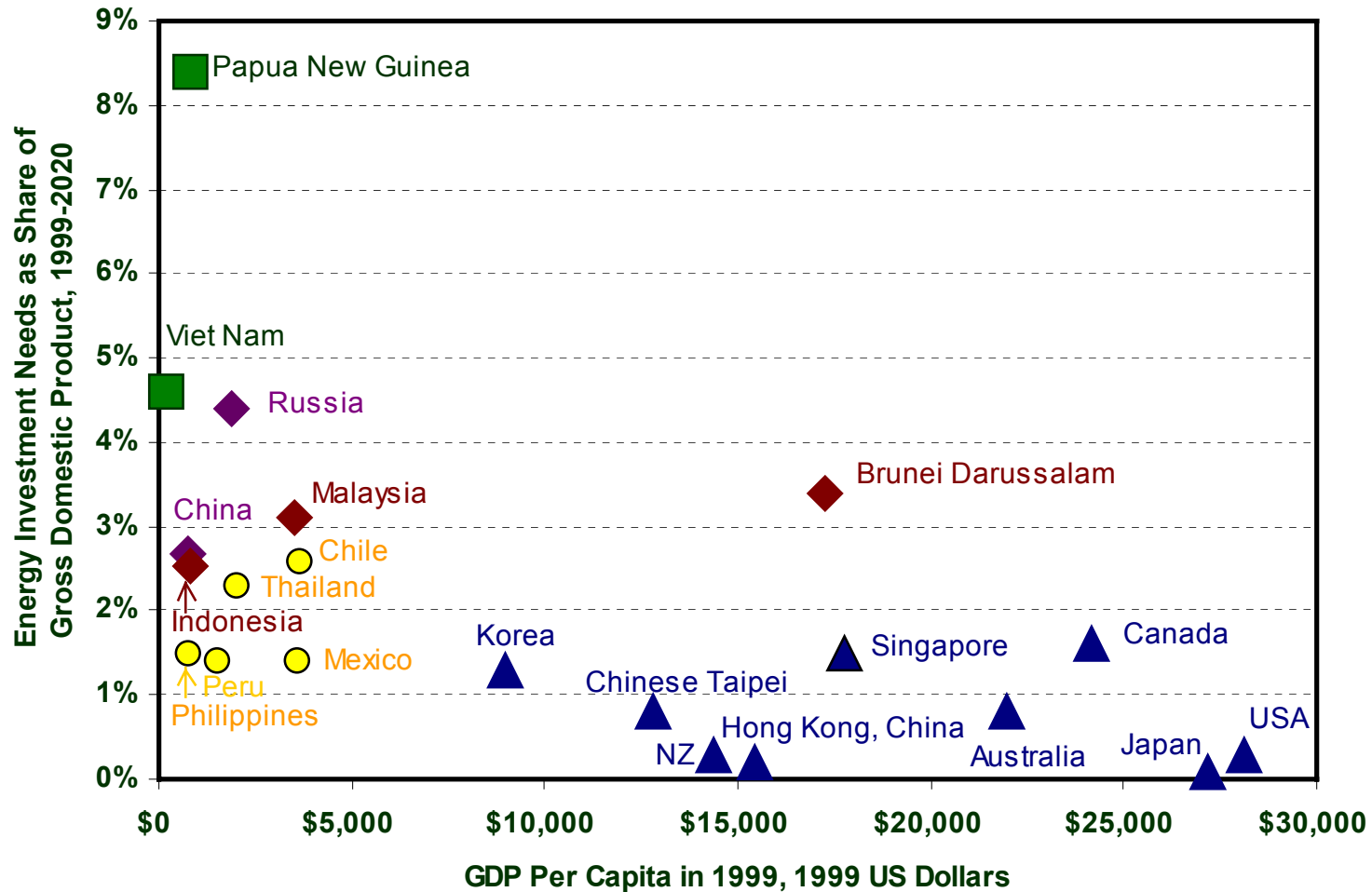
Lessons Learned from the IPP Projects in Asia

Economy	Project	Reason for Failure
China	Shijiao B and C stations in Guandong	Financial Risk: Estimated rate of return was 18%, however, government placed a cap at 10%. Newly offered low rate of return has prevented new project from taking off.
Indonesia	Paiton power plant	Currency Risk: Devaluation of the Rupiah made PLN unable to cover the initial contract rate at \$0.055/kWh, and PLN will not pay more than \$0.03/kWh.
Thailand	Phase I of the project	Economic Risk: In 1999, 4 of the 5 international consortia project agreed to delay the project to help EGAT to cope with over supply.
Chinese Taipei	Phase I and II of the IPP project	Lack of local support: 2 IPPs out of 8 were cancelled due to the lack of local government support.
	Phase III of the IPP project	Infrastructure Risk: 6 IPP project plans were submitted and Taipower considered to make power purchase agreements, however, due to the lack of transmission line, projects in the central and south regions have toger time, while projects in the north have a good chance.
Korea	SK Taegu project	Infrastructure Risk: Taegu Electric was planning to build two LNG fueled combined cycle power plants, but the problem of lack of industrial water supply and difficulties in laying down pipeline networks delayed all the construction work.

Issues of Financing Energy Projects

Share of Energy Investments Relative to the Size of Economy (2000-2020)

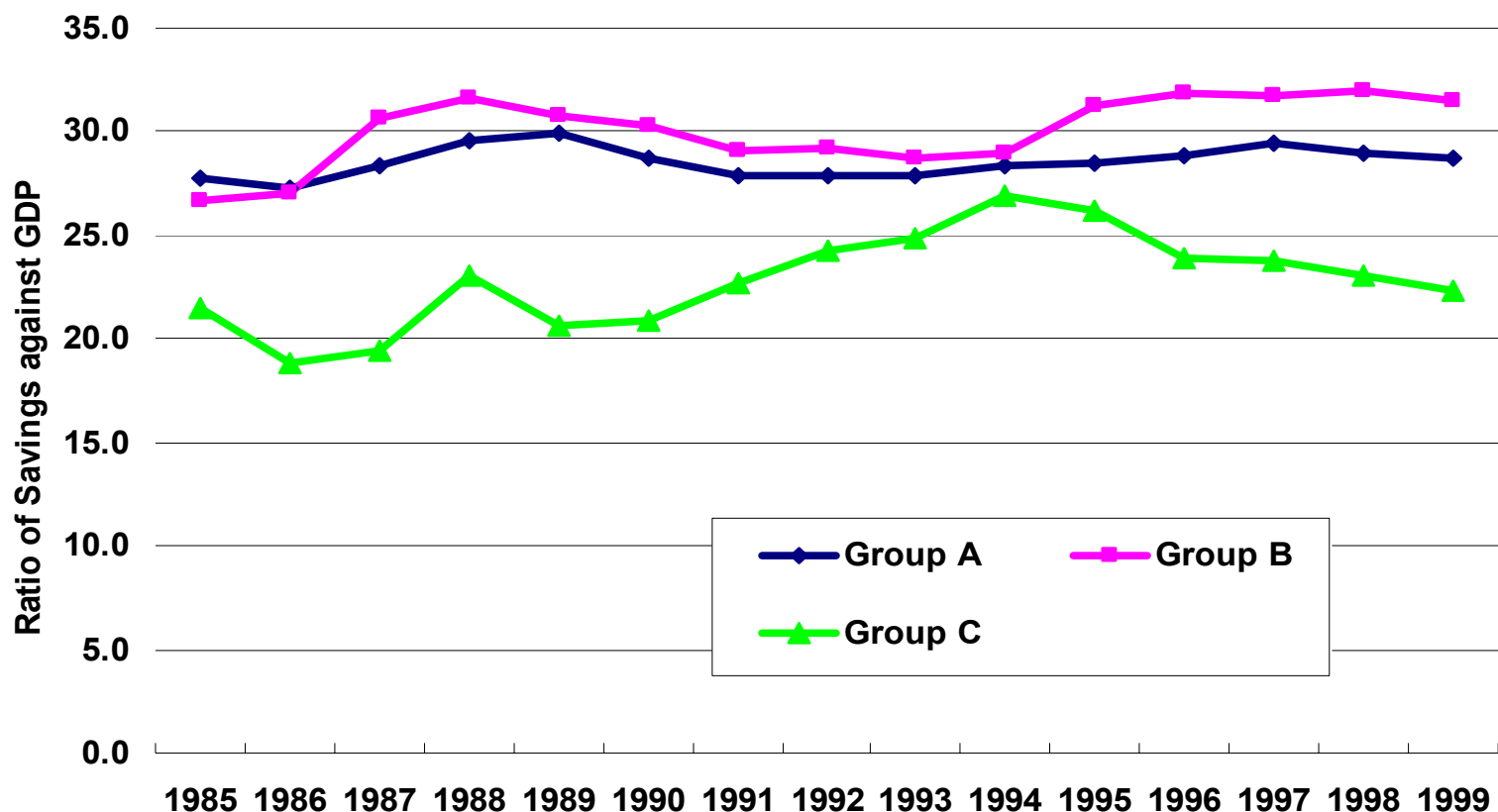
Developing economies of APEC will require larger size of energy investment relative to income level.



Sizes of Savings Relative to GDP (Group A, B and C)

Proxy for domestic capital availability

Less than enough capital availability for developing economies of APEC.



(Source) World Bank (2002), "World Development Indicators"

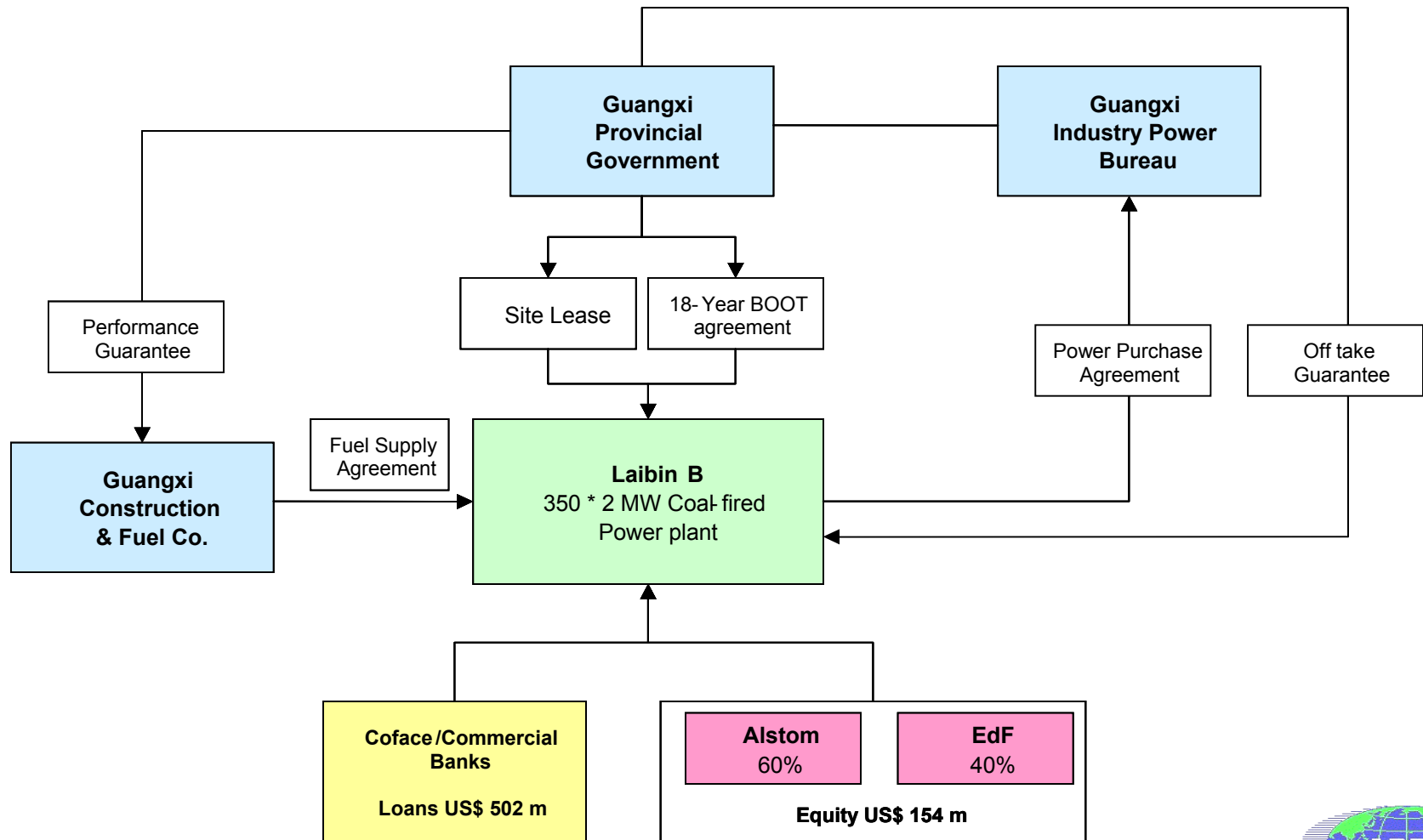


Project development comes down to financing in some developing economies

- Lack of domestic funding sources for some developing economies
 - Underdeveloped equity market and bond market
- Risk should be appropriately reflected on rate of return
- Reconsideration of Pricing - issue of subsidy
 - Question on affordability remains.
- International lending organisations, regional development banks and export credit agencies are and will be playing important role to add credibility to the project off-take.

Role of Host Governments

Importance of Government Role: A Case of Laibin B, BOT Project in China



(Source) Nevitt and Fabozzi (2000)



Implications

- **Energy investments in the APEC region will be needed between US\$ 3.4 trillion and US\$ 4.4 trillion for the next twenty years.**
 - Requirements of energy investment vary greatly depending on the level of economic development, industry structure and living standards.
- **For some APEC economies, mobilizing financial sources required to materialise the investment may not be an easy process.**
 - Deregulation and investment
 - Oil price and investment
 - Lack of domestic capital market
- **Project developers need to appropriately assess the demand prospect, availability of infrastructure and affordability.**
 - Lessons have been learned that project off take depends to some extent on structuring security packages.
- **Governments need to take into account economic and social benefits besides financial viability of energy projects.**
 - Policy objectives
 - Environment

