



**Asia-Pacific  
Economic Cooperation**

**Seminar-Workshop on**  
***“Lessons on  
Energy Sector Liberalization”***  
***Proceedings***

***3 to 5 December 2001  
The Makati Shangri-La Hotel  
Makati City, Philippines***

**APEC Energy Working Group**

**December 2001**

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## APEC Seminar-Workshop on "Lessons on Energy Sector Liberalization"



3 to 5 December 2001  
Makati City, Philippines





## APEC Seminar-Workshop on "Lessons on Energy Sector Liberalization"



*The Speakers' Dinner was held on December 2, 2001 at the exclusive Rockwell Club in Makati City and was attended by most of the foreign speakers and officials of the Philippine Organizing Committee led by Mr. Antonio V. del Rosario, President of EDUFI and Chairman of the World Energy Council (first row, extreme right) and Dr. Benjamin S. Austria, EDUFI Executive Director (first row, extreme left).*



## APEC Seminar-Workshop on "Lessons on Energy Sector Liberalization"



*The APEC delegates actively participated in the discussions during the Seminar proper and shared country experiences at the Workshop. Center photo shows EDUFI Chairman Dr. Francisco L. Viray presenting the Workshop Results to Secretary Vincent S. Perez, Jr. of the Philippine's Department of Energy.*



## APEC Seminar-Workshop on "Lessons on Energy Sector Liberalization"

### APEC Field Trip To Villa Escudero



*APEC delegates take a breather at the end of the Seminar-Workshop during the field trip to the Villa Escudero Plantations and Resort on December 6, 2001. The resort houses the first-ever hydroelectric power station in the Philippines, a showcase of private sector business undertaking.*



# CONTENTS

|  |                       |
|--|-----------------------|
| <b>Preface</b> .....   | <b>07</b>             |
| <b>Meeting Information</b> .....   | <b>07</b>             |
| <b>Program</b> .....   | <b>09</b>             |
| <b>Executive Summary</b> .....   | <b>13</b>             |
| <b>Seminar-Workshop Summary</b> .....  | <b>14</b>             |
| <b>Other Activities</b> .....  | <b>27</b>             |
| <b>Presentation Papers</b> .....   | <b>31</b>             |
| Welcome Address .....  | <b><u>Annexes</u></b> |
| <i>Mr. Antonio V. del Rosario, Republic of the Philippines</i> .....   | <b>A</b>              |
| Profile of the Guest Speaker .....   |                       |
| <i>Mr. Ben-Hur C. Salcedo, Republic of the Philippines</i> .....   | <b>B</b>              |
| Keynote Presentation .....   |                       |
| <i>The Honorable Vincent S. Perez, Jr., Republic of the Philippines</i> .....  | <b>C</b>              |
| Seminar-Workshop Overview .....  |                       |
| <i>Mr. Tatsuo Masuda, Asia Pacific Energy Research Centre</i> .....  | <b>D-1</b>            |
| Global Experience in Energy Sector Liberalization:<br>Identifying the Safe Reform Options for APEC Member<br>Economies ..... |                       |
| <i>Mr. Robert Pritchard, Australia</i> .....   | <b>D-2</b>            |
| Power Sector Restructuring In Asia .....   |                       |
| <i>Mr. Vladimir Bohun, Asian Development Bank</i> .....  | <b>D-3</b>            |
| Oil and Gas Sector Session Overview .....  |                       |
| <i>Dr. Mohd. Farid Mohd. Amin, Malaysia</i> .....  | <b>E-1</b>            |
| Open Access to Natural Gas Pipelines .....   |                       |
| <i>Dr. Mohd. Farid Mohd. Amin, Malaysia</i> .....  | <b>E-1</b>            |
| Oil Sector Liberalization in Japan .....   |                       |
| <i>Mr. Shigeru Sudo, Japan</i> .....   | <b>E-2</b>            |
| Natural Gas Industry Liberalisation .....  |                       |
| <i>Dr. Kim Bo-Young, Republic of Korea</i> .....   | <b>E-3</b>            |

|  |            |
|--|------------|
| Downstream Oil Industry Deregulation<br><i>Mr. Monico V. Jacob, Republic of the Philippines</i> .....  | <b>E-4</b> |
| Power and Electricity Session Overview<br><i>Dr. Francisco L. Viray, Republic of the Philippines</i>   |            |
| Lessons on Energy Sector Liberalization<br><i>Mr. Peter Barrie Leay, New Zealand</i> .....   | <b>F-1</b> |
| Australia’s National Electricity Market<br><i>Dr. Robert Booth, Australia</i> .....  | <b>F-2</b> |
| Power Sector Restructuring in Chile<br><i>The Honorable Undersecretary Vivianne Blanlot, Chile</i> .....   | <b>F-3</b> |
| The U.S. Experience: California Electricity Sector<br>Inside The Eye Of The Storm Today<br><i>Mr. James A. Nichols III, United States of America</i> ..... | <b>F-4</b> |
| Power Sector Restructuring: The Philippine Model<br><i>Mr. Jose Victor Emmanuel A. De Dios, Republic of the Philippines</i> .....                          | <b>F-5</b> |
| Deregulation of the Power Industry in Singapore<br><i>Dr. Soh Siew Cheong, Singapore</i> .....   | <b>F-6</b> |
| Sustainable Development Session Overview<br><i>Dr. Ludovic Lacrosse, Thailand</i>  |            |
| Small Power Producers (SPPs) Using Renewable Energy Projects<br>– Government Support in Thailand<br><i>Dr. Ludovic Lacrosse, Thailand</i> .....            | <b>G-1</b> |
| Rural Electrification: The Changing Roles of Government<br>and Private Sector<br><i>Dr. Ernesto Terrado, The World Bank,</i> .....                         | <b>G-2</b> |
| The Clean Development Mechanism: Opportunities and Challenges<br><i>Attorney Cecilia Dalupan, Republic of the Philippines</i> .....                        | <b>G-3</b> |
| <b>Complete List of Speakers</b> .....   | <b>H-1</b> |
| <b>Complete List of Participants</b> .....   | <b>H-2</b> |



## PREFACE

Energy resource endowment among APEC member economies is unevenly distributed: from the oil and gas-rich economies of Canada and the USA in North America, Russia in Europe, Peru in South America and Indonesia in Southeast Asia to the less endowed but highly industrialized and urbanized capitals of Japan, Korea and Singapore. Sector liberalization will facilitate trade among APEC members and is expected to benefit each economy.

On **December 3 to 5, 2001**, the Philippines will host "**Lessons on Energy Sector Liberalization: A Seminar-Workshop**". Sponsored by the Philippines' Department of Energy and organized by the Manila-based Energy Development and Utilization Foundation Inc., the seminar will present and discuss practical applications of energy sector liberalization in various APEC member economies and examine the experiences and lessons from these liberalization initiatives from a regional economic perspective.

The same experiences and lessons will help other countries in their own initiatives. Both legislative and policy-making institutions in APEC economies that are committed to energy sector liberalization will most benefit from this forum. Coupled with providing an effective means to access various viewpoints of key players in energy sector liberalization, the seminar-workshop will also have a direct relevance to a variety of businesses not only in terms of energy commodities but in the manufacture of equipment and the establishment of energy infrastructure as well. While the project focuses on the energy sector, ultimately, other industries will derive substantial benefits from increased efficiency and improvements.

## MEETING INFORMATION

|                     |   |
|---------------------|---|
| <b>Venue</b>        | <b>Makati Shangri-La Hotel</b><br><i>Ayala Avenue corner Makati Avenue<br/>Makati City, Philippines</i> |
| <b>Date</b>         | <b>3 to 5 December 2001</b>   |
| <b>Host Economy</b> | <b>The Republic of the Philippines</b>  |
| <b>Sponsor</b>      | <b>Department of Energy</b>   |
| <b>Organizer</b>    | <b>Energy Development and Utilization<br/>Foundation, Inc. (EDUFI)</b>                                  |
| <b>Language</b>     | <b>English will be the official language<br/>for the Seminar-Workshop</b>                               |

### Main Themes

1. *Oil & Gas Sector Liberalization*

## **Main Themes**

1. *Oil & Gas Sector Liberalization*
2. *Power & Electricity Sector Restructuring*
3. *Liberalization Towards Sustainable Development*

## **Host Secretariat**

**The Energy Development Utilization and Foundation Inc. (EDUFI)**

***Benjamin S. Austria, Ph.D.***

*Executive Director*

*EDUFI*

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## **Website**

**<http://www.doe.gov.ph/apec>**

## PROGRAM

### December 3, 2001 (Monday)

|                      |   |
|----------------------|---|
| <b>09:00 - 10:00</b> | Registration/Coffee/Tea   |
| <b>10:05 – 10:20</b> | Welcome Address<br>Mr. Antonio V. del Rosario<br>Chairman, World Energy Council and<br>President, Energy Development & Utilization Foundation Inc.<br>Republic of the Philippines |
| <b>10:25 – 10:35</b> | Introduction of the Guest Speaker<br>Atty. Ben-Hur C. Salcedo<br>Undersecretary, Department of Energy<br>Republic of the Philippines  |
| <b>10:40 – 11:00</b> | <b>KEYNOTE ADDRESS</b><br>The Honorable Vincent S. Perez, Jr.<br>Secretary, Department of Energy<br>Republic of the Philippines   |
| <b>11:00 – 11:15</b> | Photo Session<br>Coffee Break   |

### OVERVIEW SESSION

|                      |   |
|----------------------|---|
| <b>11:20 – 11:35</b> | <b>Overview by Session Chairman</b><br>Mr. Tatsuo Masuda<br>President, Asia-Pacific Energy Research Centre (APERC)<br>Tokyo, Japan  |
| <b>11:40 – 11:55</b> | <b>Global Experience in Energy Sector Liberalization:<br/>Identifying the Safe Reform Options for APEC Member<br/>Economies</b><br>Mr. Robert Pritchard<br>Pritchard Udovenya International Lawyers<br>Sydney, New South Wales, Australia |
| <b>12:00 – 12:15</b> | <b>Power Sector Restructuring in Asia</b><br>Mr. Vladimir Bohun<br>Director, Operations/Evaluation Department<br>Asian Development Bank, Philippines  |
| <b>12:20 - 12:35</b> | Open Forum  |
| <b>12:40 - 12:50</b> | Wrap-Up   |
| <b>12:55 – 13:55</b> | LUNCH (Rizal C Room)  |

### Session 1: Oil and Gas Sector Session

|                      |  |
|----------------------|--|
| <b>14:00 – 14:30</b> | <b>Overview and Presentation by Session Chairman</b><br><b>Open Access to Natural Gas Pipelines</b><br>Dr. Mohd. Farid Mohd. Amin<br>Senior Manager, Corporate Information and Research Unit<br>PETRONAS |
|----------------------|--|



Kuala Lumpur, Malaysia

- 14:30 – 14:50**      **Upstream Oil Sector Liberalization**  
Mr. Shigeru Sudo  
Research Director  
Mitsubishi Research Institute  
Tokyo, Japan
- 14:55 - 15:15**      **Natural Gas Industry Liberalization**  
Dr. Boyoung Kim  
Senior Research Associate, Managerial Research Team  
Korean Gas Corporation  
Republic of Korea
- 15:20 - 15:35**      Coffee Break
- 15:40 – 15:55**      **Downstream Oil Industry Deregulation**  
Mr. Monico V. Jacob  
CEO's Inc.  
Makati City, Philippines
- 16:00 – 16:20**      Open Forum
- 16:25 – 16:40**      Wrap-Up
- 17:00 – 17:30**      **Press Conference**  
Manila A Room

**Welcome Reception/Cocktail**

- 19:00 – 21:00**      **Manila Golf and Country Club**  
**Forbes Park, Makati City**

**December 4, 2001, Tuesday, Manila A&B**

**Session 2: Power and Electricity Sector Session**

- 08:30 – 08:45**      **Overview by Session Chairman**  
Dr. Francisco L. Viray  
Chairman, EDUFI  
Philippines
- 08:50 – 09:05**      **Lessons on Energy Sector Liberalization**  
Mr. Peter Barrie Leay  
Past Chairman, APEC Energy Business Network  
New Zealand
- 09:10 – 09:25**      **Australia's National Electricity Market**  
Dr. Robert Booth  
Managing Director, Bardak Group  
West Perth, Australia
- 09:30 – 09:45**      **Power Sector Restructuring**  
Ms. Vivianne Blanlot  
Undersecretary of Energy  
National Energy Commission  
Chile
- 09:50 – 10:05**      **The U.S. Experience: California Electricity Sector**  
**Inside The Eye Of The Storm Today**

Mr. James A. Nichols III  
Director, Navigant Consulting, Inc.  
Energy and Water Practice  
California  
United States of America

**10:10 – 10:25 Deregulation of the Power Industry in Singapore**

Mr. Soh Siew Cheong  
Senior Vice President  
Singapore Power Ltd.  
Singapore

**10:30 – 10:45** Coffee Break

**10:50 – 11:05 Power Sector Restructuring: *The Philippine Model***

Mr. Jose Victor Emmanuel A. De Dios  
Undersecretary, Department of Energy  
Republic of the Philippines

**11:10 – 11:40** Open Forum

**11:45 – 12:00** Wrap-Up

**12:05 – 13:00** LUNCH (Manila A Room)

**Session 3: Sustainable Development Session**

**13:05 – 13:25 Overview by Session Chairman**

Dr. Ludovic Lacrosse  
Executive Director, Asian Institute of Technology  
Thailand

**13:50 – 14:05 Small Power Producers (SPPs) Using Renewable Energy Projects – Government Support in Thailand**

Dr. Ludovic Lacrosse  
EU Adviser, EC-ASEAN COGEN Programme  
Thailand

**14:10 – 14:25 Rural Electrification: The Changing Roles of Government and Private Sector\***

Dr. Ernesto N. Terrado  
Consultant, The World Bank  
Washington, D.C., U.S.A.

\* Presented by **Mr. Alberto R. Dalusung III**,  
Senior Adviser, EDUFI

**14:30 – 14:45 The Clean Development Mechanism: Challenges and Opportunities**

Atty. Cecile Dalupan  
Consultant, Natural Resources Law Center  
Republic of the Philippines

**14:50 – 15:10** Open Forum

**15:15 – 15:20** Wrap-Up

**15:25 – 15:40** Coffee Break

**December 5, 2001 (Wednesday)**

## WORKSHOP SESSION (09:00 – 12:00)

There will be three (3) groups for the Workshop Session. Speakers/Participants may be divided equally to fit all groups. These are:

| <b>SECTOR</b>                           |
|---|
| <i>Oil and Gas Sector</i>               |
| <i>Power and Electrification Sector</i> |
| <i>Sustainable Development Sector</i>   |

### Closing Ceremonies

- 12:05 - 12:20**      **Presentation of Seminar-Workshop Results to DOE**  
**Undersecretary Cyril C. del Callar**  
Dr. Francisco L. Viray  
Chairman, EDUFI  
Republic of the Philippines
- 12:25 - 12:40**      **Acceptance of Seminar-Workshop Results and**  
**Closing Remarks**  
Honorable Secretary Vincent S. Perez, Jr.  
Secretary, Department of Energy  
Republic of the Philippines
- 12:40 - 13:30**      Lunch (Manila A Room)

### December 6, 2001 (Thursday)

#### Field Trip to (1) Makiling-Banahaw Geothermal Power Plant and (2) Villa Escudero Micro-Hydro Plant

- 07:30 – 09:00      Departure from Makati Shangri-la Hotel to Mak-ban  
Geothermal Power Plant
- 09:00 – 11:00      Mak-ban Geothermal Power Plant Visit
- 11:00 – 12:00      Departure to Villa Escudero Micro-Hydro Plant
- 12:00 – 14:30      Lunch
- 14:30 – 15:30      Villa Escudero Micro-Hydro Plant Visit
- 15:30 – 17:00      Departure from Villa Escudero to Makati Shangri-la Hotel

*Important Notice : We advice all the delegates joining the field visit to come in their most casual wear (avoid leather or high-heeled shoes please). Luncheon at Villa Escudero will be served in the low water side of the dam (called “picnic area”) where guests can wade in ankle-deep water while having their meal in the ambience of cascading water from the dam’s overflow.*

### **SOCIAL PROGRAM**



## **Welcome Reception**

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Date : December 3, 2001  
Venue : Manila Golf and Country Club  
Forbes Park, Makati City  
Time : 19:00 – 21:00  
Attire : Semi-formal

*Foreign delegates and participants will be transported to the venue by an official hotel coach.  
Kindly be at the hotel lobby by 1845 hrs.*

## EXECUTIVE SUMMARY

The APEC Seminar-Workshop (S-W) on “Lessons on Energy Sector Liberalization” drew a total of 19 experts in the field of energy from 11 APEC member economies who presented papers that covered a wide array of topics ranging from Oil and Gas Exploration and Development, Power and Electricity Sector Restructuring, Downstream Oil Deregulation, and Sustainable Development.

In addition to the speakers, a total of 104 participants representing 15 APEC-member economies comprised the entire delegation of technocrats, engineers and technical experts as well.

It is particularly true that liberalization of the energy industry has resulted in a number of benefits. These include better customer satisfaction, better allocation of scarce capital, better use of existing energy resources. There have been more incentives for efficiency gains, competition creates greater innovation, and the energy industry became very sensitive and responsive to customer demands.

Liberalization and privatization meant higher operative and investment efficiency.

However, it is not enough that member economies exult at the benefits alone. The three-day S-W also resulted in the following **KEY CHALLENGES** to liberalization: To wit:

1. There is no single best practice model made-to-fit a specific country or economy. Adequate time should be allotted to legislative changes that should provide for a gradual and flexible implementation.
2. Reforms should be kept as flexible and as straightforward.
3. Governments have to provide security and stability for its investors.
4. Economies should be able to strike the right balance and the reform process should always be treated as an “on-going exercise”, a very complex process with a never-ending venue for change.
5. Blueprint for reform must include creating a genuine competition in all sectors.
6. Policy makers need to pay attention to security of supply but there is also a need to ensure transparency, i.e. stable rules to assure confidence of the consuming public.
7. Liberalization will continue to be subjected to the dynamics of oil price economics, technological innovations, trading, geo-political developments, and sustainable development issues, particularly on the environment.
8. Member economies, most especially in the developing world, are challenged to unify and harmonize product standards and specifications. By 2007, across the world, there will be unified specifications for gas and diesel. Asia and the other developing economies of APEC should start considering unified specifications for petroleum products.

## SEMINAR-WORKSHOP SUMMARY

### I. OPENING CEREMONIES

1. **Dr. Benjamin S. Austria, Executive Director of the Energy Development and Utilization Foundation Inc. (EDUFI)** was the Master of Ceremony for the entire Seminar-Workshop (S-W) on “Lessons on Energy Sector Liberalization”.
2. Dr. Austria introduced the first speaker for the S-W, **Mr. Antonio V. del Rosario, Chairman of the World Energy Council (WEC) and President of EDUFI.**
3. In his Address, Mr. del Rosario welcomed all delegates and expressed to them his sincerest appreciation for taking time off to participate in the APEC S-W. Briefly, Mr. del Rosario stressed that the objectives of the S-W, i.e. to draw together experiences and lessons learned from liberalization initiatives are a very timely topic in the context of a rapidly globalizing, deregulating and privatizing world.
4. More than experiences and lessons learned, Mr. del Rosario clearly pointed out that almost eventually, countries represented in this activity will be able to generate bilateral and/or multi-lateral energy trade with each other. *“There is a need to link (the developing economies with that of the developed countries) through trade if we are to stimulate economic growth”*, to quote the Current WEC Chairman.
5. On liberalization in general, Mr. del Rosario zeroed in on the need for capital investment by inviting the private sector to participate in energy and infrastructure projects. However, to entice private sector participation, government should both be able to play its game and offer a level-playing field for all sector players. Market reform policies to enhance competition, increasing efficiency and reducing energy costs are the main considerations that should be initially addressed at.
6. Energy sector liberalization does not guarantee that benefits could always be derived from its implementation. Mr. del Rosario cautioned that there will be deficiencies along the way. The S-W then is a very appropriate avenue to present these constraints and how the APEC member economies contemplating on replicating their developed neighbors’ experiences on liberalization initiatives may now have more flexibility in availing of such practices and methodologies.
7. The complete text of Mr. del Rosario’s speech is shown at **Annex A.**
8. **Undersecretary Ben-Hur C. Salcedo** of the Philippines’ **Department of Energy** (DOE) introduced the Keynote Speaker for the S-W, the **Honorable Secretary of Energy, Vincent S. Perez, Jr.** **Annex B** presents a short profile of the Keynote Speaker.



9. Secretary Perez outlined the developments in the Philippine energy sector starting with the highlights of the country's downstream oil industry liberalization program. Summing up, the Philippine downstream sector can be characterized by:
- a) Market-based pricing mechanism;
  - b) Investments reaching US\$260 million to-date;
  - c) New players accounting for 10.4% of the entire market;
  - d) Existence of government price monitoring;
  - e) Continuous consumer information campaign;
  - f) Improved retail services; and,
  - g) Government assistance to new players in the form of management sills and loan funds.
10. Showcased during the Honorable Secretary's speech was the Power Sector Reform Act that was just recently enacted on June 26, 2001 by the Philippine legislature and approved by President Gloria Macapagal-Arroyo.
11. The Philippine Power Reform Act provided for the following:
- a) Creation of a Transmission Company ("TRANSCO");
  - b) Creation of a Power Sector Asset and Liabilities Management Corporation ("PSALM");
  - c) Constitution of the new Energy Regulatory Commission (ERC);
  - d) Privatization of the National Power Corporation, the state-owned utility monopoly firm (expected to get underway by the 2<sup>nd</sup> quarter of 2002); and the,
  - e) Creation of a Wholesale Electricity Spot Market (also scheduled for the 2<sup>nd</sup> quarter of next year).
- The Implementing Rules and Regulations (IRR) for the Power Sector Reform Act is expected to be approved by the government, in consultation with the private sector, sometime early part of 2002.
12. The Secretary capped his speech with other notable developments in the Philippine energy sector highlighting the Malampaya Deep Water Gas-to-Power Project in Palawan, Northwestern Philippines, the emerging Downstream Natural Gas Industry, the continuous development and utilization of Geothermal Power and an ambitious venture to harness new and renewable energy into full commercial scale.
13. **Annex C** features Secretary Perez' full speech.

## **II. OVERVIEW SESSION**

1. The Overview Session aimed to jumpstart the technical discussions on the overall impact of early voluntary sector liberalization (EVSL), specifically in the energy sector. For this session, experts from the Asia-Pacific Energy Research Centre (APEREC), and the Asian Development Bank (ADB), two (2) multilateral organizations focused on developmental schemes in the region and an energy expert from an international law firm were invited to focus on the general perspective of EVSL in APEC-member economies.

2. **Mr. Tatsuo Masuda, President** of the Tokyo-based **Asia-Pacific Energy Research Centre (APEREC)** made a brief presentation on the Overview of Regulatory Reform in the APEC Energy Sector.
3. Mr. Masuda summarized his presentation in three (3) sub-sectors:
  - a) Forces behind changes in the region's energy sector. This includes economic competitiveness of industries in every society, direct local and foreign investments in infrastructure development, rising consumer demand for lower prices, effects of globalization and the increase perception and adoption of new technologies allowing for lower supply costs.
  - b) Current status of energy sector reform specifically in the electricity and gas sectors. Mr. Masuda showed the extent of power sector deregulation in the Asia-Pacific region with Australia, Singapore, the USA, Chile and Peru, Japan and the Hong Kong Special Administrative Region all adopting the principle of complete private sector ownership of several energy utilities. Canada, the Philippines and Chinese Taipei have implemented deregulation, and are being followed by Thailand, Malaysia and Korea. At the other side are the APEC economies that are still to undergo privatization of lead industries. These are Mexico, Russia, China, Indonesia, Brunei Darussalam, Vietnam and Papua New Guinea.  
  
On the other hand, changes in the natural gas market will be characterized by the increase in short-term trade (eg. spot market for LNG) and gas network development in the region will enhance third party access.
  - c) Identification of policy issues. In analyzing the policy issues, Mr. Masuda focused on the creation of competitive environment, the financing of privatization initiatives and the harmonization of a deregulated energy environment with the other sectors of government.
4. Mr. Masuda's complete presentation profile is attached as **Annex D-1**.
5. The next speaker, **Mr. Robert Pritchard, a senior lawyer of the Pritchard, Udovenya International Lawyers** of Sydney, Australia and a member of the **Finance Committee of the World Energy Council** presented the *Global Experience in Energy Sector Liberalization: Identifying the Safe Reform Options for APEC Member Economies*.
6. Mr. Pritchard mentioned that the 21-APEC member economies comprise more than 50% of the world's total energy consumption and production. This makes it more difficult to identify the safest reform option for each member country because there is no BEST model to wit. There are no universally applicable rules but there are existing, straightforward principles that may be exercised accordingly. He cautioned member economies to be very extra cautious in adopting another country's precedents.
7. He briefly cited that before the era of deregulation and restructuring, the energy industry almost everywhere has always been organized as a vertical monopoly. Petroleum, gas and electricity were almost always dominated by pipeline operators, and vertical monopolies. "MONOPOLOUS" was then regarded as the Supreme God.

8. With the entry of globalization and liberalization, markets gave way to competition. Oil and gas became a global commodity with the creation of more pipelines and energy trade. The same goes well for electricity as an increasing number of interconnections pave the way for intra-global trade.
9. According to Mr. Pritchard, countries commit the mistake of considering energy reform as “a single step” and not a “whole process” of change. In reality, energy sector reform involves an on-going, continuing process of structural and regulatory change.
10. Mr. Pritchard further discussed several safe principles that go with liberalizing the energy industry such as:
  - a) separating the transportation utilities (to provide for vital transportation arteries);
  - b) establishing a professional regulatory regime that is accountable in all its actions;
  - c) natural monopolies remain;
  - d) financial incentives are necessary;
  - e) there should be a proper balance among the players in the market;
11. Eight (8) reform principles have been identified by Mr. Pritchard that should be kept in mind in addition to the above mentioned principles:
  - a) need to link the reforms with the legal system for security purposes;
  - b) caution with IPPs because these can strain the government in its ability to introduce future reform packages;
  - c) corporatization and privatization will introduce a level playing field in the industry;
  - d) public support should be ensured;
  - e) design the reforms to suit the industry;
  - f) design the reforms to suit economic and political situation;
  - g) keep rules flexible. The challenge here is to create rules that can be changed to suit the level of development in a particular country; and,
  - h) avoid flawed market rules and regulations.
12. In conclusion, Mr. Pritchard identified several challenges to liberalization. Reforms should be kept as flexible and as straightforward; governments have to provide security and stability for its investors; economies should be able to strike the right balance and the reform process should always be treated as an “on-going exercise”, with a never-ending venue for change.
13. **Annex D-2** features the complete presentation of Mr. Pritchard.
14. The final speaker for the Overview Session is **Mr. Vladimir Bohun, Director of the Operations Evaluation Department of the Asian Development Bank**. Mr. Bohun’s presentation focused on the *Power Sector Restructuring in Asia*.
15. Based on statistics alone, the population of Asia is three (3) times as much as that of the OECD countries, basically indicating a great potential for energy demand growth. However, since half of almost 2 billion people are without access to modern energy supply, Asia’s per capita energy and electricity consumption (0.7 mtoe) were just a



fraction of what the industrialized countries consumed in 1998 (4.6 mtoe and 7.8 mtoe, respectively).

16. Capital requirements for the power sector in Asia are estimated to reach US\$30 billion between 2000 and 2005 per annum in 16 medium and large developing countries. It is obvious that governments cannot sustain such tremendous amount of capital investment requirements. It is necessary therefore to mobilize all available sources starting with private investments, government budget, internal cash generation, multilateral and bilateral aids, export credits and commercial loans.
17. Private sector investments are still considered to be of utmost importance. Mr. Bohun identified several enabling conditions for private sector investments. These are:
  - a) government's role should be limited to providing sound macroeconomic principles (planning, policy-making and regulation) rather than be a player in the power/electricity market. The power sector has been in the hands of public domain for such a long period already. It is about time that the role of government needs to be curtailed;
  - b) institutional reforms and strategic planning;
  - c) stable and transparent legal and regulatory framework will support competitive markets;
  - d) unbundling the power sector in separate generation, transmission, distribution and retailing functions provide competition;
  - e) domestic capital market development; and,
  - f) adequate risk sharing.
17. Finally, Mr. Bohun cautioned the APEC delegates of the possible obstacles to restructuring ranging from small or fragmented power systems, to power demand/supply gap, from low diversity in generation resources to low electricity tariffs, from a large number of IPPs with "take-or-pay contracts" to the lack of regulatory capacity.
18. Reiterating Mr. Pritchard's general principle, Mr. Bohun seconded that restructuring is a complex process that needs thorough preparation. There is no single best practice model made-to-fit a specific country or economy. Adequate time should be allotted to legislative changes that should provide for a gradual and flexible implementation.
19. Mr. Bohun's presentation is attached as **Annex D-3**.

### **III. OIL AND GAS SECTOR SESSION**

1. The Oil and Gas Sector Session was Chaired by **Dr. Mohd. Farid Mohd. Amin, Senior Manager, Corporate Information and Research Unit of PETRONAS** in Malaysia. He is also the lead coordinator of the Trans-ASEAN Gas Pipeline Project. Dr. Farid also presented the *Open Access to Natural Gas Pipeline*, as the first country presentation under the Oil and Gas Sector Session.
2. In his overview, Dr. Farid stressed that oil and gas remains a critical component of the world energy mix. While oil still dominates the energy mix, gas has already been

recognized as a viable alternative fuel in many parts of the world, although unequally distributed between suppliers and consumers.

3. Pipeline gas will continue to dominate the gas trade as new pipeline projects are undertaken worldwide. The gas pipeline infrastructure in the USA are very well developed and interconnected. Over the years, economies in Western Europe and North America have found the means to effectively harness natural gas resources as a viable form of energy to fuel their economies. Hence, pipeline trade in these regions have reached a level where gas trade becomes a viable form of energy supply and security.
4. Governments realized the long-term goal of putting gas infrastructures in place and together the gas producers, consumers, financiers as well as government itself shared a common vision of developing the backbone and foundation of meeting their long-term energy needs.
5. Dr. Farid also recounted that many painful lessons have been learned and the gas pipeline trade has already evolved in many stages from third party access to unbundling of services, all in admitting the challenges of an increasingly competitive gas market.
6. Dr. Farid later discussed the Open Access to Natural Gas Pipeline. Some key issues and challenges that he deemed appropriate to be addressed during the APEC Seminar-Workshop were as follows:
  - a) attracting investments;
  - b) security of energy supply;
  - c) realization of the Trans-ASEAN Gas Pipeline;
  - d) creating a “bigger ASEAN Gas Market”;
  - e) third party access or open access;
  - f) common regulatory framework for gas pipeline trade;
  - g) unbundling and competition.
7. The complete presentation of Dr. Farid is attached as **Annex E-1**.
8. Three (3) other experts from the region made individual country presentations for this session. They are: **Mr. Shigeru Sudo, Research Director of Mitsubishi Research Institute, Inc. in Japan** (*Topic: Liberalization and Its Impacts on the Oil Industry: The Japanese Experience*), **Dr. Bo-young Kim, Senior Research Associate, Managerial Research Team of Korea Gas Corporation** (*Topic: Korean Natural Gas Industry Liberalization*), and **Mr. Monico V. Jacob, former President of Petron Corporation and now Chairman of CEO’s Inc.** (*Topic: Philippines Downstream Oil Industry Deregulation*).
9. **Annexes E-1 to E-4** present the country reports for the Oil and Gas Sector Session.

#### **IV. POWER AND ELECTRIFICATION SECTOR SESSION**

1. The Power and Electrification Sector Session was Chaired by **Dr. Francisco L. Viray, Chairman of EDUFI** and former Secretary of the Philippines’ Department of Energy.

2. Six (6) country presentations comprised the Power and Electrification Sector. Speakers include: **Mr. Peter Barrie Leay, Past Chairman of the APEC Energy Business Network (New Zealand)** on the topic *“Lessons on Energy Sector Liberalization”*; **Dr. Robert Booth, Managing Director of the Bardak Group in Australia** (topic: *“Australia’s National Electricity Market”*); the **Undersecretary of Energy of Chile’s National Energy Commission, the Honorable Madame Vivianne Blanlot Soza** who presented the *“Power Sector Restructuring in Chile”*; **Mr. James A. Nichols III, Director of Navigant Consulting, Inc. in the USA**, (topic: *“The U.S. Experience: California Electricity Sector Inside The Eye Of The Storm Today”*); **Dr. Soh Siew Cheong, Senior Vice President of Singapore Power Ltd.** who spoke on the *“Deregulation of the Power Industry in Singapore”*; and **Mr. Jose Victor Emmanuel A. De Dios, Undersecretary of the Philippines’ Department of Energy** who presented the *“Power Sector Restructuring: The Philippine Model”*.
3. As part of the Chairman’s Wrap-Up, Dr. Viray stated that in terms of lessons learned and observations gained, there have been generic similarities in terms of the restructuring exercise.
4. The Chairman was impressed with Singapore, despite having an already efficient and reliable power system, has restructured to be more efficient and more reliable. That in itself was referred to as political will on the part of Government especially so because of the imminent difficulty to convince state employees on the merits of privatization and restructuring.
5. Generic similarities are also evident in terms of structure although they differ in ownership terms. This is especially true with cross-ownership restrictions. Dr. Viray mentioned the case of the Philippines as a classic case where specifics on cross-ownership have to be included in the approved law.
6. Dr. Viray likewise pointed out that benefits to be derived from the exercise of liberalization do take time. The same may also be applied to the timetable of implementation, its different phases and steps that sectors want to go into.
7. Going country-by-country, and using New Zealand first as an example, the country took eight (8) years before it could finally separate the utility lines from the generation functions. Australia was another classic case whereby after ten (10) years of solid restructuring process, (five years from legislation before final implementation), the country is still encountering problems with its power market.
8. Chile was one of the first few countries to undergo privatization of its electric utility industry, some 20 years ago. Now, they are into so-called “second generation electricity reform”. California started in 1996, and experienced one of the worst "benefits" of restructuring. Singapore started in 1995 and will probably be fully finished by 2003. Learning from the lessons of other industrialized countries, Singapore maintains a very detailed, moderate phase-in of the things they wanted to do.

9. As for the Philippines, privatization started more than 10 years ago, seven years of which were spent by legislators deliberating on its would-be effects. Results have been a mixed breed: there have been failures and successes, parameters both that have been mentioned in the Philippine country paper presentation. Should prices of electricity shoot up similar to what happened in California, definitely a negative result is in the offing.
10. For Dr. Viray, the ultimate essential part of a perfectly restructured industry will be the role of Government and its politicians. Each specific question on why, what, how and when all depend on their suitability to a particular country. Ultimately, the Chairman said that there is indeed no “best model” since almost all of the country presentations made included constraints and problems. Adoption of these models are really dependent on the flexibility of each member economy to changes.
11. **Annexes F1 to F6** compiles all the presentation materials for the Power and Electricity Sector Session.

## **V. SUSTAINABLE DEVELOPMENT SECTOR SESSION**

1. The Sustainable Development Sector Session was chaired by **Dr. Ludovic Lacrosse, Executive Director of the Asian Institute of Technology in Bangkok, Thailand.**
2. Three (3) country presentations comprised the Sustainable Development Sector Session. Speakers included were: Dr. Lacrosse, on the topic *“Small Power Producers (SPPs) Using Renewable Energy Projects – Government Support in Thailand; Atty. Cecile Dalupan, a Consultant of the Natural Resources Law Center in Manila, Philippines (The Clean Development Mechanism: Challenges and Opportunities);* and, **Dr. Ernesto N. Terrado, an External Consultant of The World Bank based in Washington, D.C., U.S.A.** Dr. Terrado’s paper on *“Rural Electrification: The Changing Roles of Government and Private Sector”* was delivered and presented by **Mr. Alberto R. Dalusung III, a Consultant of EDUFI.**
3. As part of the Chairman’s Wrap-Up, Dr. Lacrosse zeroed into each of the three (3) presentations starting with the energy policies in Thailand. Whichever way one looks at it, governments can do things very well as long as they have the right framework. That is particularly true with the government of Thailand’s policy on sustainable energy, specifically on the rather astonishing success of coal development and utilization in the country. With energy demands being met by local supplies coupled with government incentives for private sector developers, the coal industry was successfully on its feet by the end of the year.
4. Dr. Terrado’s paper was summarized as a very realistic but conventional way of looking at off-grid rural electrification. Essentially, a suggested, emerging principle is that “consumers are willing and should definitely contribute to the development and operation of rural electrification systems.” Government should also adjust its policy to enable things to happen, by providing subsidy in a “smart” way, but allowing consumers’ capability to pay to surface as well.

5. Governments likewise should portray the role of a “market enabler” and “subsidy provider” in the right sense by giving the right policy environment and market nurturing (that includes credit programs, information/training, consumer protection). Blanket subsidies, central detailed planning and restrictive regulations should be basically “thrown overboard”.
6. Good collaboration between the local government and national policy makers is a major facet of a successful rural electrification program.
7. On the very comprehensive presentation of the Clean Development Mechanism presentation by Attorney (Atty.) Cecile Dalupan, the Chairman reiterated Atty. Dalupan’s conclusion that “ the CDM is indeed intended to be the primary vehicle to encourage investment in sustainable energy projects in the developing world.”
8. Effective rules for the CDM can accelerate the growth of domestic industries for developing countries, giving them a firm foothold in emerging clean energy markets. Used properly, the CDM can act as a springboard for technological change.
9. In summary, the CDM has the following: environmental integrity, genuine greenhouse gas abatement, host-country driven, verification and certification methodology, transparent and with government accountability, and, definitely a contributing factor to sustainable development.
10. Presentation materials on the Sustainable Development Sector Session are filed as **Annexes G1 to G3.**

## **VI. WORKSHOP SESSION**

The last day of the APEC activity was focused on the half-day workshop where all delegates had the flexibility to choose which group they will have to join. The groups were divided into: Oil and Gas Workshop Session, Power and Electrification Workshop Session, and Sustainable Development Workshop Session.

The roundtable discussion enabled all the delegates to share country experiences from each liberalization initiatives. Countries that have yet to liberalize their energy industries gained insights and valuable lessons from other neighboring countries that have either fully or partially liberalized.

### ***A. Oil and Gas Workshop Session Results***

The Oil and Gas Sector Group was chaired by **Ms. Soh Mey Lee, Corporate Affairs Manager of the Malaysian oil and gas firm PETRONAS**. The group consisted of 15 members from seven (7) APEC member economies.

The Oil and Gas group focused on three (3) areas:

1. experience sharing
2. issues
3. recommendations/suggestions

Country experiences were shared and were based on common areas such as:

1. current stage in terms of energy infrastructure;
2. production and consumption patterns
3. ownership structure of existing oil and gas industries
4. open access or vertically integrated mechanisms on oil and gas operations;
5. degree of regulation or deregulation of the oil and gas industries;
6. specific pricing regimes; and,
7. finally, issues, challenges and other cross-cutting issues were raised during the round-table discussion.

**Why Open Up?                      Basic reason: to attract foreign investors and access to technology.**

**BUT:**

- a) government should also share the risk of investments;
- b) government should allow investors access to retail markets;
- c) To attract investors, let them play their game.
- d) Opportunities abound to tap larger markets worldwide vs. huge upfront capital investments. **BALANCING OPPORTUNITY TO TAP A BIGGER MARKET vs HUGE FRONT-END INVESTMENTS.**

**Points to Consider:**

- Oil and gas sector being strategic resources can be very difficult to FULLY DEREGULATE. It is the backbone of energy supply hence, the backbone of most economies;
- It will continue to be subjected to the dynamics of oil price economics, technological innovations, trading, geo-political developments, and sustainable development issues, particularly on the environment;
- Different degrees of deregulation/liberalization should be introduced per member economy as there are no clear cut definitions for a deregulated industry;
- Social impacts have to be considered very carefully because at the end of the day, stable prices is necessary to ensure stable non-inflationary environment and social harmony;
- For upstream: the dual role of a national company as supervisor and a partner in business should be carefully addressed;
- Policy makers need to pay attention to security of supply but there is also a need to ensure transparency – stable rules to assure confidence of the consuming public;
- Diversify sources of energy to address security of supply;
- Liberalization is necessary. Member economies and their individual political will should ensure its success. Success is not only incumbent on governments but also on the industry players: producers, consumers, investors, financiers;



- Unification of product specification in Asia-Pacific maybe a necessary step forward to promote increasing liberalization. There is tremendous potential benefits to tap into a larger world market, although that will come at a price.
- Governments have the options to determine the most appropriate structure available given the number of options, but what regulatory regime has to be put in place remains a challenge. It is important to ensure that investments are available and that which poses less risks to investors without going through the tedious unbundling process earlier experienced by other industrialized countries;
- Near challenge: question of managing transition period. Legislators resistance to change and grapple with distorted prices;
- Another challenge for deregulation of the industry: transparency in communication with the consuming public; and their “buy in”; failure to get consumers ‘buy in’ has proven that it can be a set back to liberalization;
- There has been contrasting degrees in which deregulation has been adopted by various countries but the key remains that a certain degree of deregulation is still needed in order to attract FDI, spur economic growth, risk-sharing, gaining access to technology and finance, as well as to promote and encourage healthy competition in the industry.

## ***B. Power and Electrification Workshop Session Results***

The Power and Electrification was chaired by **Mr. Robert Pritchard, Senior Lawyer of the Pritchard, Udovenya International Lawyers of Sydney, Australia** and a member of the **Finance Committee of the World Energy Council** group consisted of 21 members from 7 APEC member economies.

Identified below are six (6) fundamental principles highlighted and discussed by the group. These are:

1. Transparency
2. Level Playing Field
3. Simplicity
4. Security/Stability For Investors
5. Flexibility/Adaptability
6. Welfare Gain Is Paramount

### *Transparency*

- Important for stability of policy
- Must have participation of key stockholders

### *Market Design*

- Appropriate market design must be specific to industry characteristics
- Develop country expertise
- Incremental stages – start with what you’ve got and aim for market changes; progressively evaluate each step until achieving competitive market (might take 10 years)
- Reform must be monitored and cost benefit analysis made at each stage

- Market design should be allowed to evolve
- Market design should be based on optional trading: short, medium and long-term
- Market design should be in consonance with energy policy objective
- Harmonize market design policy with policy directions from government
- 2 legitimate policy directions:
  - a) Put obligations to retailers
  - b) Taxing the inputs

### System Planning

- Need for system planning council
- If market distortions exist, free market shall fail to operate and market flaws need to be rectified

### Retail Competition

- Go by stages towards retail competition, have good answers to distribution charges before going to small customers

### Market Power

- Need to have cross-ownership limitations if market power is a concern
- Electricity industry is unique. You can have market power in existence only a fraction of a time but serious enough to distort the industry

### Regulator

- Should be independent but not allowed to set policy
- Government sets the policy
- Regulator needed to resolve disputes
- An efficient system of challenge must be installed
- Transparency on price regulation essential

### Commercialization/Corporatization

- Need to privatize as utilities owned by government are hampered by lack of incentives and lack of access to capital
- Reasons to privatize:
  - a) for efficiency
  - b) for acceleration of capital inflow
- Restructure, corporatize, privatize in progressive stages (Don't privatize before reforms)
- Ways to start privatization:
  - a) privatize state utility
  - b) issue license to investors to compete with state utility

## ***C. Sustainable Development Workshop Session Results***

The Sustainable Development Group was chaired by Mr. Peter Barrie Leay, Executive Chairman of Ecodyne Ltd. in New Zealand, and a member of APEC Energy Business Network as the Inaugural Chair and Inaugural Director of the Electricity Market Co. Ltd. The group consisted of 9 members from 5 APEC member economies.

The guiding question for the group's workshop activity was: ***'WHY ARE WE INTERESTED IN SUSTAINABLE DEVELOPMENT?'***

Identified below were the major points discussed in the workshop:

a. Basics of Renewable Energy Options

- nature/background/science. Mr. Leay cautioned that if the world continues to use all the energy available now and into the next century, carbon dioxide levels will be pushed back to the time of the dinosaurs. Burning huge amount of carbon will increase the carbon dioxide content. Sea temperatures will definitely rise, drowning most parts of the world (Ireland, Bangladesh and Holland, to name a few countries). At the same time, world population is likely to grow from the present six (6) billion to ten (10) billion. This aggravates around 6 million people not having commercial energy from the currently estimated 2 million people without primary source of commercial energy.
- different options and selection of most viable and suitable option. The group considered all the fundamental sources where energy can come from and how it can be useful for human consumption.
- Out of the recent World Energy Council Study, the world faces a US\$30 trillion bill for providing commercial energy for communities who do not have access to such in the next 20 years. Therefore, the biggest single investment required is in MEGAWATTS.
- Policy makers are therefore faced with the problem to efficiently use the energy currently being produced. Studies suggest that in the developed world, almost 56% of the electricity produced is wasted.

b. Project experience from participating delegates generated several country experiences on:

- Solar/PV. The Philippines is the largest user of PV in Asia. There are a lot of very interesting methodologies to get a community into the technology process and avail of the resource.
- waste streams/biogas. Various forms of biomass resources generate wastes. These include domestic animal farms and wet and dry market wastes. However, a number of institutional problems and constraints prevent from fully utilizing this resource.
- geothermal. Geothermal potential remains one of the least untapped resources for power and electricity in the world. The Philippines and New Zealand both have ample resources of geothermal power. Both countries however have experienced depletion of geothermal basins.
- Wind. This resource is probably emerging as the largest single renewable resource in terms of carbon levels of cost and technology as its credibility increases by the day.
- Biomass.

c. Summary

- Most of the technologies required are now very well proven. The stage of experimentation is over. There is likewise finance available.
- The key single problem is institutional blockage. If these institutional barriers are not removed, then governments will continue not to be able to put commercially-viable renewable projects into the market place.
- These institutional blockages however can be put away if governments and the private sector put their resources together.
- The Chairman in the end correlated liberalization with New Zealand's very popular hi-end sport, 'bungee jumping' -- where there is no turning back as soon as someone has jumped over the cliff.

## **VII. PRESENTATION OF WORKSHOP RESULTS AND CLOSING REMARKS**

1. In behalf of the APEC speakers and participants, EDUFI Chairman Dr. Francisco L. Viray presented the Workshop Results to the Honorable Secretary of Energy, Vincent S. Perez of the Philippines, who also delivered the Closing Remarks during the last day of the S-W.
2. Secretary Perez deduced that what the delegates have done during the three (3)-day meeting has benefited each other, with the lessons learned and pitfalls to be avoided with reference to energy sector liberalization.
3. Forum such as the "Lessons on Energy Sector Liberalization" is indeed an example of a perfect way for the interchange of ideas and experiences. Most impressive for the Honorable Secretary was the workshop activity where, as an APEC rule, everyone is given a freehand to express an idea, regardless of any conviction on a particular issue. He mentioned that at one point, a known dissenter of an issue was able to convert all opinions back to the opposite side --- all in the spirit of APEC openness and flexibility.
4. The Secretary thanked all delegates and wished to see each other again, be it in another APEC forum (the next one to be hosted by Cabo San Lucas, Mexico) or during the next ASEAN Ministers Meeting in Bali, Indonesia.
5. The APEC Seminar-Workshop officially closed at 4:00 in the afternoon of December 5, 2001.

## **VIII. OTHER ACTIVITIES**

### *Press Conference*

1. A 30-minute Press Conference was held at the end of the first day session. Seated as panel members were Secretary V.S. Perez of the DOE, Mr. T. Masuda of APERC and Chair of the Overview Session, Dr. M. Farid of PETRONAS and Chair of the Oil and Gas Sector Session, Dr. F.L. Viray, Chairman of EDUFI and Chair of the Power and Electrification Sector Session and Dr. B. Austria, from EDUFI as Moderator.

2. Dr. Austria gave brief remarks on the background purpose of the Seminar-Workshop.
3. Notable among the questions raised by the local and foreign press was the impact of ENRON on the trend towards liberalization and the Philippines in particular. DOE Secretary Perez assured that the Philippines has no exposure in ENRON. Instead, there are commitments by ENRON with respect to power generation.
4. Dr. Farid, on the other hand, responded to a question on the Trans-ASEAN Gas Pipeline, particularly on the segment interconnecting the Philippines and Sabah. Although the pipeline might not be implemented in the next 10-15 years, efforts are being exerted to see if it can be implemented earlier.
5. Questions were also focused on the status of the Philippine Power Industry Reform Bill and were directed to Secretary Perez.
6. Mr. Masuda provided insights on the status of liberalization in Japan as well as with other selected member economies.

#### *Field Trip*

1. A field trip to the Makiling-Banahaw (Makban) Geothermal Power Plant and the Villa Escudero Plantation and Resort in the province of Laguna, Philippines, was held on Thursday, December 6, 2001.
2. The field visit to the Makban Geothermal Power Plant showcased the country's geothermal operations to both foreign and local delegates.
3. The power plant complex comprises ten (10) generating units housed in five (5) separate power stations. Plants A, B, and C produce 330 megawatts (MW) of electricity while modular plants D and E generate another 80MW for a total generation of 410MW which goes to the Luzon island grid, where Mak-Ban is utilized as a base load plant.
4. As the Philippines heads towards the full deregulation of its electricity industry and the privatization of the state-owned National Power Corporation (NPC), the Makban Geothermal Power Plant surges on ahead, filled with the zest to continually step up efforts in improving product quality, achieving excellence in overall operation while initiating socio-economic growth in its area of responsibility.
5. The APEC delegates also visited the Villa Escudero Plantations and Resort, Inc. (VEPRI), one of the most visited tourist spots in the Philippines owing to the resort's proximity to Metro Manila and its warm, cheerful showcase of Philippine hospitality. The resort is located within the Villa Escudero estate where a river runs through the property and is considered as the first hydroelectric power station in the Philippines that was built by estate owner, Mr. Arsenio Escudero.
6. The micro-hydro project is a fully private sector collaboration of the Escudero family, Preferred Energy Inc. (PEI), a non-profit organization that promotes renewable energy, energy efficiency and demand-side management in the Philippines, and BCE Management Inc. PEI funded the project under the USAID-Winrock International Renewable Energy Financing and Technical Assistance Project (REFTA) while BCEM Inc. took charge of the technical aspects.

7. VEPRI embarked on a rehabilitation and expansion of its micro-hydro facility, increasing the capacity from 75kW to 172.8kW. The project combines several noteworthy characteristics:
  - ❖ Partnership with private sector business
  - ❖ Strengthening of eco-tourism industry
  - ❖ Renovation and expansion of the first micro-hydro project in the Philippines
  - ❖ Owner/operator will use the power generated to meet most of its electricity requirements
  
8. VEPRI management reported that the project yielded favorable results and savings on electricity bills that amount to about ₱2.4 million annually. The project has a combined capacity of about 556,336 kWh per year that equates to an average displacement of about 1,002 barrels of fuel oil equivalent per year. Essentially, green house gasses such as CO<sub>2</sub>, SO<sub>2</sub>, and NO<sub>2</sub> would be mitigated, thereby preserving the environment.



## **IX. ACKNOWLEDGMENT**

The Management and Staff of the *Energy Development and Utilization Foundation, Inc. (EDUFI)* and the *Philippine Organizing Committee* wishes to express its sincerest gratitude to the following organizations and individuals, who in one way or another has contributed to the success of this APEC Seminar-Workshop:

**First Gas Holdings, Inc.** for sponsoring the Welcome Reception; the **Philippine National Oil Company (PNOC)**, **Supply Oilfield Services (SOS)** and **Trans-Asia Power Generation Corporation** for sponsoring the lunch functions during the Seminar-Workshop, the **National Power Corporation** and **Philippine Geothermal Inc.** for hosting the trip to the Mak-ban Geothermal Power Plant and the Villa Escudero Resort and Plantations, and **Preferred Energy Inc.** for making the logistical arrangements for the post-conference site visit.

EDUFI also deeply appreciates the counsel and support given by the **Project Steering Committee** for the *APEC Seminar-Workshop on “Lessons on Energy Sector Liberalization”* composed of Undersecretary Cyril C. del Callar of the Department of Energy, Mr. Tatsuo Masuda of the Asia-Pacific Energy Research Centre, and Ms. Lilian C. Fernandez of the Department of Energy who also served as Project Overseer.

## WELCOME ADDRESS

By

Mr. Antonio V. del Rosario  
CHAIRMAN, WORLD ENERGY COUNCIL

And

President, Energy Development and  
Utilization Foundation Inc.

*Delivered at the Asia Pacific Economic Cooperation*

*Lessons on Energy Sector Liberalization*

**Manila, 3 Dec. 2001**

Secretary of Energy for the Philippines, Hon. Vincent S. Perez; Ambassador to the Philippines of Papua New Guinea, H.E. Graham John Ainui; Undersecretary of the National Energy Commission of Chile, Ms. Vivianne Blanlot; former Secretary of Energy now Chairman of the Energy Development Utilization Foundation, Dr. Francisco L. Viray; Pacific Energy Research Center President Mr. Tatsuo Masudo, distinguished guests, participants and colleagues in the power industry, ladies and gentlemen: GOOD MORNING!

On behalf of the Asia Pacific Economic Cooperation Center, the Energy Development Utilization Foundation Inc., and the Philippine Department of Energy, welcome to this lead event of Philippine Energy Week, a seminar-workshop on “**Lessons on Energy Sector Liberalization**”. Many of you have come from far away and/or taking the time from pressing obligations to be with us over the next few days. We would like to express our appreciation for your participation in this seminar-workshop and look forward to a lively and rewarding exchange of views among you. We hope that those of you who come from abroad will take the opportunity after this workshop to see the attractions of our countryside and to experience the warmth and hospitality of our people.

The purpose of your meetings in the next few days is to present and discuss the practical applications of energy sector liberalization in various APEC member economies and to examine from a regional economic perspective the experiences and lessons learned from these liberalization initiatives. I trust you will agree with me that this is a very timely topic for the many countries that are contemplating these initiatives in the context of a rapidly globalizing, deregulating, and privatizing world. It is a world that has been brought about by swift technological change, almost instant telecommunication, cheap transport and radically increased mobility. It is also a world that has just experienced the shocking events of **September 11**. How these will impact on the world we live in, or for how long, is still evolving. It is the only world we live in. We can't get off it. The alienated among us included, we are all in it for good or ill. There is a need to mete justice to the perpetrators. But there is

also a need to address the circumstances that breeds a terrorist. It remains to be seen whether the well intentioned among us can **make a difference for the better**.

“To make a difference for the better”, especially for those who are hopelessly mired in disaffection and poverty, we must have economic growth. I take it this is why your organizers have cited **facilitating trade in energy** as a principal objective. If we must stimulate economic growth, the **sustainable supply** and **efficient use** of **affordable energy** is one of the principal pre-conditions for it. But **why trade in energy?**

Energy resources are widespread but unevenly distributed around the world. Often they are situated in the developing economies. The main markets for energy, on the other hand are found in the developed economies. There is a **need to link** the two together through trade if we are to stimulate economic growth. Massive capital resources will need to be mobilized to build the infrastructure for this. Appropriate policies will be required to attract the necessary investments and to encourage cross-border trade in energy. **Energy sector liberalization** has been the response of many economies to these challenges. Drawing the necessary lessons from those who have taken this path earlier is an imperative for those who are contemplating a similar response. The better it is set-up, the less adjustments will be needed later on.

**Liberalization** is a word that has many strong emotional and ideological connotations. It is often associated with **deregulation, privatization, and globalization**. Webster’s New World Dictionary devotes nearly half a page to its many uses from its roots, “liber” meaning “book”, to “liberal” meaning “free” and to “liberalization” meaning “**a process of freeing up**”.

Freeing up involves change from the status quo. Change can impact positively or negatively on stakeholders. Hence, it should not be surprising to see mixed reactions to its introduction. It is important to recognize, however, that **liberalization** is **a tool**, and **not an end** objective.

Governments have used liberalization policies to introduce change, to move their economies from possible stagnation to a growth path again. As the need for capital investment has grown, they have sought to supplement it by inviting the participation of private sector. To attract private sector investments they have adopted market reform policies intended to **enhance competition**, to **increase efficiency** in their energy sector, and to **reduce** their **cost** of energy. A special objective for developing countries has been the need to shift the burden of financing power projects to the private sector and to **de-politicize** their pricing process. State owned assets have been sold off, state run businesses have been privatized, and deregulation of key sectors of the economy has been pursued.

These liberalization policies appear to have been quite successful in the main.

A study prepared by the World Energy Council entitled “**The Benefits and Deficiencies of Energy Sector Liberalization**” concludes that and I quote: “...*liberalization, by introducing competition leads to reduced costs, increased efficiency and better service to customers. Among others, it facilitates investment, especially in developing*

*countries where funding is vital for economic growth and puts energy decisions in the hands of objective market forces ...”*

“Objective market forces” do not always work perfectly and may be blind to social costs. Competition from lower priced imports due to lowered tariff barriers can adversely impact upon traditional businesses and employment. Exports from new opportunities may take time to grow and flow through to the rest of the economy. Market imperfections can also defeat expectations for greater competition and more affordable prices. Hence, **there is also a downside to liberalization**. Even as deregulation policies have been implemented in various economies, however, there is a growing realization of the need for **appropriate** regulation.

In its Statement for 1999 on the pros and cons of energy sector liberalization, the World Energy Council supports energy sector liberalization, but recognizes that this will depend greatly on the specific situation of each country and its set of priorities. In some economies, energy resources such as oil and natural gas may be the overwhelming generator of revenue. The institution(s) responsible for their exploitation may be the unifying entity and politically indispensable to the country.

**In the succeeding sessions of this seminar-workshop, you will have a direct opportunity to ascertain the benefits and deficiencies of energy sector liberalization from the experience of those who have gone through the process and to arrive at your own judgment as to their applicability. For those economies, which have made the choice, the die is cast. But we should not forget that good implementation can make a difference and structural reform is a continuing process. For those not yet committed but interested, it may be helpful to consider the extended debate that some countries have undergone, including the Philippines, just to enact the enabling legislation. If the benefits of energy sector liberalization are compelling for some, might some form of early voluntary sectoral liberalization be possible? “Energy Markets in Transition: The Latin American & Caribbean Experience” and “Electricity Market Design and Creation in Asia Pacific” are relevant and recent studies of the World Energy Council which I am sure the panelists from Australia and Chile will be well able to discuss with you in this APEC seminar-workshop.**

The seminar-workshop will encompass the three sectors of the industry where liberalization efforts have been either substantial, planned or underway. **Day One** will cover upstream oil sector liberalization in Japan, Korea, and the Philippines. **Day Two** will focus on the Power and the Electricity Sector and Sustainable Development. Speakers will cover developments in New Zealand, Australia, United States, the Philippines and Singapore. The session on sustainable development will focus on the elements of a **sustainable rural electrification program**. Papers will be presented by experts from the World Bank, Canada, the European Union Cogen Program and the Philippines. Finally, plant visits to the geothermal power plants south of Manila operated by the Unocal’s Philippine Geothermal affiliate and the National Power Corporation, and to a micro-hydro power plant located in Villa Escudero, one of the more popular resorts in Luzon. Participants are encouraged to take advantage of the field trips, as these promise to be a truly enjoyable experience.

In closing, allow me to reiterate our warmest welcome and hopes for a rewarding and informative workshop. MABUHAY to everyone!

## **Annex B**

### **Profile of the Keynote Speaker**

#### **Vincent S. Perez, Jr.**

Secretary, Department of Energy  
Philippines

Vincent S. Perez, Jr. is the Secretary of the Philippines' Department of Energy (DOE), having been appointed by Her Excellency Gloria Macapagal-Arroyo to implement the recently enacted Power Reform Law. He is also the Ex-Officio Chairman of the Philippine National Oil Company (PNOC) and the National Electrification Administration (NEA).

Prior to his appointment, he served as Undersecretary of the Industry and Investments Group of the Department of Trade and Industry and Vice Chairman and Managing Head of the Bureau of Investments (BOI).

Prior to joining the government in March 2011, Mr. Perez has over 18 years experience in private equity and capital markets and emerging markets. He was an international officer at Mellon Bank, N.A. in Pittsburgh from 1983 to 1986 in its Latin American restructuring group. Previously, he had internships with New Jersey Bank, Citibank N.A. and the Manila-based Far East Bank and Trust Company.

Secretary Perez pioneered Lazard Freres & Co.'s emerging markets team in New York where he arranged numerous debt and equity financing in Argentina, Brazil, India, Indonesia, Mexico, Philippines and Turkey. Until he resigned in 1996, he worked as Managing Director of Lazard Asia and a General Partner of Lazard Freres & Co. in New York. He holds the distinction of being the first Asian partner at Lazard and the first Filipino partner on Wall Street.

Secretary Perez co-founded Next Century Partners in 1996, a private equity firm that focused on investing in Asia. He has been actively involved in bringing prominent foreign investors into the Philippines.

The Honorable Secretary holds a Masters in Business Administration degree from the Wharton Business School of the University of Pennsylvania and a Bachelor's Degree in Economics from the University of the Philippines. In 1994, he was named one of the Top 100 Emerging Market Superstars by Global Finance Magazine.

# **Republic of the Philippines**

## ***Lessons in Energy Sector Liberalization***

***03 December 2001***



**Secretary Vincent S. Pérez, Jr.**  
**Department of Energy**

# Presentation Outline

- I. Developments in Energy Sector**
- II. Why Liberalization in the Energy Sector?**
- III. Lessons in Liberalization: The Philippine Experience**
  - a. Downstream Oil Industry
  - b. Power Sector Reform
- IV. Future Liberalization**
  - a. Downstream Natural Gas
  - b. New & Renewable Energy Sources
- V. Challenges and Opportunities**

# Developments in Energy Sector in APEC

- **Liberalization initiatives gaining ground**
  - *Led by Australia and New Zealand*
  - *Followed by Philippines , Singapore and South Korea*
  - *Indonesia, Thailand soon to follow*
  
- **More private sector participation in power sector**
  
- **Trend towards energy security and environmental protection**
  - *Cleaner technologies, reduction of gas emissions*
  - *Development of renewable and sustainable energy sources*

# Why Liberalization in the Energy Sector?

- **De-monopolization and market-based rules to encourage competition and attract more players**
- **Encourage investments and innovations in operations**
- **Promote active private sector participation**
- **Encourage more economic activities**
- **Cost-effective energy and improved quality of services for consumers**

# Challenges & Opportunities

- **Social acceptability in cases of price fluctuations**
- **Giving the right economic rewards for innovations and effectiveness**
- **Mitigating environmental impact**
- **Attracting more capital and investments into the sectors**
- **Designing most appropriate and economically-viable structures**
- **Delivering lowest possible prices and best services to consumers**

# **THE PHILIPPINE EXPERIENCE:**

## **Liberalization of Downstream Oil Industry**



# Downstream Oil Industry Deregulation

## *Prior to Deregulation*

**Philippine Oil Industry was characterized by :**

- **Government intervention in pricing to stabilize oil prices (Creation of the Energy Regulatory Board)**
- **Introduction of oil subsidy (Oil Price Stabilization Fund, OPSF)**
- **Inefficiencies brought about by lack of investments in refining capacities**
- **Less competition**

# Downstream Oil Industry Deregulation

## *Developments After Deregulation with Republic Act 8479 in 1998*

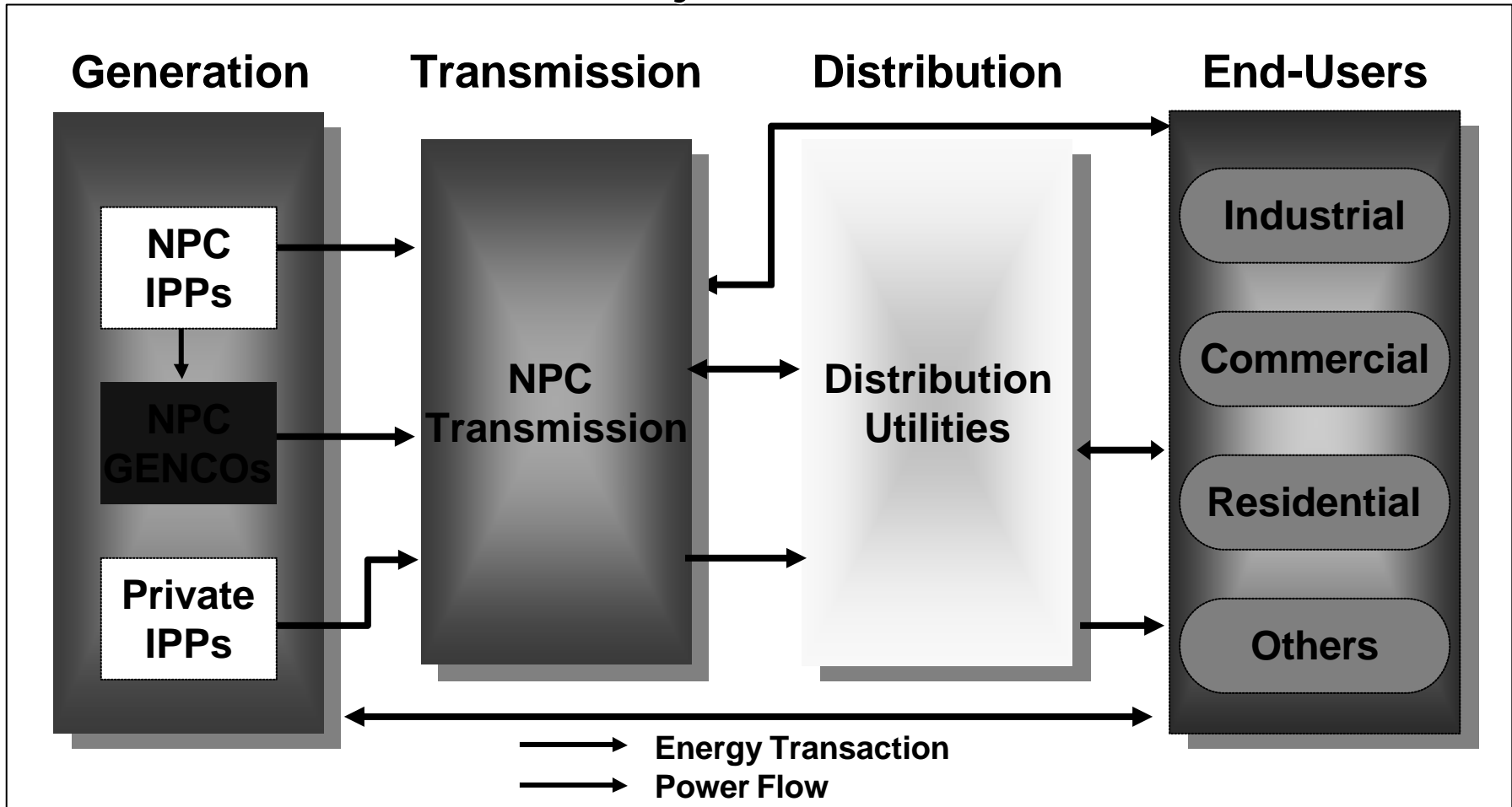
- **Market-based pricing mechanism**
- **Investments to date reached P13 billion (\$260 Mn)**
- **Total of 66 players, with new players accounting for 10.4%**
- **Government price monitoring**
- **Continuing Consumer Information Campaign**
- **Government assistance to new players in the form of management skills training and loan funds**
- **Improved retail services**

# **THE PHILIPPINE EXPERIENCE:**

## **Restructuring of the Power Sector**

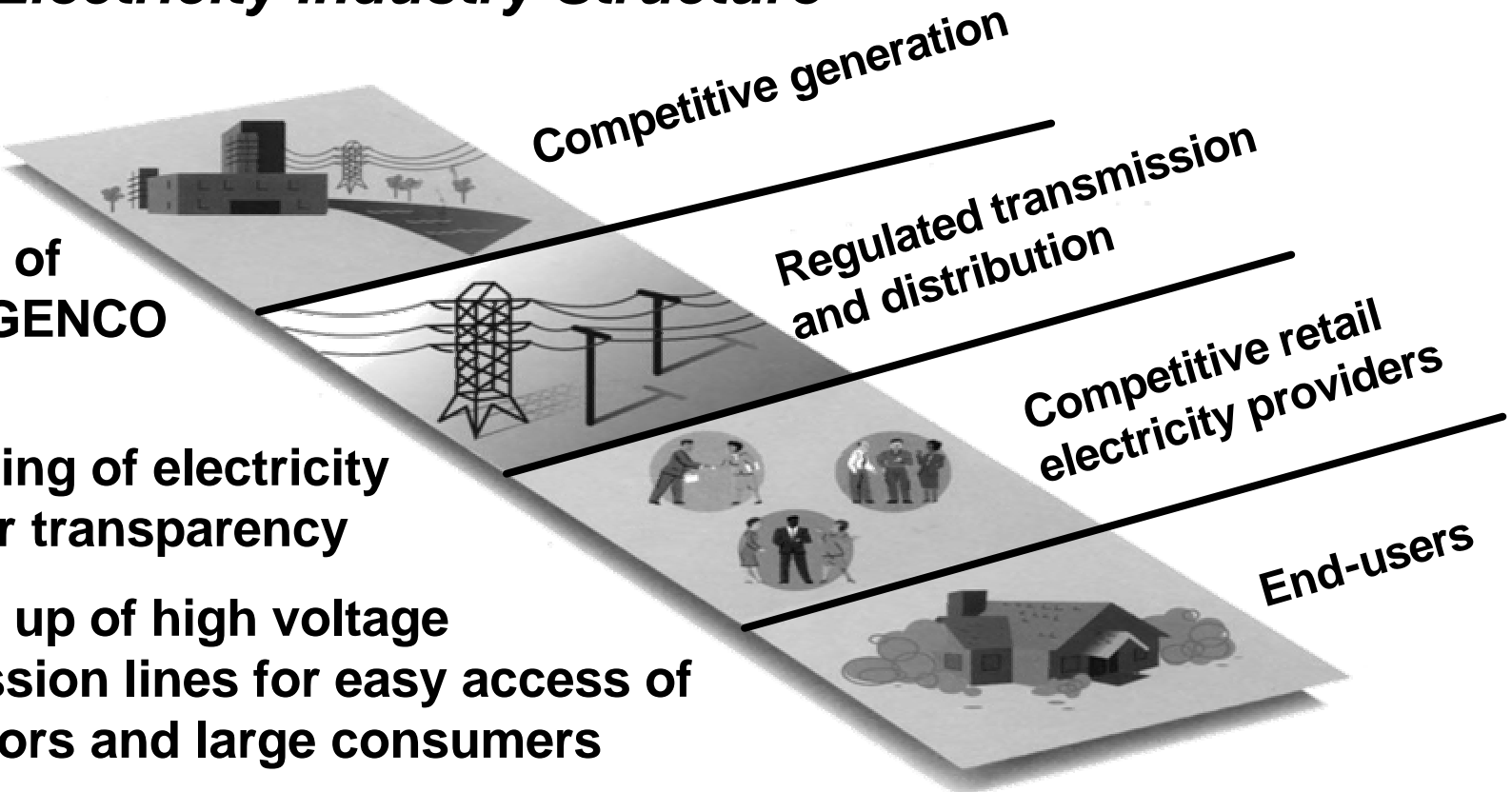
# Electricity Sector Reform

## *Former Structure of Industry*



# Electricity Sector Reform

## *The New Electricity Industry Structure*

- 
- **Creation of several GENCO clusters**
  - **Unbundling of electricity tariffs for transparency**
  - **Opening up of high voltage transmission lines for easy access of distributors and large consumers**
  - **Opening up of distribution lines for competitive consumers**

# Electricity Sector Reform

## *What have we done so far?*

- **Power Reform Act took effect June 26, 2001**
- **Provided for:**
  - **Creation of Transmission Company (“TRANSCO”)**
  - **Creation of Power Sector Asset and Liabilities Management Corporation (“PSALM”)**
  - **Constitution of new Energy Regulatory Commission (ERC)**
  - **Privatization of the National Power Corporation (“NPC”)**
    - **To begin 2<sup>nd</sup> Quarter 2002**
  - **Creation of Wholesale Electricity Spot Market (“WESM”)**
    - **Scheduled for 2<sup>nd</sup> Quarter 2002**
- **Implementing Rules and Regulations for approval no later than 26 December 2001**

# Electricity Sector Reform

## *Key Industry Restructuring Benefits*

### Pre-Restructuring

**Government's Support in  
Electricity Market**

**Politicized rate regime**

**Government role in electricity  
market**

**Electric utility monopoly**

### Post-Restructuring

**Enhanced Transparency and  
Efficiency**

**Transparent, market-driven  
tariff mechanism**

**Phase out role and exposure  
of government in electricity sector**

**Multiple players in a competitive  
environment**

# Electricity Sector Reform

## *Opportunities for Ancillary Services*

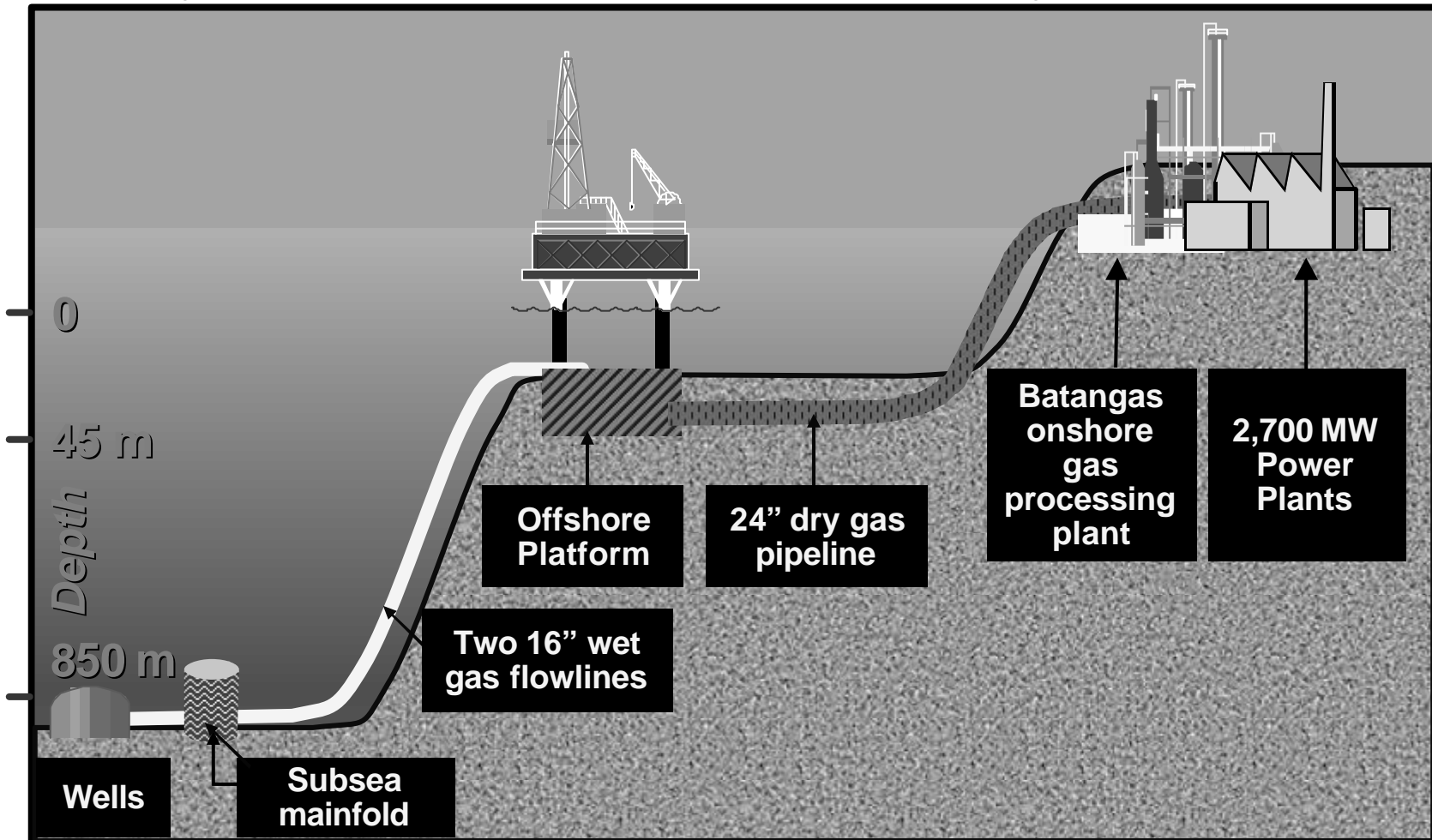
- **Residential Service Application**
- **Residential Meter Installation**
- **Meter Reading**
- **Printing of Bills**
- **Bill Delivery**



# **Other Developments in Energy Sector**

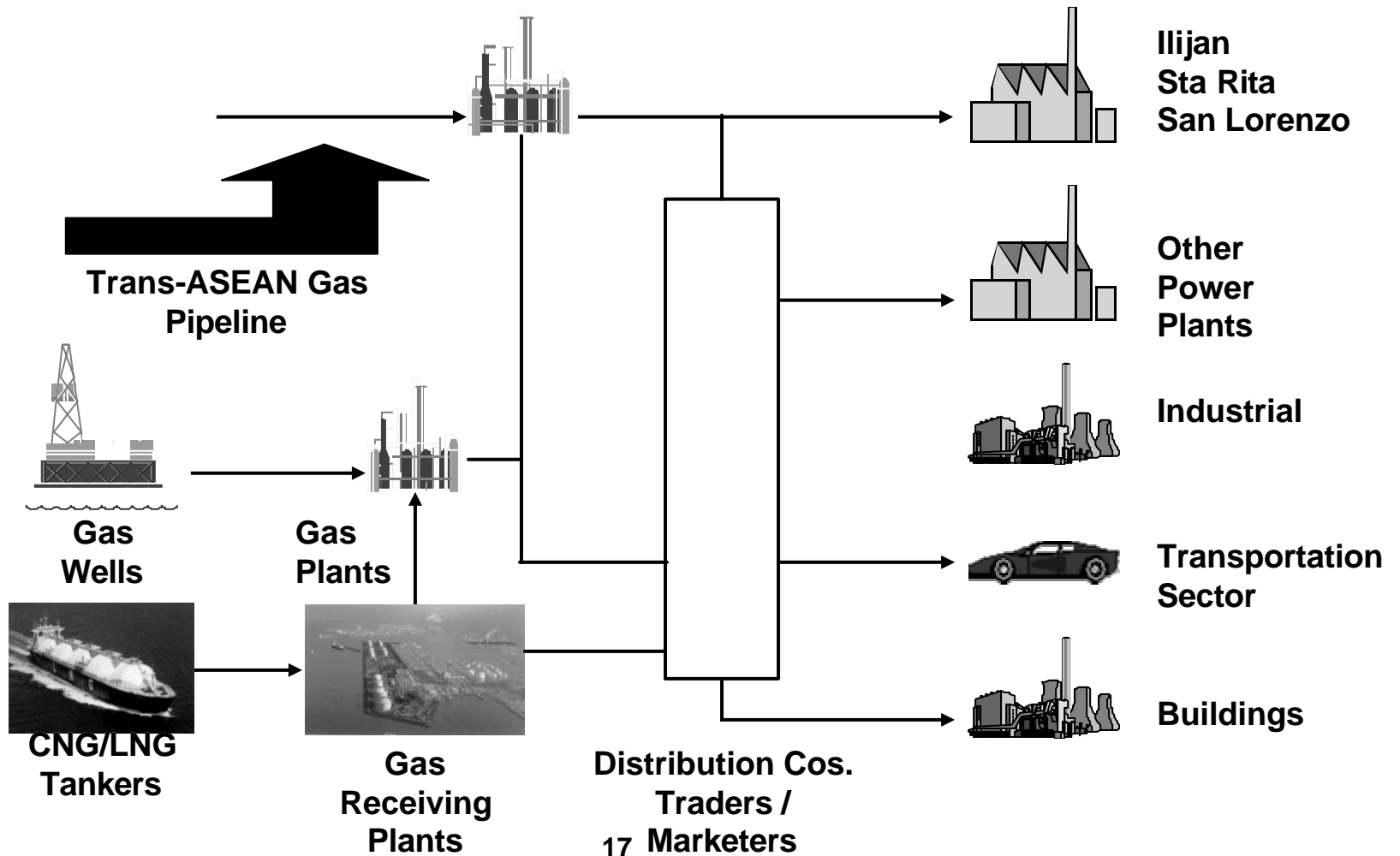
# Other Energy Sector Development - Downstream Natural Gas

## *Malampaya Deep Water Gas-to-power Project*



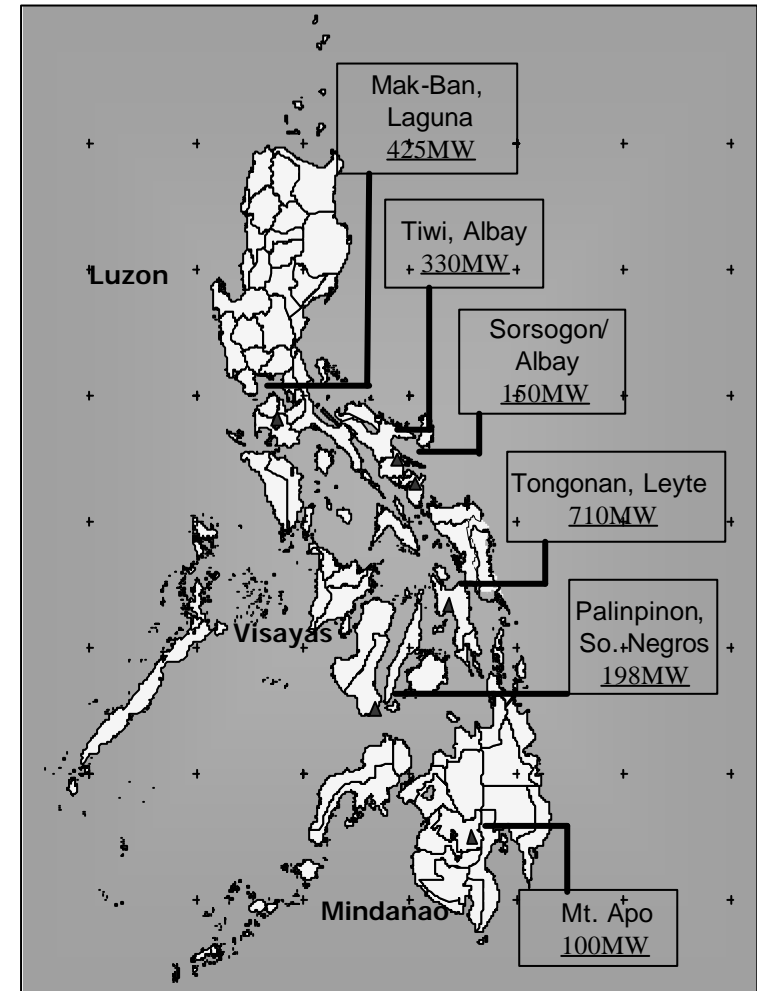
# Other Energy Sector Development - Downstream Natural Gas

## *The Emerging Natural Gas Industry*



# Other Energy Sector Development - Geothermal Power

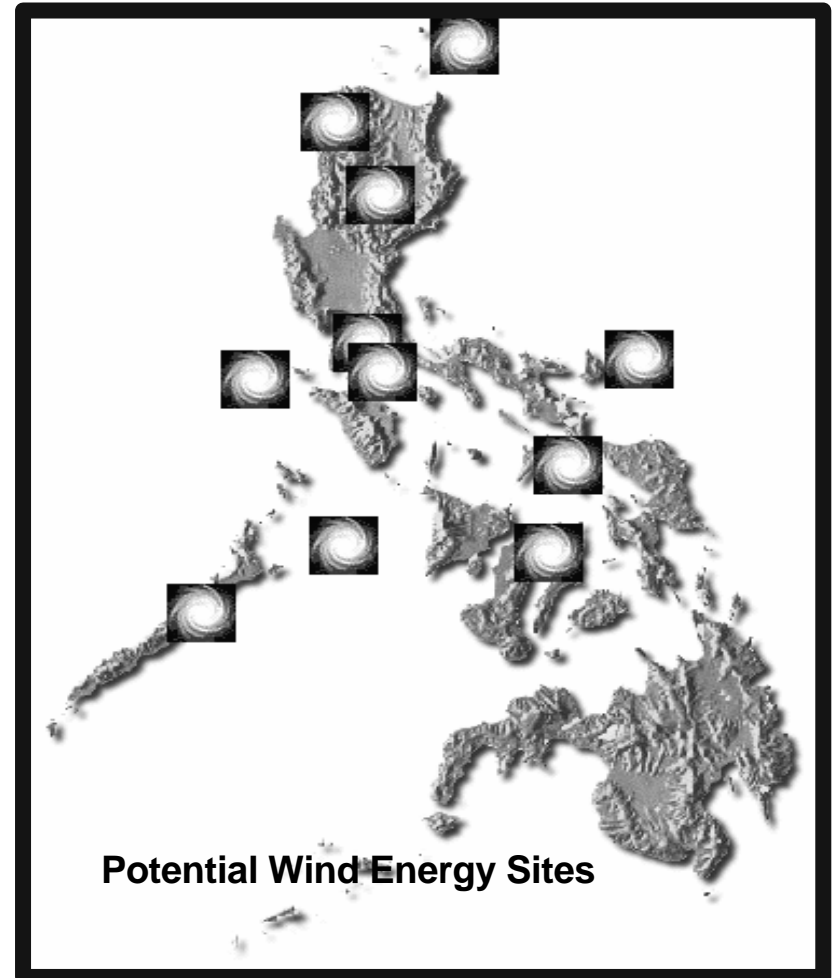
- Installed capacity of 1,931 Mwe
- Leyte Geothermal Field - world's largest geothermal plant for wet steam
- Largest user of geothermal energy resources for power generation
- Potential of 730 MW from 11 explored prospect areas
- Promotion of well-head turbines to develop small geothermal fields



# Other Energy Sector Developments

## - New and Renewable Energy

- **Potential development in wind, solar and ocean energy**
- **Philippine wind energy potential could be as much as 70,000 MW**
- **Significant progress in wind farms:**
  - 40MW wind farm project
  - Project cost of US\$ 54 Million
- **Promotion of micro-hydro power**



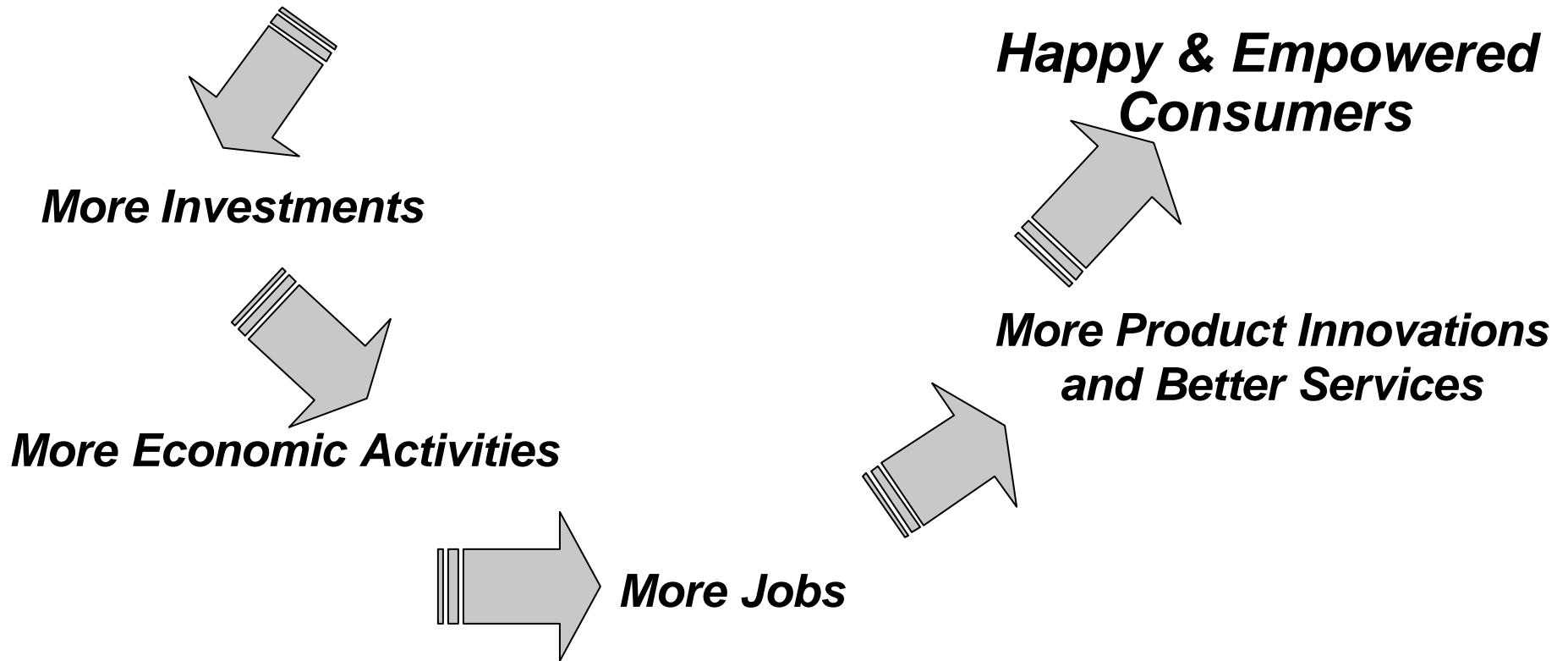
# **Lessons from Liberalization**

# Lessons from Energy Sector Liberalization

- 1. Market reform benefits take time to be felt.**
- 2. Costs are front-ended while benefits are back-ended.**
- 3. Market mechanisms difficult to explain and often misunderstood.**
- 4. Successful implementation requires an enlightened consuming public.**
- 5. Managing consumer expectation requires distinction between controllable and uncontrollable factors.**
- 6. Development of competitive markets requires deregulated environment.**

# The Industry Liberalization Cycle

## *INDUSTRY LIBERALIZATION*







***THANK YOU!***

*www.doe.gov.ph*

# Overview of Regulatory Reform in the APEC Energy Sector

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**APEC Seminar Workshop:  
“Lessons on Energy Sector Liberalization”**

**3-5 December 2001  
Makati Shangri-La Hotel, Manila**

**Tatsuo MASUDA**

President

**Asia Pacific Energy Research Centre, Tokyo**



# Table of Contents

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- Forces for change
- Current status of energy sector reform
  - Electricity
  - Gas
- Policy issues identified



# Forces for Change

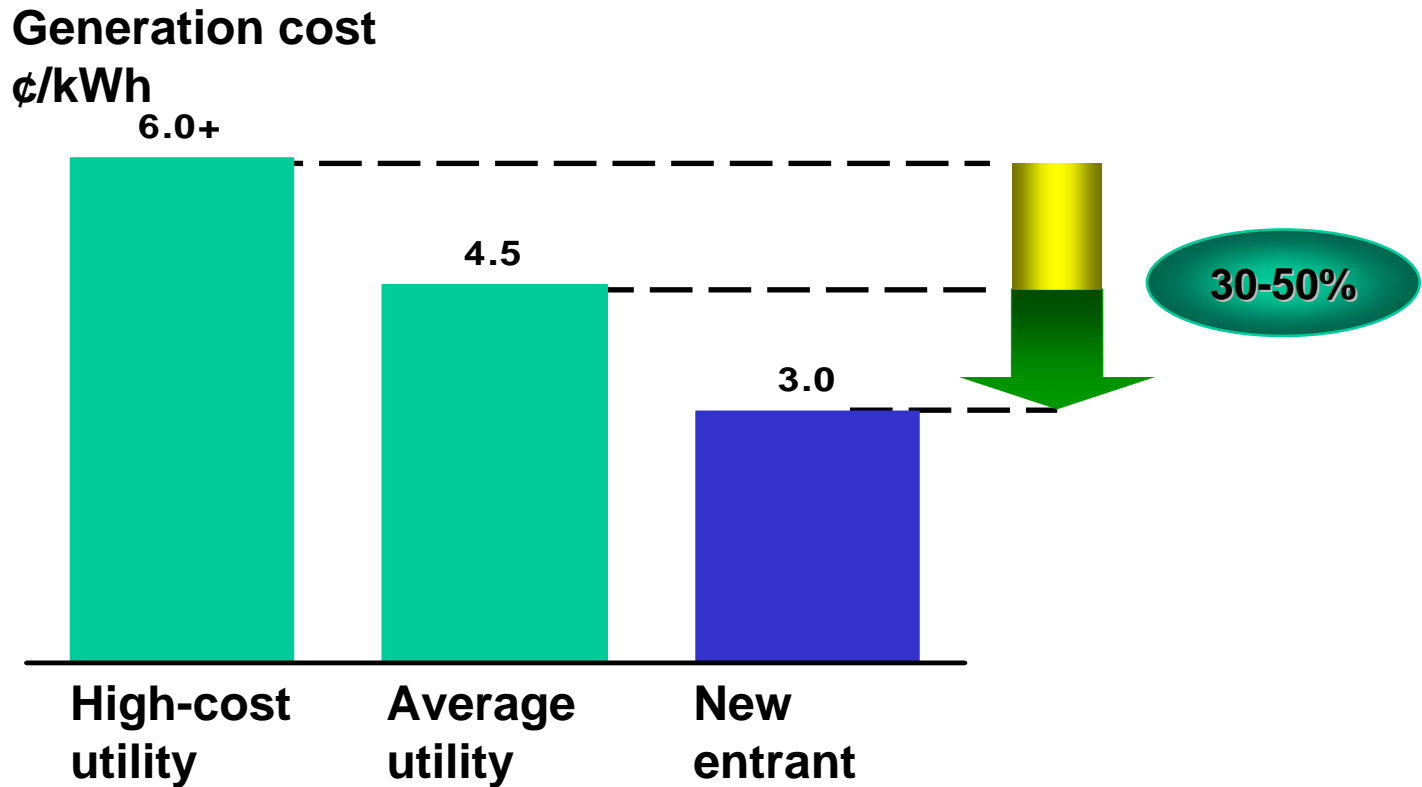
# Forces for Change

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- **Strengthening economic competitiveness by lowering cost**
- **Encouraging foreign investment to cover capital for infrastructure development**
- **Rising consumer demand for low prices in most developed countries**
- **Changing landscape of energy industry in the wake of globalization**
  - **Window of opportunities from adopting multinational companies' business practical know-how**
- **Technology development allowing lower supply cost**
  - **New entrants with new technology**



# Driving Forces Behind Power Sector Restructuring: New Entrant Economics



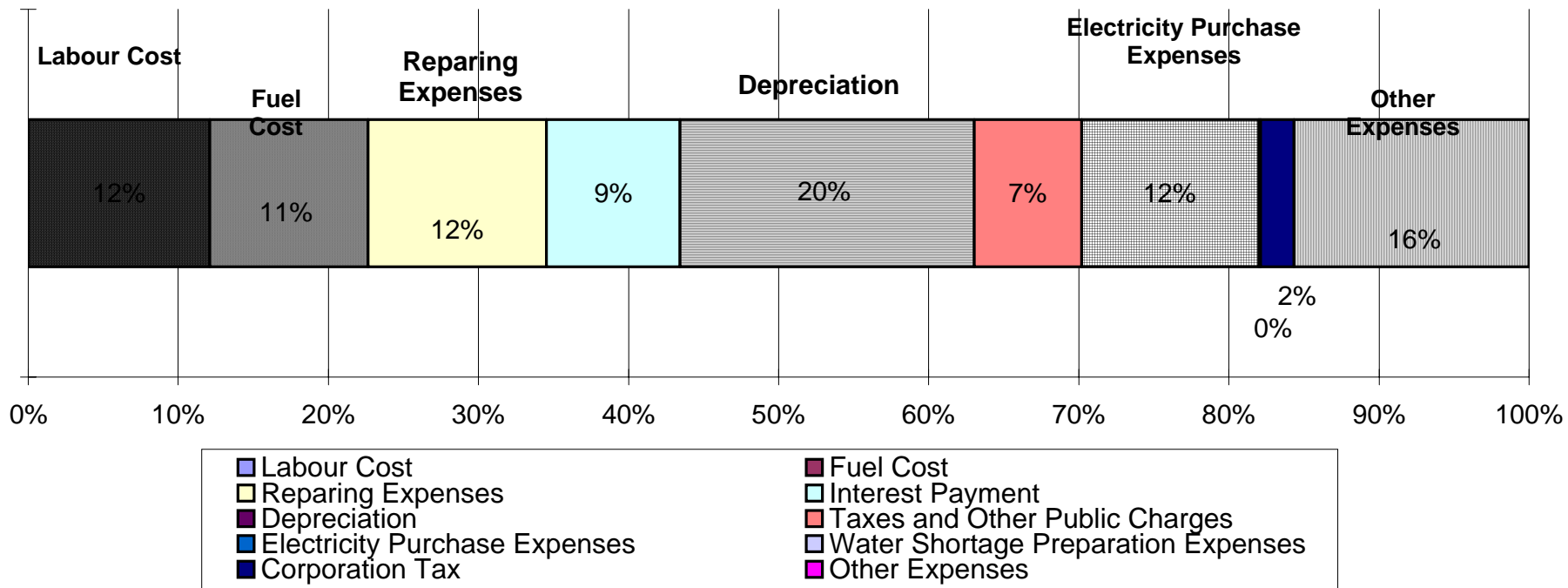
Source: McKinsey & Company (1999)

# Cost Breakdown

## Average of 10 Japanese Electric Utilities in 1998 (%)



Cost Breakdown of 10 Japanese Electric Utilities in 1998 (Unit: %)



Source: Denki Jigyo Binran (1999)



# Cost analysis for CCGT and steam power plants in the US

|  |  | 1990  |       | 1995  |       | % Change |       |
|--|--|-------|-------|-------|-------|----------|-------|
|  |  | CCGT  | Steam | CCGT  | Steam | CCGT     | Steam |
|  | <b>Plant costs (\$/kW)</b>                 | 500.0 | 815.0 | 345.0 | 440.0 | -31%     | -46%  |
|  | <b>Efficiency (%)</b>                      | 52.2  | 40.4  | 57.2  | 42.0  | 10%      | 4%    |
|  | <b>Delivery time (months)</b>              | 36.0  | 60.0  | 24.0  | 30.0  |          |       |
| <b>Cost of generation (US cents/kWh)</b> | <b>Capital costs</b>                       | 3.5   | 3.1   | 3.3   | 2.9   | -6%      | -6%   |
|  | <b>O&amp;M (Operation and Maintenance)</b> | 0.7   | 1.7   | 0.5   | 0.8   | -29%     | -53%  |
|  | <b>Fuel costs</b>                          | 0.8   | 1.4   | 0.5   | 0.7   |          |       |
|  | <b>Total</b>                               | 5.0   | 6.2   | 4.3   | 4.4   | -14%     | -29%  |

Notes: LCA stands for Life Cycle Cost Analysis. Numbers are electricity generation cost of CCGT and Coal steam power of 2\*660MW Units

Source: Hansen (1998)

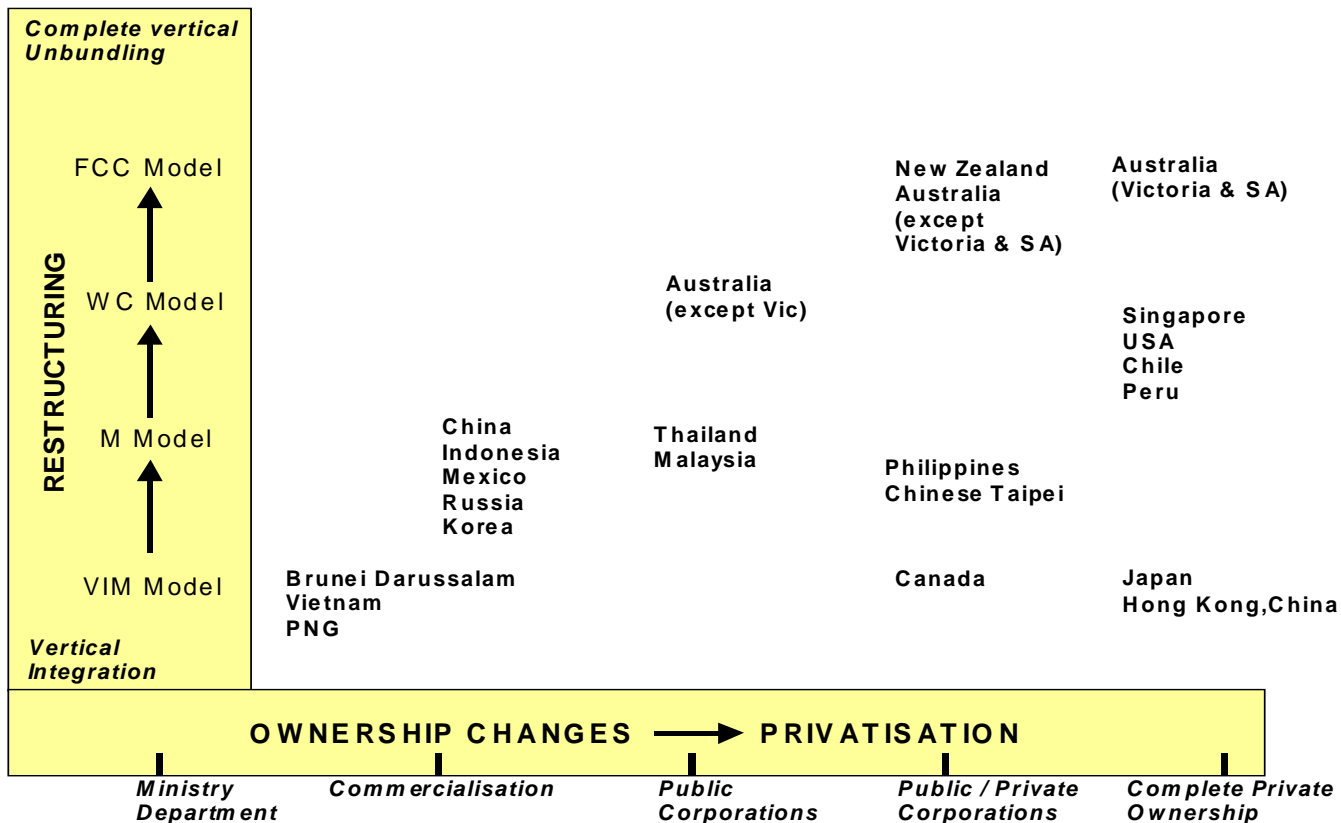




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# **Current Status of Energy Sector Reform in the APEC Region**

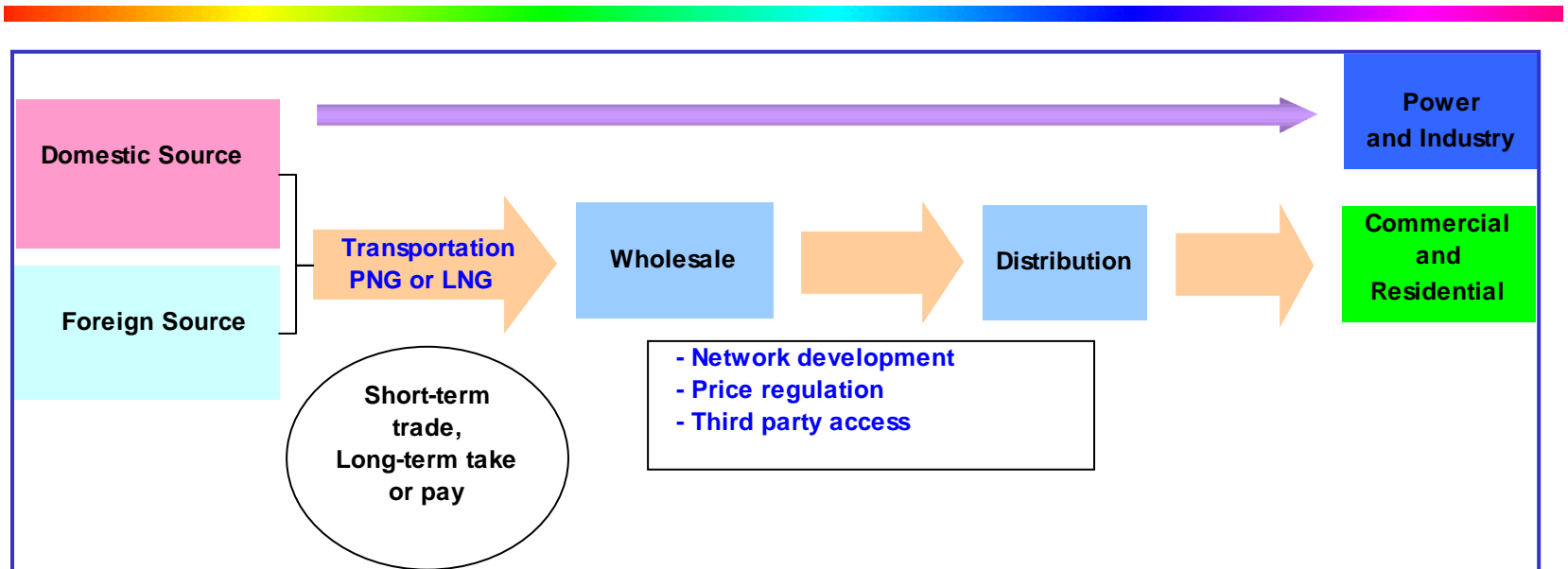
# Power Sector Regulatory Reform in the APEC Region



Source: APERC (1999)



# Fuel Chain of Natural Gas



- **More competitive market reform would be enhanced by :**
  - **Type of trade**
    - Short-term trade (e.g. spot market)
  - **Network development: Enhancing third party access**
    - National trunk-line
    - Distribution line

# Development in Natural Gas Market

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- Significant cost reduction in pipeline construction and LNG tanker building.
  - Potential for “25% saving in the capital expenditure of large diameter, long distance onshore pipeline systems”: BP
  - 30-40% reduction in LNG tanker
- Due to the still high capital investment requirement in construction, unbundling (vertical disintegration) seems difficult.
- Where pipeline gas is supplied, deregulation is more advanced because of the large room for competition. (e.g. USA)
- In the Northeast Asia, where LNG is the main source of natural gas supply, gas sector deregulation is yet to be implemented. (e.g. Japan, Korea)

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# Policy Issues Identified

# Policy Issues Identified

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- **How to create competitive environment**
  - **Third party access - wheeling**
  - **Unbundling**
  - **Level playing field: Market power**
- **How to finance privatization**
  - **Asset sales: power plants, city gas companies etc.**
  - **At what price?**
    - Asset valuation
    - Public acceptance
- **How to harmonize deregulation in energy sector with other sectors.**
  - **Industry competitiveness**
  - **Environmental protection**
  - **Social policy obligation**

# **ASIA-PACIFIC ECONOMIC COOPERATION (APEC)**

**APEC SEMINAR  
Manila  
3-5 December 2001**

## **“GLOBAL EXPERIENCE IN ENERGY SECTOR LIBERALIZATION: IDENTIFYING THE SAFE REFORM OPTIONS FOR APEC MEMBER ECONOMIES”**

**Robert Pritchard  
Pritchard Udovenya International Lawyers  
Sydney**

# **HISTORICAL PERSPECTIVE**

- **VERTICAL MONOPOLY**
- **PETROLEUM**
- **GAS**
- **ELECTRICITY**
- **MONOPOLUS THE SUPREME GOD**



# **GLOBALIZATION AND LIBERALIZATION**

- **THE NEW ENERGY GOD, COMPETITUS**
- **HIS EMISSARY, REGULATUS**

# **REFORM IS A PROCESS**

- **A CONTINUING PROCESS OF STRUCTURAL AND REGULATORY CHANGE**
- **NOT A SINGLE STEP**
- **BE CAUTIOUS IN ADOPTING ANOTHER COUNTRY'S PRECEDENTS**
- **NO UNIVERSALLY APPLICABLE RULES**

# **SEPARATING TRANSPORTATION**

- **SEPARATE THE TRANSPORTATION UTILITIES AND ESTABLISH A PROFESSIONAL REGULATORY REGIME**
- **THE SAFE, “NO REGRETS” OPTION**
- **THEN ALLOW THE DUST TO SETTLE**

# **CONSEQUENTIAL ISSUES FROM SEPARATION**

- **NATURAL MONOPOLIES REMAIN**
- **VITAL TRANSPORTATION ARTERIES**
- **FINANCIAL INCENTIVES NECESSARY**
- **MUST BE A PROPER BALANCE**

# **CONSEQUENTIAL ISSUES FROM SEPARATION contd.**

- **PROFESSIONAL REGULATORY REGIME**
- **TWO OPTIONS — REGULATORY CONTRACT OR INDEPENDENT AGENCY**
- **KEEP REGULATOR ACCOUNTABLE**
- **MANAGE THE REGULATIONS**

# **MARKET CREATION — WEC STUDY**

- **COSTS OF COMPLEX MODELS**
- **DE-LINK DISPATCH AND PRICE SETTING**
- **A QUESTION ABOUT CONTROLLING MARKET POWER**
- **COST-BENEFIT ANALYSIS**
- **USE THE SIMPLEST APPROACH**

# 8 REFORM PRINCIPLES

- **LEGAL SYSTEM**
- **BE CAREFUL WITH IPPS**
- **CORPORATIZATION AND PRIVATIZATION**
- **PUBLIC SUPPORT**

## **8 REFORM PRINCIPLES contd.**

- **DESIGN TO SUIT THE INDUSTRY**
- **DESIGN TO SUIT ECONOMIC AND POLITICAL SITUATION**
- **KEEP RULES FLEXIBLE**
- **AVOID FLAWED REGULATIONS**



# **CONCLUSION**

- **STRAIGHTFORWARD AND FLEXIBLE REFORMS**
- **SECURITY AND STABILITY FOR INVESTORS**
- **STRIKING THE RIGHT BALANCE**
- **PROCESS IS ONGOING**

# ENERGY USE IN ASIA

- **1998 statistics:**

|  | <u>OECD</u> | <u>Asia</u> | <u>%</u> |
|--|-------------|-------------|----------|
| Population (billion)                     | 1.1         | 3.1         | 282      |
| Per capita energy consumption (mtoe)     | 4.6         | 0.7         | 15       |
| Per capita electricity consumption (MWh) | 7.8         | 0.7         | 9        |
- **About half of almost two billion people without access to modern energy supply live in Asia.**

# **CAPITAL REQUIREMENTS**

- **Capital requirements for power development in Asia during the period 2000-2005 accordingly high ₪ about \$30 billion p.a. in 16 medium and large developing countries**
- **Need to mobilize all available sources :**
  - **private investments**
  - **internal cash generation**
  - **government budget**
  - **multilateral and bilateral aid**
  - **export credits**
  - **commercial loans**

# **CREATING THE ENABLING CONDITIONS FOR PRIVATE INVESTMENT**

- **Sound macroeconomic policies**
- **Institutional reforms and strategic planning**
- **Stable and transparent legal and regulatory framework**
- **Unbundling and competition**
- **Domestic capital market development**
- **Adequate risk sharing**

# THE ROLE OF GOVERNMENTS

- **Common Issues:**

- ⌘ power sector too long in the public domain  
⇒ lack of competition and poor efficiency
- ⌘ the role of governments needs to be curtailed

- **Best practice:**

- ⌘ **primary role:**
  - ⌘ **sound macroeconomic environment**
  - ⌘ **prudent monetary, fiscal and exchange rate policies**

# THE ROLE OF GOVERNMENTS (Cont'd)

⌘ **in the power sector, focus on:**

☒ planning

☒ policy

☒ regulation

⌘ **private sector responsibility:**

☒ financing

☒ construction

☒ operation and maintenance

☒ provision of services

# OBJECTIVES OF RESTRUCTURING

- Improving efficiency
- Minimizing the cost of supply and thereby reducing current electricity tariffs and/or limiting future tariff increases
- Improving governance related to supply additions
- Attracting private sector participation and investment

# RESTRUCTURING PROCESS

- Create an enabling legal and regulatory environment to support competitive markets in electricity
- Unbundle the power sector in separate generation, transmission, distribution and retailing functions
- Proceed gradually with the restructuring to allow the development of infrastructure required to operate the unbundled system
- Operate the generation and retailing markets competitively



## **RESTRUCTURING PROCESS (Cont'd)**

- Operate the transmission network as a concession on the basis of competitive bidding; or privatize it within a tight regulatory framework controlling rates of return, prices or gross revenue
- Establish an independent regulator that controls the wholesale electricity market and sets retail supply standards
- Privatize both existing and new assets and utilities using a transparent process
- Address existing obligations under long-term take-or-pay power purchase agreements

# THE ROLE OF BOT PROJECTS

- **Common issues:**

- ⌘ popular financing modality in Asia
- ⌘ helped attract private investments
- ⌘ capacity shortages removed
- ⌘ risks of long-term take-or-pay contracts:
  - ☒ currency mismatch
  - ☒ maturity mismatch
  - ☒ capacity mismatch

- **Best practice:**

- ⌘ **international competitive bidding to select project sponsors**
- ⌘ **domestic sources for part of investment requirements**
- ⌘ **where competition possible, firm sales contract only during transition**

# ADB SUPPORT

## (\$ Million)

| Country            | Technical Assistance | Project Loans | Program Loans |
|--------------------|----------------------|---------------|---------------|
| Bangladesh         | 2.7                  | 259           | -             |
| China              | 9.4                  | 308           | -             |
| India <sup>a</sup> | 5.8                  | -             | 350           |
| Indonesia          | 1.9                  | -             | 380           |
| Pakistan           | 2.1                  | -             | 300           |
| Philippines        | 2.0                  | -             | 300           |

<sup>a</sup> State of Gujarat (to be followed by Madhya Pradesh and Kerala).

# MAIN POWER SECTOR FEATURES

| Country            | GW  | USc/<br>kWh | Issues                                   |
|--------------------|-----|-------------|--|
| Bangladesh         | 4   | 5.8         | T&D losses, financial losses             |
| China              | 316 | 5.2         | Rural tariffs, interconnection           |
| India <sup>a</sup> | 11  | 6.9         | Agriculture tariffs,<br>financial losses |
| Indonesia          | 36  | 3.9         | Financial losses, IPPs                   |
| Pakistan           | 17  | 7.6         | T&D losses, financial losses,<br>IPPs    |
| Philippines        | 12  | 9.4         | Financial losses, IPPs                   |

<sup>a</sup> State of Gujarat

# **OBSTACLES TO RESTRUCTURING**

- **Small or fragmented power systems**
- **Power demand/supply gap**
- **Low diversity in generation resources**
- **Low electricity tariffs**
- **Large number of IPPs with take-or-pay contracts**
- **Lack of regulatory capacity**

# **POWER SECTOR RESTRUCTURING IN ASIA**

**VLADIMIR BOHUN**

**DIRECTOR**

**OPERATIONS EVALUATION DEPARTMENT  
ASIAN DEVELOPMENT BANK**

**3 December 2001**

# LESSONS LEARNED

- **Complex process**
- **Country-specific plan  $\Rightarrow$  no single best practice model**
- **Thorough preparation**
- **Adequate time for legislative changes**
- **Gradual and flexible implementation**



**Asia Pacific Economic Cooperation**

**LESSONS ON ENERGY SECTOR LIBERALISATION  
A Seminar-Workshop**

**Session 1  
OIL AND GAS SECTOR SESSION**







**Asia Pacific Economic Cooperation**

**LESSONS ON ENERGY SECTOR LIBERALISATION  
A Seminar-Workshop**

**Session 1**  
**OPEN ACCESS TO NATURAL GAS  
PIPELINES**

by

**Dr. Mohd Farid Mohd Amin**  
**Senior Manager**

**Corporate Information & Research Unit**  
**Corporate Planning & Development Division**  
**PETRONAS**

**(E-mail Address: [faridm@petronas.com.my](mailto:faridm@petronas.com.my))**



# OUTLINE

## **1. OVERVIEW**

## **2. EVOLUTION OF GAS TRADE**

## **3. OPEN ACCESS TO THE GAS PIPELINE**

## **4. GAS PIPELINE INFRASTRUCTURE AND GAS TRADE**

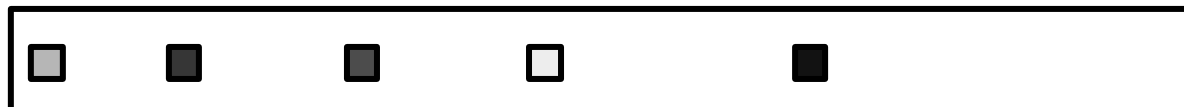
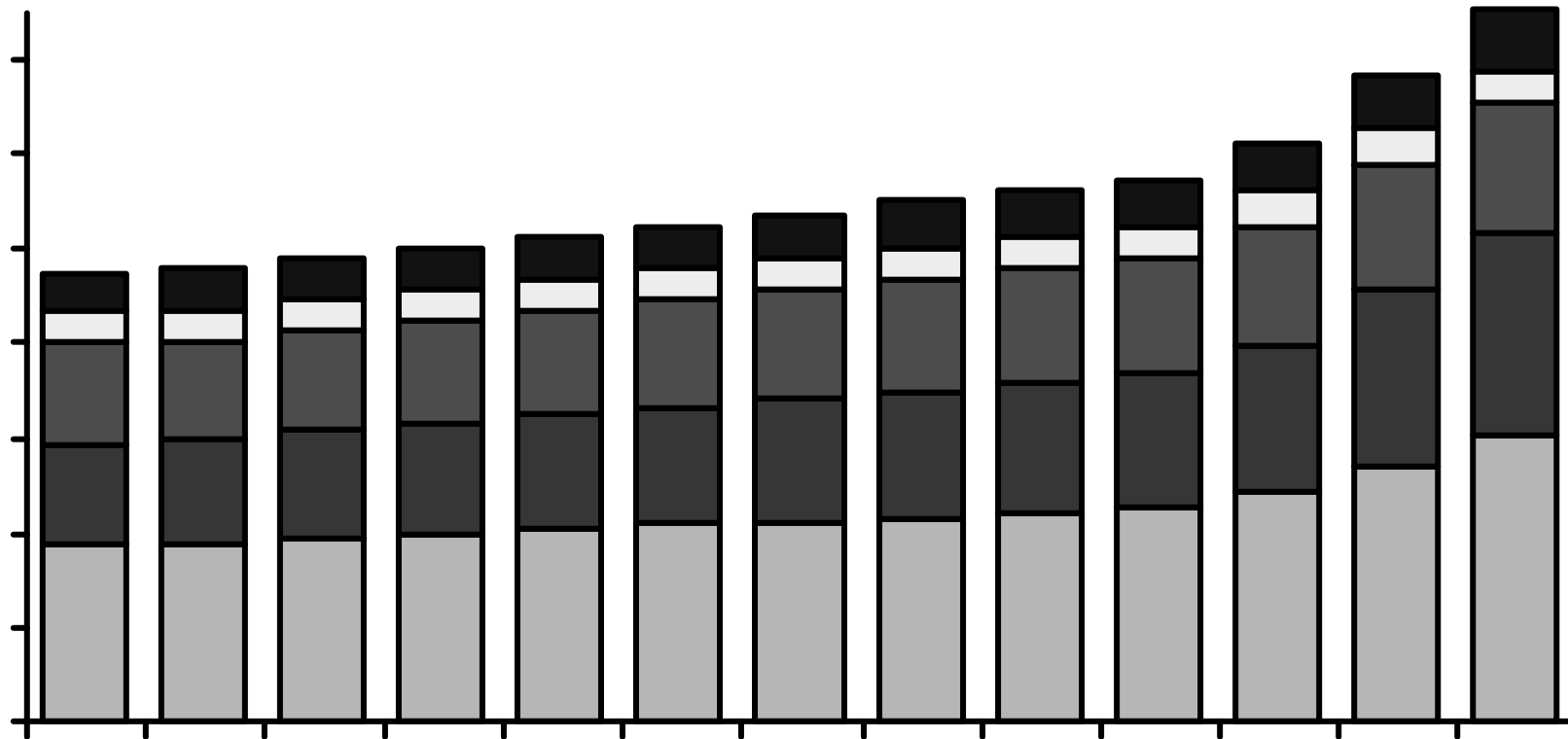
### **4.1 Experience of USA**

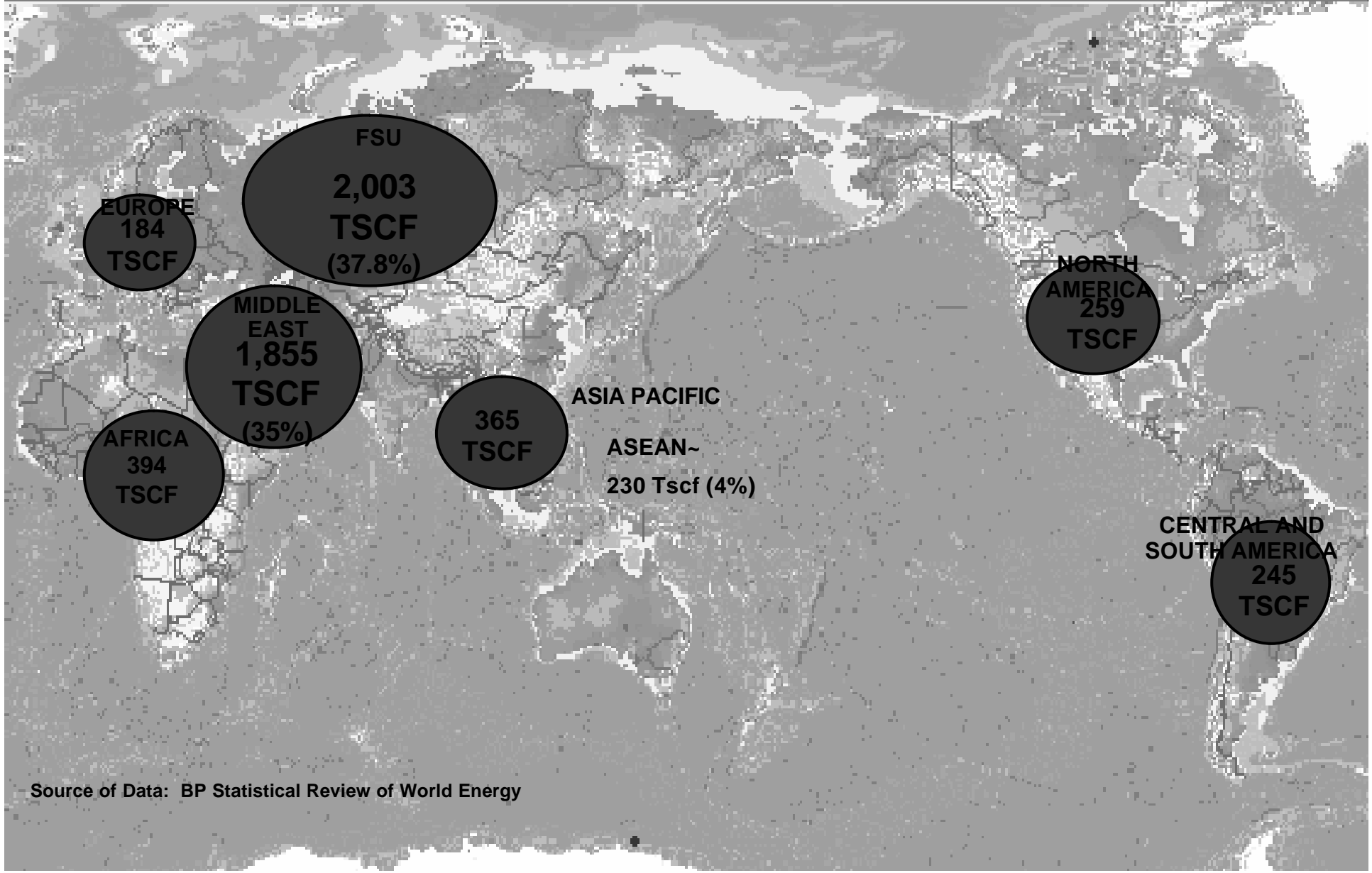
### **4.2 Experience of EUROPE**

### **4.3 Gas/LNG Trade in the Asia Pacific**

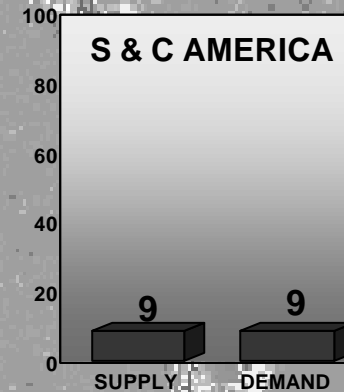
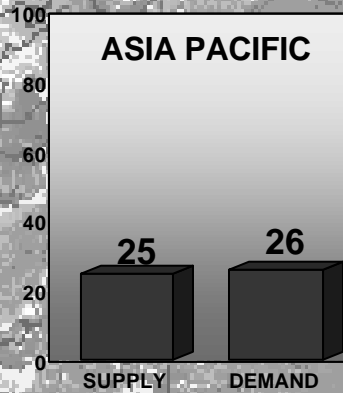
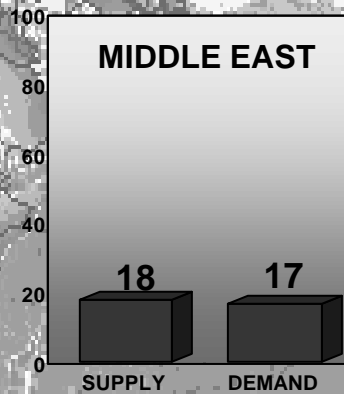
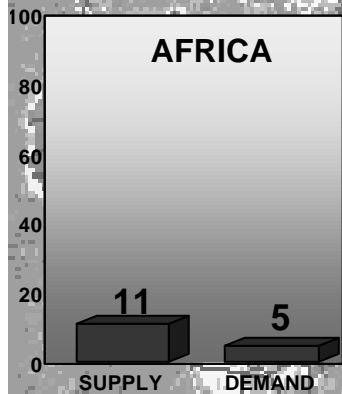
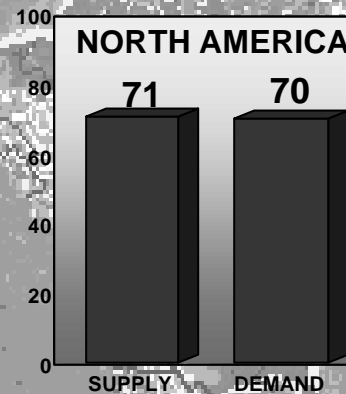
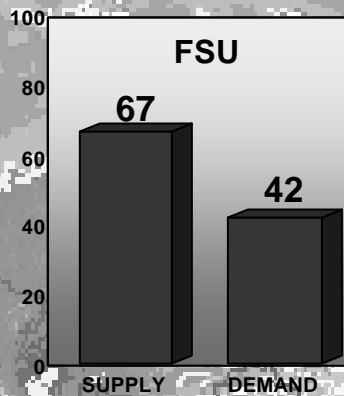
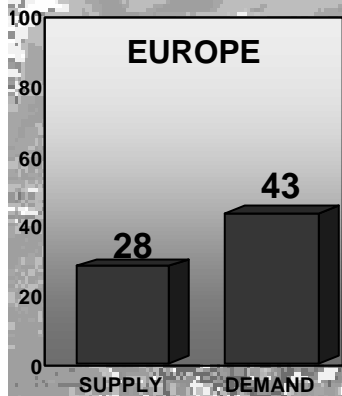
### **4.4 Potential Gas Trade in ASEAN**

## **5. KEY ISSUES AND CHALLENGES**





Source of Data: BP Statistical Review of World Energy



Units: Billion scf/d

Source of Data: Statistical Review of World Energy

# OUTLINE

**1. OVERVIEW**

**2. EVOLUTION OF GAS TRADE**

**3. OPEN ACCESS TO THE GAS PIPELINE**

**4. GAS PIPELINE INFRASTRUCTURE AND GAS TRADE**

**4.1 Experience of USA**

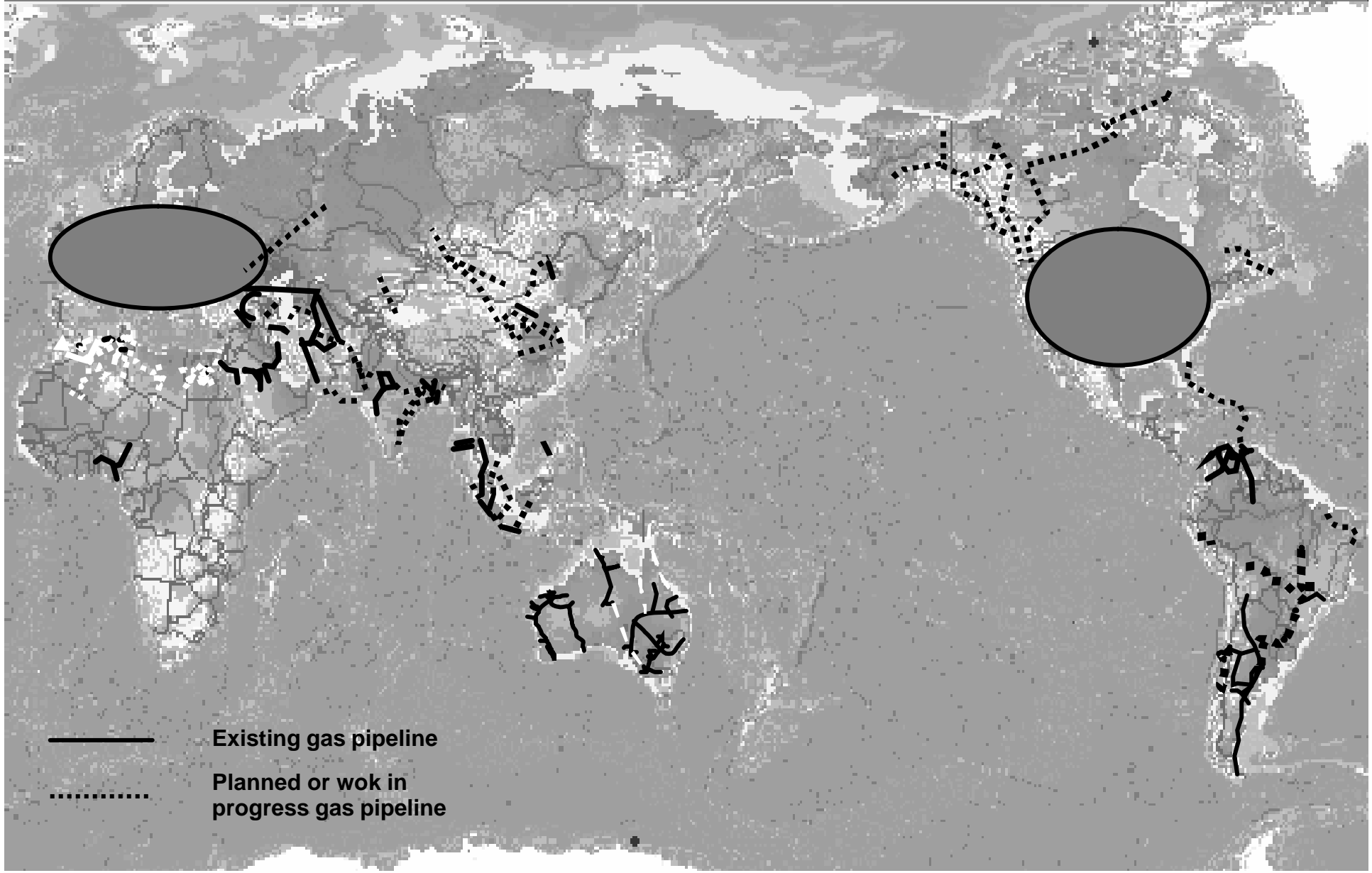
**4.2 Experience of EUROPE**

**4.3 Gas/LNG Trade in the Asia Pacific**

**4.4 Potential Gas Trade in ASEAN**

**5. KEY ISSUES AND CHALLENGES**

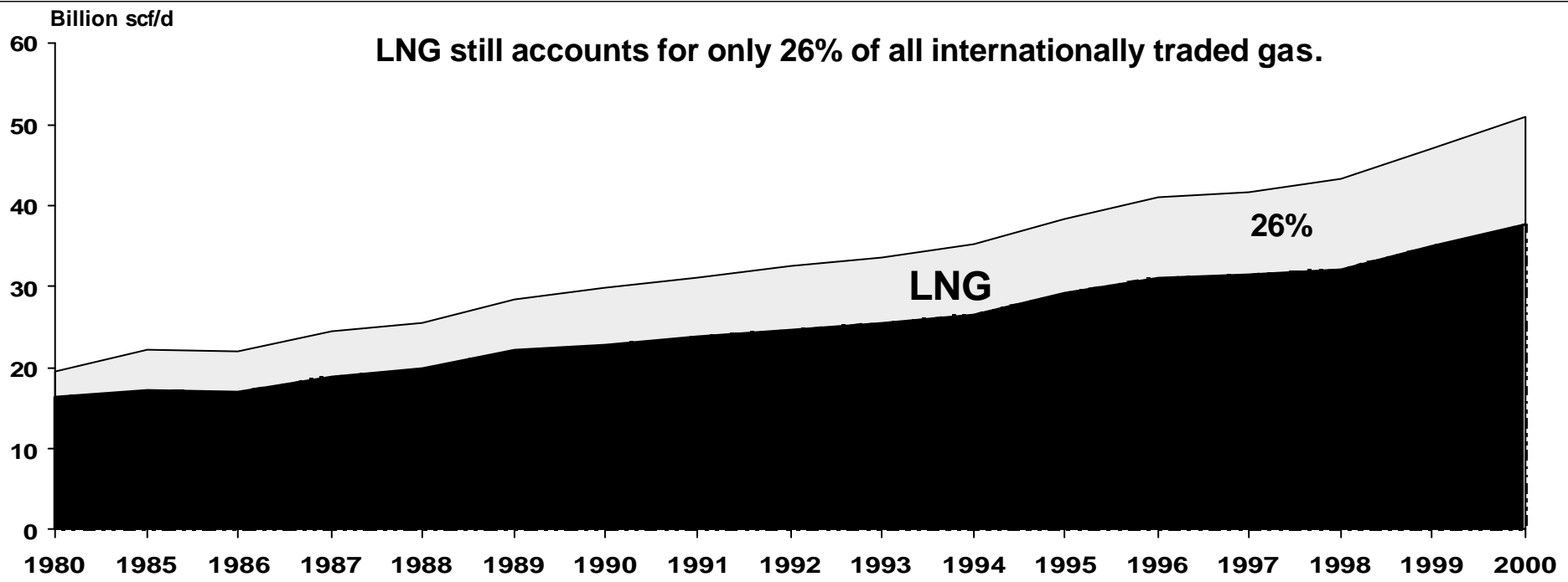




Existing gas pipeline



Planned or work in progress gas pipeline



### LNG

- Out of 26% traded LNG, less than 3% was short term trade. The percentage is likely to grow to 5% in next five years, spurred by growing demand from the East.
- LNG will provide strong competition with pipeline gas in the East. To remain competitive, LNG has to compete with the pricing of pipeline gas in the markets.

### Pipeline

- In the last 10 years, gas pipeline trade registered the biggest increase.
- Pipeline gas will continue to dominate the gas trade as new and expansion pipeline projects are announced in various parts of the world.

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**4.3 Gas/LNG Trade in the Asia Pacific**

**4.4 Potential Gas Trade in ASEAN**

**5. KEY ISSUES AND CHALLENGES**



————— Gas Transportation  
.....▶ Gas Supply Transaction

**ONE MARKET : GAS AND TRANSPORTATION SERVICES  
SOLD AS A "BUNDLE" TO END USERS**

**OPEN ACCESS**

**GAS MARKET**

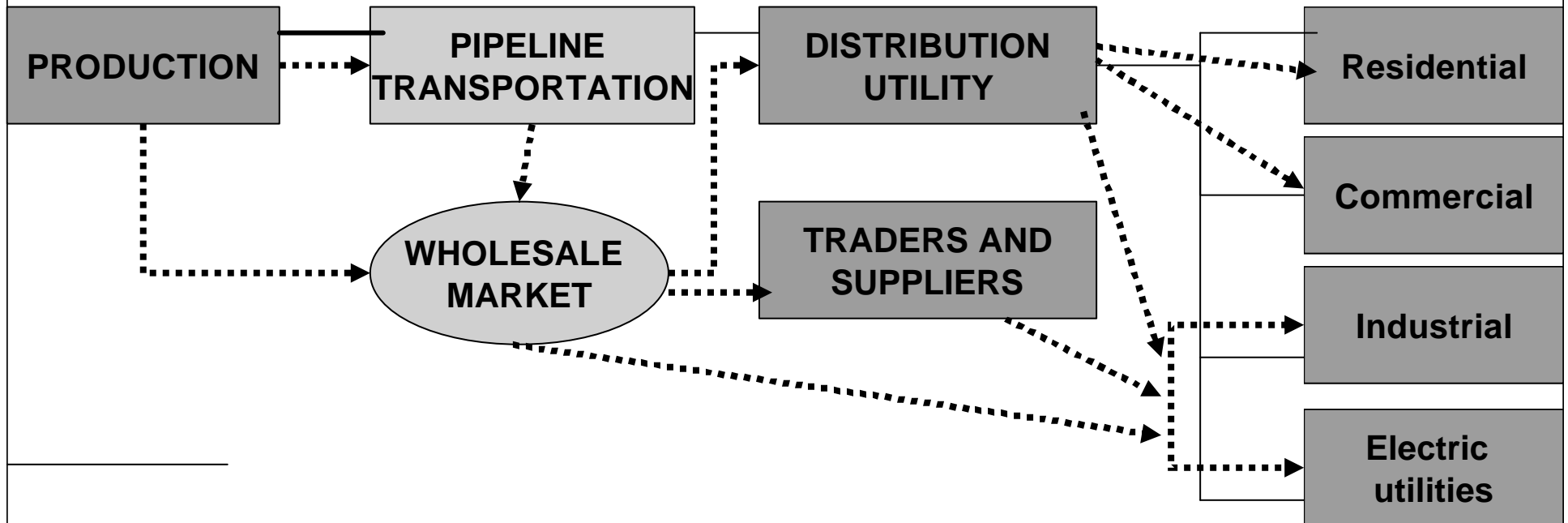
**EMERGENCE OF SPOT MARKET**

**EMERGENCE OF TPA**

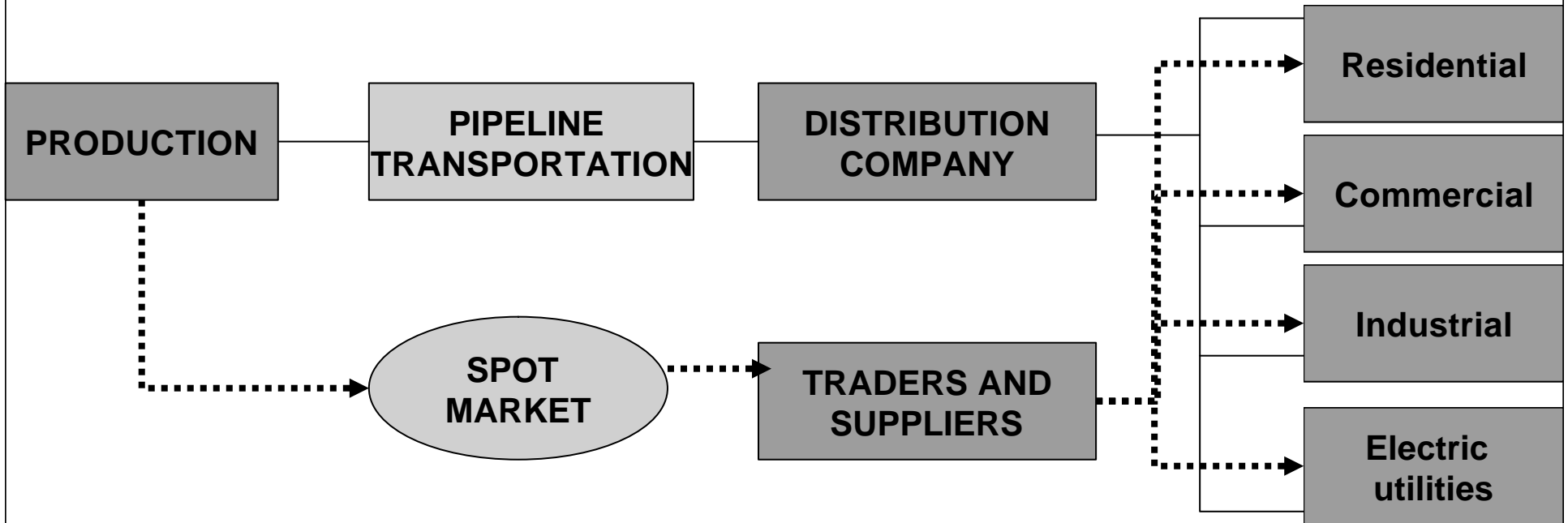
**TRANSPORTATION MARKET**

**TWO DISTINCT MARKETS WILL BE FORMED**

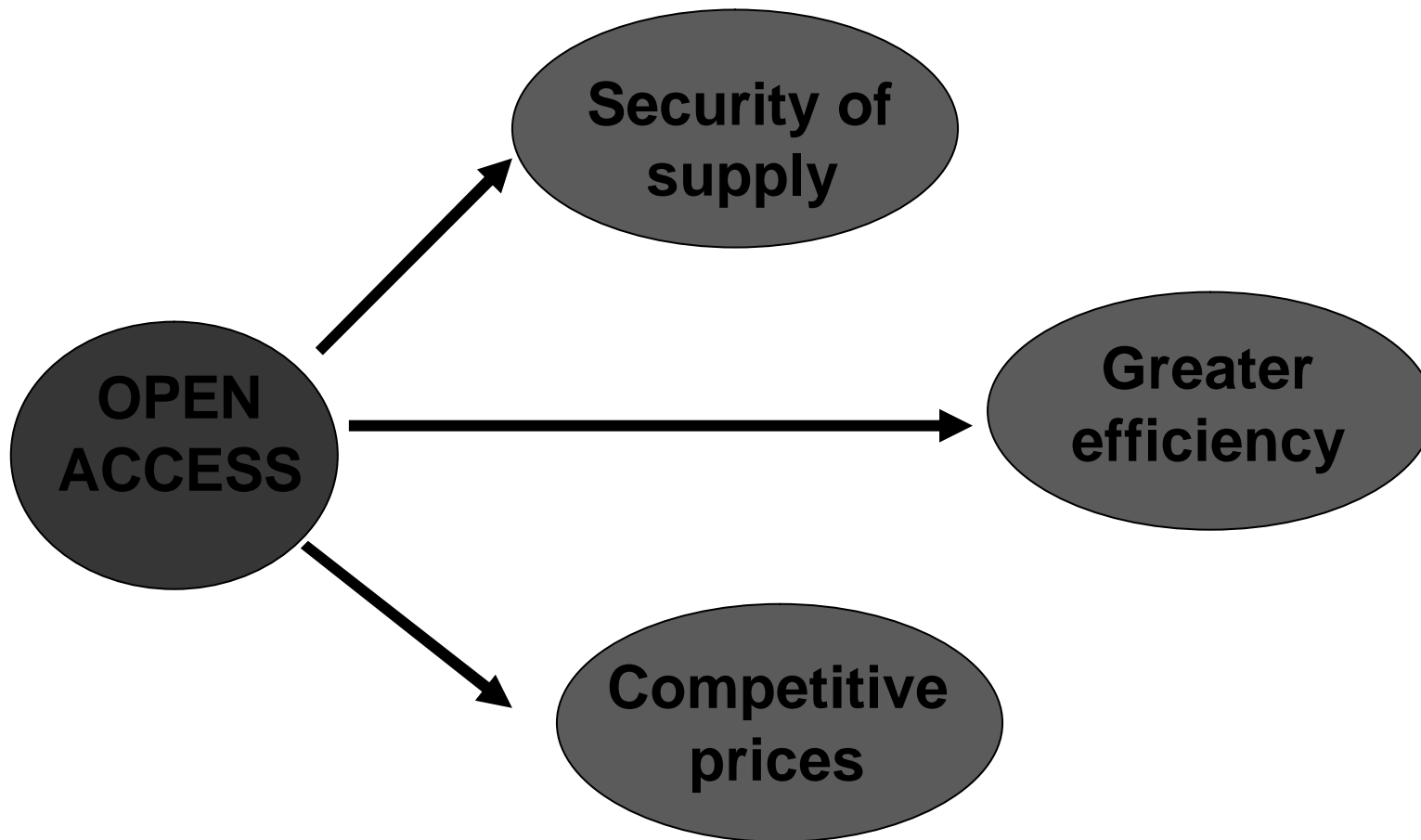
## OPEN ACCESS AND WHOLESALE COMPETITION



**UNBUNDLE VERTICAL LINES AND CREATE WHOLESAL GAS MARKETS**



**THE INCREASING COMPLEXITY OF TRANSACTIONS IN BOTH MARKETS CALL FOR INTERMEDIARIES AND SPOT MARKETS**



**OPEN ACCESS SYSTEM IS A “ BUYERS “ MARKET**

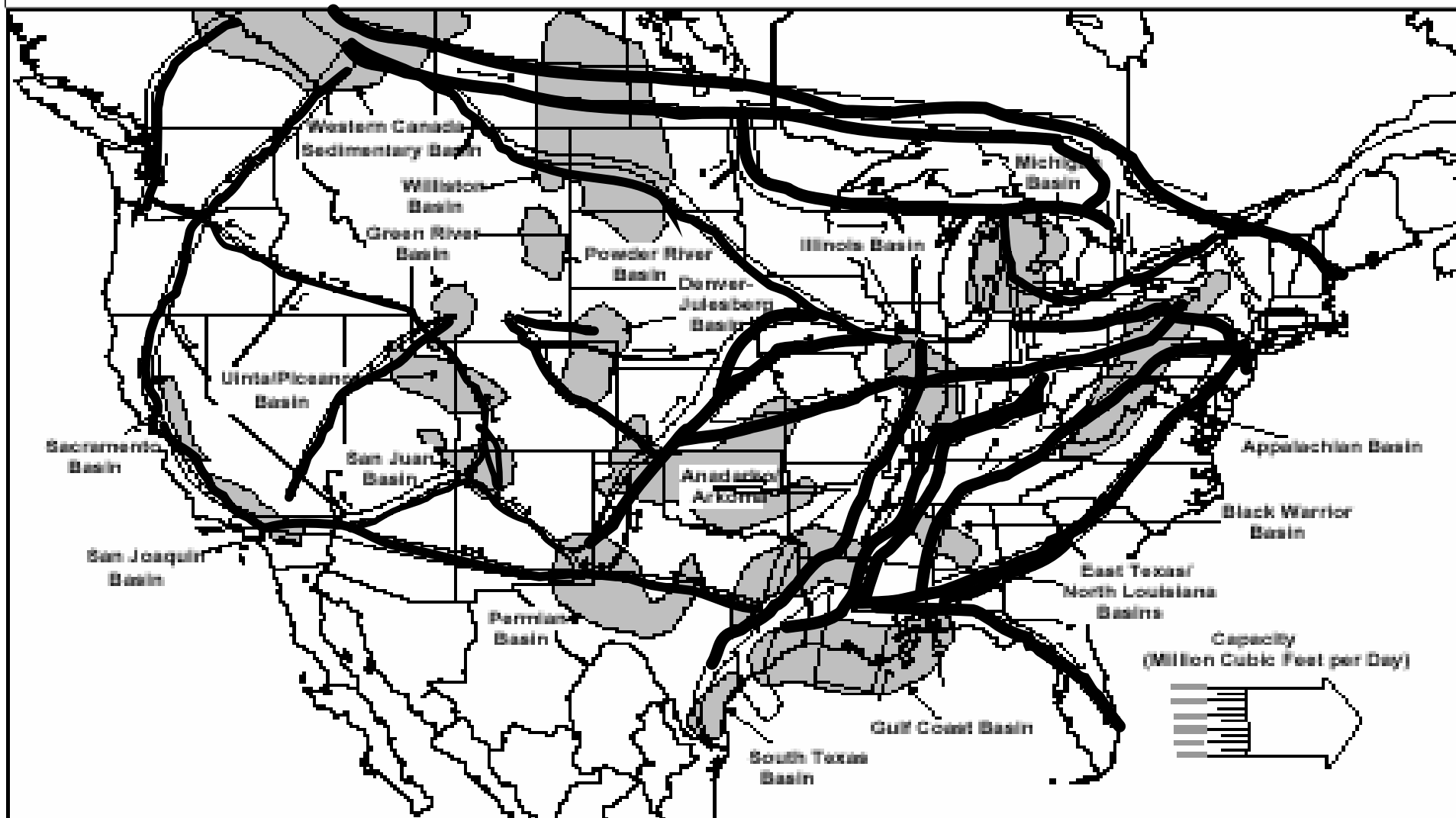


# OUTLINE

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- 2. EVOLUTION OF GAS TRADE**
- 3. OPEN ACCESS TO THE GAS PIPELINE**
- 4. GAS PIPELINE INFRASTRUCTURE AND GAS TRADE**
  - 4.1 Experience of USA**
  - 4.2 Experience of EUROPE**
  - 4.3 Gas/LNG Trade in the Asia Pacific**
  - 4.4 Potential Gas Trade in ASEAN**
- 5. KEY ISSUES AND CHALLENGES**

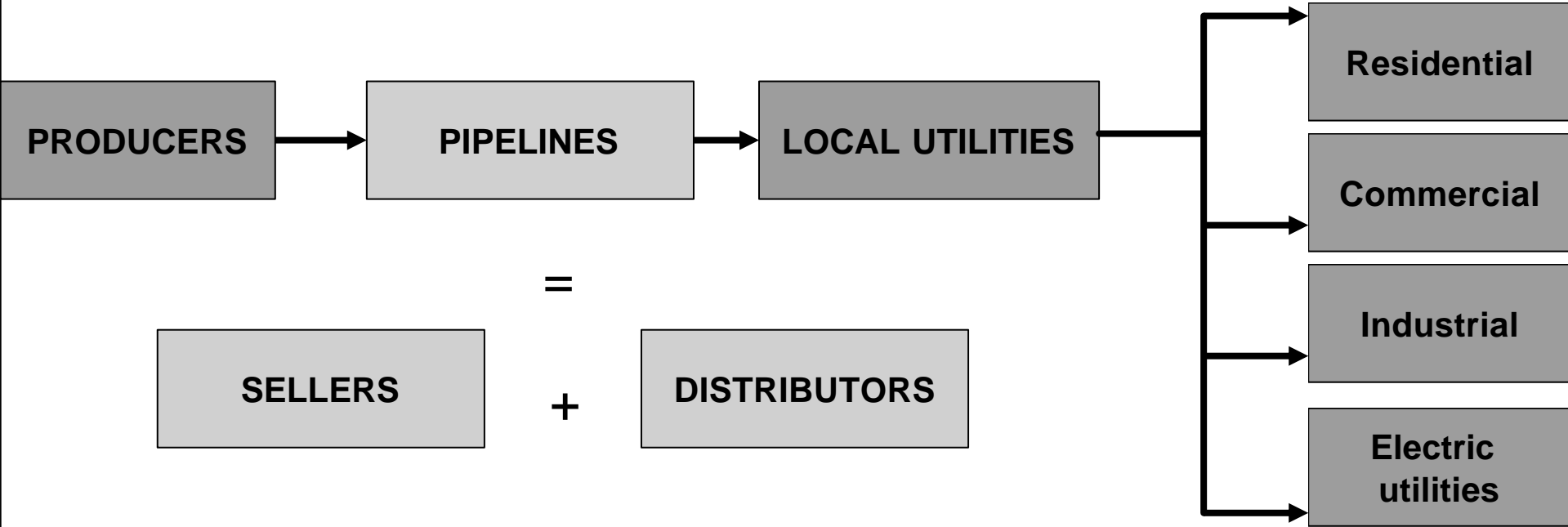
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  - 4.4 Potential Gas Trade in ASEAN**
- 5. CONCLUSION**

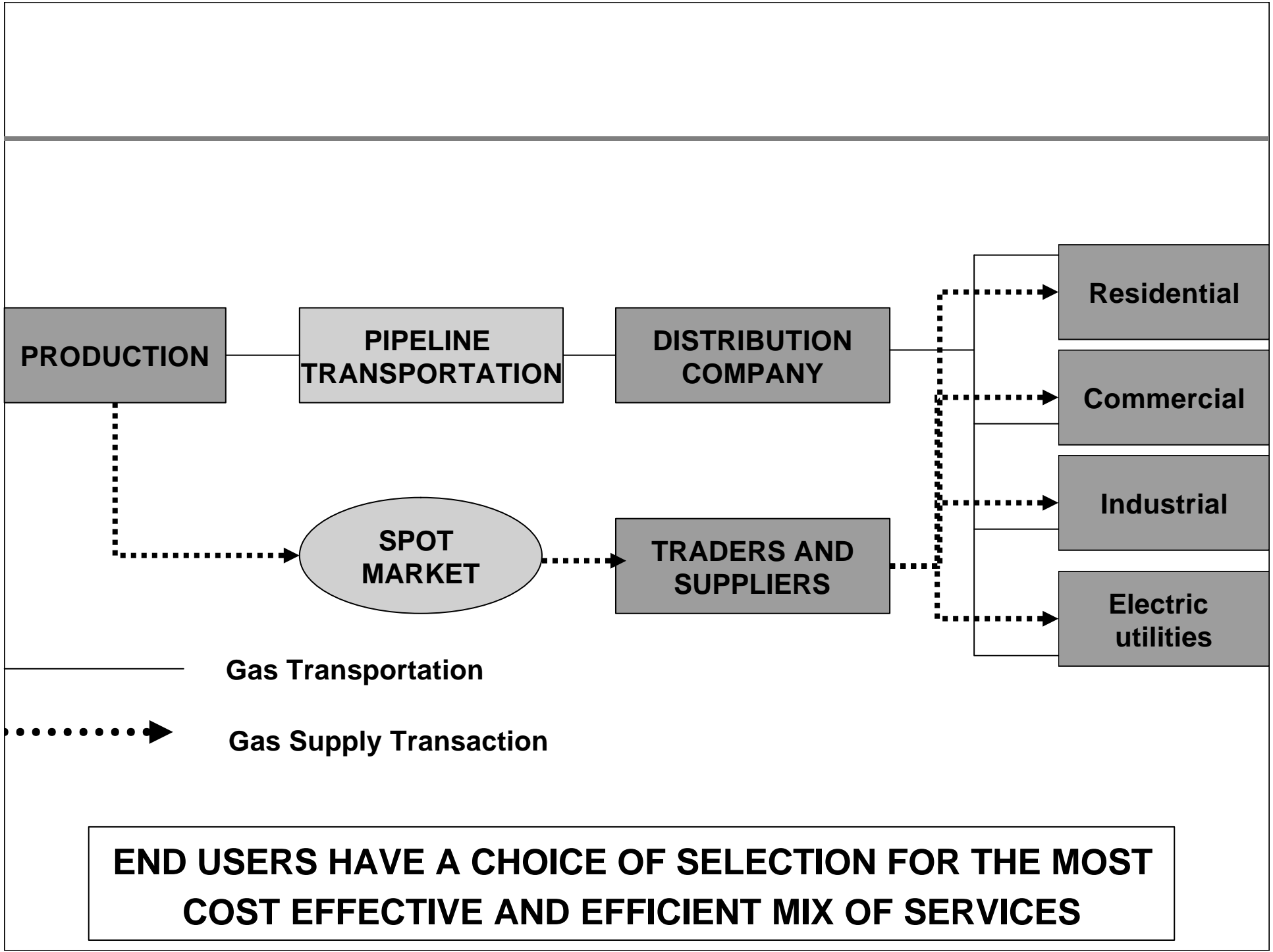


**CONCENTRATED SELLERS AND BUYERS DRIVE THE SPOT MARKET**

# The Structure of Gas Industry Prior to Deregulation



**DEREGULATION PROCESS WAS DONE OVER A 15-YEAR PERIOD BEGINNING IN 1992 (FERC ORDER 636)**



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  - 4.4 Potential Gas Trade in ASEAN**
- 5. KEY ISSUES AND CHALLENGES**

**pipelines integrated in the European system**

- existing
- under construction or planned

**other pipelines**

- existing
- under construction or planned

■ natural gas fields

**liquefied natural gas (LNG) receiving terminal**

- in operation
- under construction or planned

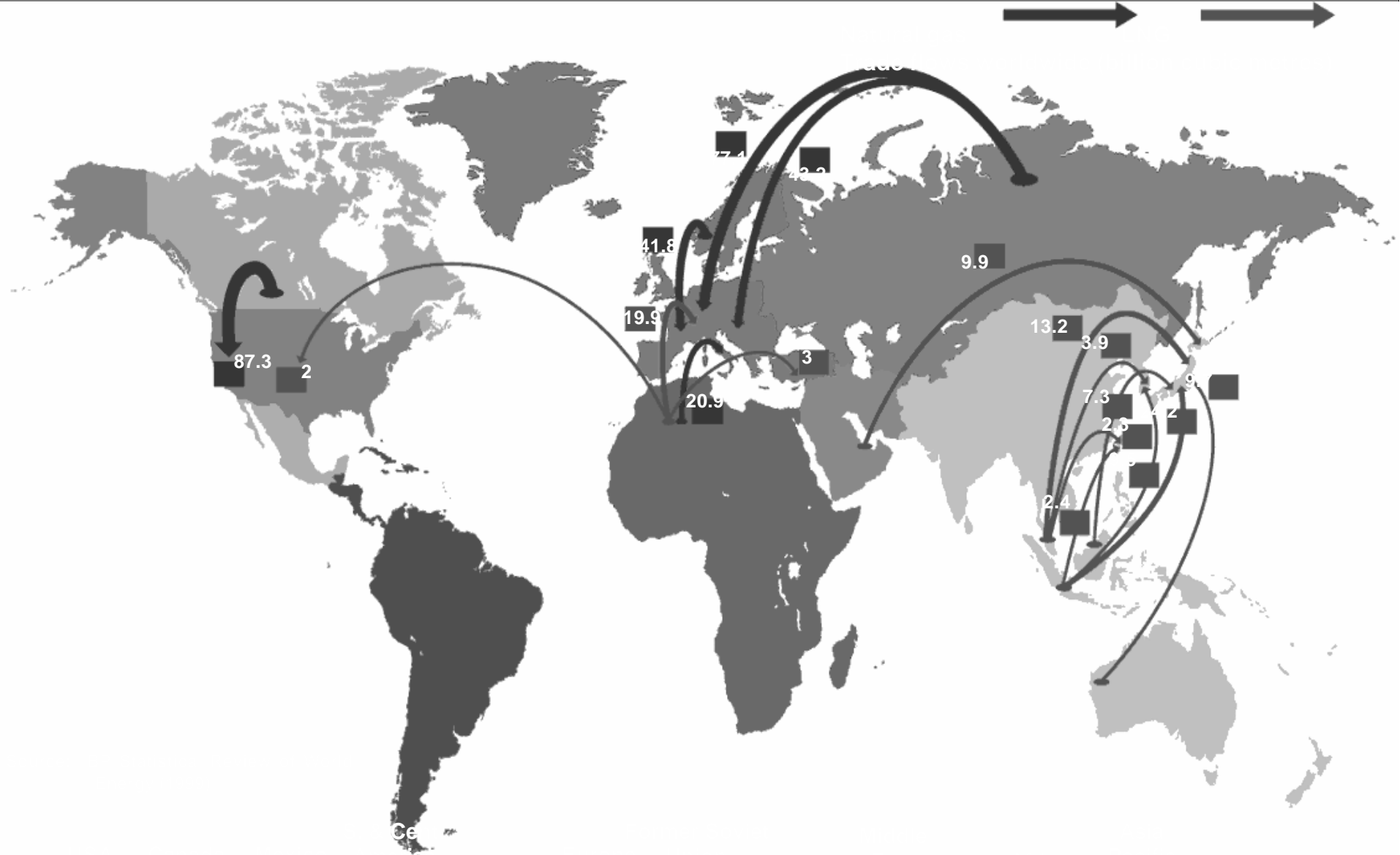






# OUTLINE

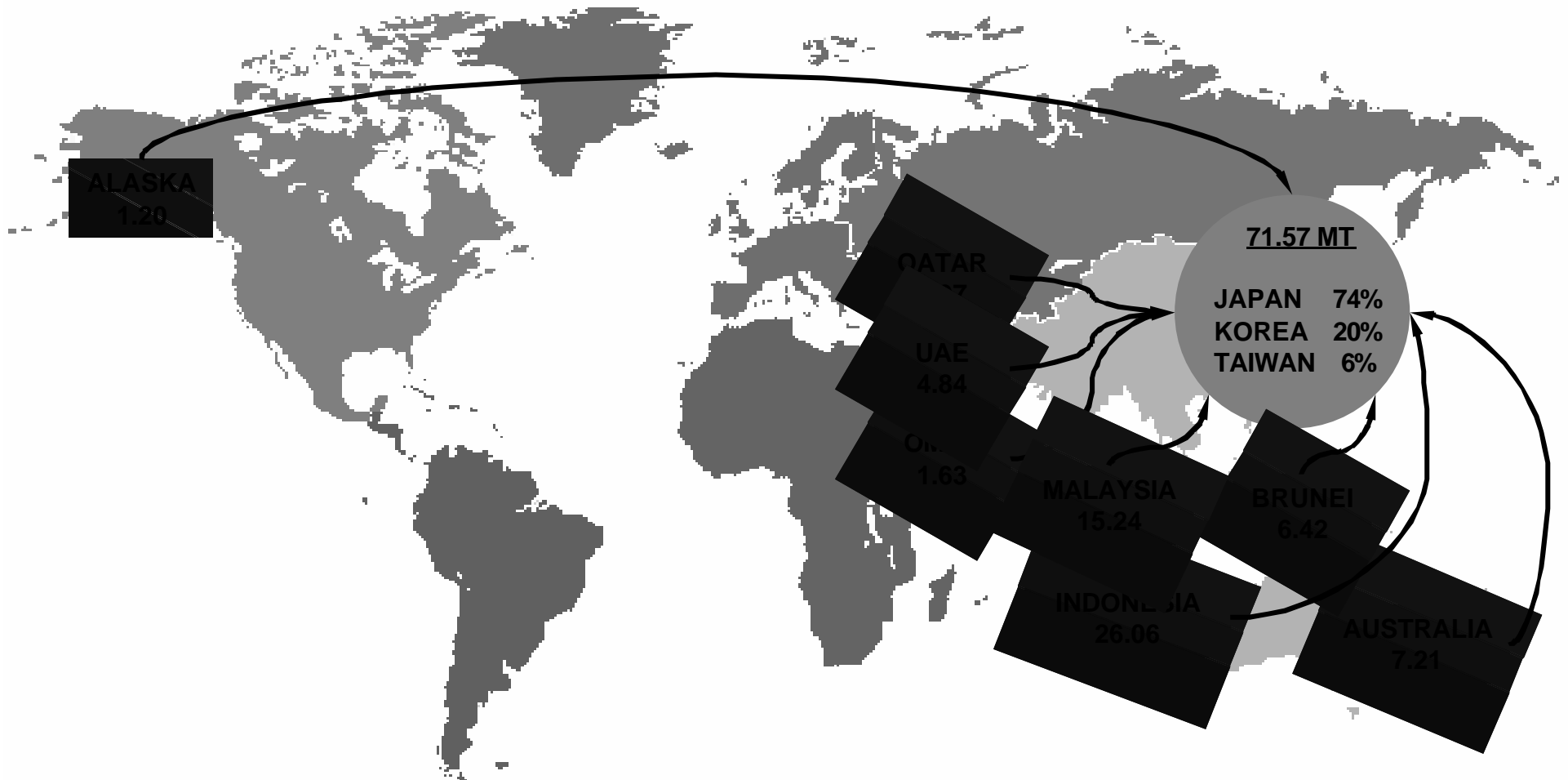
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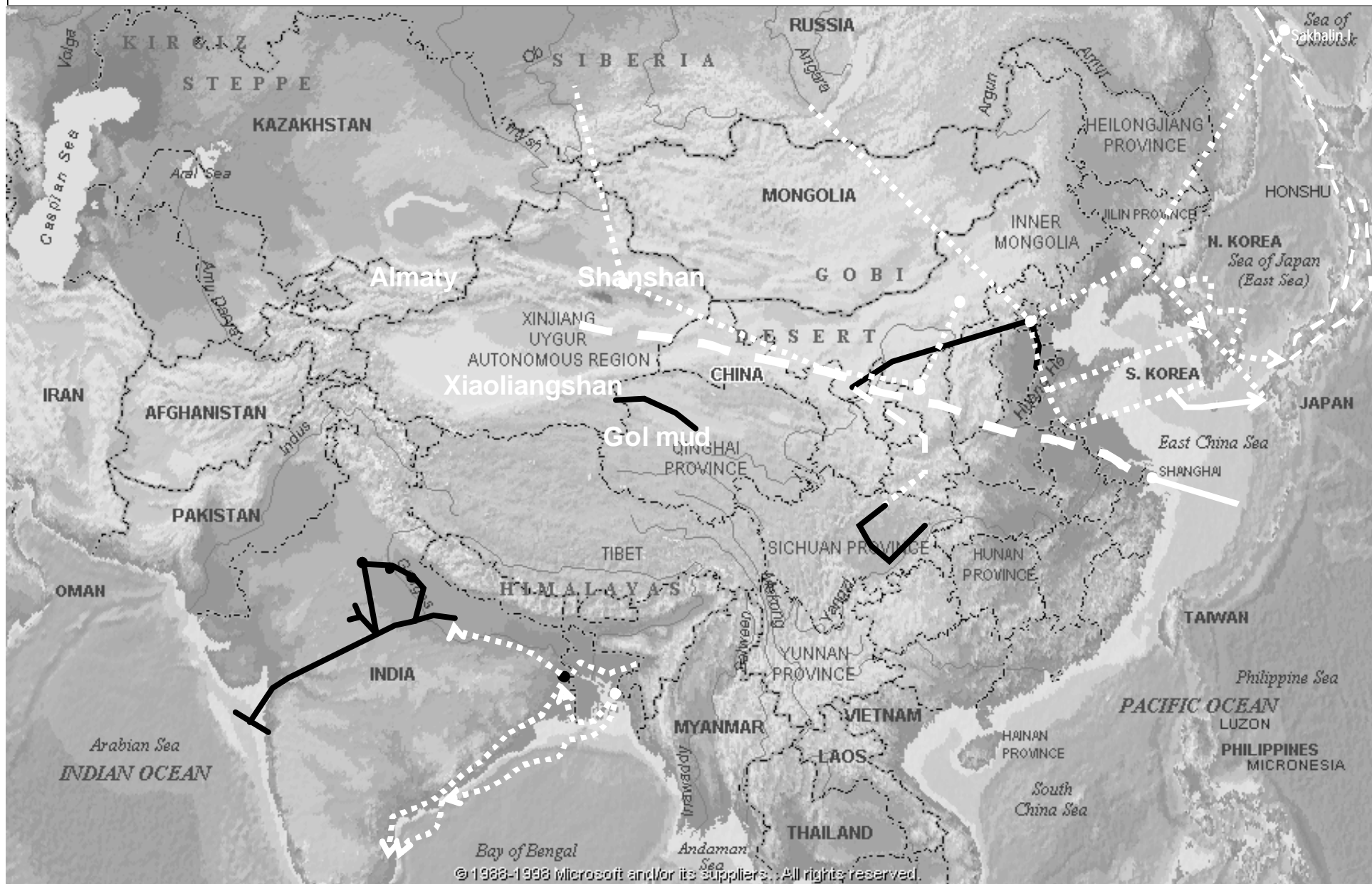
Ce

# GLOBAL LNG

## 2000 Trade Flow into Asia Pacific

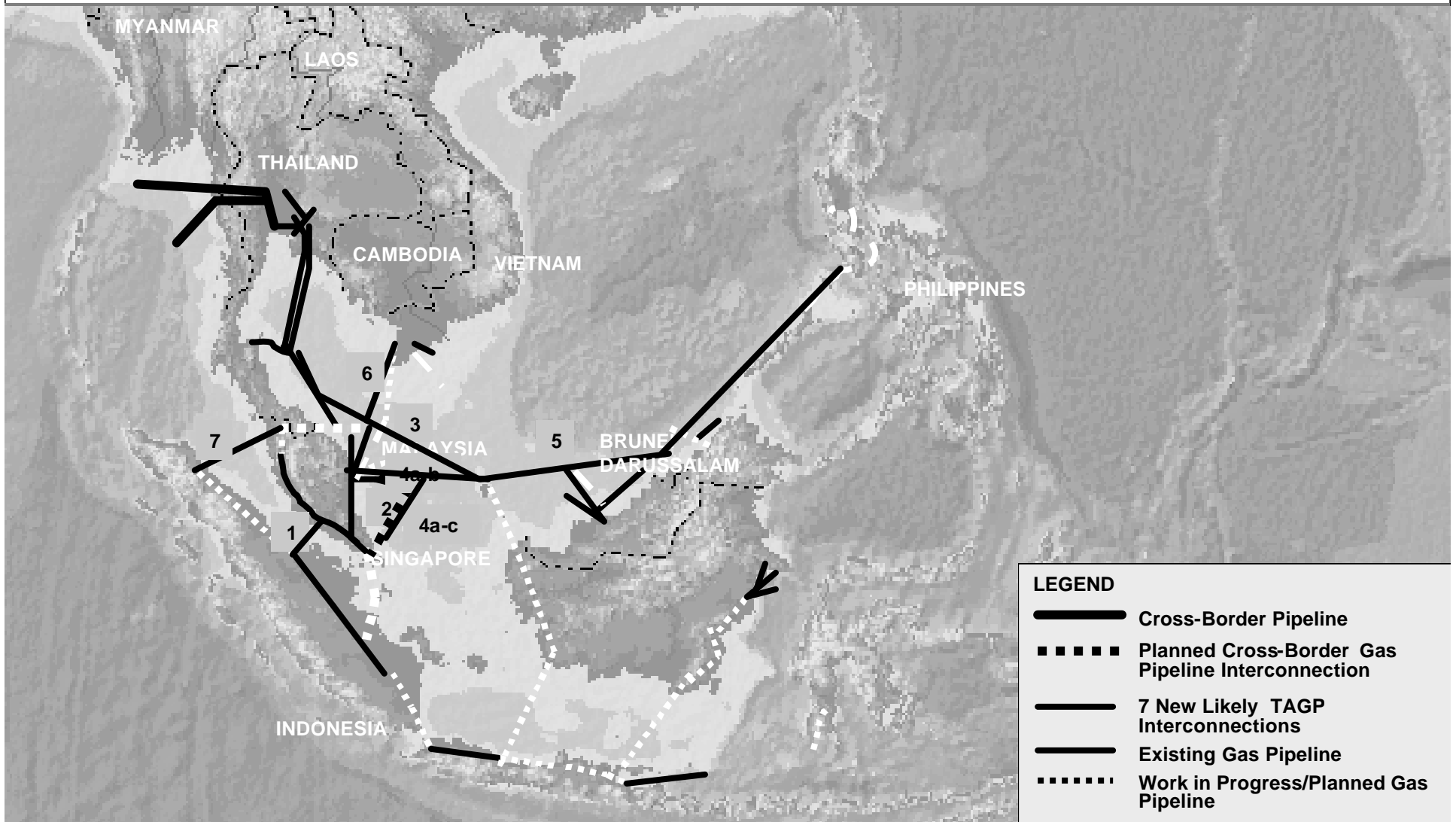


- Asian importers continued to dominate the LNG trade, with Japan being the single largest importer by far.
- Most of the LNG imports into Asia are under long term Take-or-Pay contracts tied to crude oil price.



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**REALISATION OF TAGP IS CRUCIAL IN ENSURING THE GREATER SECURITY OF SUPPLY FOR THE REGION**

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  - 4.4 Potential Gas Trade in ASEAN**
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**THANK YOU**

# **Liberalization and its impacts on oil industry**

**- Japanese Experience -**

**December 3, 2001**

**Shigeru Sudo**

**Mitsubishi Research Institute, Inc.**

# Scope of the Presentation

1. Legal legislation framework of oil industry
2. New legislation framework of oil industry
3. Oil market situation after the liberalization
4. Implication of the liberalization in oil industry

# 1. Main Developments in Deregulation

| General |     |   | Energy Sector |                                   |        |   |             |  |  |
|---------|-----|---|---------------|-----------------------------------|--------|---|-------------|--|--|
|         |     |   | Oil           |                                   | Gas    |   | Electricity |  |  |
| 1993    | Apr | Formulation of basic policy for revision of official regulations by the study group on economic reform (Hiraiwa Report) |               |                                   |        |   |             |  |  |
| 1994    | Dec | Inauguration of the Administrative Reform Committee   |               |                                   |        |   |             |  |  |
| 1995    | Nov | Economic Council compiled "Social/Economic Plan for Structure Reform" to the Prime Minister                             |               |                                   | Mar    | The amended Gas Utility Industry Law enforced               | Dec         | The amended Electric Utility Industry Law enforced |  |
| 1996    | Dec | Cabinet determination of the program for economic structural reform and creation  | Mar           | Petroleum Import Law Abolished    |        |   |             |  |  |
| 1997    | May | Cabinet determination of the action plan for economic Structural reform and creation                                    | Jul           | Liberalization of product exports |        |   |             |  |  |
|         | Dec | Compilation of the final opinion of the Administrative Reform Committee   |               |                                   |        |   |             |  |  |
| 1998    | Mar | Cabinet determination of the three-year plan for the promotion of further deregulation                                  | Apr           | Self-Service SS approved          |        |   |             |  |  |
| 1999    |     |   |               |                                   | May 14 | Bill to amend the Electric Utility Law and Gas Industry Law |             |  |  |
|         |     |   |               |                                   | Nov 19 | The amended Gas Utility Industry Law enforced               |             |  |  |
| 2000    |     |   |               |                                   |        |   | Mar 21      | The amended Electric Utility Law enforced          |  |

## **2. Overview on Petroleum Industry Law Enacted in July 1962**

Subject of Regulations  
[Necessary procedures]

Petroleum Refining  
Business  
[Permission]

New Installation of  
Refining Facilities  
[Permission]

Oil Products Production  
Plan  
[Permission]

Petroleum Import  
Business  
[Report]

Petroleum Products  
Marketing Business  
[Report]

Petroleum Products  
Selling Prices  
[Minister has an authority to  
fix standard prices]

# 3. The Oil Industry & Liberalization

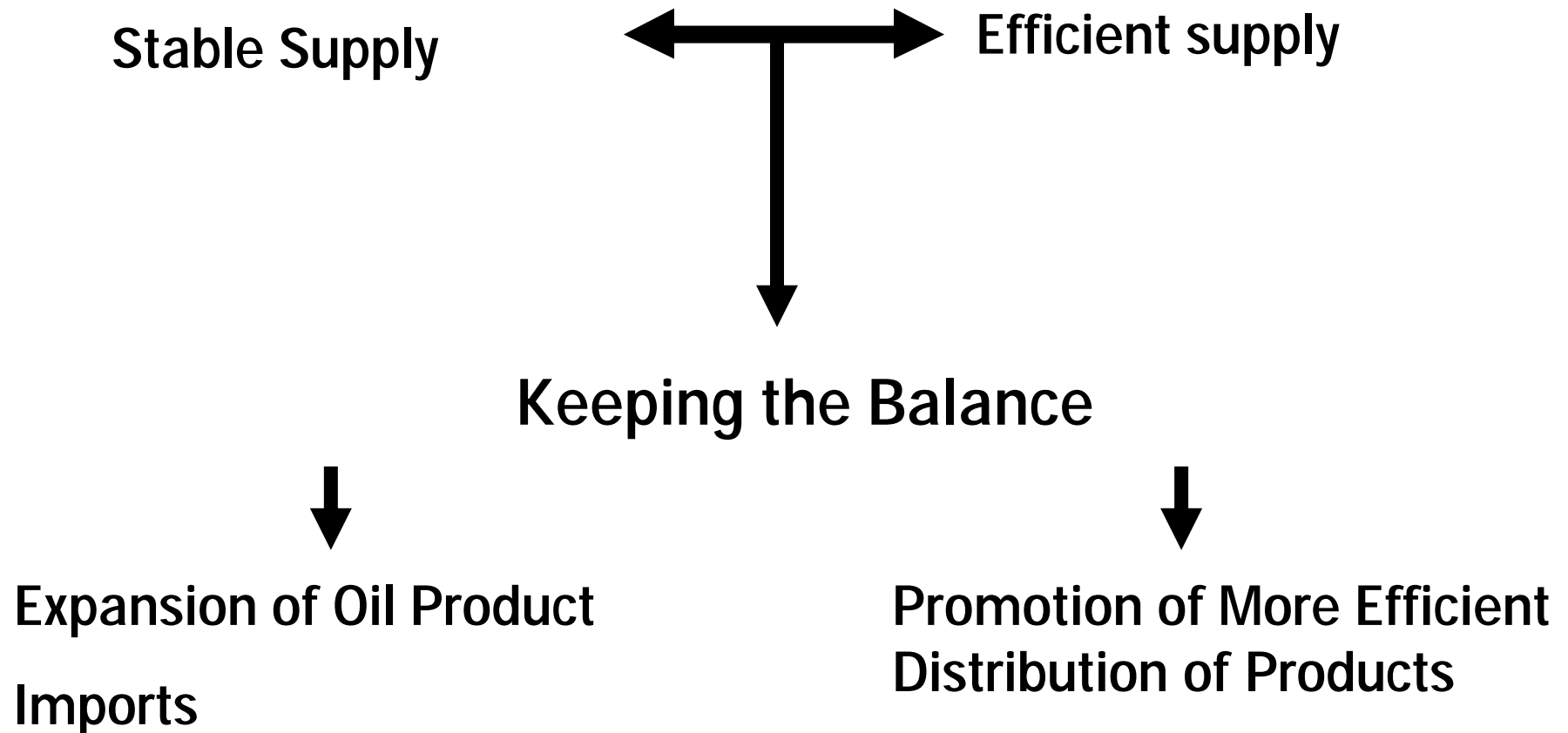
## First Phase

- |      |  |
|------|--|
| 1986 | Import of Designated Products                                      |
| 1987 | Automatic Approval of Secondary Units                              |
| 1989 | Gasoline PQ, Administrative Guidance to pile up Kerosine Inventory |
| 1990 | SS Construction & Conversion                                       |
| 1992 | Crude Throughput Quota   |

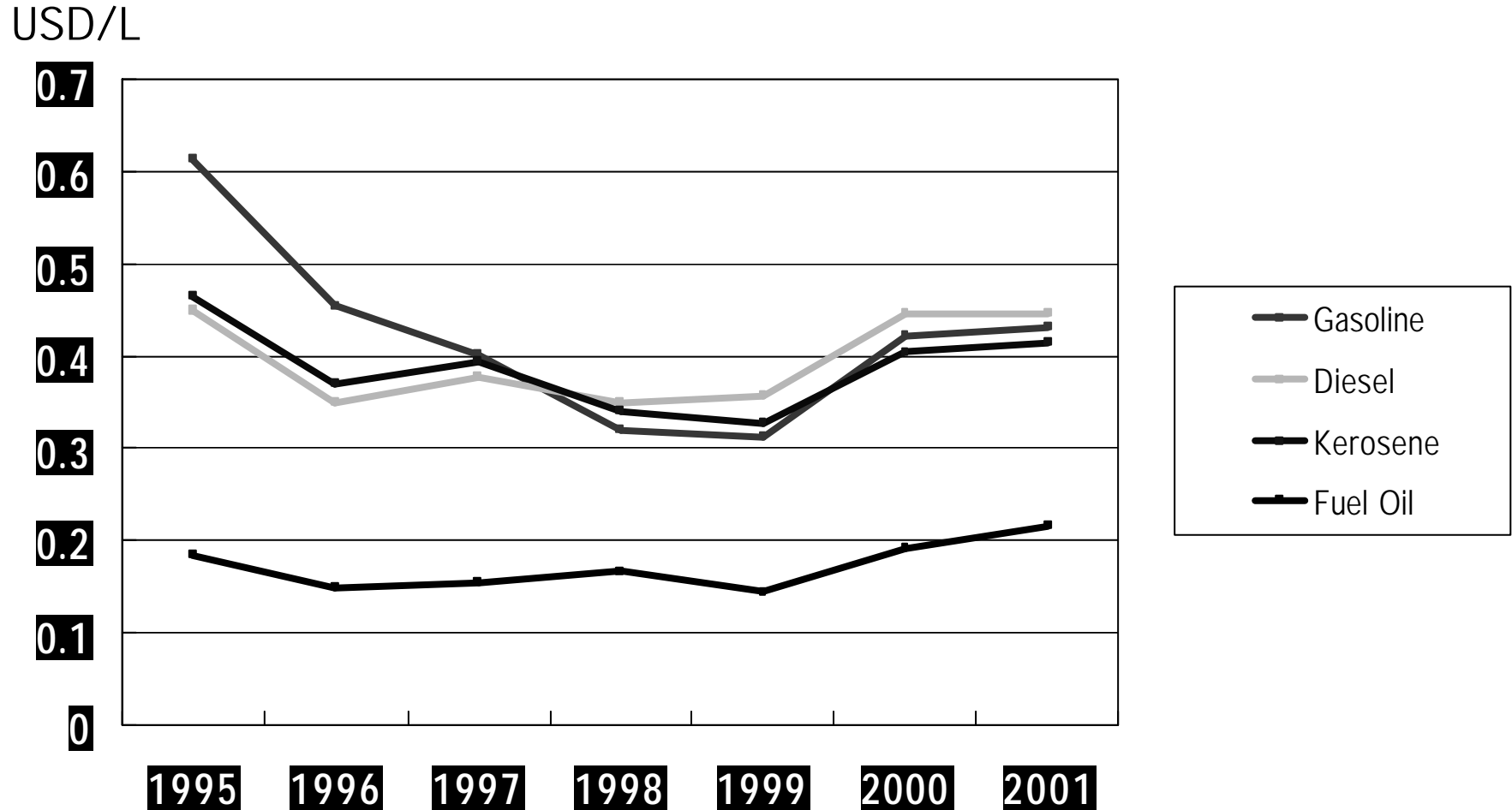
## Second Phase

- |      |  |
|------|--|
| 1996 | Abolition of Product Import Law                                      |
| 1998 | Abolition of Gasoline Supply Proof<br>Self-Service Pumping Permitted |
| 2001 | Overall Review on Petroleum Industry Law                             |

## 4. Background of Liberalization of oil industry



# 5. Petroleum Product Price in Japan (USD/L, Excl. Tax, each March)



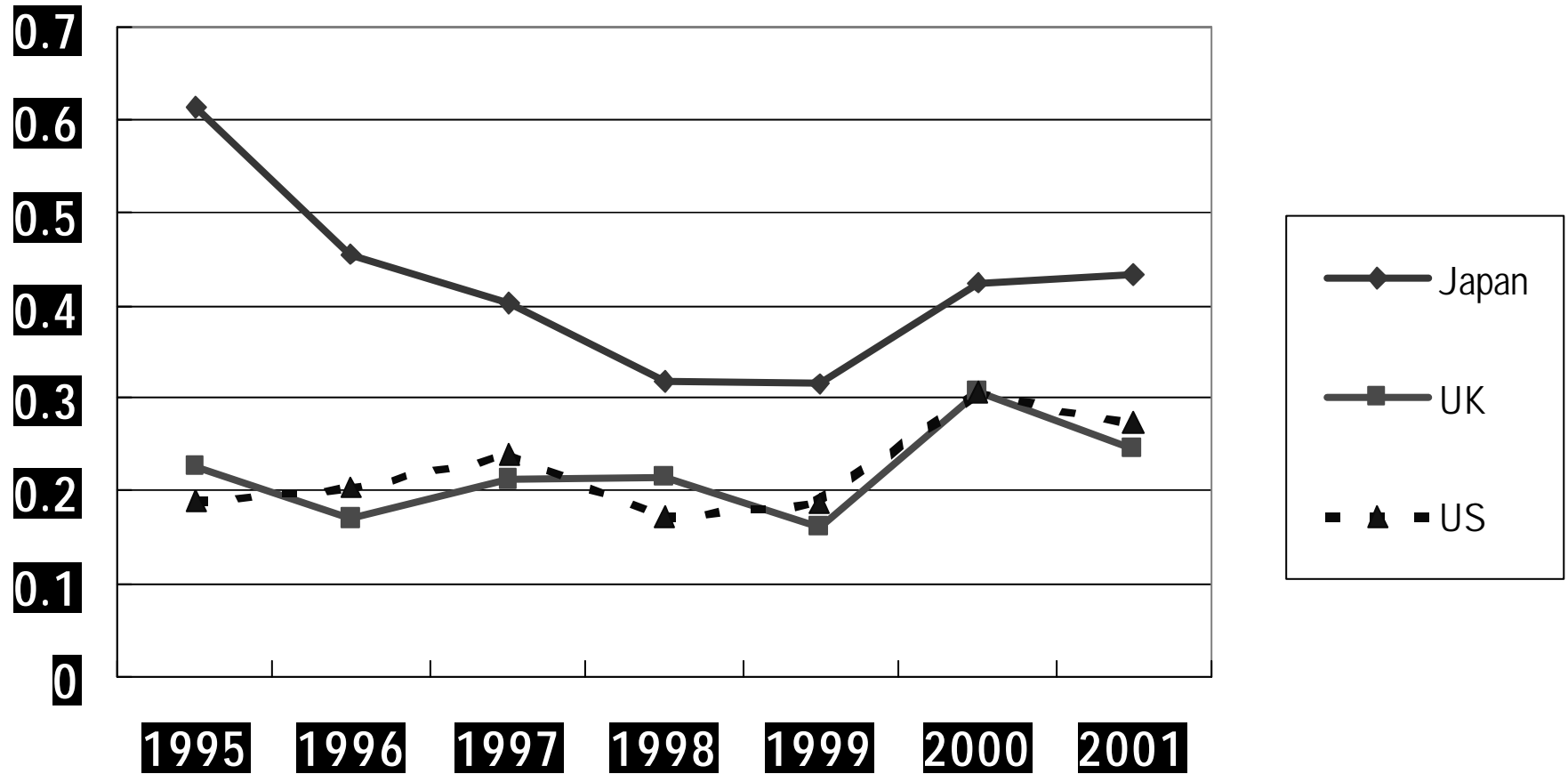
Source: IEA Oil Market Report



## 6. Gasoline Price in Each Countries

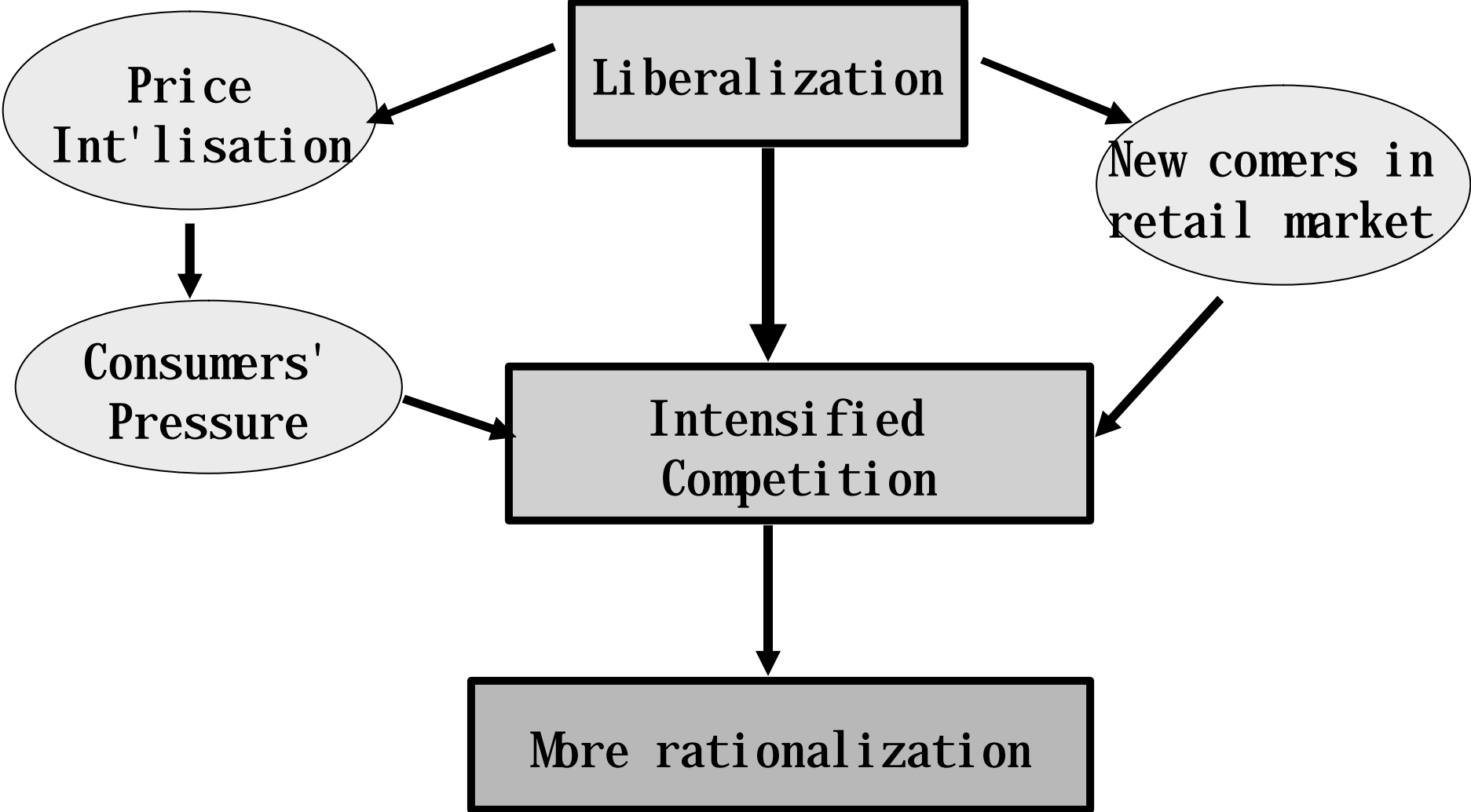
(USD/L, Excl. Tax, each march)

USD/L

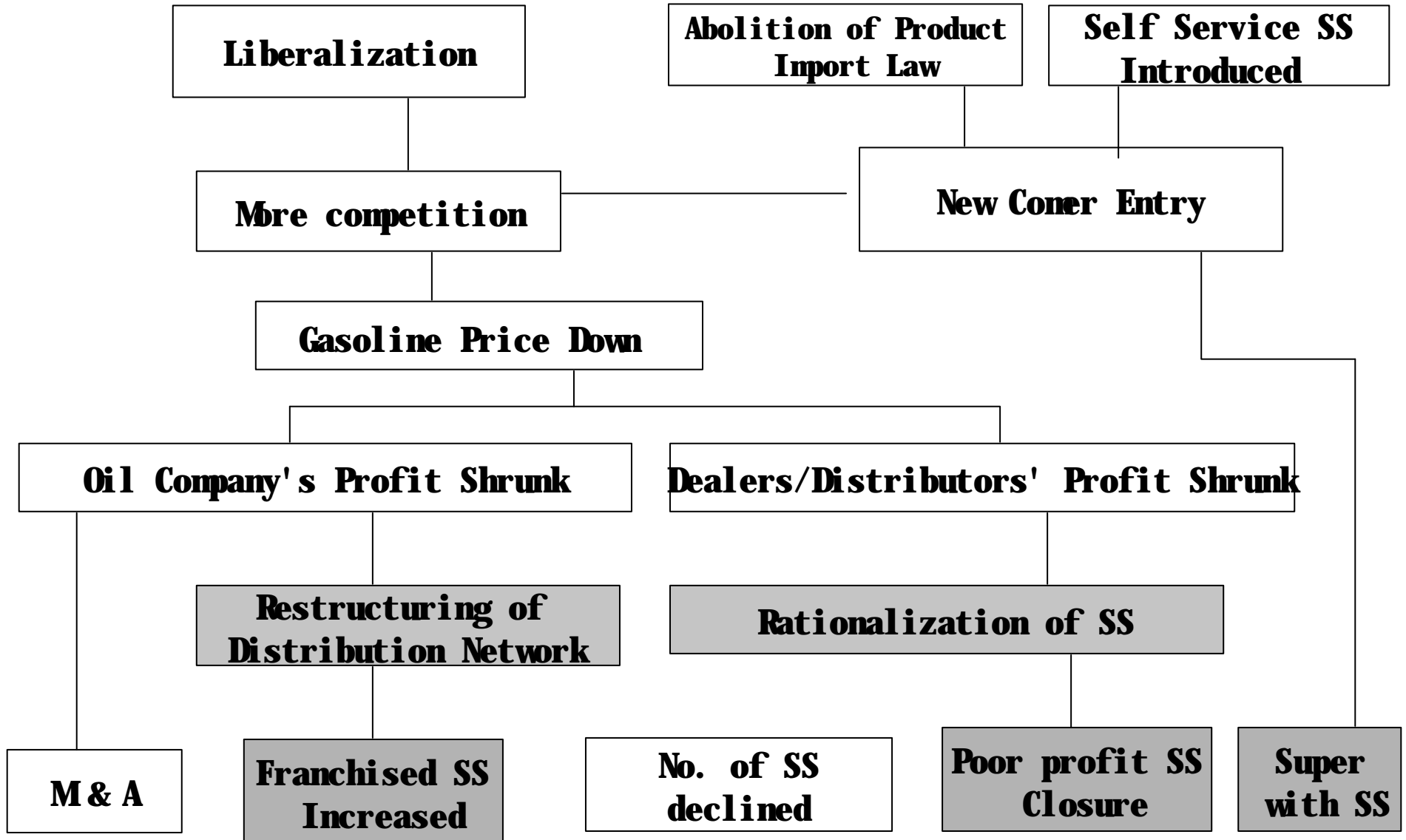


Source: IEA Oil Market Report

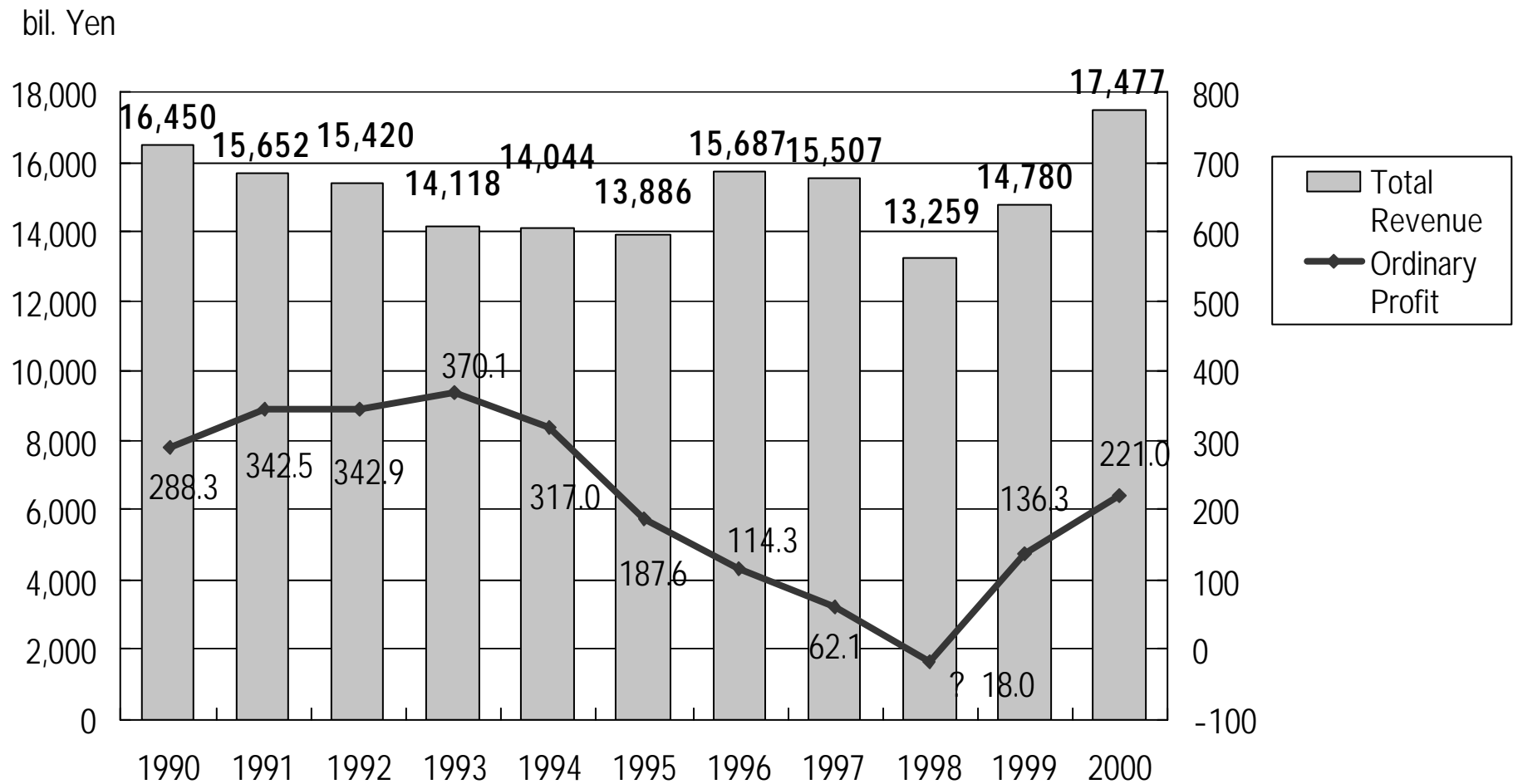
# 7. What happened in 1995-96



# 8. Oil Industry Structure Change in Japan

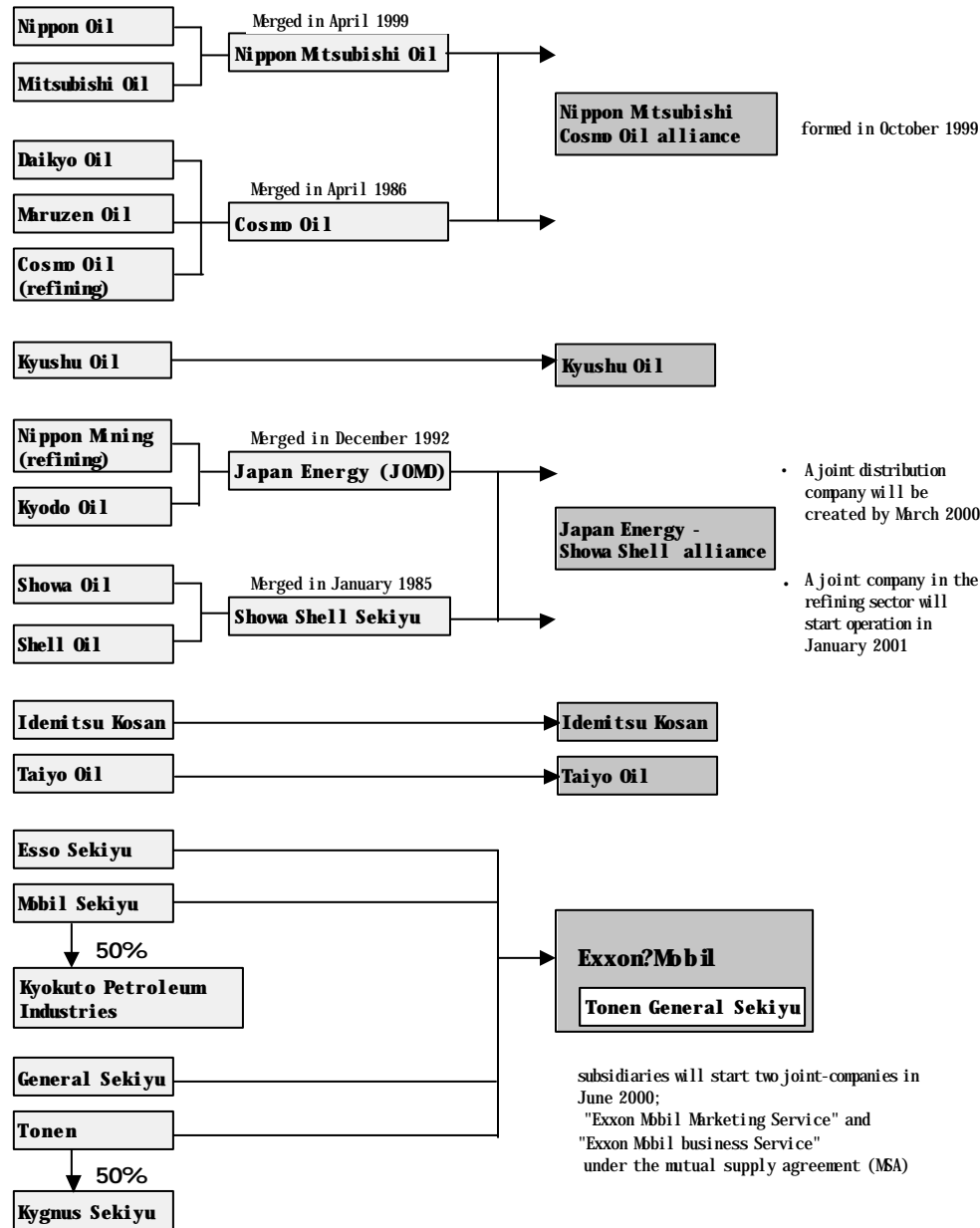


# 9. Total Revenue and Ordinary Profit to Sales

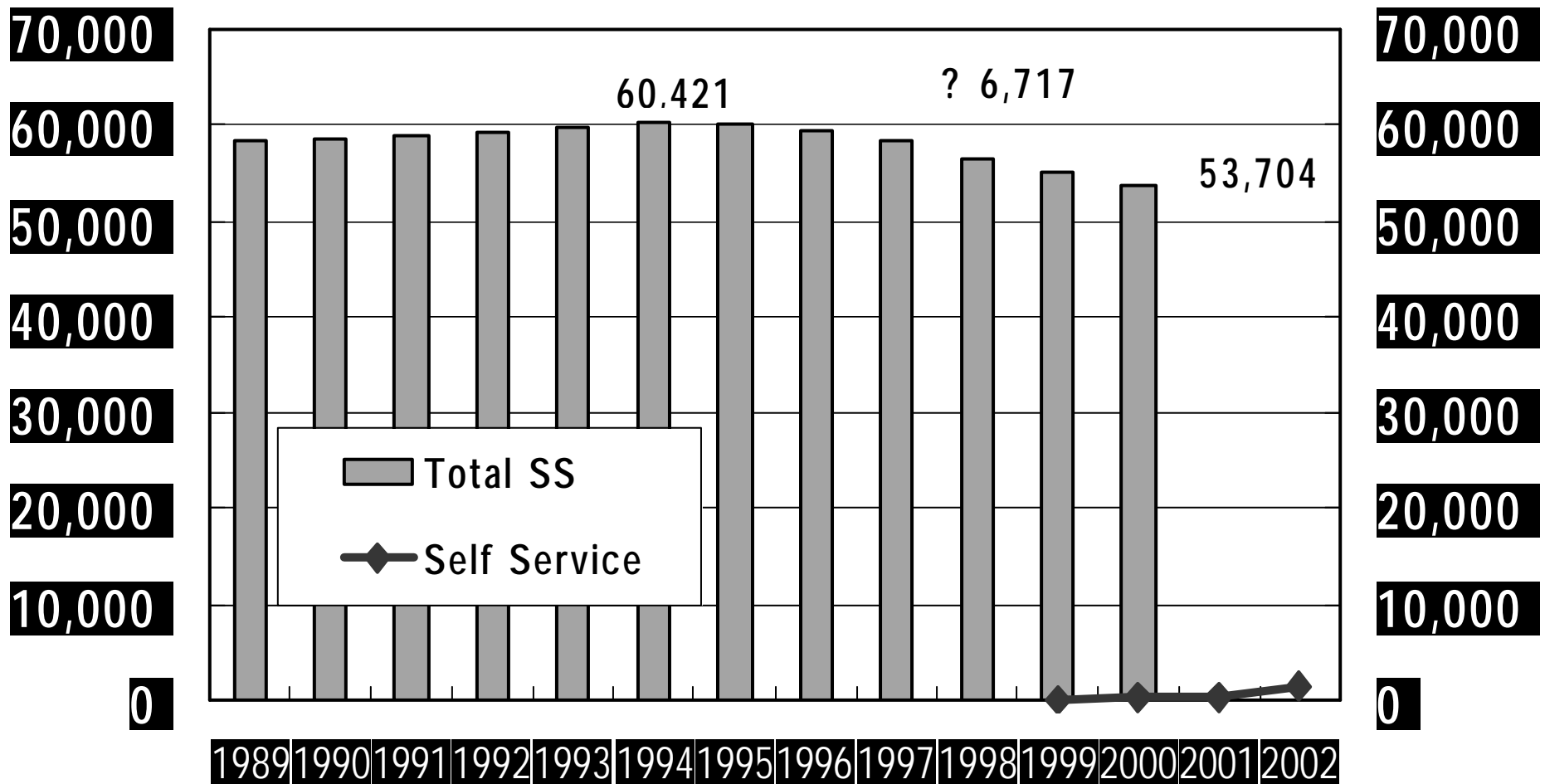


Source: Petroleum Assn. of Japan

# 10. M&A Development in Japanese Oil Companies



# 11. Development of the Number of SS in Japan (as of the end of each March)



## 1 2 . Concluding Remarks

- ? Harmonization between stability and efficiency of supply recognized as most important in Japan.
- ? Speed in volume change is slow but impact on price is very quick in the liberalizing process.
- ? Restructuring and possible M & A contribute to strengthen financial capability.
- ? Need to prepare the risk hedging mechanism increases in the liberalized market.

# **Korean Natural Gas Industry Liberalization**



**Bo-young Kim**  
**Korea Gas Corporation(KOGAS)**

**Prepared for A Seminar-Workshop 'Lessons on Energy Sector Liberalization'**  
**Makati City, Philippines 3 to 5 December 2001**



# Contents

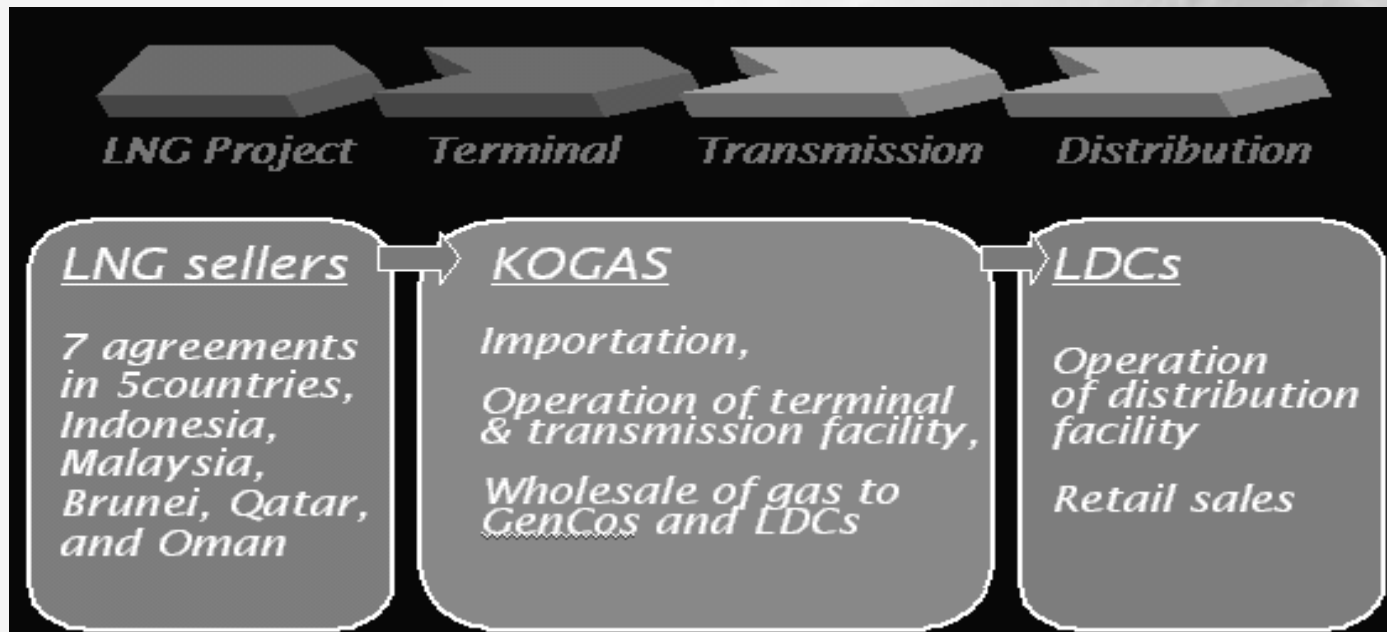
- ? . **Overview of Korea Gas Industry**
- ? . **Restructuring Plan of Korea Gas Industry**
- ? . **Liberalization of Gas Market after Restructuring**

# ? . Overview of Korea Gas Industry

# 1. Characteristics of LNG in Korea

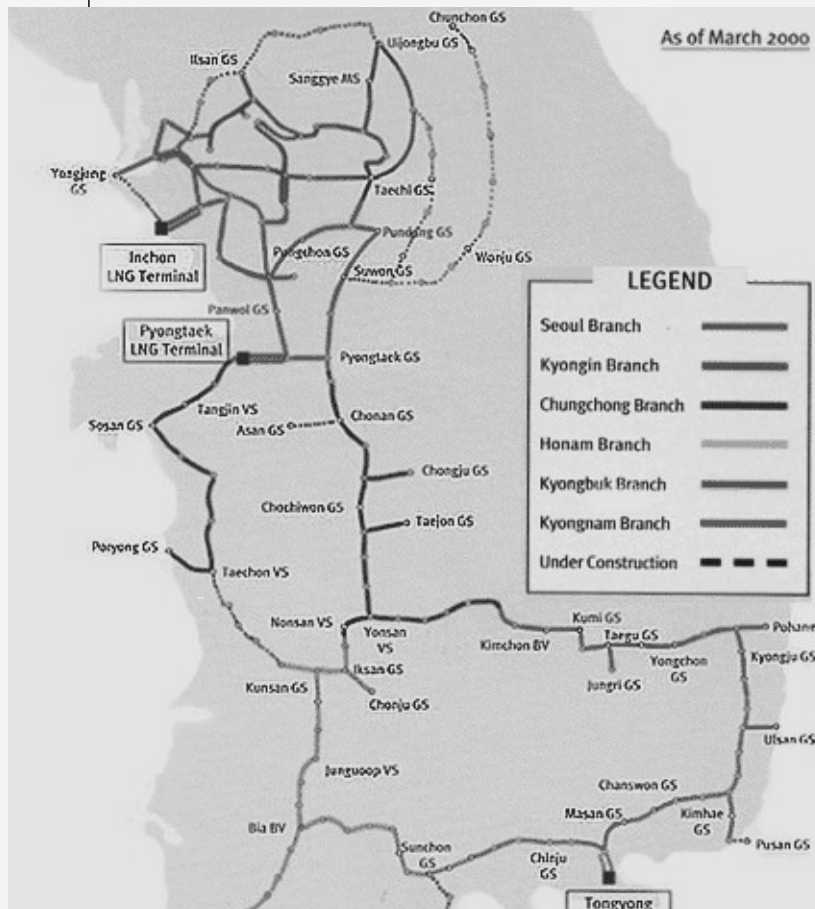
## □ Characteristics of LNG in Korea

- Long-term period & 'Take or Pay' clause in the agreements
- High seasonal demand difference between winter and summer
- Current Value Chain



# 2. Natural Gas Supply Facilities

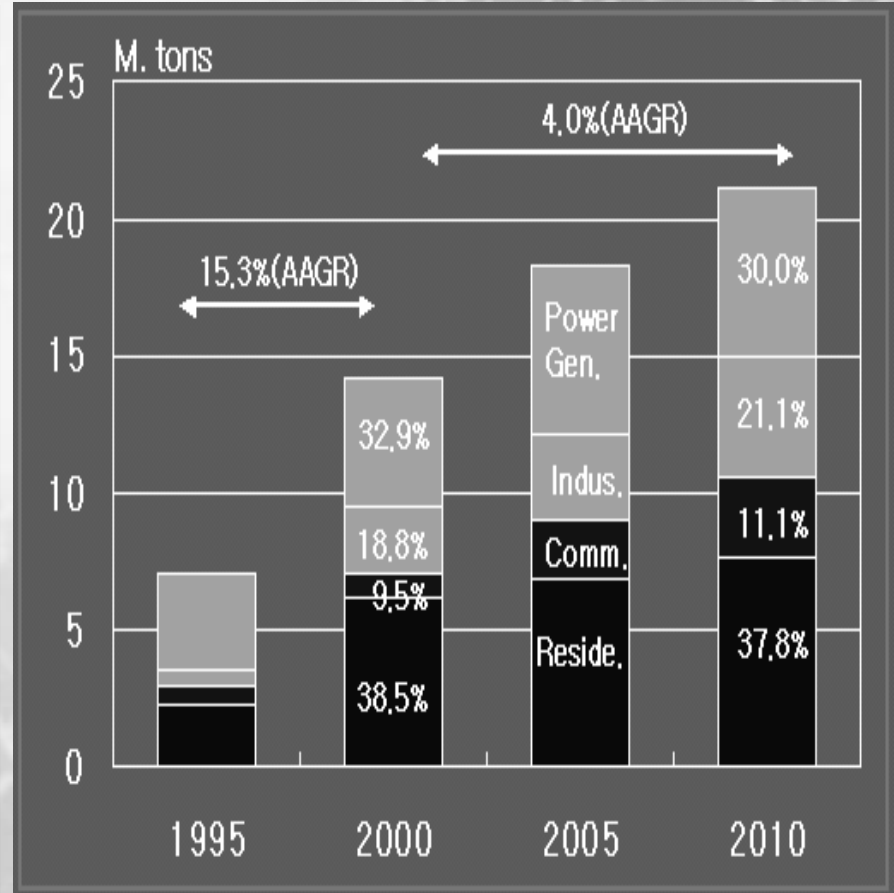
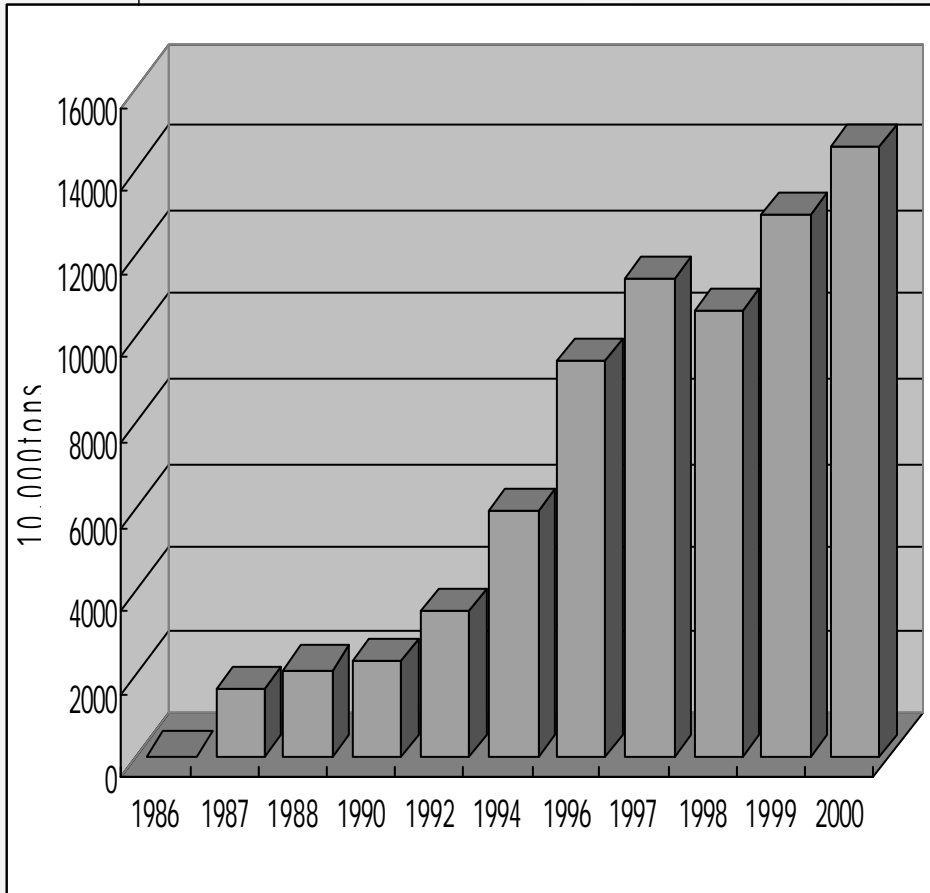
## □ Natural Gas Supply Facilities



| Description                        | Current                     | Planned                       |
|------------------------------------|-----------------------------|-------------------------------|
| <b>Terminal</b>                    | <b>Inchon<br/>Pyongtaek</b> | <b>Tongyoung</b>              |
| <b>LNG Storage Tank(100,000kl)</b> | <b>22.8</b>                 | <b>55.8<br/>(in 2010)</b>     |
| <b>Transmission Pipeline</b>       | <b>2,133km</b>              | <b>2,450km<br/>(in 2002)</b>  |
| <b>Distribution Pipeline</b>       | <b>15,221km</b>             | <b>19,681km<br/>(in 2003)</b> |

# 3. Demand for Natural Gas

## □ Demand for Natural Gas



# ? . Restructuring Plan of Korea Gas Industry

# 1. Background for the Restructuring

## □ Backgrounds for the Restructuring

### ➤ Market environments for the Restructuring

- Major advanced countries have been implementing the restructurings of the natural gas businesses

### ➤ Preparations for the Restructuring

- KEEI(Korea Energy Economics Institute) conducted a research on the privatization of Kogas during March 1994 to July 1995
- The government announced the policy directive for the privatizing public companies in July 1998
- Arthur Andersen Business Consulting, KEEI and Anjin&Co conducted a consultation study jointly during Jan. 1999 to Aug. 1999 for the restructuring of the gas industry

### ➤ Unexpected Accident which accelerated the Restructuring

- Occurrence of economic crisis (IMF) in the end of 1997

## 2. 'Basic Proposal' of Restructuring Plan

### □ 'Basic Proposal' of Restructuring plan (Nov. 1999)

#### ➤ Objectives

- Improvement of the Efficiency
- Promotion of the gas Industry Development
- Enhancement of the Service Quality

#### ➤ Basic principles

- Remove impediments to competition
- Privatize Kogas after restructuring

#### ➤ Schemes for competition

- Import and wholesale business
- Retail service business

#### ➤ Introducing the OAS(Open Access System)

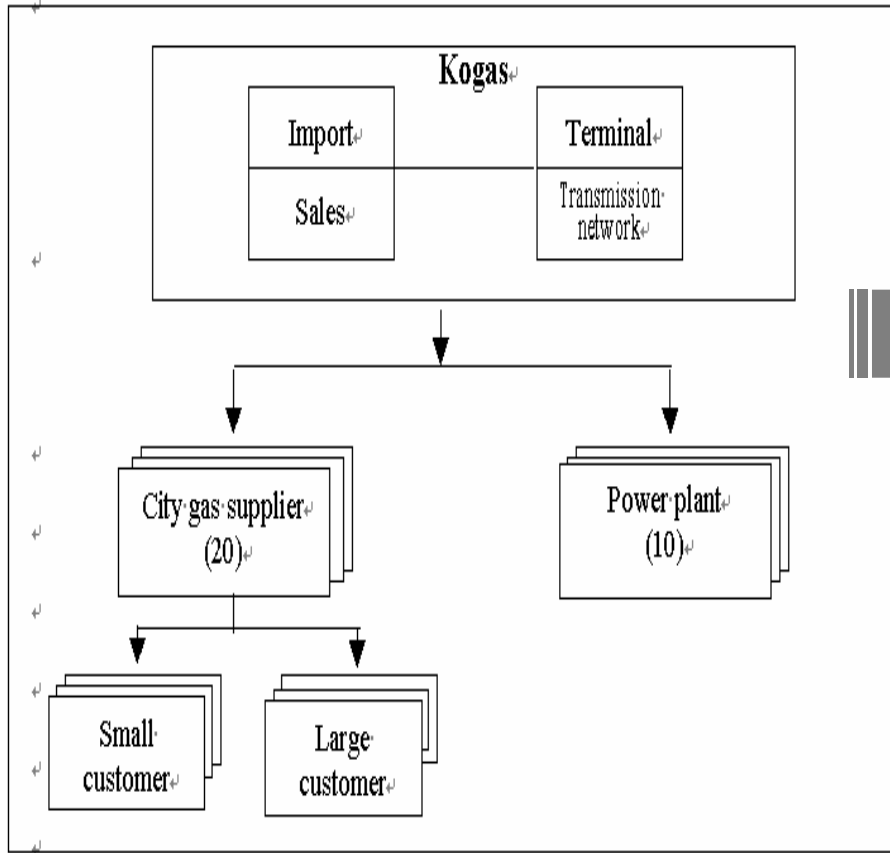


# Existing Long-term Gas Import Agreements

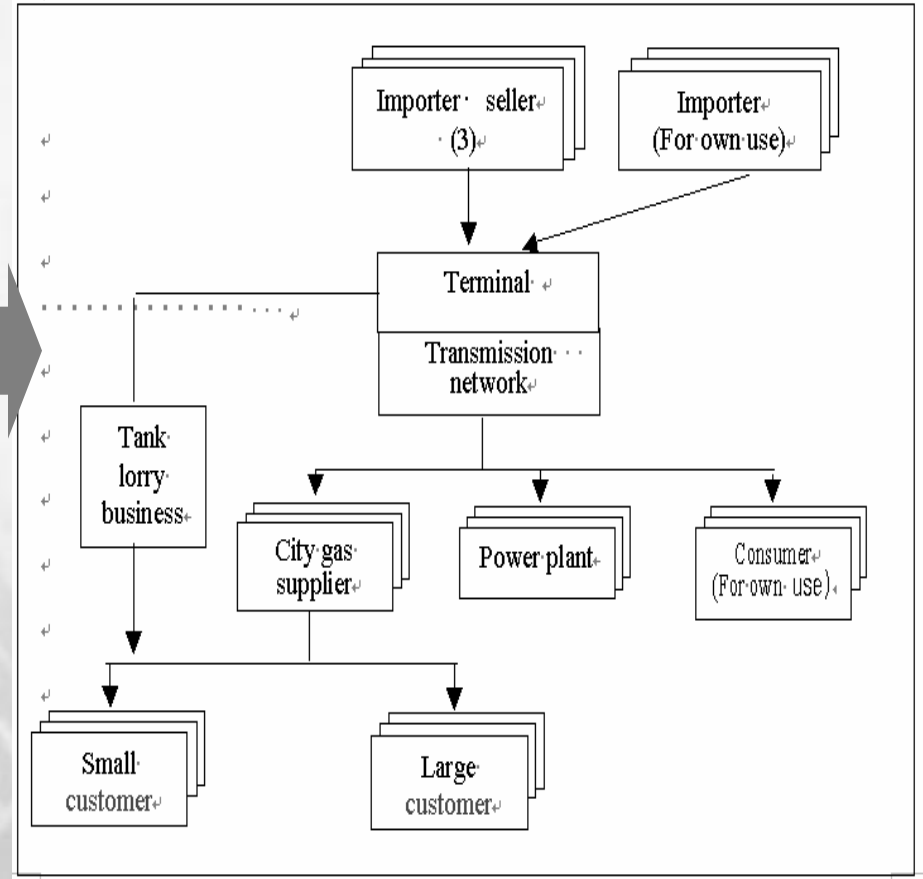
| Import from | Project name | Amount of agreement<br>(10,000 ton/year) | Period of agreement | Contract date | LNG Carriers |
|-------------|--------------|--|---------------------|---------------|--------------|
| Indonesia   | Arun III     | 230                                      | Dec-1986 ~ Nov-2007 | Aug-1983      | Foreign      |
|             | Korea II     | 200                                      | Jul-1994 ~ Jun-2014 | May-1991      | Korean       |
|             | Badak V      | 100                                      | Jan-1998 ~ Dec-2017 | Aug-1995      | "            |
| Malaysia    | MLNG II      | 200                                      | Jun-1995 ~ Mar-2015 | Jun-1993      | "            |
| Qatar       | Ras Laffan   | 480                                      | Aug-1999 ~ Dec-2024 | Oct-1995      | "            |
| Oman        | OLNG         | 406                                      | Feb-2000 ~ Dec-2024 | Oct-1996      | "            |
| Brunei      | BLNG         | 70                                       | Apr-1997 ~ Mar-2013 | Oct-1997      | Foreign      |

# Comparison of the Structure

□ → Current



□ → After restructuring



# 3. Details of Propulsion Plan

## □ Details of propulsion plan (August 2001)

### ➤ Basic Directions

- Based on 'Basic Proposal of Restructuring plan (November 1999)

### ➤ Separation of import and wholesale business from Kogas in 2001, as a form of 3 subsidiaries of Kogas

- Scenario 1 (equivalent division)
- Scenario 2 (discriminative division)

### ➤ Privatization of Kogas and Sale plan of subsidiaries of Kogas

- Kogas : privatization of Kogas to be completed by 2002
- Subsidiaries of Kogas : two sold of f by 2002, one remains under Kogas control

### ➤ Recently...

- 'Revised Korea Gas Corporation Act' has passed in the State council not as a 'Special Act' but as a 'Commercial Law' on Nov. 23, 2001
- 'Revised City gas Act' and 'Energy Committee Act' also

## 4. Problems of the Plan

### □ Problems of the plan

- **Adjustment failure of the demand and supply Balance**
- **Uncertainty of Valid competition in Existing LNG project**
- **Oligopoly of Import and Wholesale Business**
- **Escaping Phenomenon of gas supply for new Area where is no economic Performance**
- **Inevitability of Household gas Tariff raising**
- **Difficulty of LNG Import Contract Succession**
- **Decline of LNG Import Negotiability**
- **Sale of Subsidiary Companies**
- **Delay of KOGAS Privatization**

# ? . Liberalization of Gas Market after Restructuring

# 1. Meaning of Korea Gas Industry Structural Reform

## **Recognizing the Concept of Market in Korea**

- **From Monopoly to competition(Oligopoly) Market**

## **Opportunity of enlarging the market size**

- **Restructuring makes the market power of gas strong in the Energy Market**

## **Incentive to elevate the Efficiency**

- **There is no incentive to elevate the Efficiency before Restructuring**

## **Restructuring is a chance to liberalize the gas market**

- **If enlarging the width of Consumer's Choice.....**

## 2. Restructuring vs. Gas Market

### **The relation of Restructuring vs. Gas Market**

➤ **Is it Negative or Positive ?**

### **Restructuring Effect on Gas Market in Korea**

➤ **This can be a chance to advance to overseas Gas Market**

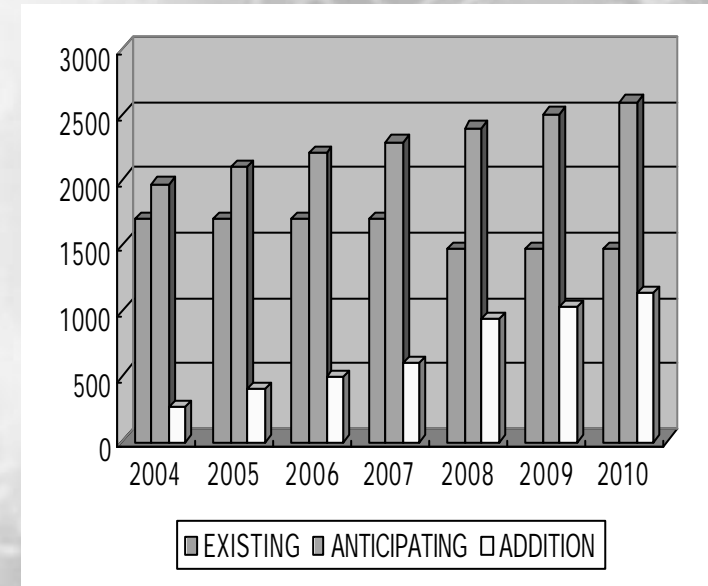
➤ **But it may also bring about Adverse Effects**

# 3. Perspectives of Domestic Gas Market after Restructuring

## Forecasting of Natural Gas Demand in Korea(2004~2010)

Unit : 10,000tons

|                               | 2004         | 2005         | 2006         | 2007         | 2008         | 2009         | 2010         |
|-------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| <b>Existing Contracts(a)</b>  | <b>1,698</b> | <b>1,698</b> | <b>1,698</b> | <b>1,698</b> | <b>1,468</b> | <b>1,468</b> | <b>1,468</b> |
| <b>Anticipating Demand(b)</b> | <b>1,964</b> | <b>2,100</b> | <b>2,200</b> | <b>2,300</b> | <b>2,400</b> | <b>2,500</b> | <b>2,600</b> |
| <b>Addition Import(b-a)</b>   | <b>266</b>   | <b>402</b>   | <b>502</b>   | <b>602</b>   | <b>932</b>   | <b>1,032</b> | <b>1,132</b> |
| <b>Ratio (b-a)/b</b>          | <b>14%</b>   | <b>19%</b>   | <b>23%</b>   | <b>26%</b>   | <b>39%</b>   | <b>41%</b>   | <b>44%</b>   |



Source : KEEI (2001. 3)



# 4. New Strategy of Korea Gas Businesses

## ❑ Strategic Association with ...

- Between Domestic and Domestic companies
- Between Domestic and Foreign companies

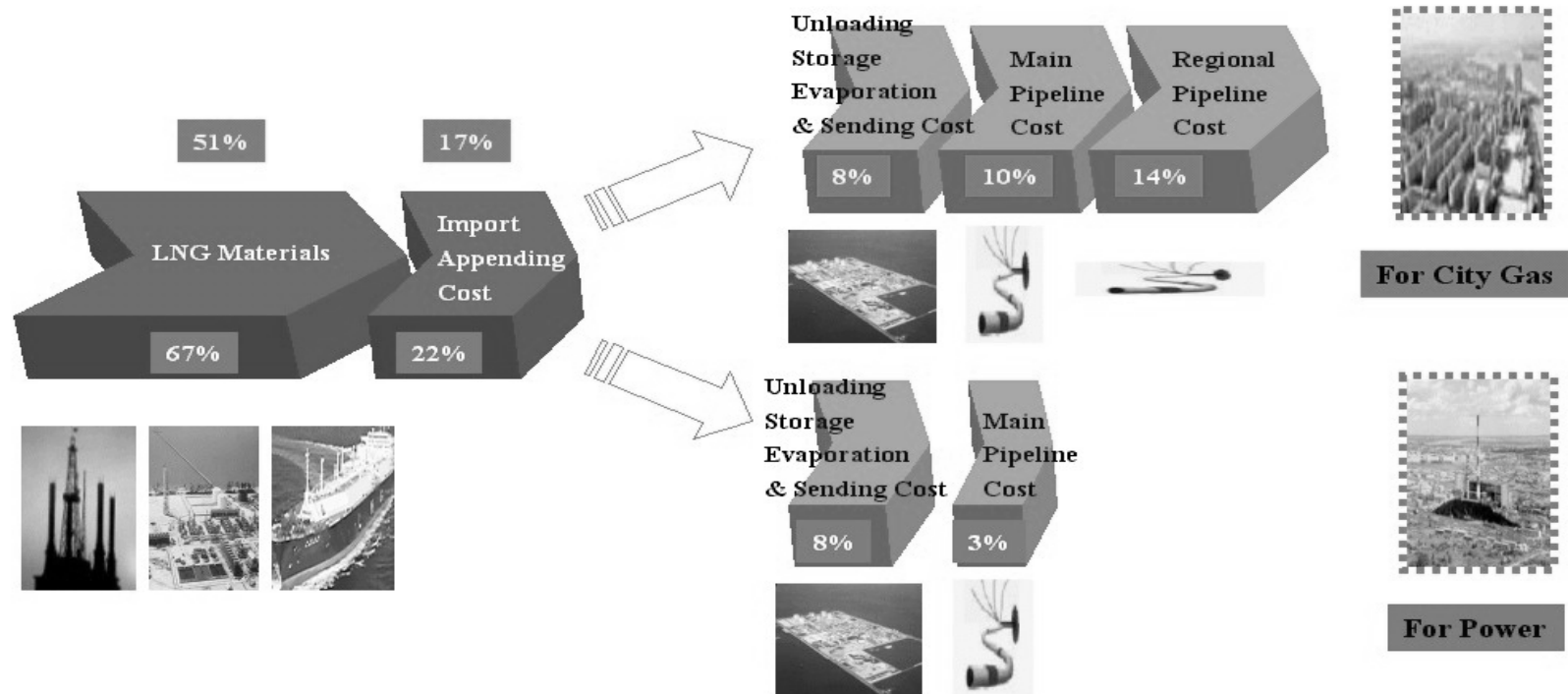
## ❑ Introducing the Advanced Administration Techniques of Oversea Oil Major or huge Energy Companies

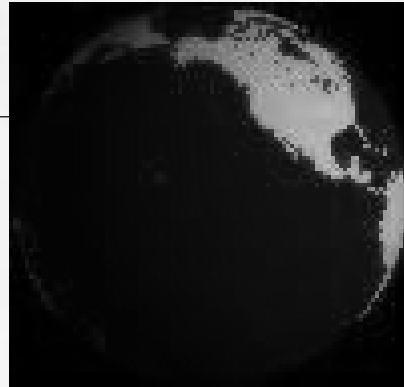
## ❑ Revision of Tariff Structure

- Price discrimination Strategy
- How to make a Profit Maximization : Ability of the Demand Estimation

**Appendix**

# Value chain of Korea Gas Market





**Thank you**

**Presentation by Bo-young Kim**



**Tel : +82-31-710-0842 E mail : kimby@kogas.or.kr**

# **Downstream Oil Industry Deregulation**

MONICO V. Jacob  
CEO's Inc.  
Philippines

# Background

- Regulation – 25 years
  - Oil Price Stabilization Fund (OPSF)
    - Buffer fund used to manage price changes
  - Full cost recovery
  - Return on Rate Base (RORB)
    - Reasonable return
- Deregulation
  - First Deregulation Law – April 1996
    - Effective – February 1997
    - Nullified – November 1997
      - 4% Crude-Product Tariff Differential
      - Minimum Inventory Requirement
      - Predatory Pricing
  - Revised Deregulation Law – February 1998

# Deregulation

- New Players



# Deregulation

- New Players

As of December 2000  
Source: DOE

|                     | Investments<br>(in Billion Pesos) | Number of Players<br>(in Operation) |
|---------------------|-----------------------------------|-------------------------------------|
| Fuel Bulk Marketing | 7.2                               | 24                                  |
| Retail              | 1.1                               | 61                                  |
| LPG Marketing       | 4.8                               | 7                                   |
| Storage             | 0.4                               | 2                                   |
| Bunkering           | 0.1                               | 8                                   |
| TOTAL               | 13.6                              | 102                                 |

|                           |    |
|---------------------------|----|
| No. of Corporate Entities | 62 |
|---------------------------|----|

# Deregulation

- New Players in Operation

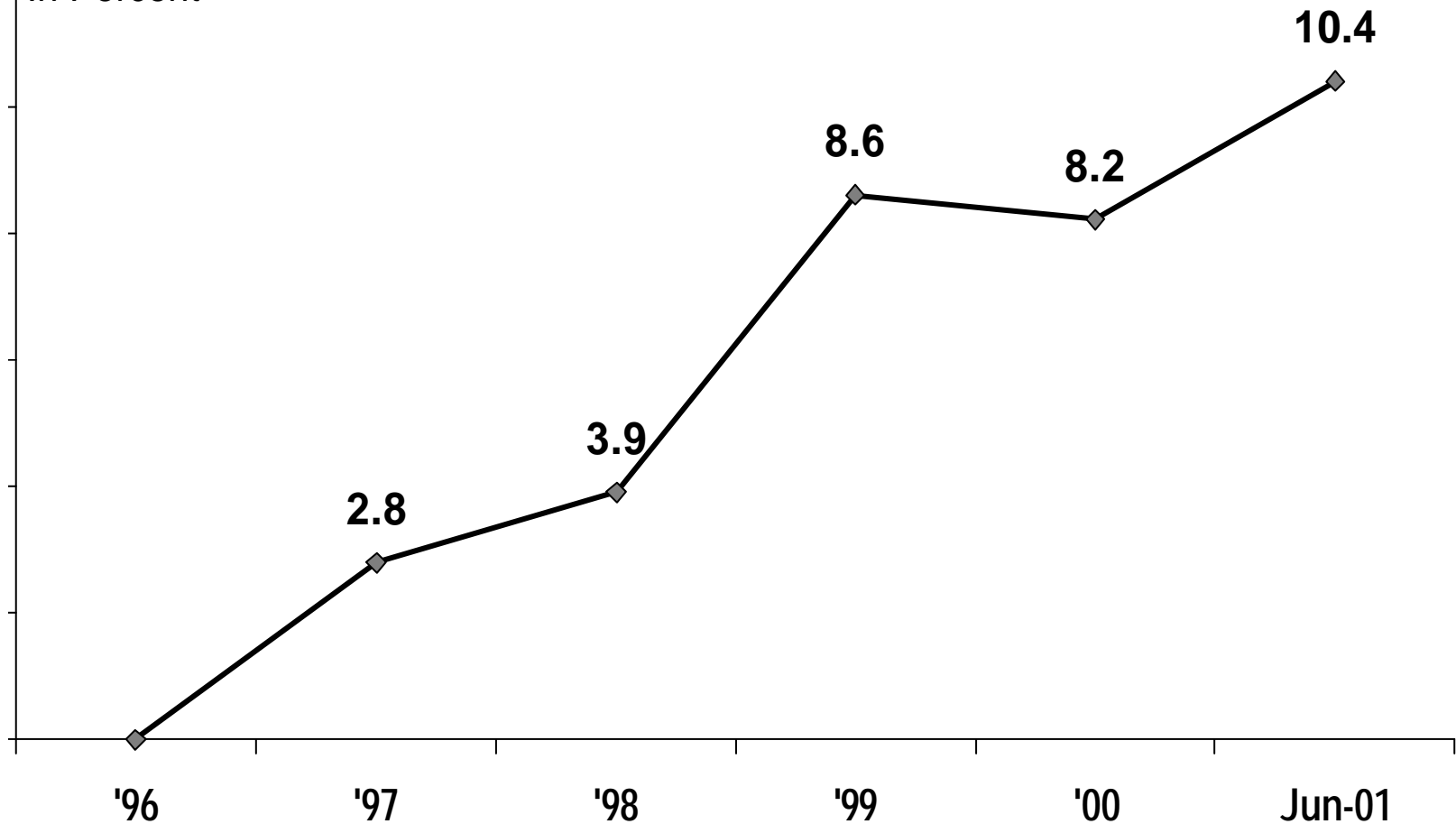
| Source: DOE               | As of June 2001 | As of December 2000 |
|---------------------------|-----------------|---------------------|
| Fuel Bulk Marketing       | 28              | 24                  |
| Retail                    | 83              | 61                  |
| LPG Marketing             | 13              | 7                   |
| Storage                   | 7               | 2                   |
| Bunkering                 | 14              | 8                   |
| <b>TOTAL</b>              | <b>145</b>      | <b>102</b>          |
| <br>                      |                 |                     |
| No. of Corporate Entities | 66              | 62                  |



# Deregulation

- New Players – Market Share (%)

In Percent



\* Excludes direct imports by end-users

# Deregulation

- New Players – Market Share (%)

| Source: DOE                    | As of June 2001 |
|--------------------------------|-----------------|
| <b>LPG</b>                     | <b>25.0</b>     |
| Jet Fuel                       | 11.3            |
| Diesel                         | 10.2            |
| Kerosene                       | 9.7             |
| Fuel Oil                       | 8.8             |
| <b>Gasoline</b>                | <b>5.4</b>      |
| <b>No. of Service Stations</b> | <b>317</b>      |

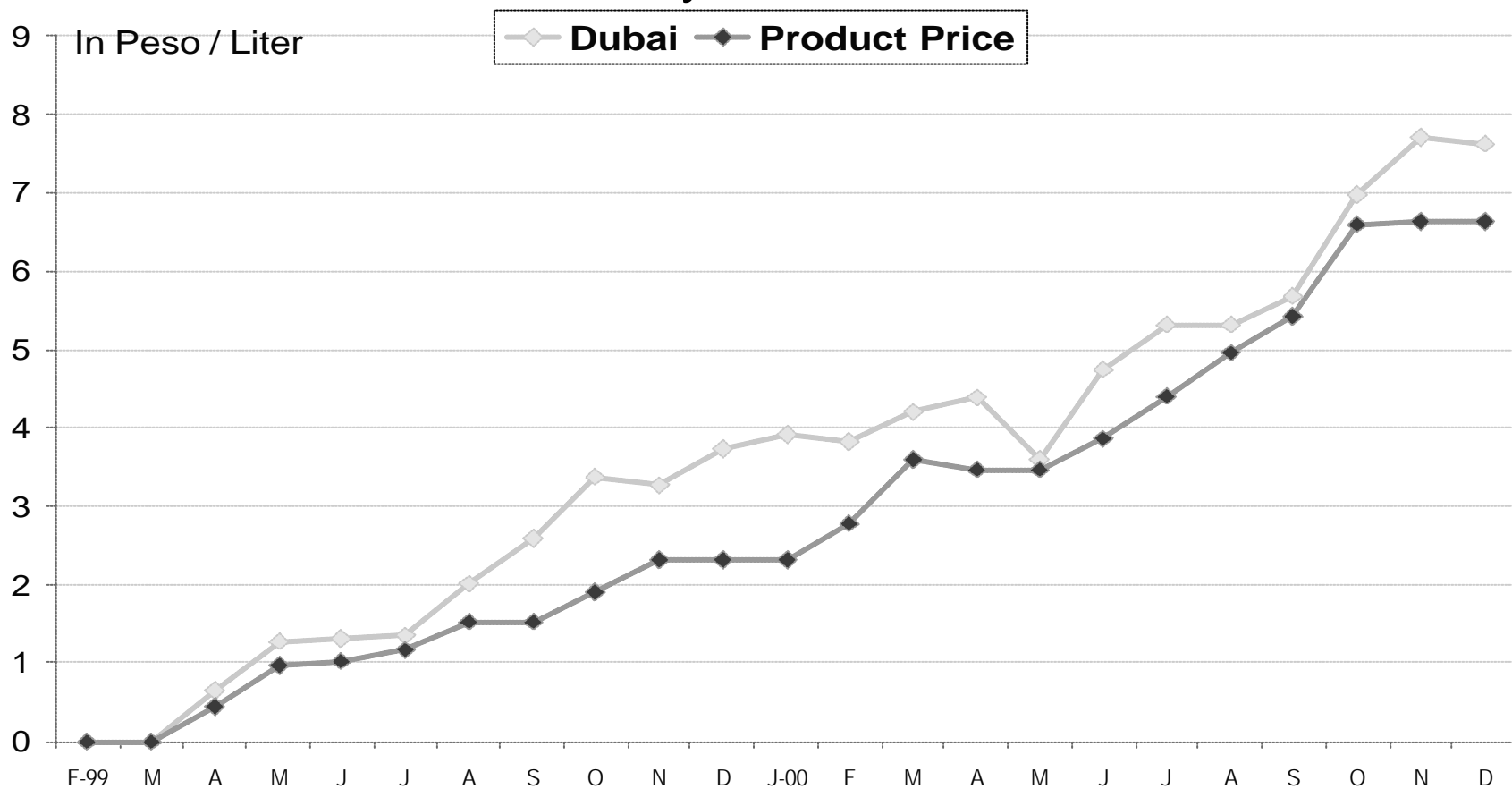
# Deregulation

- 1999 & 2000 oil price hike; peso decline



# Deregulation

- 1999 & 2000 oil price hike; peso decline
  - Cost under-recovery



# Deregulation

- 1999 & 2000 oil price hike; peso decline
  - Cost under-recovery
- 2001 stable crude prices
  - Cost recovery
  - Improved margins

# Credibility of Deregulation

- Stability of main cost components
  - Crude price
  - Foreign exchange rate
- Transparency
- Public transport policy

# Credibility of Deregulation

- Stability of main cost components
  - Crude price
  - Foreign exchange rate
- Transparency
- Public transport policy
- Rapid entry of new players
- Energy conservation/ diversification policy
  - Share of oil
    - POWER MIX: from 57% to 20%
    - ENERGY MIX: from 54% to 45%

# Industry Prospects

- Cautiously Optimistic
  - Petroleum demand
    - Growing consumption
    - Changing product mix
    - Stringent product specifications



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- Cautiously Optimistic
  - Petroleum demand
    - Growing consumption
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    - Stringent product specifications
  - Supply chain optimization
    - More efficient delivery schemes
    - Synergies among oil players

# Industry Prospects

- Cautiously Optimistic
  - Petroleum demand
    - Growing consumption
    - Changing product mix
    - Stringent product specifications
  - Supply chain optimization
    - More efficient delivery schemes
    - Synergies among oil players
  - Recovery of new investments
    - Product imports
    - Competition among local refiners
    - Public resistance to price increases
  - Government's long-term commitment

# **Downstream Oil Industry Deregulation**

MONICO V. JACOB  
CEO's Inc.  
Philippines

# Lessons on Energy Sector Liberalisation

The Makati Shangri-La Hotel

3-5 December 2001

At

Barrie

New Zealand

# The Customer is King

- We forget that the customer is king, at our peril
- Energy will always be political, especially in an economy that is heavily dependent on imported fuel
- There is never enough of this increasingly scarce resource, but without it economic progress slows
- The Philippines uses a similar quantum of energy to the NZ, but we have only 5% of your population, and still energy is scarce.
- The US uses twice as much energy per capita as NZ, and what happened this year in California.

# Implementation is the hard part of Liberalisation

- The essential elements to success are:
- Political will must not to be compromised
- Incumbents must not be allowed to reverse progress, although some may well try
- A lifetime's ways are hard for some to change
- Deeply ingrained past culture must change
- Reform targets and deadlines must be met

# NZ Experience 1986 -2001

- NZ was the first APEC country to liberalize
- We adopted a light handed regulatory regime
- Introduced competition at all levels, no price
- All franchises and protection was removed
- Customers could buy from any supplier
- Any supplier could sell to any customer
- Any player could enter the supply chain

# Step 1

## Creating a wholesale market

- Competition begins with a wholesale market where generators can bid in capacity
- Retailers can buy part of their supply on the spot market, to top up their hedge contracts
- Industry and major users can also buy in the wholesale market and on the spot market
- Our market is self regulating, has no government involvement or oversight
- You have chosen a more regulated structure for quite legitimate and historical reasons



# Step 2

## Generator Competition

- Multiple competing generators are essential
- New competitive cultures must be entered
- It is a major cultural shock for many people
- The strongest vested interests to slow the whole process are often found in this sector
- They are used to having considerable power
- Many individuals feel threatened by the loss of power and do not adjust to competition

# Step 3

## Retail Competition

- We deregulated everybody in a ‘big bang’
- You have chosen a staggered, slower path
- The mechanisms for switching customers are clumsy, it needs good simple process
- We now use a central register, where all customers, their meters and GPS are stored
- The customer ‘churn’ has now exceeded 300,000 about 20% of our customer base
- Poor service is a bigger factor than price in ‘churn’

# Step 4

## Isolating monopoly networks

- We were too economically pure and created complete ownership separation of networks
- Accounting separation from generation and retailing would have sufficed
- Our purity has weakened competition, not strengthened it, as it has reduced the number of competitive players from 40 to 7
- ODV – Optimised Deprivation Value has become the benchmarking and performance measurement tool for comparative purposes between networks
- We are moving from fixed to variable line charges

# Step 5

## Transmission

- We have a long stringy country like yours
- We have a 540 kilometre HVDC linking islands
- It is a classical monopoly network that one could have seemed invulnerable
- Competition has changed behaviour and investment
- New capital expenditure is now questioned
- Will new capital be stranded or by-passed
- \$1billion of planned new projects were abandoned because of the competitive risk of by-pass
- ODV has reduced value by a further \$1 billion

# Step 6

## Renewables, Energy Efficiency and Management

- We have built our electric system for 100 years on hydro and geothermal energy
- Now wind and biomass are increasing as our gasfields diminish in production
- Energy efficiency is increasingly important
- The Kyoto Protocol will be ratified in 2002 by N
- We have to reduce CO<sub>2</sub> by about 20%, a big ask when we have so little thermal generation, motor vehicles are our major CO<sub>2</sub> problem for reduction

# Summary

## The benefits of liberalization

- Better customer satisfaction
- Better allocation of scarce capital
- Better use of existing energy resources
- Better incentives for efficiency gains
- Uncapped market prices signal scarcity early
- Competition creates great innovation
- The energy industry becomes very sensitive and responsive to customer demands

## *Outline of presentation*

- Development of the Electricity Supply Industry (ESI) in Australia
- The need for deregulation
- The impact of structural change
- The impact of privatisation
- The performance of the National Electricity Market
- The need for further reform
- Conclusions and lessons to be learnt

## *The development of the ESI in Australia...*

- Australia is a Federation, with limited powers given to the Commonwealth Government by the States
- The States have protected their constitutional rights, which include electricity supply
- The State systems developed independently
- State and municipal Government ownership was the norm for many years - via semi-Governmental “Commissions”
- Interconnections have been slow to appear
- Four States are now interconnected
- Interconnected system has 37 GW installed and generates 160 TWh/a



*The need for deregulation arose in the 1980s....*

- Arose from concerns regarding :
  - Industry performance and low productivity
  - Overcapacity and lack of cooperation between the States
  - Financial implications for State Governments
- Industry Commission report 1991 identified benefits of deregulation
- Commonwealth and States agreed on broad objectives in 1991
  - Restructure to separate functions and introduce competition
  - Apply normal corporate requirements to all entities
  - Build stronger interconnections between State systems
  - Select new power plants on a “competitive multi-State basis”
  - Allow direct access to grids
  - Allow direct arrangements between generators and customers
- Not all the objectives have been achieved

*Structural change was the first step...*

- Separation of functions into generation, transmission, distribution and retail supply implemented
- Regulatory offices established
- Generation separated into competing corporations
  - Practices varied between States
- Distribution separated into competing corporations
  - Practices varied between States
- Competition allowed for retail supply to contestable customers
- Phased implementation of contestability in all States
- Now 16 major generators and over 20 retailers operating
- Only Western Australia is still to make the change

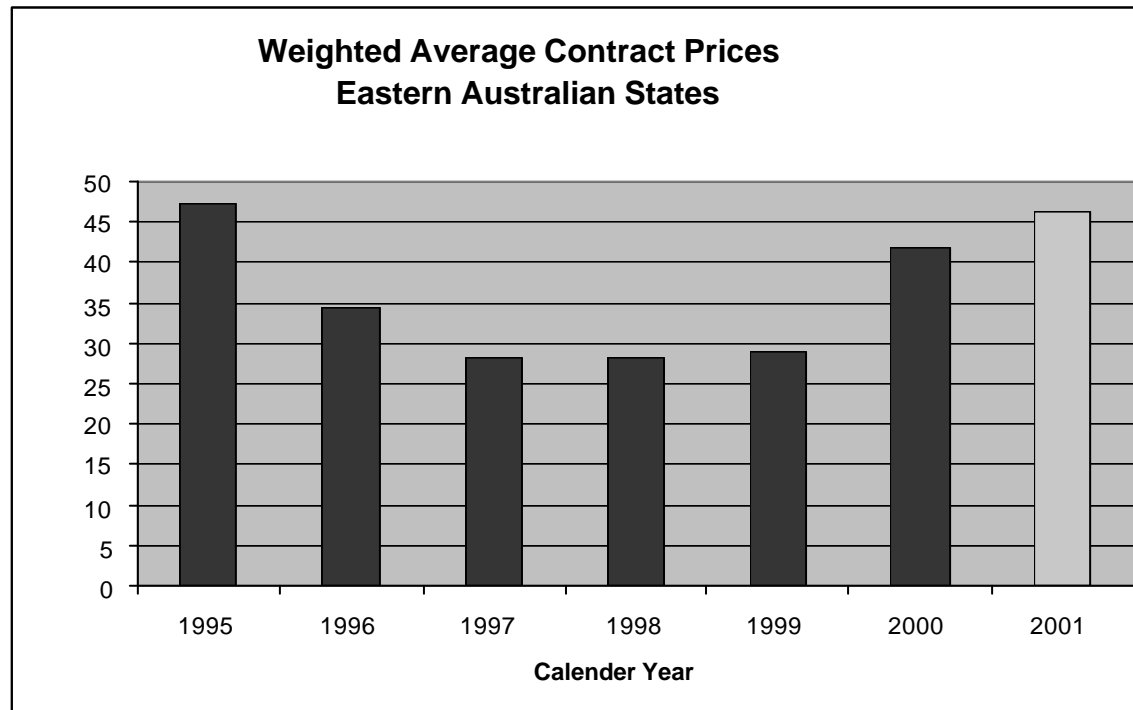
*Structural change phase was a success...*

- Labour productivity increased
  - 1900 MWh/man in 1990 > 5000 MWh/man in 2000
  - 65,000 employees in 1990 > 33,000 employees in 2000
- Power station availabilities increased
  - 80% in 1990 > 90% in 2000
- Significant reductions in cost base occurred in all States — even those with Government-owned corporations
- Unbundling and the introduction of competition is considered to have been very successful

*Performance of the National Electricity Market has been mixed...*

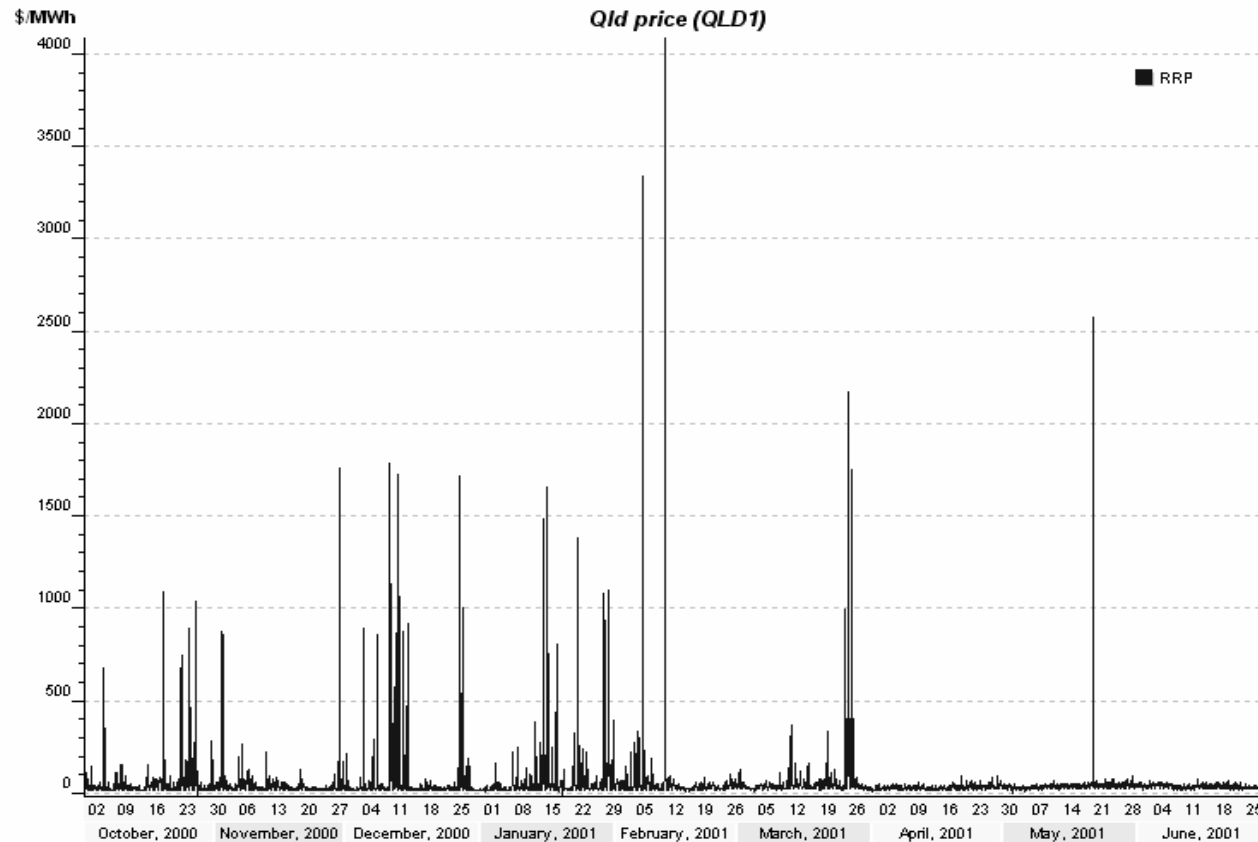
- Wholesale prices in Victoria and NSW were once low, but have risen substantially in 2000 and 2001, especially in summer seasons
- Prices in South Australia and Queensland have been exceptionally and unjustifiably high from the outset
- Prices are well above competitive market outcomes
- Reliability has not met the required standards
- Interconnections have not been able to progress
- Reserve margins in Victoria and South Australia are low
- Governance arrangements are under criticism
- Evidence of the use of market power to raise prices is growing

*Wholesale prices are rising...*



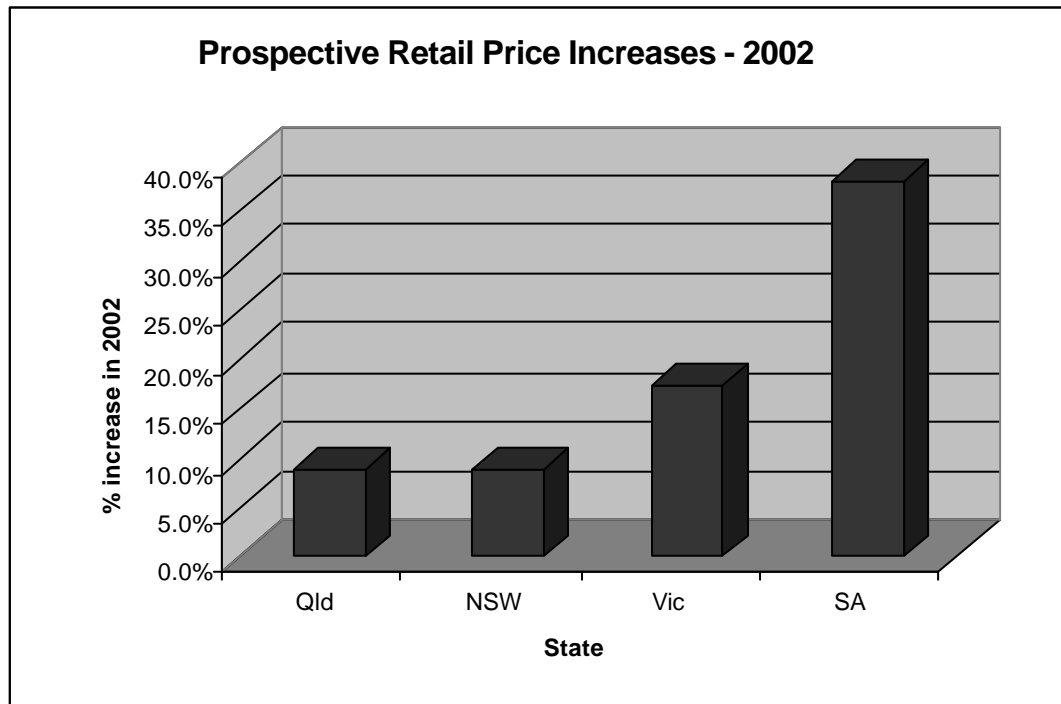
- They are now back to pre-reform levels — despite the lower cost base

*Wholesale prices are very volatile....*



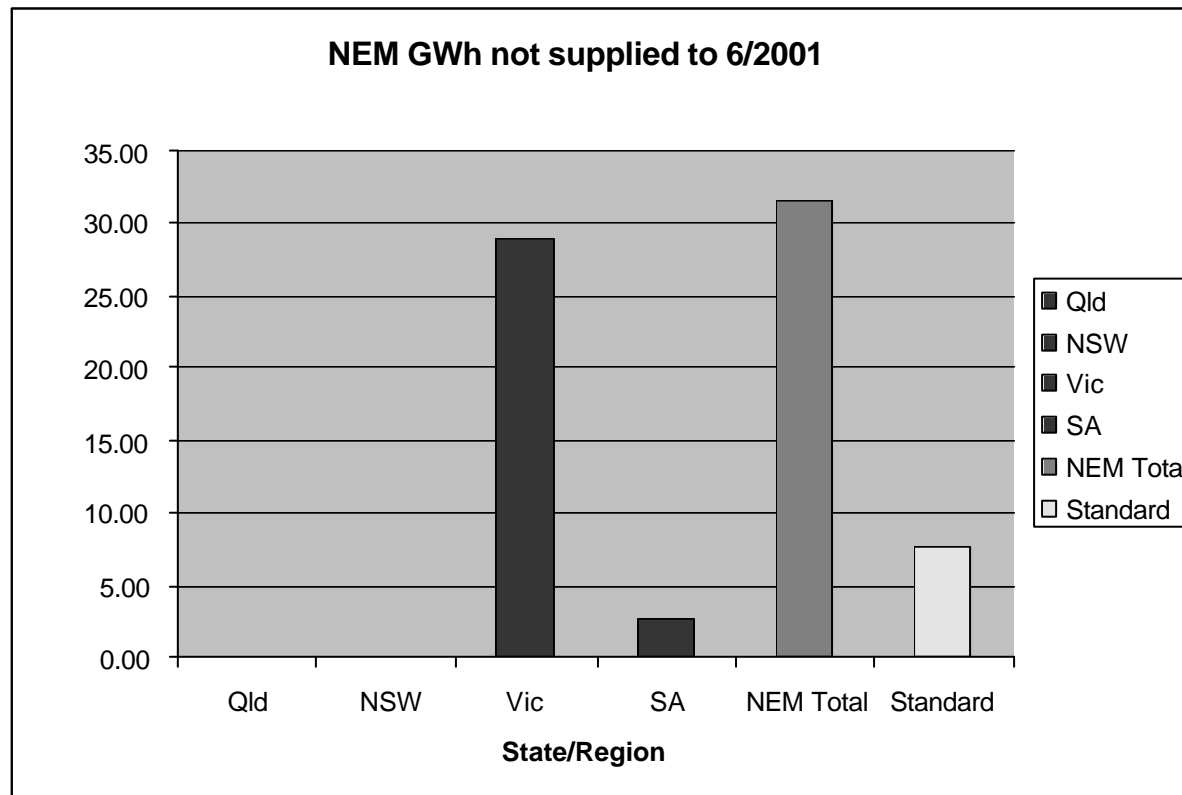
- Volatility adds risk to both generators and retailers

*These effects are lifting retail prices...*



- There is pressure to raise average retail prices significantly if present wholesale prices and risk margins persist

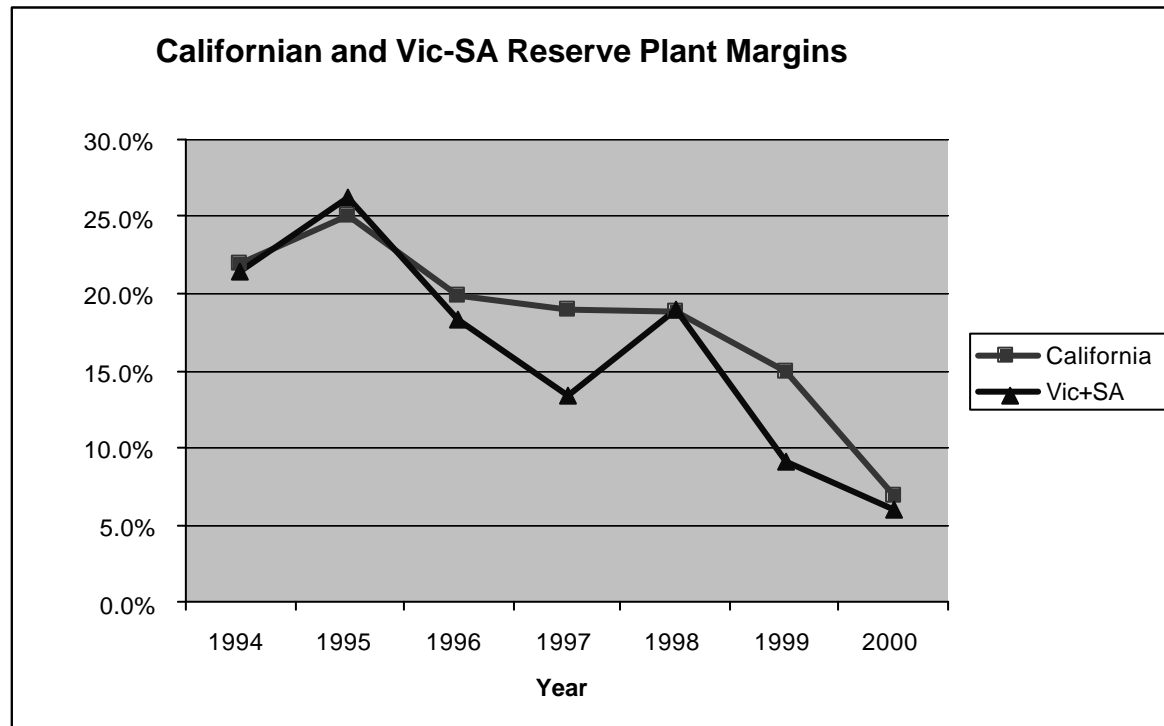
*Reliability has been below standard...*



- Reliability has failed to meet the Reliability Panel target



*Reserve margins have fallen in the southern States..*



- Reserve margins in Victoria and South Australia are low — problems during the next two summers may well be encountered
- Second-hand, small, low efficiency gas turbines being installed

*Interconnections have stalled....*

- Major interconnections have not occurred under the National Electricity Market rules
- New South Wales - Queensland (1000MW) was approved before the NEM started and has been a great success
- No firm progress yet on NSW>SA and NSW>Victoria
- Slow development of interconnections confines the National Market to a series of regional markets — with greatly reduced levels of competition and increased prices
- This is recognised as a major problem for the National Electricity Market

## *Market power problems are emerging in Australia...*

- Withdrawal of capacity — both physical and economic — at peak times now becoming commonplace
- Bids are changed when competition falls away to raise prices
- Extensive re-bidding taking place (800 rebids/day on average)
- “Financial Optimisation” and “increase profits” accepted as valid reasons for rebids
- This inhibits the development of effective long term hedging
- No effective monitoring or mitigation actions have been taken
- Investigations now proceeding to develop new controls to limit market power

*Regulation is a problem — and network pricing .....*

- Too many regulators at State and Commonwealth level
- Leads to duplication, inconsistency of decisions and avoidance of responsibility
- Regulation of networks is excessively detailed while regulation of generation bidding behaviour is almost non-existent
- Network pricing unresolved after many attempts
- Existing network pricing is illogical, discriminatory and expensive
- No one takes responsibility for losses or congestion

*Overseas developments are showing the way....*

- Scandinavia (NordPool), PJM and others have shown the way to direct bilateral trading plus access to a “power exchange” and last-hour balancing
- California's use of a UK-style mandatory spot market has undergone “fundamental modification” in favour of direct bilateral trading via contracts and power exchanges
- The UK — after many years of market power problems and high prices — finally concluded that “radical reform” was required. NETA has now started operation and is successful
- Only Australia now operates an old-style UK approach

*The blueprint for reform must include....*

- Creating genuine competition in the generation sector
- Building stronger interconnections between the States
- Separating out network businesses and re-allocating responsibilities
- Facilitating retail competition
- Reforming the trading system — no compulsory pool
- Reforming the network pricing system — to be simple
- Creating a single, competent National Regulator and regulating generation as well as networks
- Establishing a wide-ranging and expert independent Board of Inquiry

## *Conclusions and lessons learnt....*

- Australia has deregulated its ESI by unbundling functions and creating competition in generation and retail supply
- 70% of the ESI remains State Government-owned, but placed in competing corporations
- Structural change phase has been a great success and has lifted performance and reduced costs
- Experience with the National Electricity Market trading, network pricing and regulatory systems has been mixed
- The compulsory pool has shown itself to be prone to market power problems (as in UK and California)
- Wholesale and retail prices are rising at unacceptable rates
- Australia needs an independent Board of Inquiry to examine the problems and arrive at new solutions

# **Asia Pacific Economic Cooperation**

**“Lessons on Energy Sector Liberalization”**

***Makati City, Philippines***

***3 - 5 December 2001***

**Power Sector Restructuring in Chile**

**Vivianne Blanlot**

**Viceminister of Energy**

**Government of Chile**



# 1. Introduction

- **Chile was an early starter in economic reform, particularly in the energy sector (privatization carried out in the 80's)**
- **Investment decisions are private and the government has a regulatory role**
- **Gross Domestic Product (GDP) shows an average annual growth of 6.6% (1990-2000)**
  - Sustained economic development of the country requires constant expansion in the energy sector (demand grows at 7%-9% per year)
  - Strong investments (US\$7,500 million 1997-2000)
- **Price Policy**
  - Electricity: not regulated prices for large consumers, fixed by the National Energy Commission for small consumers; they must reflect the actual costs of producing, transmitting and distributing power in an efficient manner
  - Oil and gas: not regulated prices; follow international market prices.

## 2. How did we got here

- **1978: National Energy Commission created to lead energy reform**
- **1982: New Electricity Law, regulatory framework for the sector**
- **1983 to 1986: Main state owned electricity utilities restructure. Unbundling into distribution and generation-transmission companies**
- **1985 1987: privatization of distribution.**
- **1988-1989: privatization of generation-transmission companies**

## 2. What we had in 1990: the industry

- Two separate interconnected systems (IS)
- Some 15 distribution companies (DC)
- Largest DC concentrated 45% of demand in largest IS.
- 7 generation-transmission companies
- Largest GTC concentrated 70% generation capacity, 90% of transmission.
- Largest GTC, DC owned by same holding company.

## 2. What we had in 1990: the industry

- **Main Results:**
- **Substantial vertical G-T-D integration**
- **Transport (TyD) open access in theory, closed access in practice because of failure to regulate access prices.**
- **Very limited competition in generation: competition for the market between existing companies; barriers to entrance for new investors.**

## 2. What we had in 1990: regulatory capacity

- **National Energy Commission: Ministry and Regulator**
- **Weaknesses in technical and political capacities: lack of political independence; low budget and salaries; hence, dangers of regulatory capture.**
- **During the 90's, increasing weakness, conflict between government agencies, and between private sector and government agencies.**

### 3. The last decade

- **Evolution of the energy market:** fast capacity growth, companies kept share of market.
- **Partial energy integration with neighbor countries:** gas and oil pipelines, but no electricity national or international interconnections
- **Internationalization of the energy sector:** new foreign investment, change of companies ownership, due to a stable regulatory framework, macroeconomic and institutional stability.
- **Substantial progress in environmental protection:** Gradual implementation of the environmental legal framework.
- **Definition of a regulatory framework to explore and exploit national geothermal resources (1998)**
- **Virtually no institutional, regulatory, or structural changes.**

### 3. The last decade

## Electricity

- **Investment reached US\$ 3,300 millions (1990-1997)**
- **Installed Capacity: average annual growth 9.1% (1990-1998)**
  - 4,400 MW in 1990 to 10,650 MW in 2000
  - thermal/hydraulic: 45% oil and coal/55%hydro in 1990 ; 35% gas/65% hydro 2000
- **Generation: average annual growth 8.5% (1990-1999)**
  - 18,370 GWh in 1990 to 41,600 GWh in 2000
- **Rural Electrification Policy** (Coverage 55% in 1992 v/s 78% in year 2000)

## Consumption of Secondary Energy 1978-2008

|                                 | Teracalories |         |         |         |                   |
|---------------------------------|--------------|---------|---------|---------|-------------------|
|                                 | 1978         | 1988    | 1998    | 1999    | 2008 <sup>e</sup> |
| Oil and Natural Gas Derivatives | 54%          | 45%     | 43%     | 41%     | 39%               |
| Natural Gas                     | 6%           | 7%      | 13%     | 16%     | 28%               |
| Coal and Coke                   | 12%          | 16%     | 17%     | 17%     | 7%                |
| Electricity                     | 8%           | 10%     | 11%     | 11%     | 16%               |
| Firewood and other              | 20%          | 22%     | 16%     | 15%     | 10%               |
| Gross Consumption               | 96,964       | 127,857 | 264,754 | 286,266 | 550,533           |
| Index                           | 100.00       | 131.86  | 273.04  | 295.23  | 567.77            |
| Average Rate of Growth          |              | 2.8%    | 7.6%    | 8.1%    | 7.6%              |

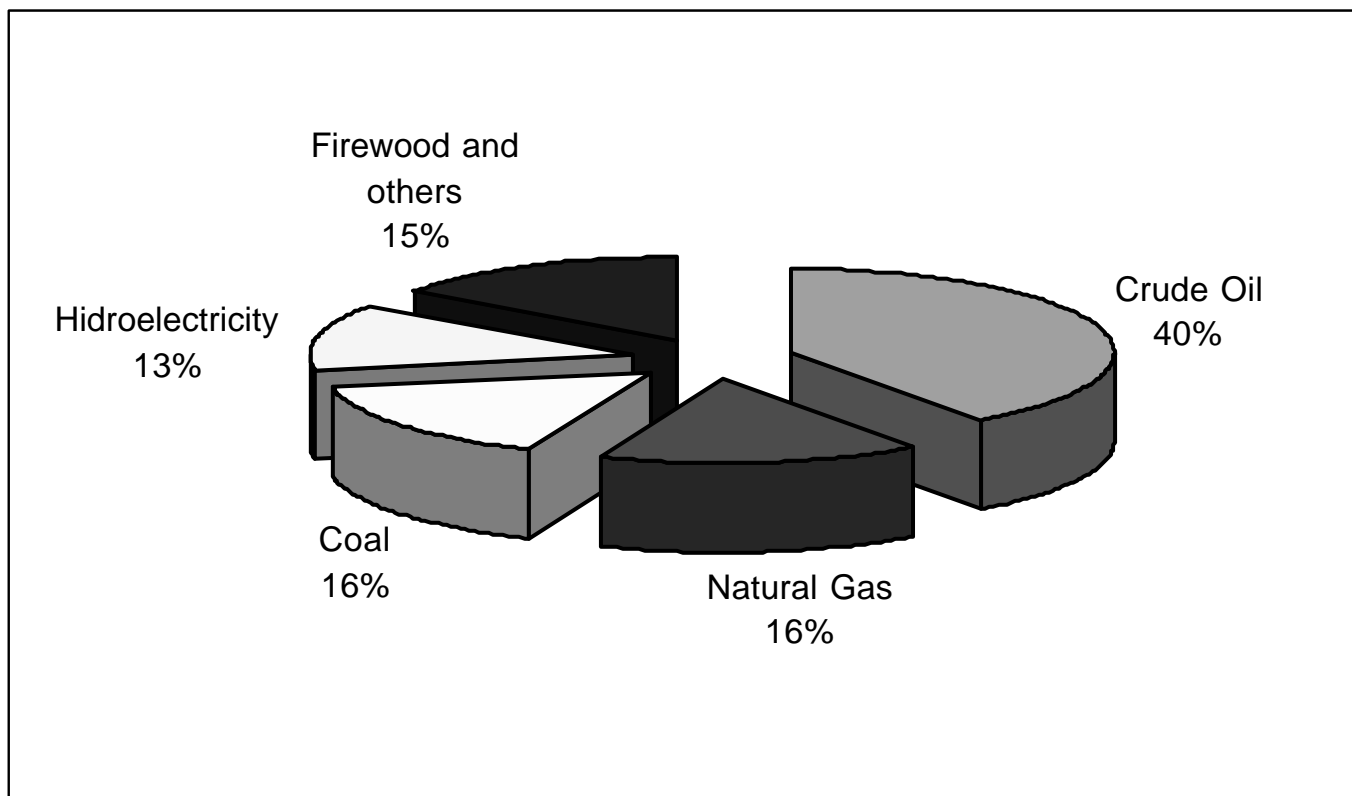
e: Estimate

Considers electricity with a caloric equivalence of 860 Kcal/KWh.

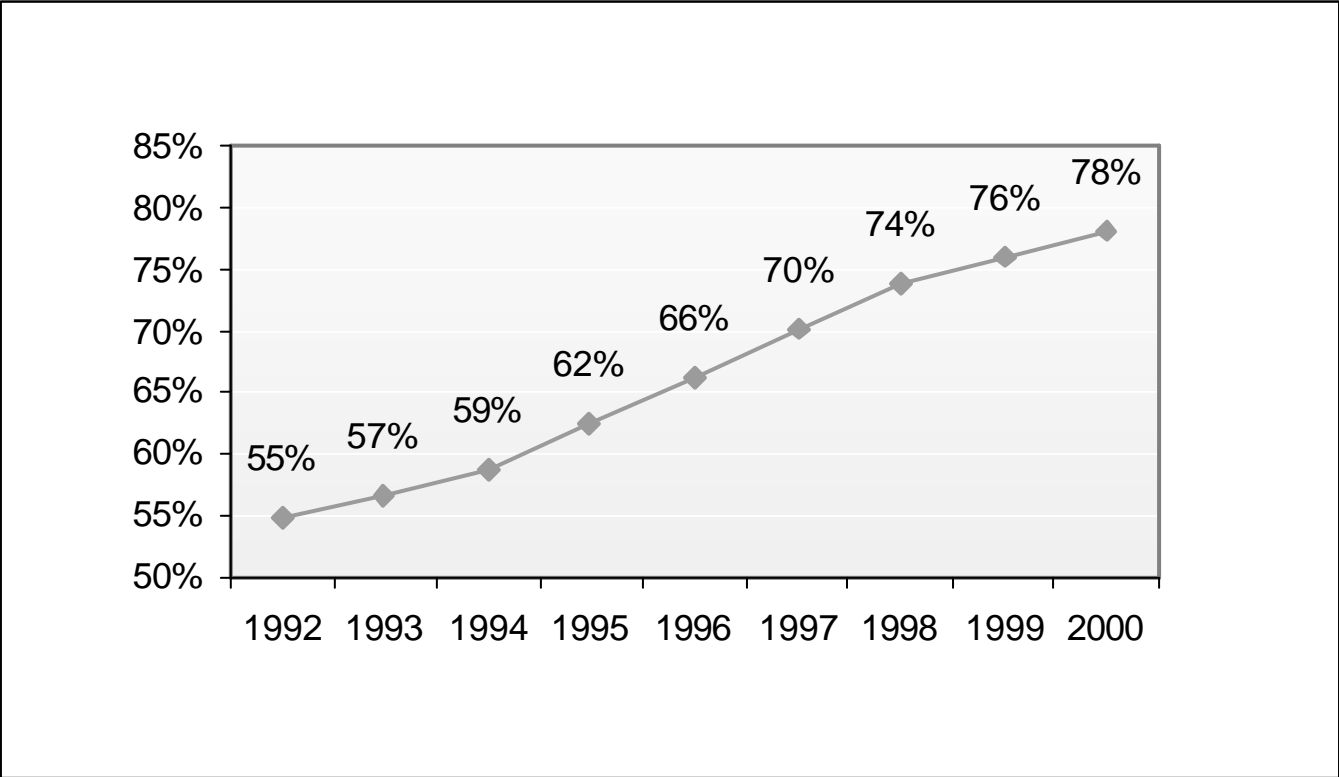
Source: CNE



## Energy Matrix 1999 in Teracalories



# Evolution of Rural Electrification Coverage, 1992-2000



### Total Installed Capacity (MW)

|                  | 1990  | 1991  | 1992  | 1993  | 1994  | 1995  | 1996  | 1997  | 1998  | 1999  | 2000   |
|------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| Thermal          | 2,013 | 2,016 | 2,091 | 2,169 | 2,168 | 2,667 | 2,928 | 3,450 | 4,405 | 5,914 | 6,624  |
| Hydraulic        | 2,431 | 3,101 | 3,111 | 3,254 | 3,280 | 3,287 | 3,788 | 3,828 | 4,018 | 4,027 | 4,027  |
| <b>Total</b>     | 4,444 | 5,117 | 5,202 | 5,423 | 5,448 | 5,954 | 6,716 | 7,278 | 8,423 | 9,941 | 10,651 |
| Annual Variation |       | 15.1% | 1.7%  | 4.2%  | 0.5%  | 9.3%  | 12.8% | 8.4%  | 15.7% | 18.0% | 7.1%   |

### Total Power Generation (GWh)

|                  | 1990   | 1991   | 1992   | 1993   | 1994   | 1995   | 1996   | 1997   | 1998   | 1999   | 2000e  |
|------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Thermal          | 9,447  | 6,833  | 5,623  | 6,792  | 8,350  | 9,633  | 13,910 | 14,338 | 19,544 | 25,250 | 21,929 |
| Hydraulic        | 8,927  | 13,128 | 16,698 | 17,213 | 17,248 | 18,748 | 17,171 | 19,567 | 16,415 | 14,283 | 19,669 |
| <b>Total</b>     | 18,374 | 19,961 | 22,321 | 24,005 | 25,598 | 28,381 | 31,081 | 33,905 | 35,959 | 39,533 | 41,598 |
| Annual Variation |        | 8.6%   | 11.8%  | 7.5%   | 6.6%   | 10.9%  | 9.5%   | 9.1%   | 6.1%   | 9.9%   | 5.2%   |

### **Electric power prices charged to end-users**

| <b>ZONE</b>       | <b>Residential<br/>US\$c/KWh</b> | <b>Commercial<br/>US\$c/KWh</b> | <b>Industrial<br/>US\$c/KWh</b> |
|-------------------|----------------------------------|---------------------------------|---------------------------------|
| <b>North</b>      | <b>10,78</b>                     | <b>9,62</b>                     | <b>5,53</b>                     |
| <b>Central</b>    | <b>8,6</b>                       | <b>8,17</b>                     | <b>5,39</b>                     |
| <b>Aysen</b>      | <b>17,89</b>                     | <b>17,18</b>                    | <b>11,57</b>                    |
| <b>Magallanes</b> | <b>14,51</b>                     | <b>12,82</b>                    | <b>9,19</b>                     |

### 3. Concerns as the last decade ended

## Electricity

- **Falling prices affected new investment after 1998.**
- **Lower reliability and security as the decade ended.**
- **Growing conflictivity between companies on systems operational rules and decisions.**
- **Low and distorted incentives to invest in transmission; growing reliability and capacity bottlenecks.**

## 4. Investments needs in the Energy Sector

|   | 1997-2000 | 2001-2004 |
|---|-----------|-----------|
| TOTAL                                     | 7,441     | 4,852     |
|   |           |           |
| TOTAL NATURAL GAS SECTOR                  | 2,015     | 471       |
|   |           |           |
| TOTAL OIL AND PETROCHEMICAL SECTOR        | 2,138     | 2,149     |
|   |           |           |
| TOTAL ELECTRICAL SECTOR                   | 3,284     | 2,202     |
|   |           |           |
| TOTAL OTHER (Coal, Geothermal, Renewable) | 5         | 30        |

# 5. Coming Ahead

## Electricity

- **Generation:** According to government's indicative planning, 5,000 new MW will be needed between 2001 and 2009 (62% combined cycle plants) to supply the estimated demand
- **Distribution:** New investments are needed to reach the requested quality
- **Transmission:** According to government planning, 2,500 new MVA will be needed between 2001 and 2009 (improvement of the actual network, and new national and international connections)
- **120,000 rural homes without electricity:** Renewable energies to reach disperse communities
  - North: high solar radiation ==> fotovoltaic systems
  - Coasts and Center: wind ==> wind-power systems
  - South: wind, waterfalls ==> wind power and micro hydraulic plants

## 6. What we want to happen

- Sustained growth of electricity needs, about one combined cycle per year (400 to 600 Mw up to 2009).
- Introduction of new renewable resources (geothermal, wind, solar) for interconnected and isolated rural systems
- Enhancement of open entrance to private investment in geothermal development, rural electrification, electricity generation.
- Government commitment with sound economic policy in energy; and priority to international integration /gas and electricity interconnections.
- Legal electricity framework reform to improve competition, reduce market barriers to entrance, deregulate prices, stimulate access of new investors to the market (second generation reform)



# 7. Electricity sector main challenges

- Short term problems and decreased rate of investment due to financial crisis, drought, and overinvestment between 1994 and 1997
- Reduction of security and reliability at the generation-transmission systems
- Precarious balance supply-demand for next 3 years
- Need to update regulatory framework, to enhance competition, open access to markets, and security and quality of supply.

# 7. Second Generation Electricity Reform

- Main features:
- Accent on competition “for the market”
  - Accent on long term bilateral contracts between supplier and consumer.
  - Deregulation of consumers 200Kw to 2000 Kw.
  - Creation of short term “adjustment market” managed by independent entity (energy exchange)
  - Creation of independent operator of interconnected systems
  - Introduction of the “energy broker”
  - Explicit definition of supplier responsibility in contracts
  - Improvement of price setting administrative processes, to enhance transparency, consumers participation, and reduce conflictivity
  - Transmission charges regulated , based on average long run development cost.

# 7. Second Generation Electricity Reform

- **Market organization:**
  - **Independence of Market and System Operator**
  - **Main Transmission Systems own and operated by companies independent from Generators and Brokers.**
  - **Deregulation of consumers 200Kw to 2000 Kw.**
  - **Energy broker, supplies energy through long term contracts, arranges fees for use of transmission and distribution systems.**

# 7. Second Generation Electricity Reform

- Regulated segments:
  - Access fees for Main Transmission and Distribution systems fixed by Regulator, administrative processes open to participation of different stakeholders.
  - Access fees equivalent to medium term average development cost for an optimal system.

# 7. Second Generation Electricity Reform

## ■ Expansion of Transmission Systems

- Transmission systems can be private or subject to open access and regulation.
- Main Transmission access regulated, payments by users (all agents that buy and sell) is mandatory.
- Transmission owner responsible for system expansion, according to agreed expansion plan (regulator, owner, and users participation).
- New Interconnections (National or International) defined by agreed expansion plan. Developed by company that submits best offer.

## 8. Reform of Regulatory Body

- Reestructuring of regulatory institutions
- Creation of an Independent Regulatory Body: Energy Regulation Commission, state body, independent from government.
- Separation of policy role of government, viceministry of energy within Ministry of Economy.

## 9. Lessons from our reform process

- **Sweet and sour experience; the sweet:**
  - **Privatization meant higher operative and investment efficiency;**
  - **Prices initially went up, then stabilized at acceptable levels.**
  - **Investments kept up with demand up to 1998.**
  - **State subsidies focalized on low income, rural electrification, and in other high priority social investment.**

# 9. Lessons from our reform process

- **Sweet and sour experience; the sour:**
  - **Technology change (CCGT) lowered prices, investment slowed down, risk of energy shortages.**
  - **Rediscovery of the instability of the investment cycle?**
  - **Rediscovery of the need for low barriers of entry!**
  - **If we want competition in generation and retail supply, sooner or later it is necessary to separate competitive from non competitive segments: better sooner than later!**
  - **The independent regulator will always be needed; create it at the beginning!**



# **THE U.S. EXPERIENCE: CALIFORNIA ELECTRICITY SECTOR**

## **Inside the Eye of the Storm Today**

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**Presentation to the APEC Workshop on  
Lessons On Energy Sector Liberalization  
December 3-5, 2001  
Manila, Philippines**

**Nick Nichols  
Director  
Navigant Consulting, Inc.  
Sacramento, California**



# Context: Navigant Consulting

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- **Publicly Traded Management Consulting Firm (NYSE: NCI); 1,200 People**
- **Advisor in Large, State Power Crisis Interventions**
  - **New York - LIPA, \$7 Billion in Bonds**
  - **California DWR, \$12 Billion bond issue**
- **Financial Advisor in the Purchase or Sale of 67,000 MW of Generating Capacity (Over \$35 Billion) in Past Four Years**



# Changes in the Rules Create Foundation for Future Prices

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- **Restructuring of the electric power market in California in 1996-98**
- **The State's three large Investor Owned Utilities sold most of their power generation assets (except for nuclear, hydroelectric, and a few selected fossil fuel generators) to non-regulated power producers**
- **A rate cap was put in place on retail electric rates**
- **All short-term energy sales were directed through the new California Power Exchange -- which cleared prices at the highest marginal cost**



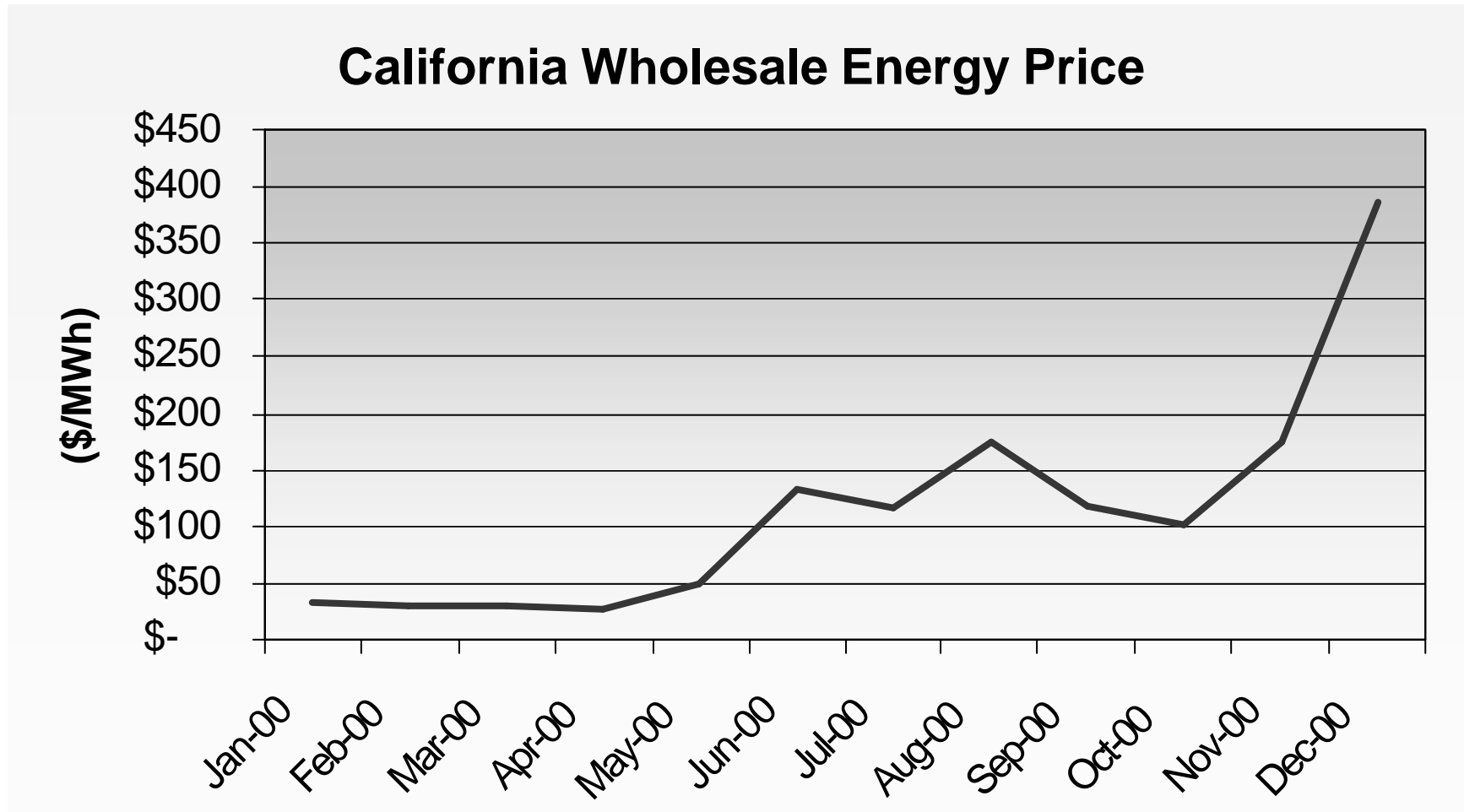
### Some Preliminary Market Activities

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- **No Long-Term purchase contracts**
- **Buyers began shorting the PX Day-Ahead market**
- **Sellers played the same game**
- **Over 1/3 of total requirements of the IOU customers was being bought in the hourly imbalance market**

# By Late Summer 2000, the “Storm” Was Gathering Momentum - and Reached Full Force by Year-end

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## Extraordinary Outages Shocked the System

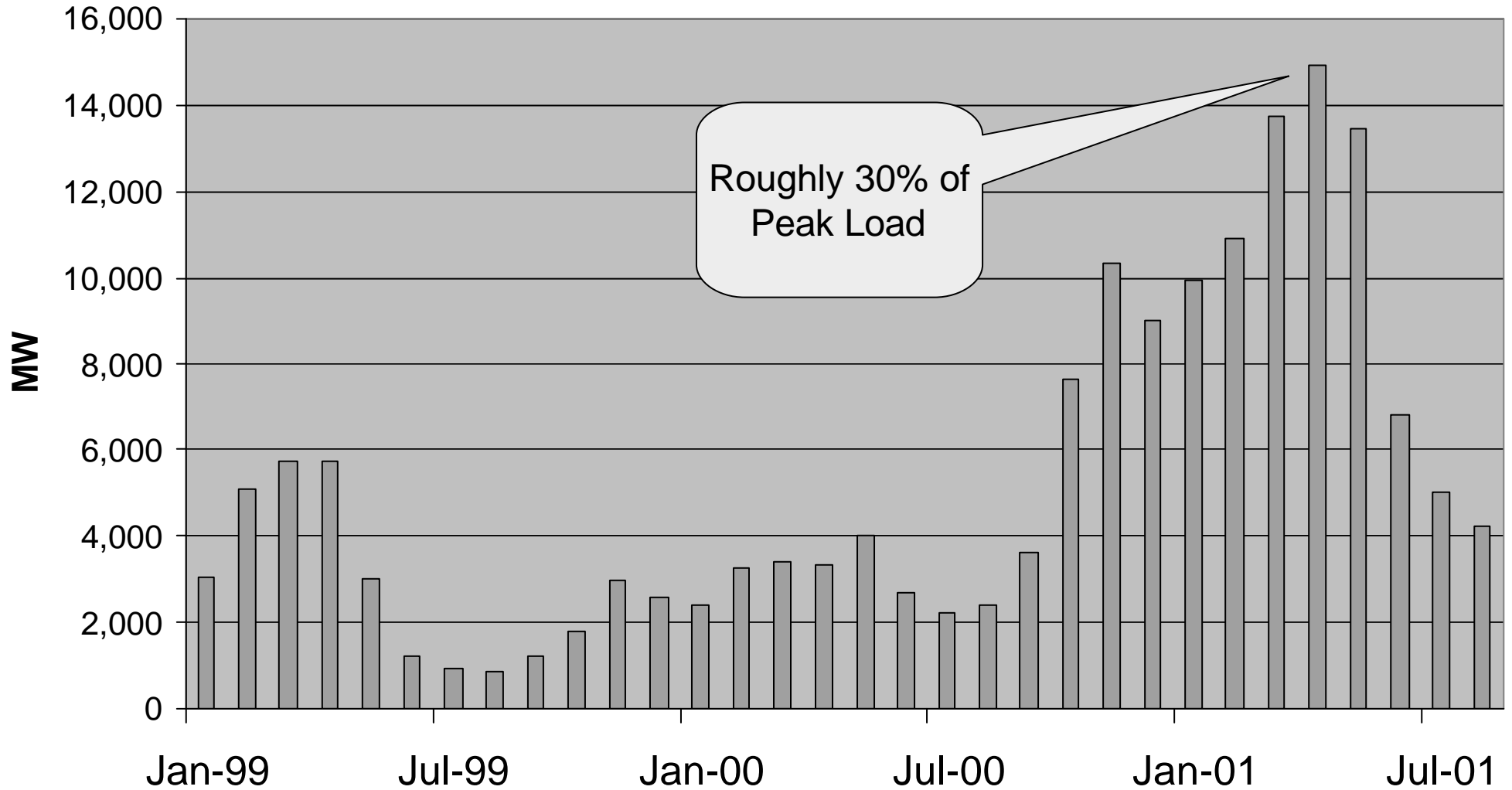
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- **Generators began “calling in sick”**
  - Up to 13,000 MW of total generating capacity was off-line (1/3 of winter peak demand)
- **Causes included**
  - Weather
  - pollution control installation
  - advanced plant age
  - stalled payments
  - (virtual) collusion?



Amory Lovins ....

# Statewide Average Daily Megawatts Offline



# **Staggering Daily Costs of Energy Was Unsupportable**

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- **Daily cost of energy in January 2001 ranged from \$50 million to \$90 million**
- **(or \$2 to \$4 million per hour)**





# Staggering Daily Costs of Energy Was Unsupportable

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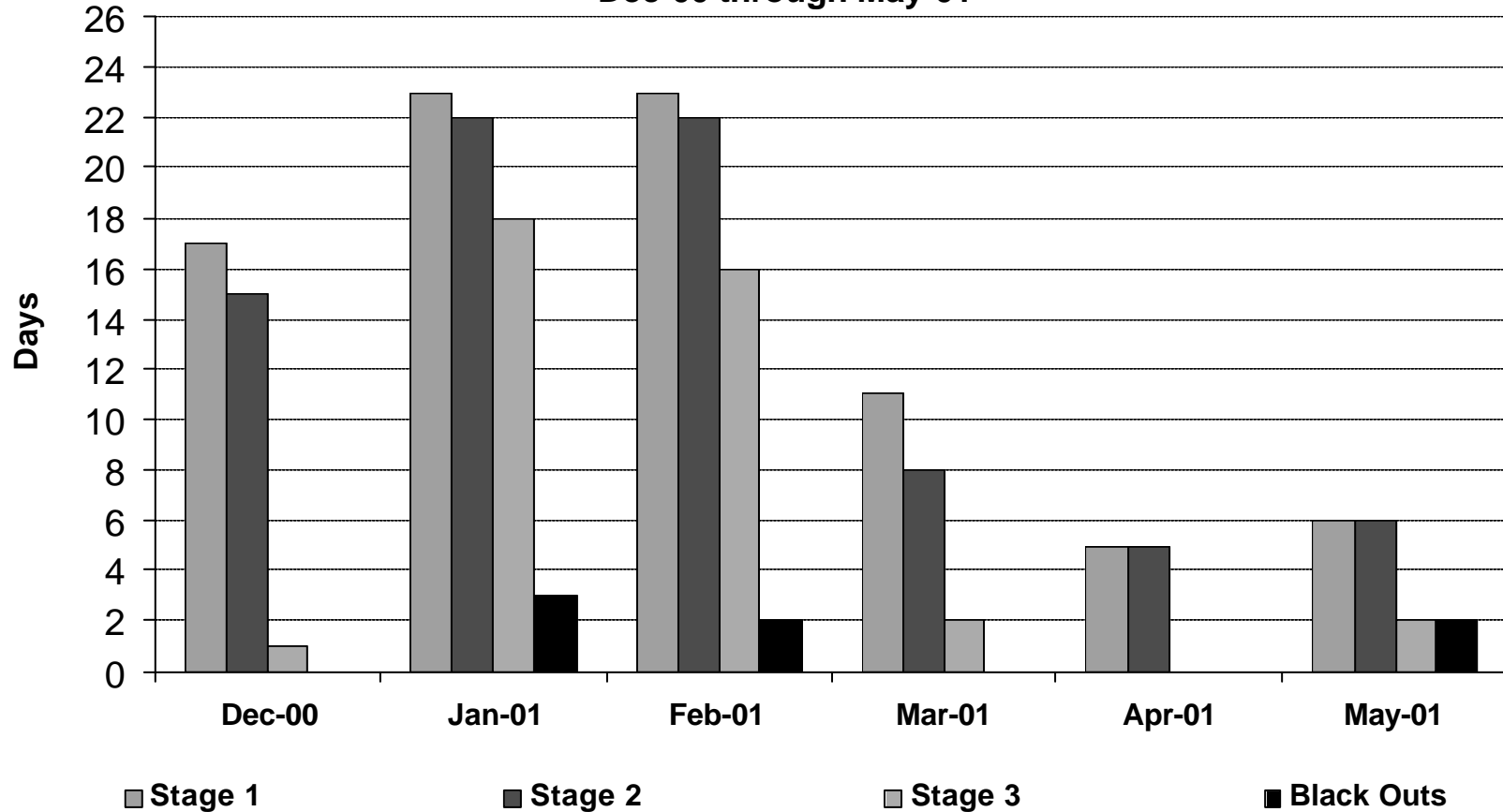
- On January 30, the California Power Exchange ceased trading and sought creditor protection
- Between the last week of January and the first week of February, both PG&E and Southern California Edison defaulted on debt payments, quickly falling below investment grade credit
- The California Independent System Operator, not receiving payments for energy it purchased, became non-creditworthy
- Many power suppliers quit selling in California altogether, creating more price pressure
- PG&E later (April 6, 2001) filed for bankruptcy protection



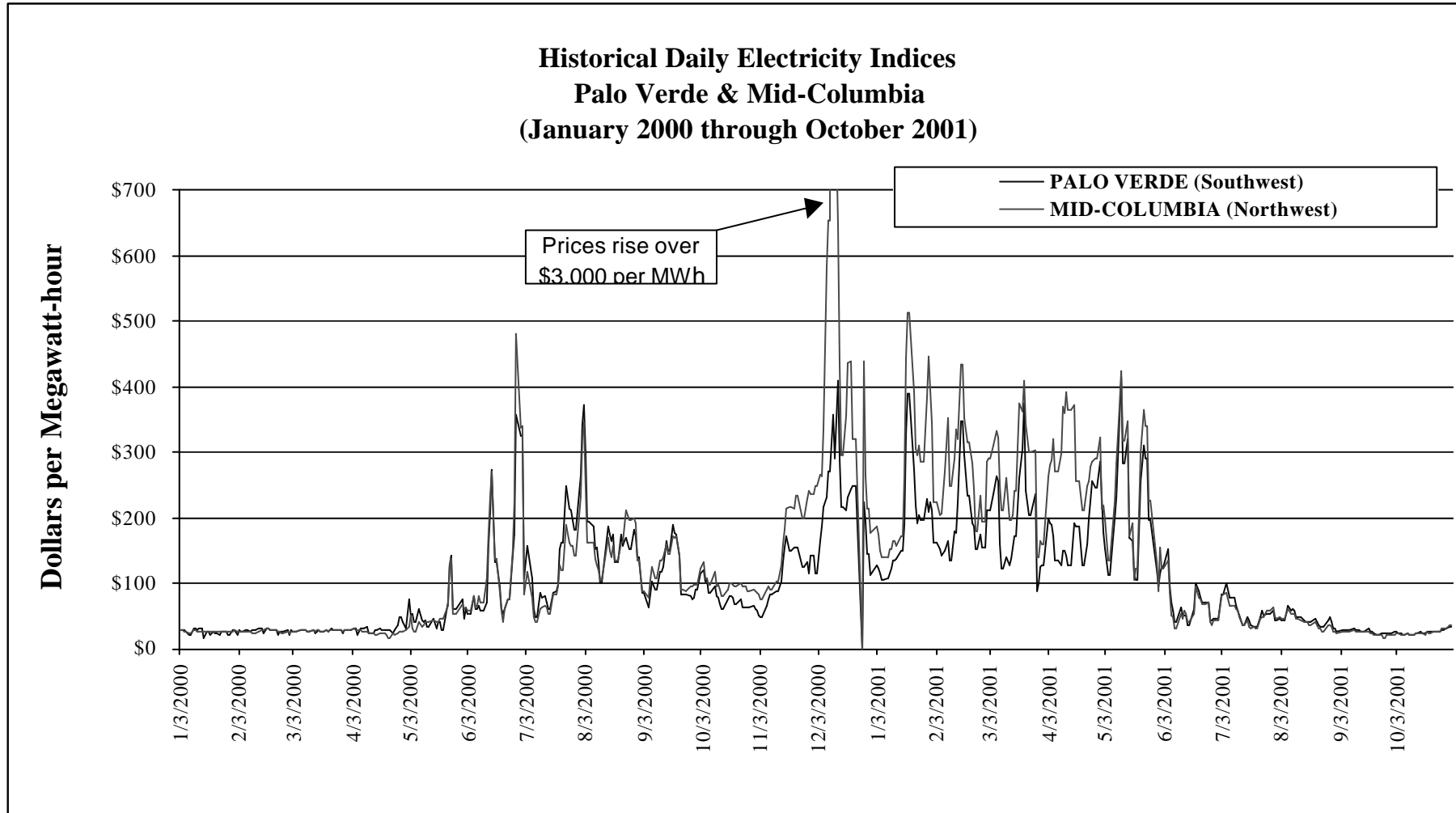
## The State Went on Alert and Rotating Blackouts Began

### CAISO Stage Alerts & Rotating Blackouts

Dec-00 through May-01



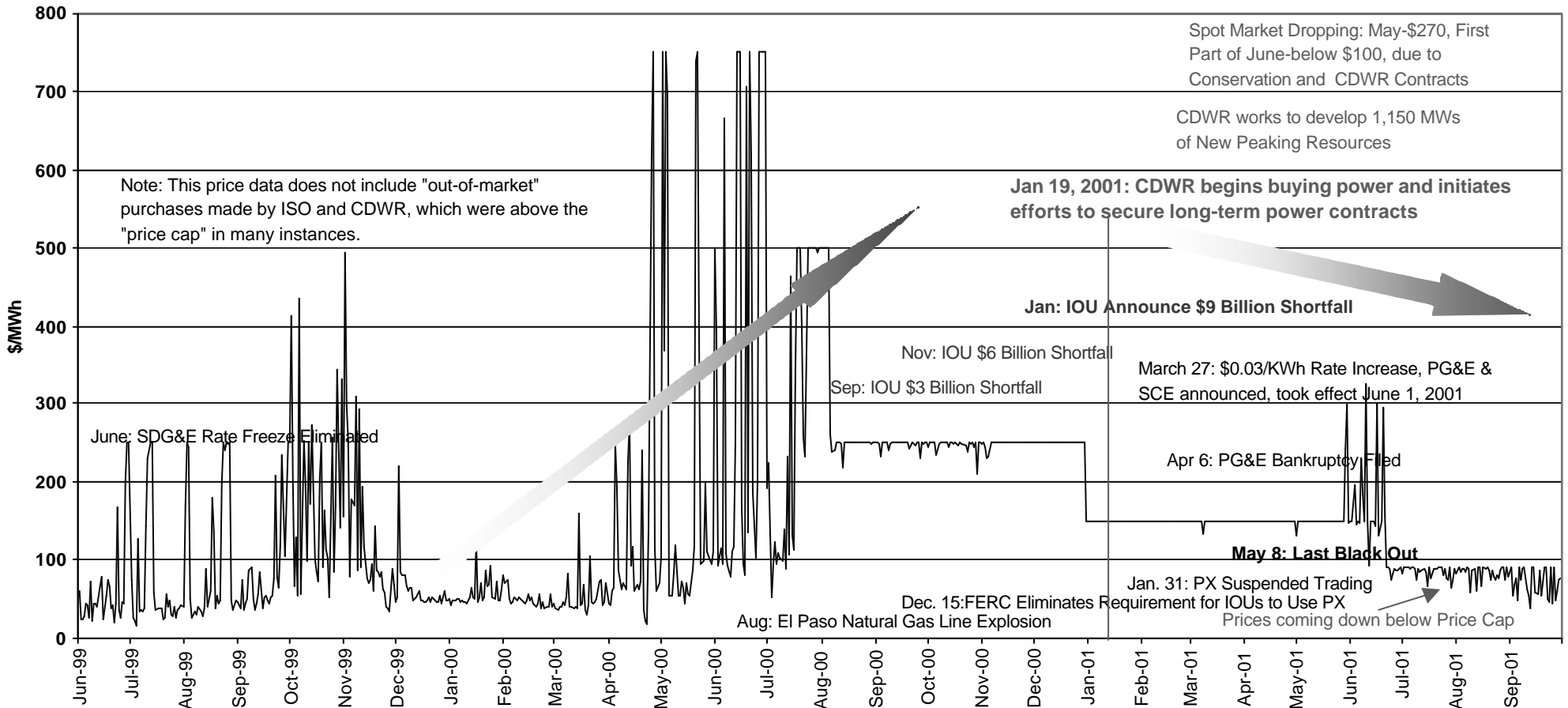
## Regional Prices



# California ISO Price Saga

## Maximum Daily Actual Electrical Price (Ex Post)

Ref: California ISO Prices Through September 30, 2001: CDWR Revenue Requirement Filing, November 5, 2001; NCI



# The State Acted in January to Keep the Lights On

---

- **California Department of Water Resources (DWR) given authority to purchase the “net short” energy that the IOUs cannot supply to customers from their own sources**
- **Legislation Enacted (Assembly Bill 1X and Senate Bill 31X )**
  - **provided for DWR’s role in purchasing and reselling power to retail customers**
  - **established temporary funding from the General Fund**
  - **authorized issuance of bonds**
  - **required recovery of costs through rate increases**
- **Created a self-supporting and creditworthy structure based on revenues for DWR**
  - **enables DWR to smooth out costs of power over term of financing**
  - **allows DWR to use financing to compensate for volatility in energy markets**



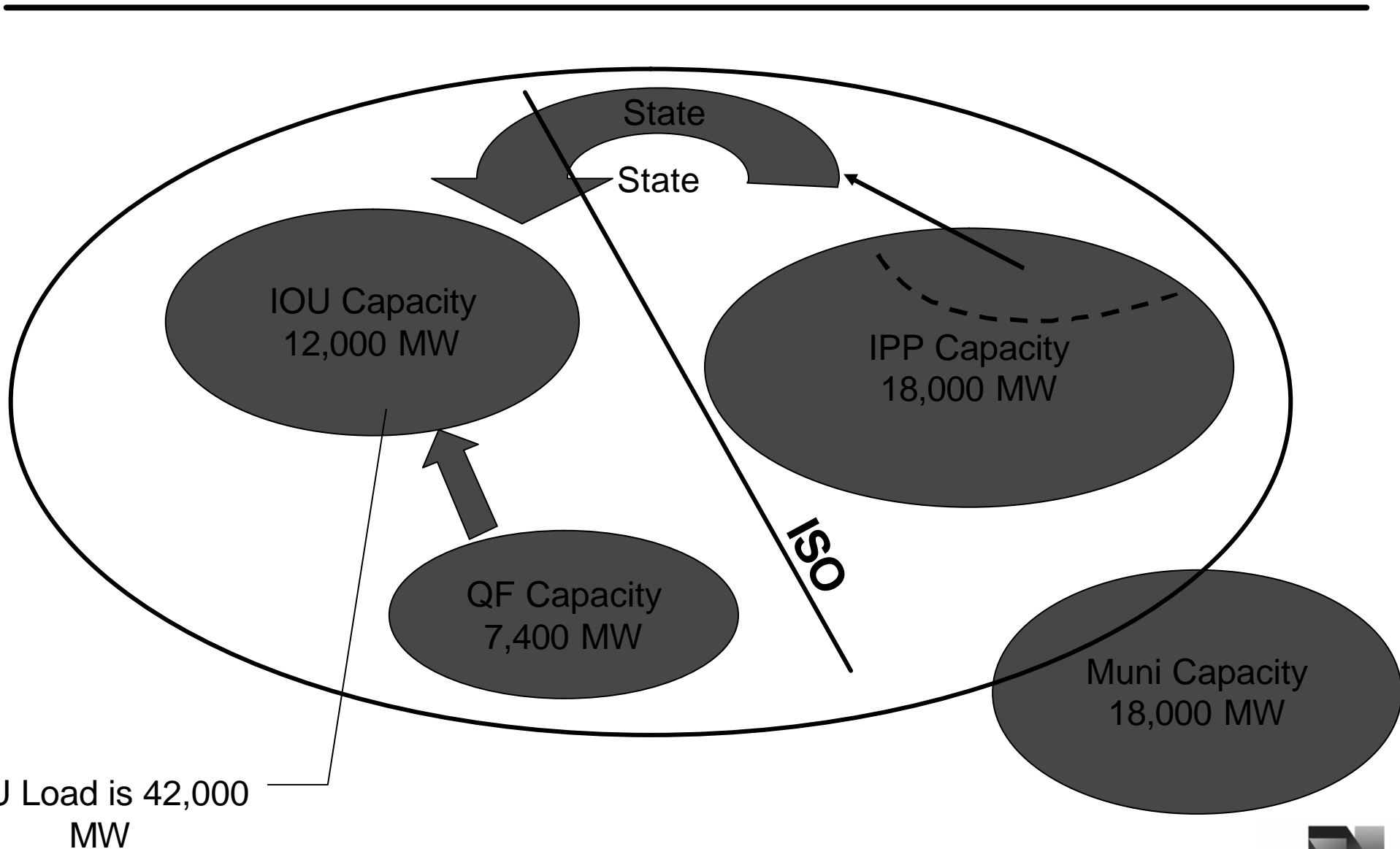
## **Stabilizing the Market**

# **The State's Strategy Aimed to Stabilize the Market and Bring Prices Down**

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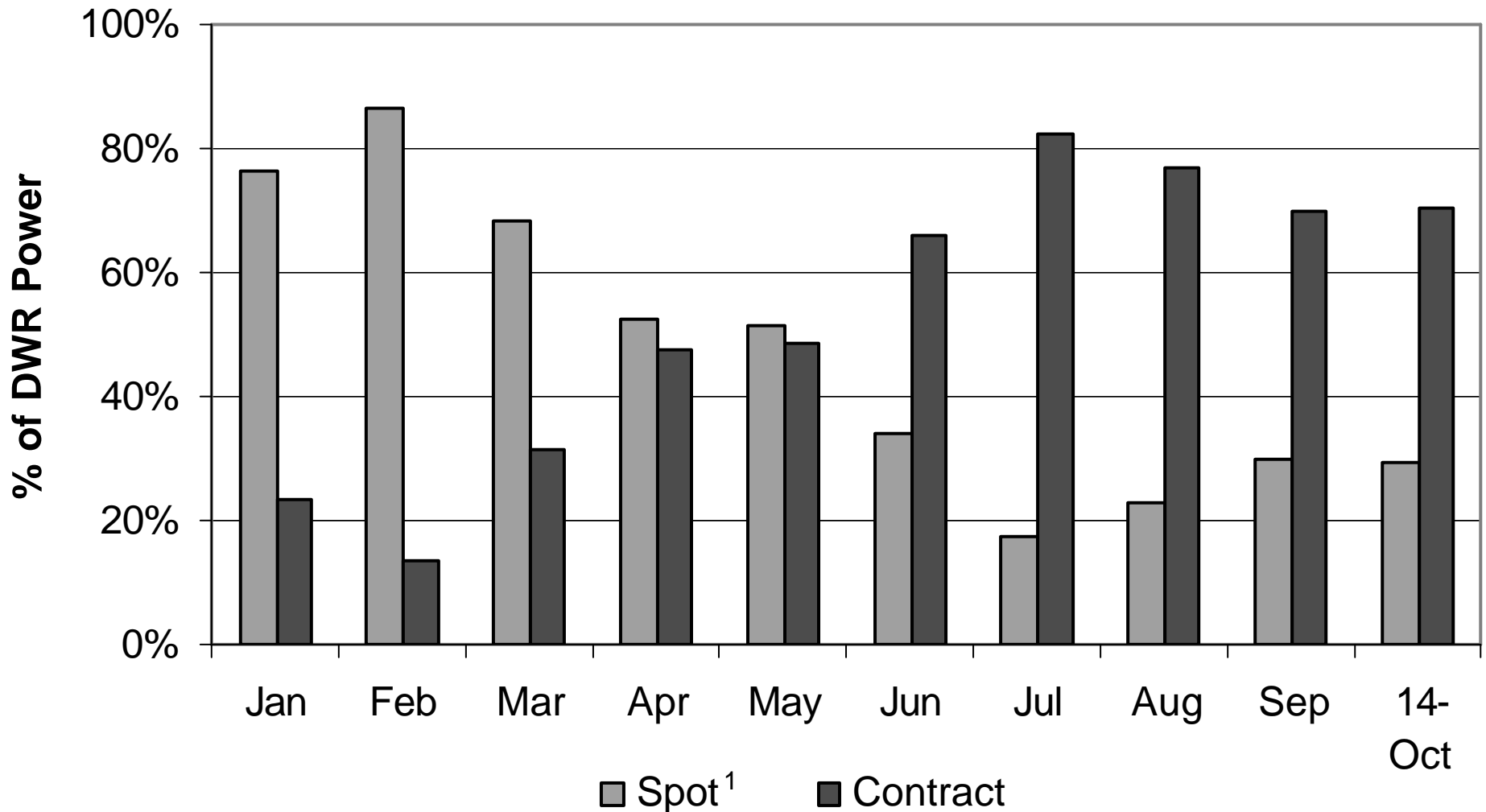
- **Increase power supply in State by streamlining siting process**
- **Return existing power plants to service to restore existing capacity**
- **Alleviate dependence on spot market purchases through new power contracts**
- **Prioritize contracts tied to new generation capacity in the State**
  - **Emergency Permitting Procedures**
- **Promote conservation and demand reduction**

# The Existing Energy Market



## California's Spot Market Exposure has Declined

### Comparison of Spot to Contract Power (2001)

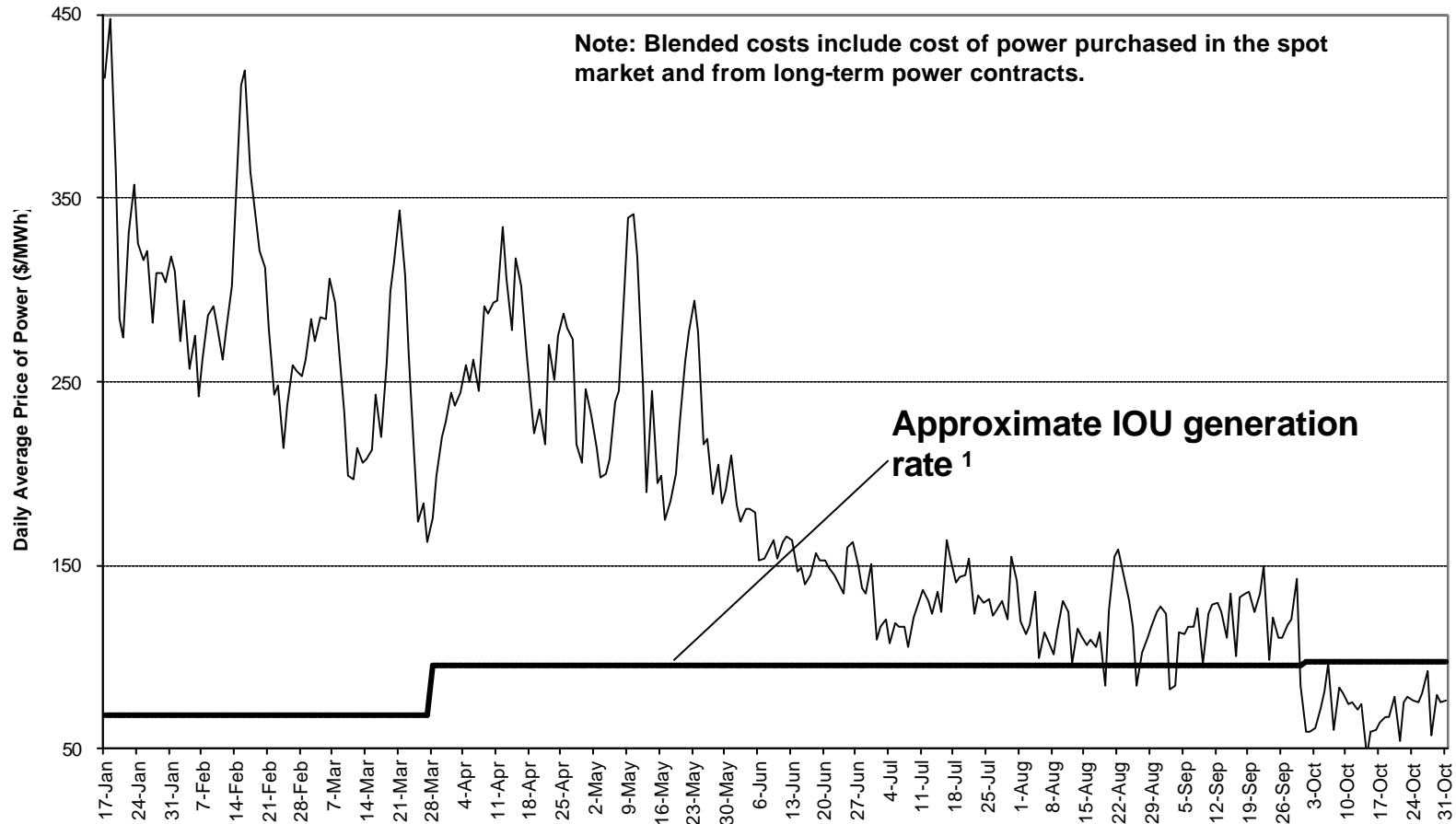


<sup>1</sup> Spot includes only day ahead and hour ahead purchases





## Prices Return to Near-Normal



<sup>1</sup> Rate is weighted average of total IOU sales. Includes \$30/MWh increase to PG&E and SCE generation rates on 3/29/01 and a \$14.60/MWh increase to SDG&E generation rates on 10/1/01.



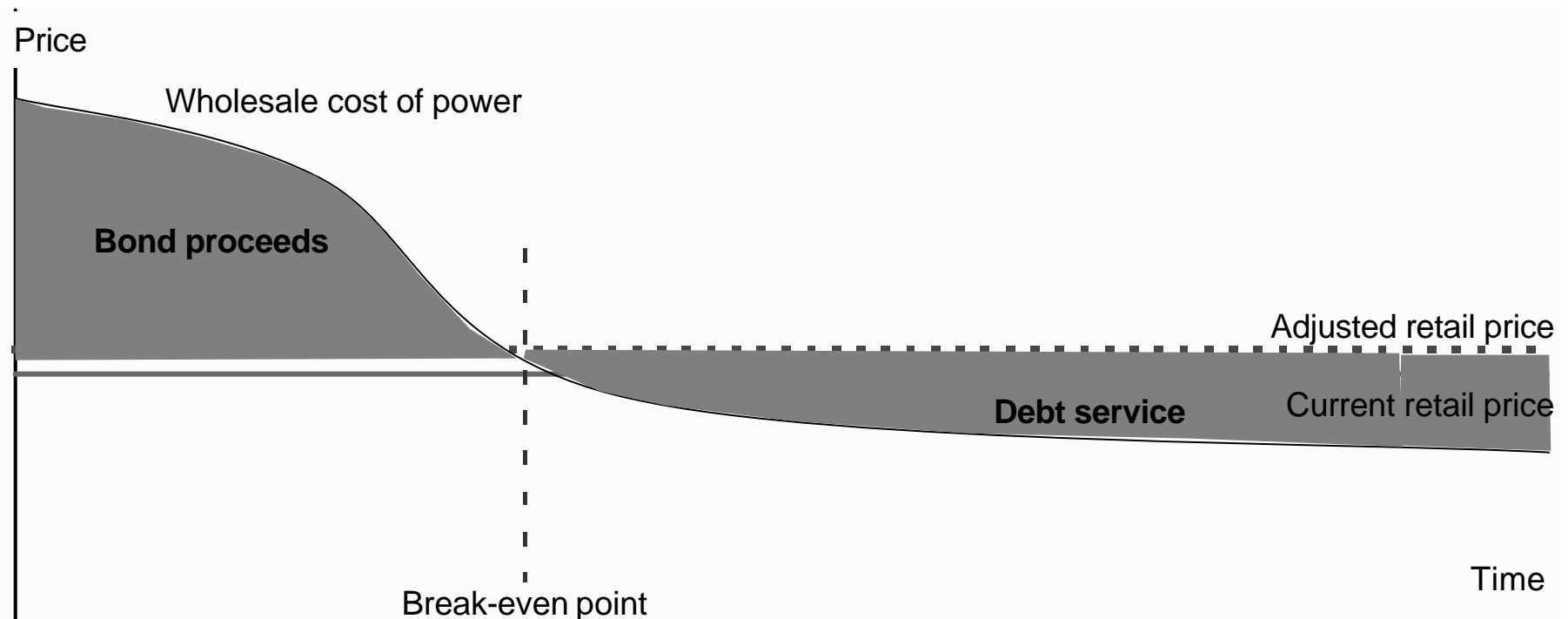
# Protecting Consumers from Crisis Costs

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- **\$6 Billion advanced from State General Fund January through June 26, 2001**
- **\$500 million block advances provided to Department of Water Resources to purchase energy for utilities' customers (in Jan-Feb, \$500 million every 7 to 12 days)**
- **\$4.3 Billion “bridge loan” obtained end of June 2001 - stopped need for General Fund advances**
- **Rates increased for PG&E and Southern California Edison in March**
- **Rates increased for San Diego Gas & Electric in October**



## Bonds Used to Smooth Out the Cost of Power



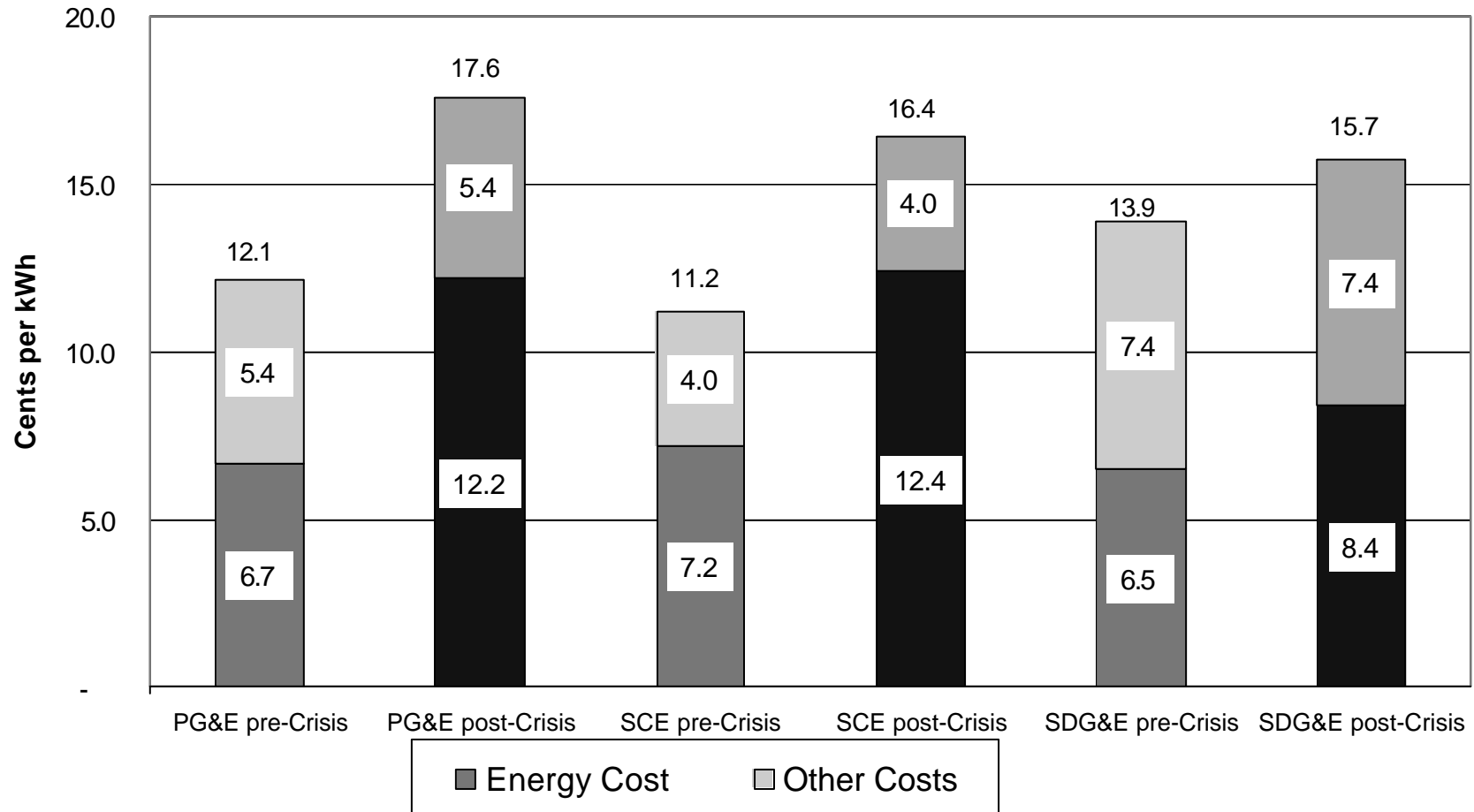
- Until the break-even point, bond proceeds will be used to pay the cost of power and debt service, together with revenues received from customers
- After the break-even point, customer revenue will be sufficient to pay debt service and cost of power as purchased power costs fall below rates

Note: Figure not drawn to scale



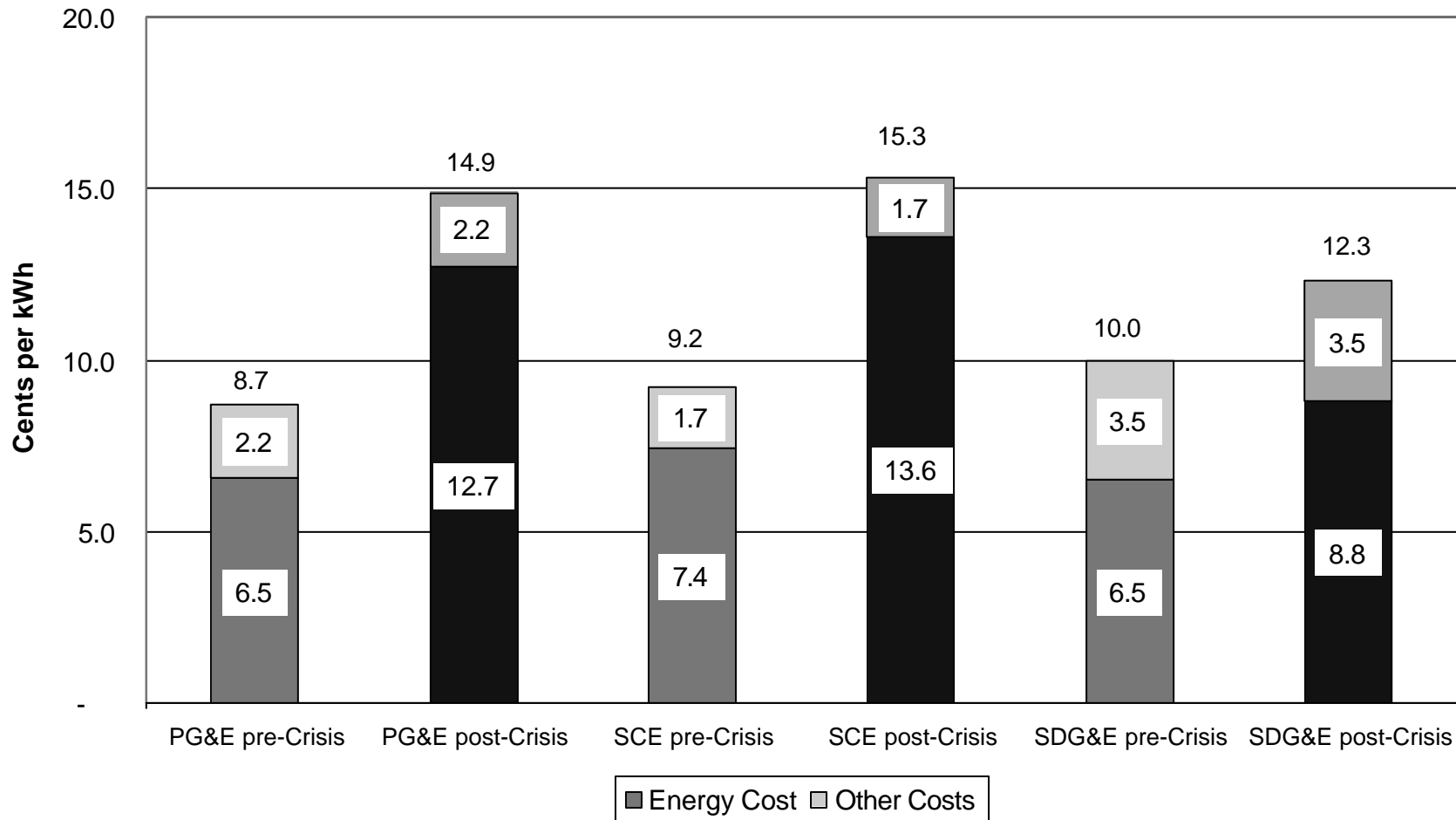
## Rate Effects for Small Commercial Customers

### COST OF ENERGY COMPONENT TO RETAIL ELECTRIC RATE SMALL COMMERCIAL CUSTOMERS



## Rate Effects for Large Commercial & Industrial Customers

### COST OF ENERGY COMPONENT TO RETAIL ELECTRIC RATE LARGE COMMERCIAL & INDUSTRIAL CUSTOMERS



# What's Happening Now

---

- **Over 5,000 MW in new Conservation and Load Reducing Programs**
  - **Real Money, DG retrofits, others**
- **Over 5,000 MW of new supply by next Summer**
- **State is assessing 2002 Load-Resource Balance and options for “insuring” reserves**
  - **Planning studies are showing adequate reserves – always!**
- **Choice has been suspended – will we transition back to competition?**
- **State will step out by end of 2002 and Transition Planning is underway**



# Selected Key Observations from the Eye

---

- **Markets Like Anonymity**
- **Exposure to spot markets**
  - **LTCs - ameliorate spot market flaws**
  - **Utilities miss the flexibility of block forward contracts**
- **Monitor the Market and Operating Reserves:**
  - **Medium and Short-term**
  - **Able to initiate demand-side programs**
  - **Able to step in financially**
- **Control of Siting and Licensing Process can be critical**
- **State's Role was crucial**



# **Power Sector Restructuring: *The Philippine Model***

**Presentation by**

**Undersecretary J. V. Emmanuel de Dios  
PHILIPPINE DEPARTMENT OF ENERGY**

*visit website at:* <http://www.doe.gov.ph/power>



# Guiding Principles

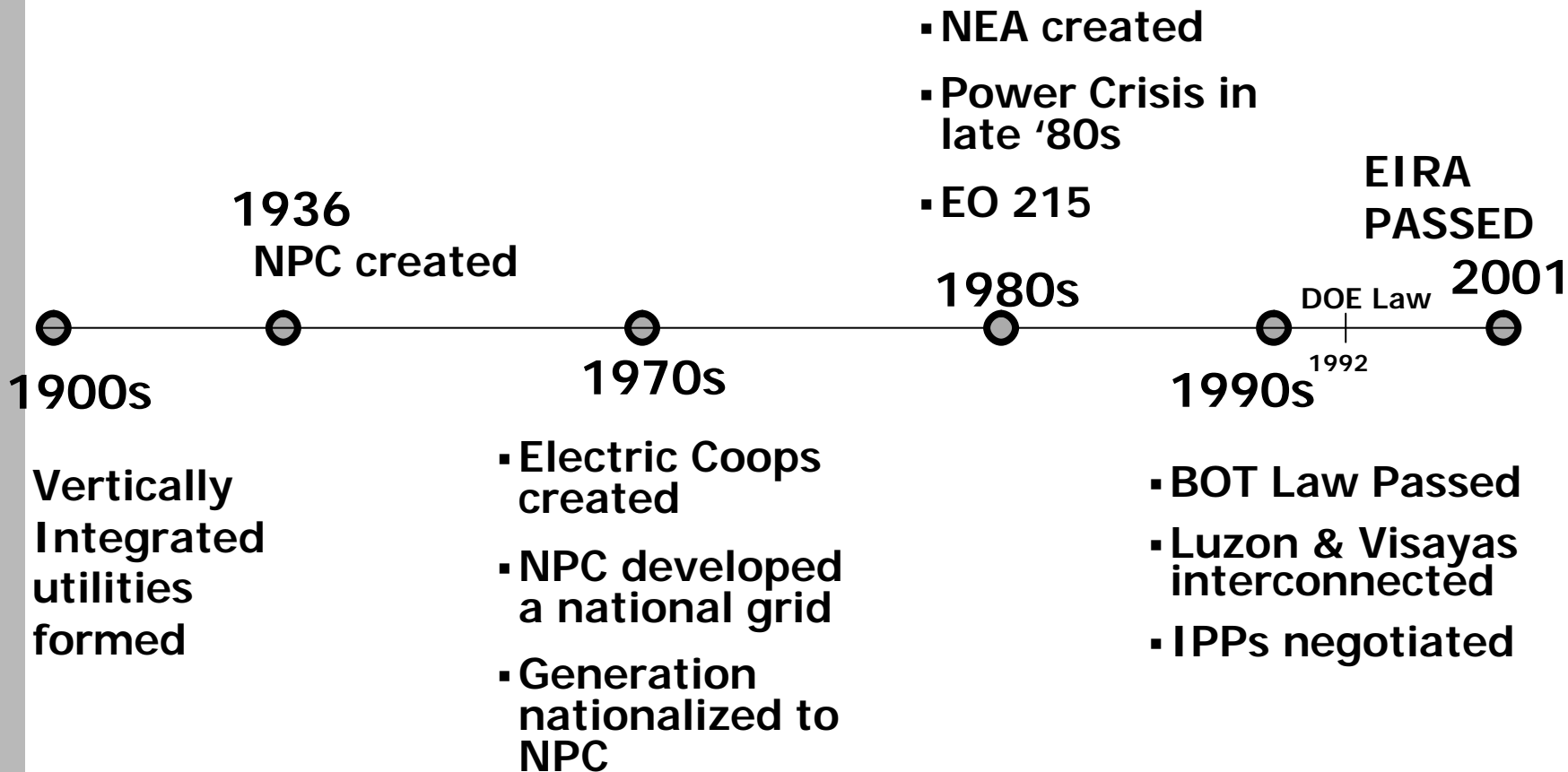
## ➤ **Competitive Sectors**

- **Generation and Supply Businesses**
  - Market-based Rates

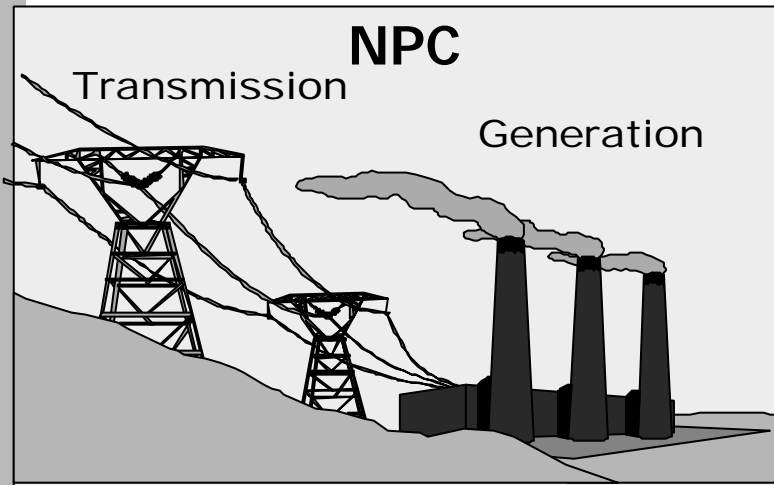
## ➤ **Natural Monopolies**

- **Transmission and Distribution Businesses**
  - Both the rates and services of these businesses are regulated, unbundled and segregated
  - Retail rates of distribution utilities to captive market are regulated

# Milestones in Philippine Electric Industry



# The Market Before Restructuring

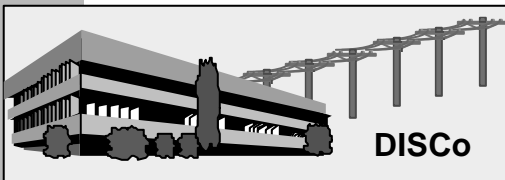
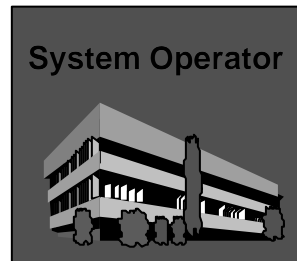
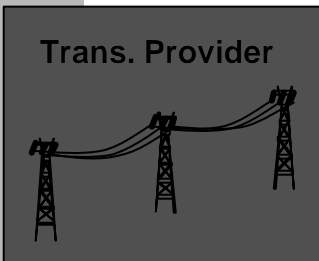
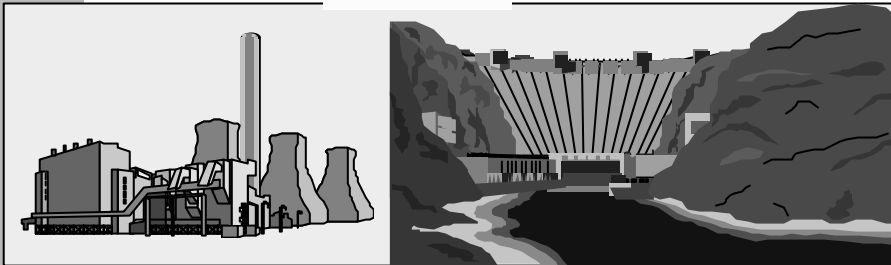


## Market Characteristics Without Reforms

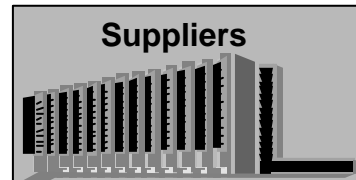
- **Bundled generation and transmission**
- **No open access**
- **No competition and choice**

# The Market After Restructuring

GENCo /  
IPPs



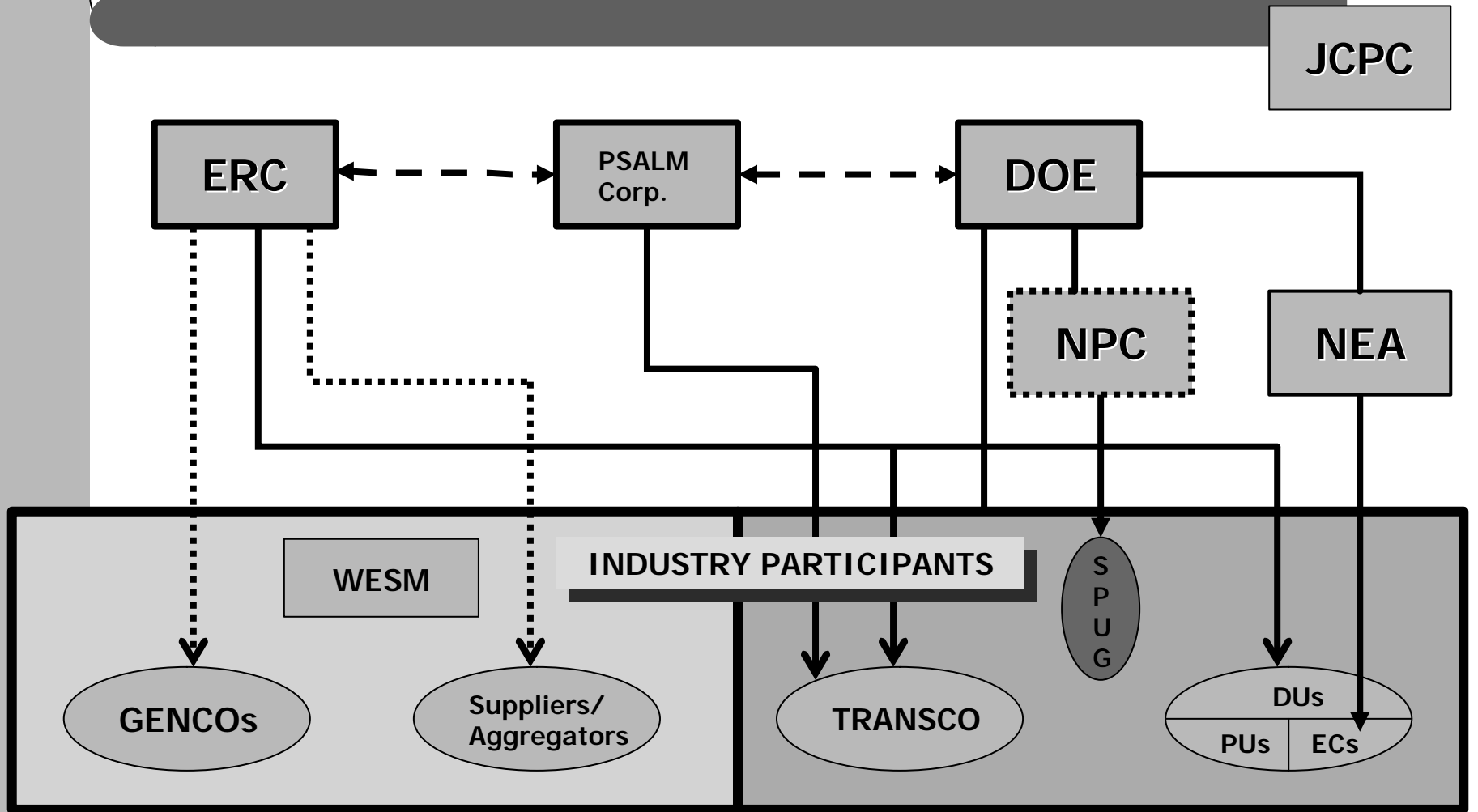
DISCo



Customers

- Unbundled Generation and Transmission Functions
- Unbundled Tariffs
- Generation Prices Market Driven
- Open Access
- Presence of Competition
- Choice for large industrial customers (1MW & above)
- Choice for small users in the long run

# New Industry Structure



**LEGEND:**



# Power Generation

- **Competitive and open;**
- **Prices are market-driven;**
- **Generation company to secure COC from the ERC;**
- **Existing generation company to register with ERC;**
- **Generation company to secure health, safety and environmental clearances from appropriate government agencies;**
- **Generation company to comply with technical, financial, environmental standards as well as ownership and market share cap limitation;**
- **Membership in the WESM;**
- **Self-generation company to remit to TRANSCO universal charge set by ERC; and**
- **Submission of Annual Business Development Plan to DOE.**

# Transmission

- **Creation of TRANSCO**
  - **wholly-owned by PSALM Corp.**
  - **shall provide open and non-discriminatory access to its transmission facilities**
  - **Privatization shall be:**
    - **through open and competitive bidding**
    - **either through direct sale or a concession contract**

# Functions of TRANSCO

- **Act as system operator;**
- **Maintain reliability, adequacy, security, stability and integrity of the Grid;**
- **Improve and expand transmission facilities;**
- **Provide central dispatch**



# Power Distribution

- **Regulated business; requires national franchise**
- **Regulated tariffs and charges;**
- **Provide open and non-discriminatory access to all users;**
- **Subject to performance standards prescribed by ERC;**
- **Membership in the WESM;**
- **Collection of wheeling fees, duly approved by the ERC; and**
- **Submission of Annual Distribution Development Plan to DOE.**

# Obligations of Distribution Utilities

- ✦ **Distribution services and connections**
- ✦ **Structural and functional unbundling**
- ✦ **Open and non-discriminatory access**
- ✦ **Compliance with:**
  - **technical specifications as specified in the Distribution Code**
  - **requirements in the Grid Code and WESM Rules**
- ✦ **Universal service within the franchise areas**
- ✦ **Electricity supply in the least cost manner**
- **File petition to ERC to allow another Distribution Utility to provide electricity to areas that it does not find viable**
- **Reflect true cost of service**

# Supply of Electricity

- **Defined as any person or entity authorized by ERC to sell, broker, market or aggregate electricity to the end-users;**
- **Suppliers of electricity to secure license from ERC;**
- **No need to secure a national franchise;**
- **May become a member of the WESM; and**
- **Prices are market-driven.**
- **Requires ERC license**
- **No franchise required**

# Wholesale Electricity Spot Market

- **DOE to establish WESM rules before June 2002**
  - **Provide mechanism for identifying and setting the price of actual variations from the quantities transacted under contracts between sellers and purchasers of electricity**
- **Generators, Distribution Utilities, Suppliers, Bulk Consumers/End-Users and other ERC authorized entities shall become members of the Market**
- **DOE to constitute autonomous group Market Operator (composed of industry participants)**
- **AGMO under administrative supervision of TRANSCO**
- **AGMO ceases operation with IMP establishment**
- **Full implementation of WESM by 2004**

# Retail Competition and Open Access

- to be implemented no later than 2004, except within franchise areas of electric cooperatives not earlier than 2006
- all End-users with monthly average peak demand of one (1) MW for the preceding 12 months;
- two (2) years after, reduced to 750 kW; Aggregators may supply contestable market in a contiguous area; and
- three (3) years after, ERC shall evaluate market and prescribe appropriate threshold level.
- ERC to gradually reduce threshold level until it reaches household demand level according its market assessment

# Market Share Limits

- **To promote true competition, prevent harmful monopoly, and market power abuse, the following caps are set:**
  - **30% of total installed capacity on a grid basis**
  - **25% of total installed capacity on a national basis**

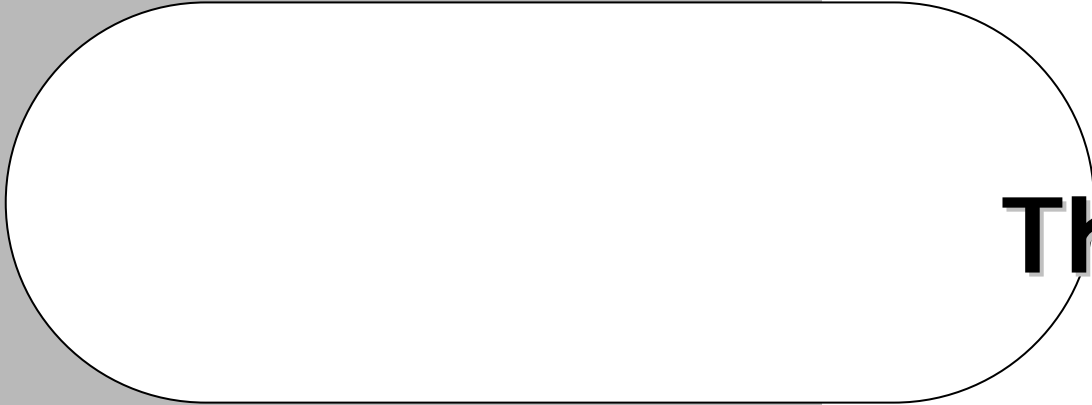
# **NPC Privatization**

- **NPC generation assets, real estate and other disposable assets as well as IPP contracts shall be privatized**
- **PSALM Corp. shall draw privatization plan**
- **Privatization value to the NG shall be optimized**
- **Agus and Pulangui complexes shall initially be excluded from privatization**
  - **to be owned by PSALM Corp. but continue to be operated by NPC**
  - **privatization of Agus and Pulangui shall be left to PSALM in consultation with Congress**


# Electric Cooperatives

- **May opt to convert to either a stock cooperative (CDA) or stock corporation (Corporation Code)**
  - **Retail competition and open access shall be no earlier than 5 years from effectivity of the Act**
  - **May acquire sub-transmission facilities through concessional financing**
  - **Program for assumption by PSALM Corp. of liabilities on rural electrification**





**Thank You  
and  
Mabuhay!!!**





# **Deregulation of the Power Industry in Singapore**

**Er. Soh Siew Cheong  
Sr. Vice President (Op II)  
Singapore Power**

# THE ELECTRICITY SUPPLY INDUSTRY



- **Reasons for Government to own electricity supply industry**
  - **Strategic Industry**
  - **Public Service**
  - **Economies of Scale: Power System**
  - **Ability and Creditability to raise large capital**
  - **Land for the infrastructure**
  - **Integration of upstream energy resources**

# REASONS FOR DEREGULATION



- **Insufficient financial resources to support rapid economic and industrial growth**
- **Expectation of higher efficiency, lower tariff and better customer service**

# **OTHER REASONS FOR DEREGULATION**



- **Raise cash to settle debts and finance social and developmental programs**
- **Unable to subsidise the industry anymore**
- **Prevent monopoly to “gold-plate” its asset**
- **Industry being inefficient, unreliable and outdated**

# **SINGAPORE'S REASON TO DEREGULATE ITS POWER INDUSTRY**



- **Between 1992-95, Singapore's power industry was rated as one of the best by international authoritative survey institutions**
- **Singapore Government was running with healthy surpluses and the economy was doing very well**
- **Why, then, did the Government decide to deregulate its power industry?**

# **SINGAPORE'S REASON TO DEREGULATE ITS POWER INDUSTRY**



- **Expectation of improved efficiency and better service**
- **Government's Asset Enhancement Program**
- **To leverage its core competence to venture into overseas power industries.**
- **To promote appropriate pace and level of competition**

# **SINGAPORE'S REASON TO DEREGULATE ITS POWER INDUSTRY**



- **Government will be able to make more impartial decisions on energy policy matters**
- **Greater transparency in the decision process**
- **Provide the environment and incentives for the executives of the ex-statutory board to excel**



# THE SINGAPORE APPROACH



- **Customise proven market structures and implementation methods to reap maximum benefits from the deregulation process**
- **Evolutionary approach**
  - **Corporatisation of the Government Utility**
  - **Restructuring the power industry into regulatory, monopolistic and competitive entities**
  - **Privatisation of the power industry**

# THE SINGAPORE APPROACH



- **1<sup>st</sup> Phase: Corporatisation of a government utility authority into a private utility company**
  - **Change the mindset and work attitude**
  - **Revamp company practices**
  - **Retain engineering managers to become business managers**
  - **Create a vibrant, innovative and highly motivated workforce**

# THE SINGAPORE APPROACH



- **2<sup>nd</sup> Phase: Restructuring the industry**
  - **Create Regulatory framework**
  - **Breaking up the industry in separate business entities**
  - **Setting up a market for trading of electricity**

# THE SINGAPORE APPROACH

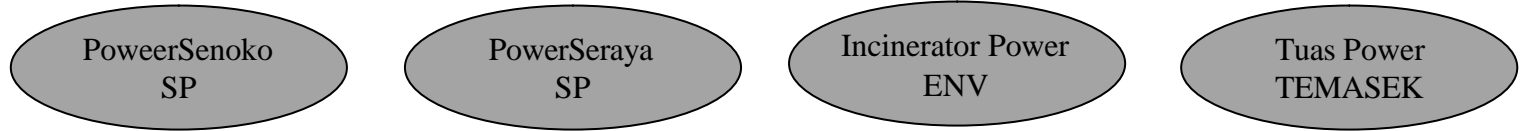


- **3<sup>rd</sup> Phase: Privatisation of the Power Industry**
  - Listing of monopoly company
  - Selling the generating companies
  - Creating new private electricity supply companies

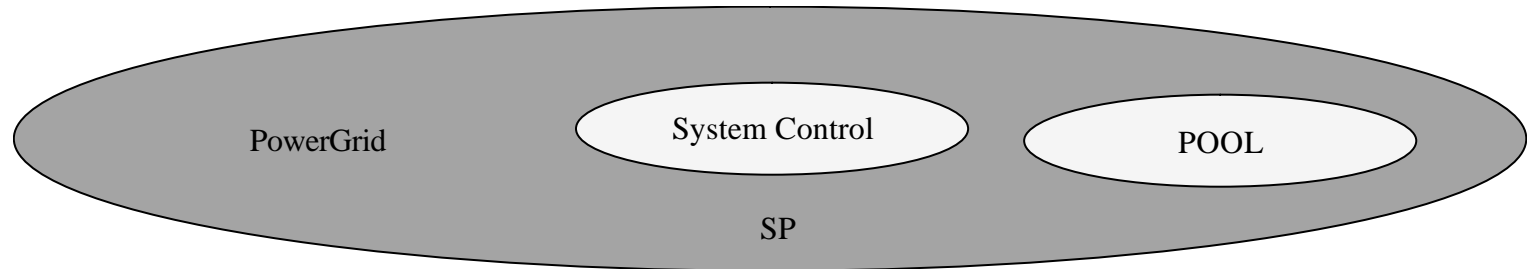
# THE RESTRUCTURED POWER INDUSTRY



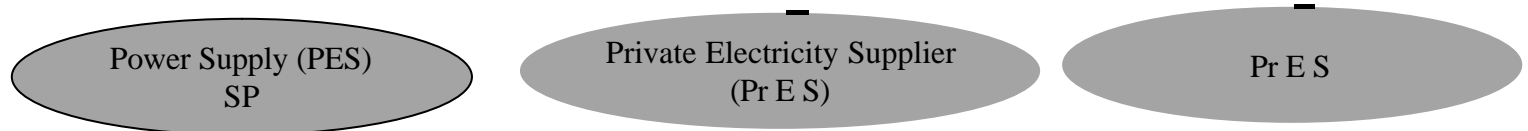
**Power  
Generators  
(competitive)**



**Power  
Transmission  
And  
Distribution  
(monopoly)**



**Retailing  
(competitive)**



**Gas**



# REGULATION OF THE INDUSTRY



- **Office of the Regulator resides in PUB**
- **Market behaviour is regulated through imposition of controls on Electricity Licensees**

# REGULATION OF THE INDUSTRY



- **Price regulatory control based on (CPI - X)**
- **Service and Technical performance is regulated through the compliance with the Performance Standards and Transmission Code**

# **THE SINGAPORE ELECTRICITY POOL (SEP)**



- **SEP operates as a wholesale market to facilitate energy trading in the power industry**
- **Governance of the Pool – SEPEC**
- **Regulator has the right to veto any SEPEC resolution**



# THE DEVELOPMENT OF THE SEP



- **Development of the Pool is a very complex exercise. It comprises 6 steps.**
- **1<sup>st</sup> step: Establish the Pool Rules**
- **2<sup>nd</sup> step: Design software to implement Pool Rules**
- **3<sup>rd</sup> step: Install computer and communication hardware**

# THE DEVELOPMENT OF THE SEP



- **Development of the Pool is a very complex exercise (cont'd)**
- **4<sup>th</sup> step: Testing system software & hardware**
- **5<sup>th</sup> step: Allowing players to practice their skill**
- **6<sup>th</sup> step: Launching of the SEP**

# ACHIEVEMENT OF THE INDUSTRY RESTRUCTURE



- **The evolutionary approach to deregulate the power industry in Singapore is pragmatic and effective**
- **The Power Industry becomes more efficient and reliable**
- **Investment in power plants and transmission network has increased significantly**
- **Industry players have adapted very well and are able to leverage its core competence to create new businesses**
- **The entire deregulation process is expected to complete by 2003**

# **FURTHER DEREGULATION OF THE ELECTRICITY INDUSTRY**



- **Government carried out a further review in Sept 2000. The objective was to promote greater competition in the electricity industry.**
- **In March 2001 Government decided to further deregulate the electricity industry to obtain the full benefits of a real time wholesale spot market.**
- **The key initiative is to create a level playing field by separating the contestable and the non-contestable parts of the industry at the ownership level.**

# **FURTHER DEREGULATION OF THE ELECTRICITY MARKET**



- **The gas industry is also restructured to support the electricity industry**
- **Creation of a new Government Statutory Board, the Energy Market Authority (EMA), to regulate the industries**
- **Transfer of the Power System Control (PSO) from the transmission licensee, PowerGrid, to EMA**
- **Creation of a joint venture company, Energy Market Company (EMC), to operate and administer the new energy market (NEM) in Singapore.**
- **The new market rules are being developed and the computer systems required to support the market have not been completed yet.**
- **EMA proposed to launch the NEM in May 2002**

# DEREGULATION OF THE POWER INDUSTRY IN SINGAPORE



- **End of Presentation**
- **Thank you.**

# THE NEW ELECTRICITY MARKET OVERVIEW



- **The new wholesale market comprises 2 sub-markets:**
  - **The Spot market where energy, spinning reserves capacities and regulating or load following power are traded and**
  - **The Ancillary market where PSO purchases ancillary services required to maintain system stability through EMC via term contracts. It includes reactive power, black start capability, quick startup, etc**

# THE NEW ELECTRICITY MARKET OVERVIEW



- **The Spot Market**
  - Generators submit bids for energy, reserves and regulation capacities. No demand bid is required.
  - The Market Clearing Engine (MCE) produces nodal prices for energy, reserves and regulation and generation schedules
- **The Nodal Pricing**
  - Every half hour, the MCE will determine the dispatch quantity of every generating plant, the reserve and regulation capacity it has to keep
  - Each generating plant is to be paid the market price for the energy at the node to which it is connected
  - All retailers and market participating consumers will have to pay a Uniform Singapore Electricity Price (USEP) irrespective of the node at which they are connected.



# THE NEW ELECTRICITY MARKET OVERVIEW



- **Bilateral contracts – creates price certainty between both parties and limits their exposures to price volatility of the wholesale spot market.**
- **Vesting contract – another form of bilateral contract imposed by EMA during the transition period to provide price certainty for non-contestable consumers.**

# THE NEW RETAIL ELECTRICITY MARKET OVERVIEW



- **The Market Support Service Licensee, (MSSL)**
  - **When the NEM opens the current public electricity supplier, Power Supply, will cease to be a retailer. It will play a new role to facilitate non-contestable consumers to purchase power from the wholesale market and the delivery services from PowerGrid.**
  - **Power Supply will become a Market Support Services Licensee. It cannot compete with electricity retailers for contestable consumers but it has the responsibility to be the supplier of last resort for all consumers.**

# THE NEW RETAIL ELECTRICITY MARKET



- In addition, the MSSL has to provide the following market support services to all non-contestable and contestable customers:
  - Meter readings of revenue meters
  - Billing of accounts
  - Bill collection from consumers
  - Prepares settlement ready billing data for transactions carried out at the wholesale market
  - Registration of consumers and
  - Facilitates switching of suppliers by consumers

# THE NEW RETAIL ELECTRICITY MARKET OVERVIEW



- **When the NEM opens contestable consumers can**
  - **Buy electricity from retailer of their choice or**
  - **Buy electricity directly from the wholesale spot market or**
  - **Buy electricity from spot market via MSSL (last resort)**

**Retailers can either buy electricity from the wholesale spot market through MSSL or directly from the wholesale spot market.**

# **SCHEDULE OF NEW RETAIL MARKET LIBERALISATION**



- **The liberalisation of the new retail market will be implemented in 3 phases**
- **Phase 1 :** All non-domestic consumers with consumption > 240,000 kWh/year will become contestable consumers one month after the NEM opens
- **Phase 2:** All non-domestic customers with consumption > 120,000 kWh/year will become contestable consumers 6 months after phase 1
- **Phase 3** Contestability will be extended to all categories of consumers, more than a million of them, in 2003.

# CONCLUDING REMARK



- **The New Electricity Market rules are still being developed and the new computer systems that are required to support the NEM have yet to be completed. As such, there could be some changes when the NEM is launched in future.**
- **EMA proposes to launch the NEM in May 2002.**
- **The author would like to thank EMA for the information provided on the new electricity market in Singapore.**

# **Small Power Producers (SPPs) Using Renewable Energy Projects – Government Support in Thailand**

*Dr. Ludovic LACROSSE*  
*Executive Director*  
**COGEN-AIT**

**APEC Seminar on “Lessons on Energy Sector Liberalization”  
3 - 5 December 2001  
Makati Shangri-La Hotel, Philippines**

## ENERGY SITUATION IN THAILAND

- Total primary energy supply: 74.8 MTOE (1999)
- Domestic source: 54.9 %
- Imported source: 45.1 %
- Conventional energy: 80 % (61 % in 1989)
- Renewable energy: 20 % (39 % in 1989)
- Installed capacity: 20,223 MW (1999)
- Economic growth: 4 % (1999 and 2000)
- Economic growth: 2 - 4 % (2001)



# ENERGY SITUATION IN THAILAND - GRID FUEL MIX

**Year: 1999**

- Natural gas: 60.2 %
- Coal: 20.1 %
- Fuel oil: 17.7 %
- Diesel: 0.6 %
- Renewable fuel: 1.4 %

# Energy Conservation and Promotion Act

- April 3, 1992
- ENCON Fund
- Energy Conservation
- Renewable Energy
- Supporting Activities

?

## Energy Conservation Programme

- Compulsory Programme
- Voluntary Programme
  - Small Power Producers (SPPs) Using Renewable Energy
- Complementary Programme

?

## Privatization of Energy Sector

- Independent Power Producers (IPPs)
- Small Power Producers (SPPs)
- Power pool

?

## Renewable SPPs – Regulation

- Renewable SPPs: 180 MW out of total 1,580 MW SPPs (April 2000)
- Maximum capacity: 90 MWe
- Commercial fuels: max. 25% (thermal energy)
- Two types of contract: “Firm” and “Non-Firm”
- EGAT’s off-take liability
  - partial peak (8:00-18:30 hours) and peak (18:30-21:30 hours) periods : 100 %
  - off-peak (21:30-8:00 hours) period: no less than 65%

## Renewable SPPs – Tariff Structure

|   | Non-firm                     | Firm                         |
|---|------------------------------|------------------------------|
| <b>1. Energy Payment</b>                  |                              |                              |
| Base energy payment (Baht/kWh)            | 1.59                         | 1.49                         |
| Base natural gas price (Baht/Million BTU) | 151.4518<br>(as of Jan 2001) | 151.4518<br>(as of Jan 2001) |
| <b>Energy payment (Baht/kWh)</b>          | <b>1.59</b>                  | <b>1.5033</b>                |
| <b>2. Capacity Payment</b>                |                              |                              |
| Base capacity payment (Baht/kW-mo)        | 0                            | 400                          |
| Base Baht to US dollar exchange rate      | 0                            | 38                           |
| <b>Capacity payment (Baht/kW-mo)</b>      | <b>0</b>                     | <b>458.95</b>                |
| <b>3. Levelised tariff (Baht/kWh)</b>     | <b>1.59</b>                  | <b>2.141</b>                 |

## Supports for Renewable Energy – NEPO Scheme

- ➡ Project announcement: NEPO
- ➡ Incentive payments: from the ENCON Fund
- ➡ Proposed budget: 2,060,000,000 Baht
- ➡ Proposed support: projects for 300 MWe
- ➡ Incentive payment: not more than 0.36 Baht per kWh for a period of 5 years.
- ➡ selection procedure: competitive bidding

## Supports for Renewable Energy – NEPO Scheme

### Assessment timetable

|   |   |
|---|---|
| Selling for Tender Pack Submission                      | 16 July-17 August 2001                        |
| Deadline for Tender Pack Submission                     | 15 October 2001                               |
| Tender Compliance Verification and Information Review   | 16-21 October 2001                            |
| Technical Appraisal carried out                         | 22 Oct.- 4 November 2001                      |
| Commercial Appraisal carried out                        | 5-18 November 2001                            |
| Selection of Projects recommended to NEPO for SPP award | December 2001 (indicative)                    |
| Feedback to Applicants on results of competition        | December 2001-March 2002                      |
| Contract Award/Negotiation                              | Within 12 months since receiving confirmation |



## Supports for Renewable Energy – NEPO Scheme

### Selection Mechanism

- Phase I: Technical and Commercial Evaluation
- Phase II: Ranking of Projects based on ALA (Average Levelised Adder)

ALA = (f) subsidy, size of project, length of SPP contract with EGAT

ALA from lowest to highest, with lowest ALA as most favorable

## List of projects proposed for NEPO incentive

| No. | Type of contract | Fuel Type | Electricity Exportable Capacity to EGAT MWe |
|-----|------------------|-----------|---|
| 1.  | Non-firm         | Rice Husk | 5.00  |
| 2.  | Firm             | Rice Husk | 1.60  |
| 3.  | Firm             | Rice Husk | 15.00                                       |
| 4.  | Firm             | Rice Husk | 16.00                                       |
| 5.  | Firm             | Rice Husk | 55.00                                       |
| 6.  | Firm             | Rice Husk | 20.00                                       |
| 7.  | Firm             | Rice Husk | 20.00                                       |
| 8.  | Firm             | Rice Husk | 20.00                                       |
| 9.  | Firm             | Rice Husk | 20.00                                       |
| 10. | Firm             | Rice Husk | 8.50  |

## List of projects proposed for NEPO incentive

| No. | Type of contract | Fuel Type                          | Electricity Exportable Capacity to EGAT MWe |
|-----|------------------|------------------------------------|---|
| 11  | Firm             | Rice Husk                          | 8.50  |
| 12  | Non-firm         | Rice Husk                          | 55.00                                       |
| 13  | Firm             | Rice Husk/Wood Chip                | 22.50                                       |
| 14  | Firm             | Rice Husk/Wood Chip                | 16.00                                       |
| 15  | Firm             | Rice Husk/Wood Chip                | 90.00                                       |
| 16  | Firm             | Risk Husk/Wood Chip                | 30.00                                       |
| 17  | Non-firm         | Rice Husk/Wood Chip                | 22.50                                       |
| 18  | Firm             | Rice Husk/Wood Chip<br>/Palm waste | 2.00  |
| 19  | Firm             | Wood Chip                          | 20.00                                       |
| 20  | Firm             | Waste/Wood Chip                    | 2.50  |

## List of projects proposed for NEPO incentive

| No. | Type of contract | Fuel Type        | Electricity Exportable Capacity to EGAT MWe |
|-----|------------------|------------------|---|
| 21  | Non-firm         | Wood Chip & Palm | 20.00                                       |
| 22  | Firm             | Bagasse          | 5.60  |
| 23  | Firm             | Bagasse          | 5.06  |
| 24  | Non-firm         | Bagasse          | 25.00                                       |
| 25  | Non-firm         | Bagasse          | 7.00  |
| 26  | Firm             | Bagasse          | 8.00  |
| 27  | Non-firm         | Bagasse          | 3.00  |
| 28  | Non-firm         | Bagasse          | 4.00  |
| 29  | Non-firm         | Bagasse          | 4.00  |
| 30  | Non-firm         | Bagasse          | 4.00  |

## List of projects proposed for NEPO incentive

| No. | Type of contract | Fuel Type         | Electricity Exportable Capacity to EGAT MWe |
|-----|------------------|-------------------|---|
| 31  | Non-firm         | Bagasse           | 4.00  |
| 32  | Non-firm         | Bagasse           | 3.00  |
| 33  | Non-firm         | Bagasse/Wood Chip | 25.00                                       |
| 34  | Non-firm         | Tapioca Root      | 22.00                                       |
| 35  | Firm             | Black Liquor      | 90.00                                       |
| 36  | Firm             | Black Liquor      | 25.00                                       |
| 37  | Firm             | Mini-Hydro        | 8.00  |
| 38  | Non-firm         | Mini-Hydro        | 10.00                                       |
| 39  | Non-firm         | Mini-Hydro        | 14.00                                       |
| 40  | Firm             | Biogas            | 0.94  |

## List of projects proposed for NEPO incentive

| No. | Type of contract | Fuel Type                | Electricity Exportable Capacity to EGAT MWe |
|-----|------------------|--------------------------|---|
| 41  | Firm             | Cogen/Waste gas          | 12.00                                       |
| 42  | Firm             | Waste Gas from Coal Mine | 1.00  |
| 43  | Non-firm         | Combined Cycle           | 25.00                                       |
|     |                  | Total                    | 775.50                                      |

# Biomass sectors and the agro-industries in Thailand

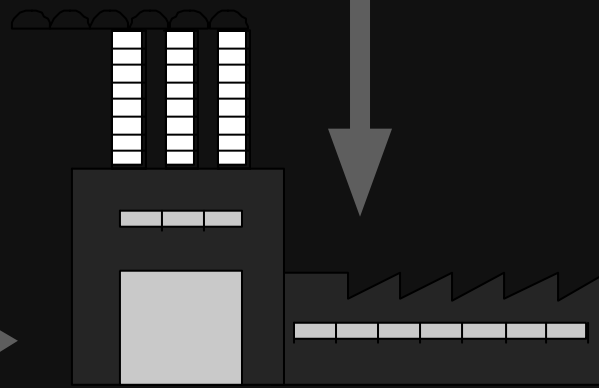
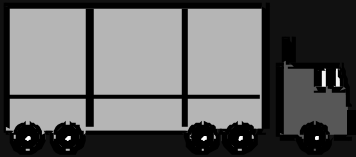
## Power Generation Potential?

| Sector   | Residue             | Power Potential    | No. of mills in Thailand |                    |
|----------|---------------------|--------------------|--------------------------|--------------------|
|          |                     |                    | Total                    | Above min. size    |
| Sugar    | Bagasse             | 5797 GWh/year      | 46                       | 46                 |
| Rice     | Rice husk           | 3725 GWh/year      | >44000                   | 78                 |
| Oil Palm | EFB+Shell+Fibre     | 379 GWh/year       | 15                       | 15                 |
| Wood     | from log production | 86 GWh/year        | 777                      | data not available |
| Wood     | from rubber wood    | data not available | about 200                | data not available |

# RICE INDUSTRY

Process energy required:  
Paddy milling and drying: 30-60 kWh/tonne paddy

1 tonne of  
Paddy



650-700 kg  
White rice



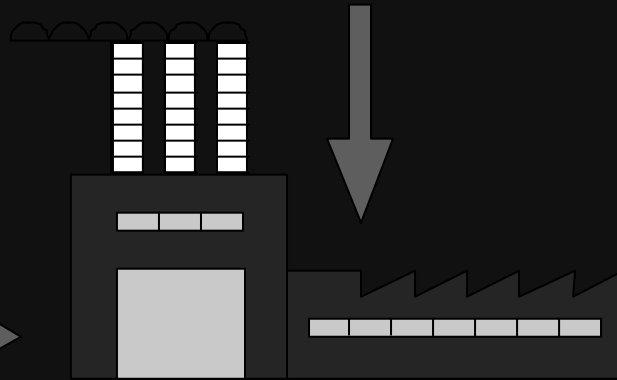
Waste:

220 kg Husks → ~ 150 -200 kWh



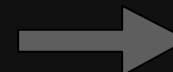
# SUGAR INDUSTRY

1 tonne of sugarcane



Process energy required:  
25-30 kWh/tonne of sugarcane  
0.4 tonne of steam

100-120 kg  
Sugar



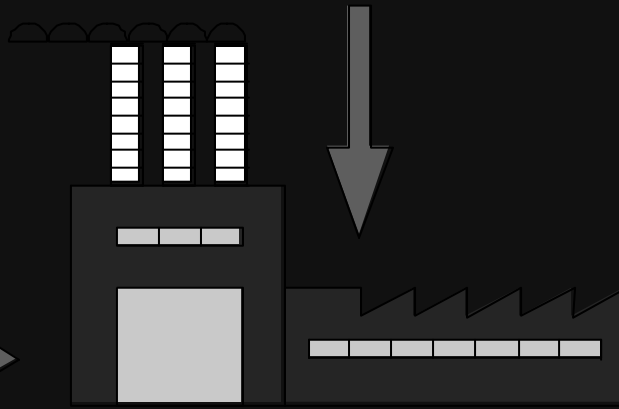
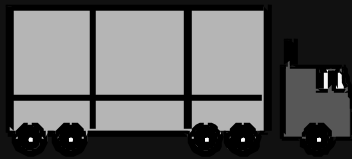
Waste:

290 kg Bagasse → ~ 100 kWh

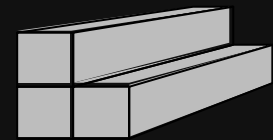
# WOOD INDUSTRY (SAWMILLS)

Energy Required:  
Sawmill: 35 - 45 kWh/m<sup>3</sup>

1 m<sup>3</sup> of Debarked  
Wood Log



0.5 m<sup>3</sup> Sawn Wood



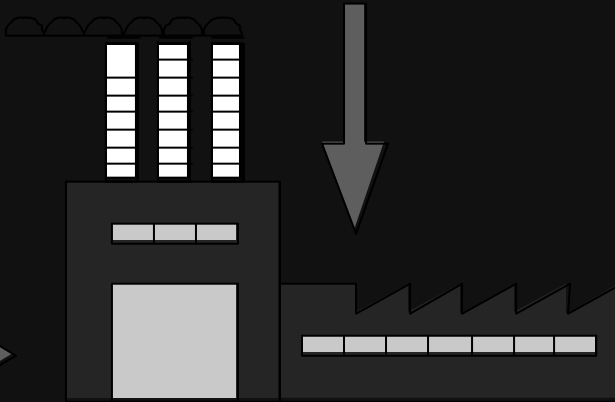
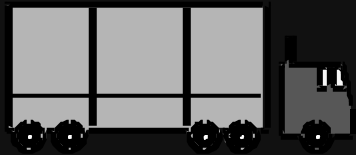
Waste:

0.5 m<sup>3</sup> Wood Residues → ~ 80 kWh

# WOOD INDUSTRY (PLYMILLS)

Energy required:  
 $110 \text{ kWh/m}^3 \text{ log} + 1.2 \text{ tonne of steam}$

$1 \text{ m}^3$  of Debarked  
Wood Log



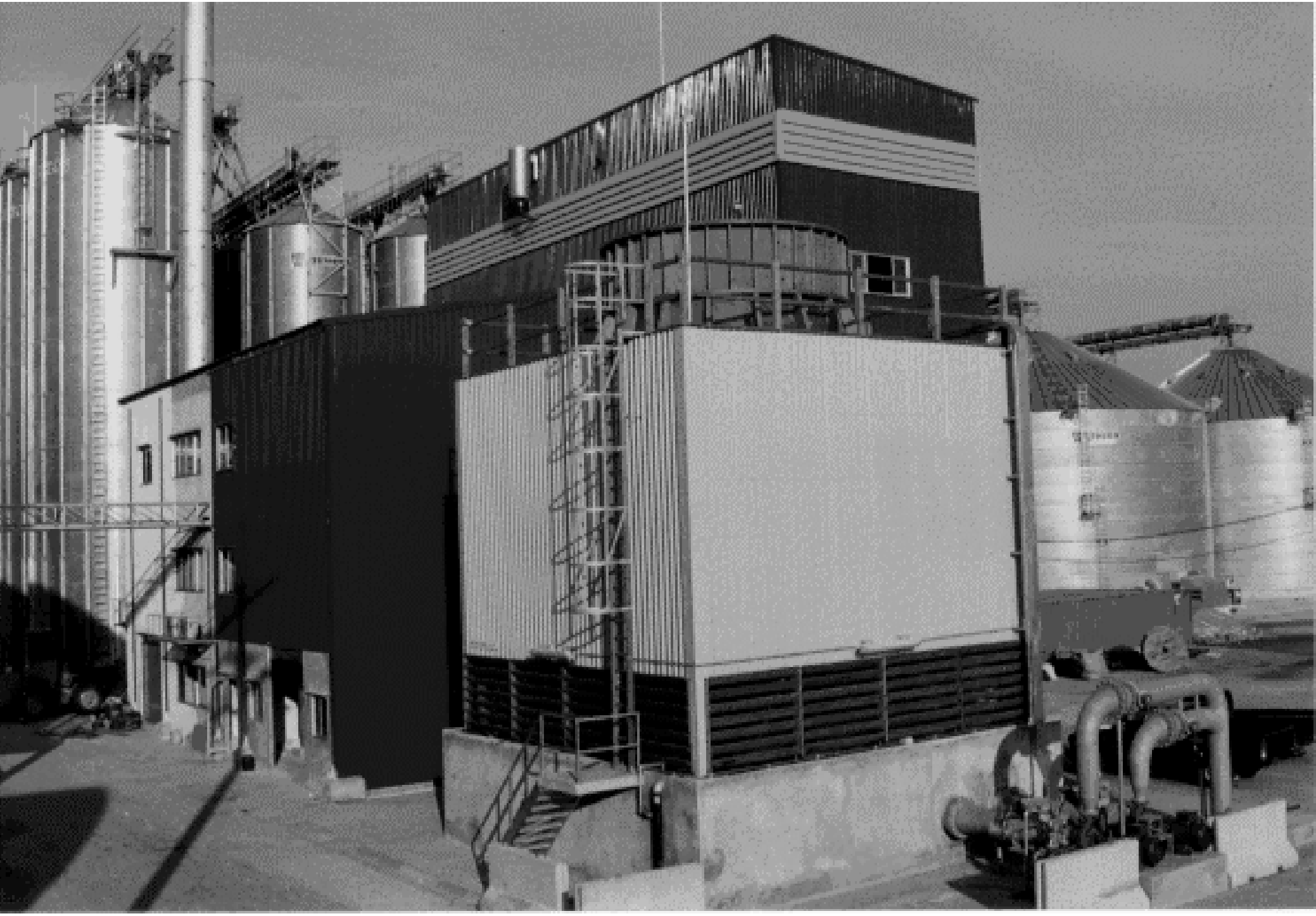
$0.5 \text{ m}^3$  Plywood



Waste:

$0.5 \text{ m}^3$  Wood Residues  $\rightarrow$   $\sim 120 \text{ kWh}$











# Rural Electrification: The Changing Roles of Government and Private Sector

by Dr. Ernesto Terrado  
The World Bank





# Outline of Presentation

- Problems in expanding coverage
- Positive global trends
- Characteristics of rural markets
- Emerging models for private service provision
- Emerging principles and strategies
- Examples: cases of Chile and Argentina
- Conclusions: the changing role of government



# **P**roblems in Expanding Coverage

- **Most remaining unelectrified areas costly to serve (easy ones have been done)**
- **Total financial requirements are huge**
- **Rural electrification has involved central planning approach, where most governments have poor record.**
- **Need more private investments BUT...**
- **Rural markets often high risk, low returns**



# **Some traditional policies block efforts to improve access by the poor...**

- **Implicit assumption that all consumers need 24 hours access -- unrealistic universal service obligation**
- **Emphasis on network expansion -- little attention to alternatives**
- **Imposition of uniform tariffs -- prevents cost recovery in difficult markets (e.g., remote areas)**



# Positive Trends

- **Global trend to restructure power sectors.**
- **Unbundling of monopolies.**
- **Increasing private investment in power.**
- **New power technologies becoming cheaper.**
- **New local delivery and financing mechanisms are emerging.**



# Two Distinct Rural Electrification Markets

- **Near the Network → Grid Extension**
- **Far from Network → Off-Grid Systems**
  - **Isolated Grids: *Diesel, Renewables, Hybrids***
  - **Individual Systems: *Battery Charging, Solar Home Systems, etc***

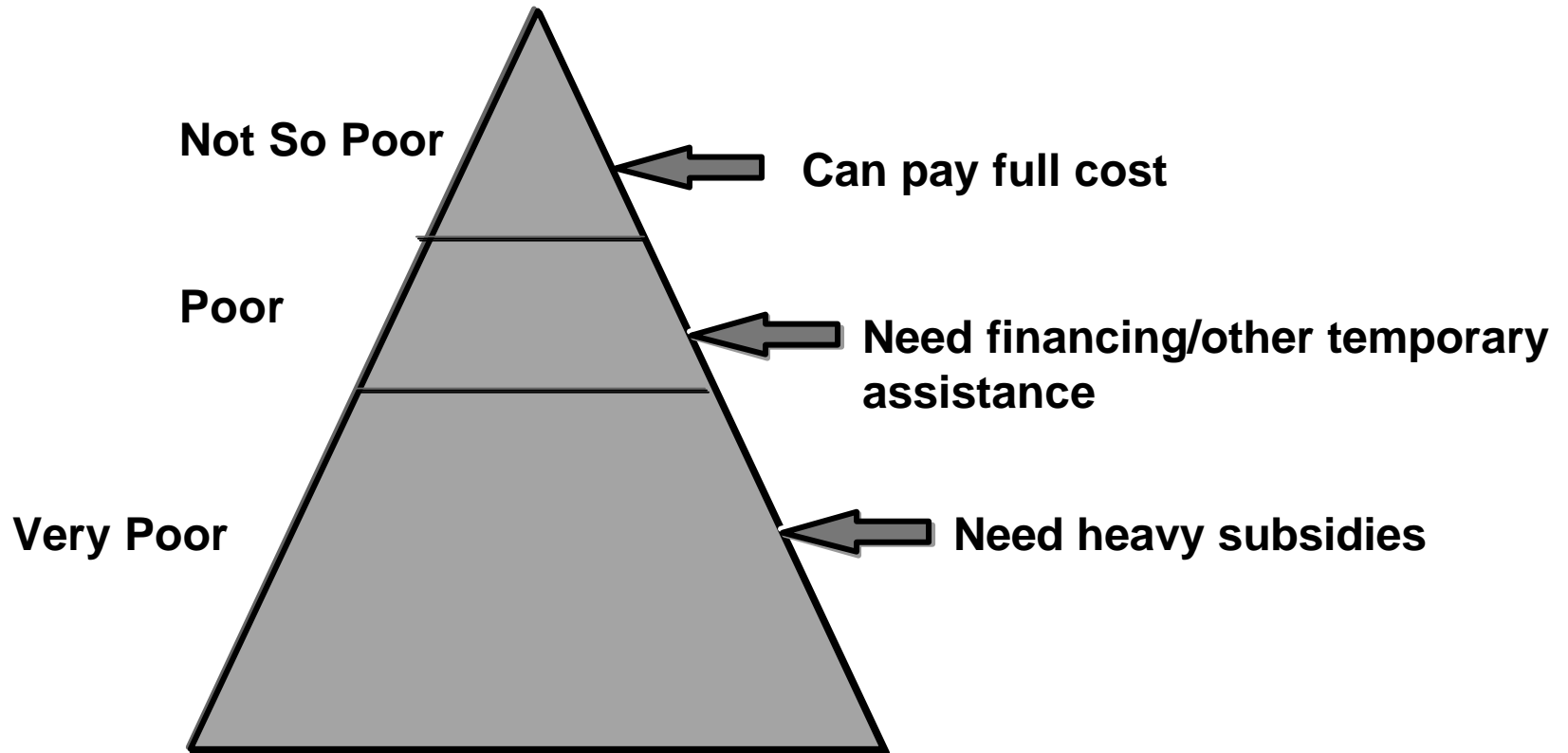
*Unserved urban and rural customers near grid areas more likely to benefit from sector reforms*

*Off-grid market more problematical. Need new approaches, new actors...*

*Offgrid does not necessarily mean 'renewables'...*



# Income Pyramid for Rural Households



*With right policies, substantial business opportunities exist for private providers - - from non-subsidized “creaming the crop” operations with limited coverage, to high coverage operations with high subsidies*



# **T**he Evidence: The Unserved are Willing to Pay

**Rural people will pay around 3-5 times more per kWh for off-grid supplies than do on-grid consumers.**

- They want the light and power.
- They'll pay a lot for it - often enough to cover (much of) the supply cost.
- What they can't afford are the high first costs (connection and wiring, solar equipment, etc.)

***...Off-grid commercial operation often possible with blend of user payments, public funds and private investment***



# Emerging Models for Offgrid Electrification

| agents   | mechanism              | market segments                          |
|--|------------------------|--|
| <p>INDIVIDUAL DEALERS</p> <p>e.g., Indonesia</p>                                   |                        | <p>INDIVIDUAL HOMES</p>                  |
| <p>FRANCHISES</p>  | <p>SELL EQUIPMENT</p>  | <p>PUBLIC SERVICES/CENTERS</p>           |
| <p>RURAL ESCOs</p> <p>e.g., Morocco</p>  | <p>FEE FOR SERVICE</p> | <p>PRIVATE PRODUCTIVE ACTIVITIES</p>     |
| <p>CONCESSIONS/<br/>Subconcessions/<br/>Permissionaires</p> <p>e.g., Argentina</p> |                        | <p>COMMUNAL ECONOMIC ACTIVITIES, ETC</p> |
| <p>COMMUNITY-BASED APPROACH</p> <p>e.g., Sri Lanka</p>                             |                        |  |





# Which Model Should be Used ? *Depends...*

---

- **DEALER-** *history of private dealer activities; high household density; relatively high willingness to pay (WTP)*
- **CONCESSION/RESCO-** *experience with concession system (in grid market); presence of interested companies; dispersed households; lower WTP*
- **COMMUNITY-BASED** - *no concession or dealership history; very low WTP; generally unattractive to external private players*

***...May need to use more than one model !***





# Models to avoid

- Technology-driven interventions
- Some donor-driven interventions
- No community/consumer/private contribution or investment



# **E**merging Principles and Strategies

- **Maximize private sector role--not only as equipment supplier to government or paid installer but as service provider and investor**
- **Promote competition to minimize project costs and encourage innovation: among projects proposed, among private providers**
- **Allow proper pricing of energy service**



# **E**merging Principles and Strategies (cont'd)

- **Consumers must contribute to cost-recovery**
- **Use “smart subsidies”:** transparent and targeted to poor consumers or to providers to reduce business costs, one-time investment subsidies rather than operating subsidies, etc
- **Link electrification projects with projects in other sectors: health, education, telecommunications, etc**



# The Chile Example

- *Background:*
  - Pre-1980s: central planning; state-owned power companies; subsidies from central govt or cross-subsidies from high urban tariffs
  - 1980s: liberalized markets; privatized power companies, unbundled generation, transmission & distribution; new electricity law established free entry & competition



# Chile: Rural Electrification Program 1994

## *Key Features:*

- Special Fund established: allocated competitively as one-time direct subsidy to private distribution companies to cover part of investment costs
- Operating costs to be covered from tariffs set by regulatory authority

## *Competition emphasized at several levels*

- Companies present projects to regional governments: compete based on Benefit/Cost, investment contribution, social impact
- Central government allocates subsidy funds to regional government based on 1) progress in RE in past year, and 2) population still unserved.



# Chile: Other key features:

- *Decentralized decision making*: regional govts identify needs and solutions, participate in decision making for fund allocation
- *Role of central govt* : provide resources, technical assistance, tools for project evaluation, institutional coordination
- *Joint financing*: state, private companies and users--all need to contribute
- *Subsidies* provided only to projects with positive social return and negative private return
- *Priority* to zones with high poverty, capacity to implement project; others will first be provided capacity-building assistance
- Consider *basic services only, alternative technologies*-- when grid extension and standard quality service too costly,



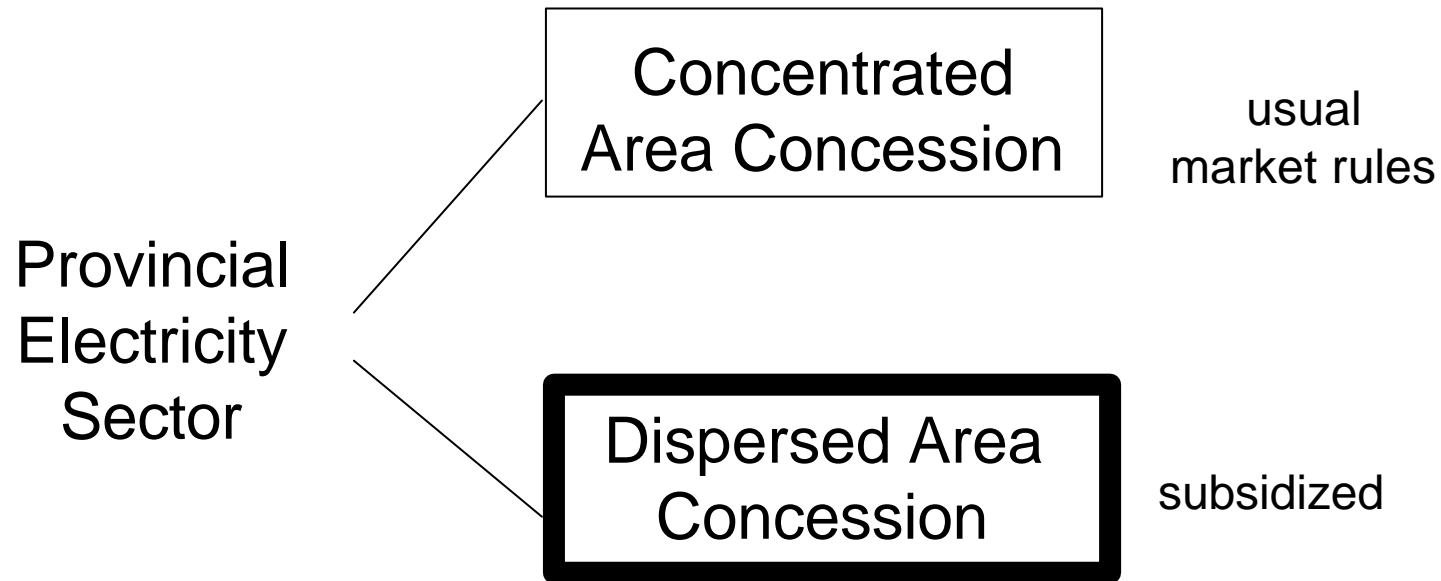
# Chile: Outcome as of 1999

- Electricity coverage in rural areas increased from 52% in 1992 to 76% in 1999 (exceeds 75% target for 2000)
- State share of investment declined from 70% in 1992 to 61% in 1999





# ***Argentina: Privatization of Provincial Power Sector (1990s)***



- Separate bids
- *For dispersed area concession, winner is company asking for least subsidy*



# Dispersed Area Concession Contract

- Area monopoly: rights to provide services to homes and public service centers in whole province
- several levels of service
- Concessionaire free to use any technology
- 3 x 15 years operation periods; rebid after each period, with last operator given priority
- Users pay connection plus tariff set by government; Subsidies provided per user
- Partial financing for initial investment
- Regulated by provincial regulatory agency



# WB/Govt of Argentina Investment Project

## RENEWABLE ENERGY IN RURAL MARKETS

### Financing Plan:

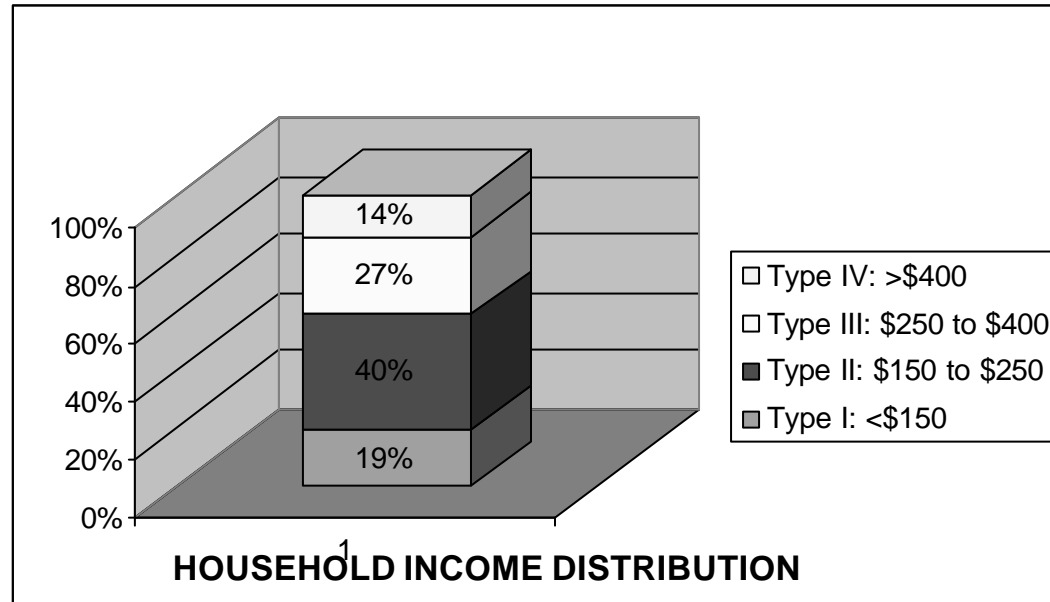
| Source                               | Total,<br>US\$million |
|--------------------------------------|-----------------------|
| Government (National and Provincial) | 26.5                  |
| Customers                            | 10.8                  |
| IBRD                                 | 30.0                  |
| Global Environmental Facility (GEF)  | 10.0                  |
| Concessionaires                      | 43.2                  |
| <b>Total</b>                         | <b>120.5</b>          |

### EIGHT INITIAL PROVINCES IN BANK PROJECT

|              | Customers     | Capacity<br>( kW p ) | Households    | Public<br>Service | Collective<br>Service |
|--------------|---------------|----------------------|---------------|-------------------|-----------------------|
| <b>TOTAL</b> | <b>70,247</b> | <b>6,658</b>         | <b>65,584</b> | <b>1,136</b>      | <b>3,547</b>          |
| Chubut       | 4,346         | 519                  | 4,110         | 20                | 216                   |
| Corrientes   | 21,560        | 2,043                | 20,140        | 380               | 1,040                 |
| Entre Rios   | 16,190        | 1,425                | 15,200        | 190               | 800                   |
| Jujuy        | 2,514         | 248                  | 2,280         | 114               | 120                   |
| Mendoza      | 2,376         | 208                  | 2,128         | 19                | 229                   |
| Rio Negro    | 2,905         | 370                  | 2,660         | 105               | 140                   |
| San Luis     | 3,677         | 385                  | 3,268         | 238               | 171                   |
| Tucuman      | 16,699        | 1,460                | 15,796        | 70                | 831                   |



# Household Market Characteristics...



## Estimating Willingness to Pay...

| Current Fuel Expenditures*                      |         |
|---|---------|
| Type I  | \$10.00 |
| Type II   | \$15.00 |
| Type III  | \$25.00 |
| Type IV   | \$38.00 |
| *kerosene, candles, dry cells, battery charging |         |



# Sources of Subsidy Funds

## Local:

*from tax on wholesale price of electricity (\$2.4/MWh).  
For rural investments and assistance to tariffs for low  
income people. Total >\$100 million/yr*

- *FEDEI-- administered by Federal CFE*
- *FCT (Fondo de Compensacion Tarifaria)--  
administered by provincial governments*

## International

- *GEF -- grant funds from Climate Change Category;  
Operational Program No.6: accelerate  
commercialization of still costly but environmentally  
clean technologies*



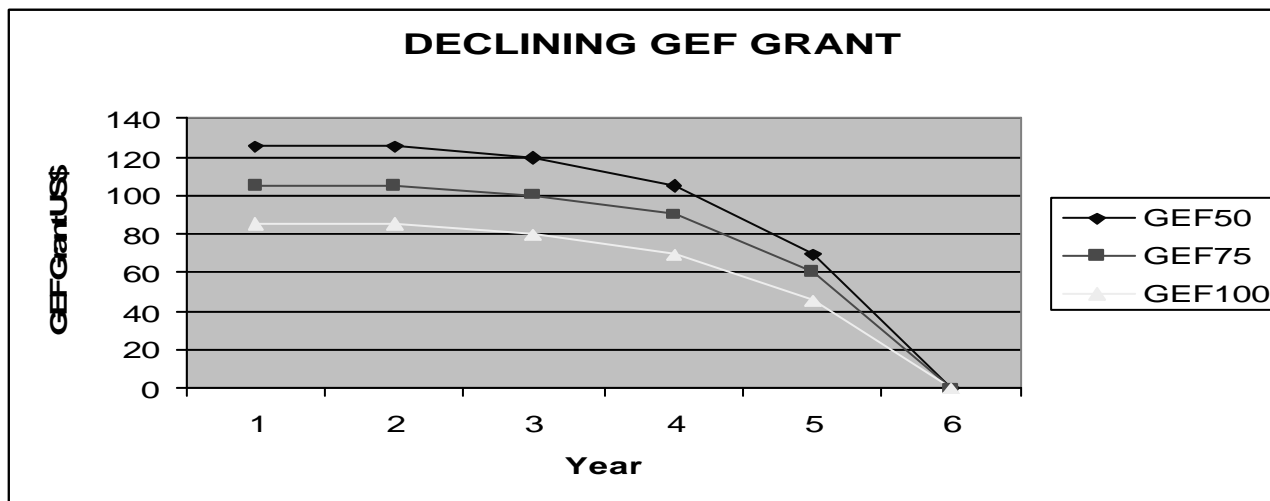
# Technologies

- No line extensions--areas too far from main network
- Highly dispersed communities: mix of isolated minigrids and individual systems
- Investments likely to be in small diesels, minihydro, PV, wind (Chubut) and hybrids



| MARKET SEGMENT                                    | SYSTEM                          | SUBSIDY*        |
|---|---------------------------------|-----------------|
| Agglomerated customers                            | Centralized system: diesel, etc | Partial subsidy |
| Dispersed Lowest Income Households (Type I)       | SHS (50W)                       | Partial subsidy |
| Dispersed Low Income Households (Type II and III) | SHS (50W,75W, 100W)             | Partial subsidy |
| Other Dispersed Households (Type IV)              | SHS (>100W)                     | No subsidy.     |
| Public Service Centers                            | PV (>100W)                      | Full subsidy    |

o  
 \*Subsidies are from GOA and from GEF. However, no GEF subsidy for diesel systems, Type IV households and Public Centers.



# Steps

- Negotiations with provincial governments--only those committed to full privatization eligible
- Market assessment surveys
- Determination of investment costs, subsidy requirements through simulated concession cash flows
- Road show by GOA in US and Europe to attract investors
- Bidding





# Status

- Provinces of Salta and Jujuy first to be awarded
  - Salta: Fenosa/BP Solar
  - Jujuy: Cartelon-CEC (Chile)
- San Luis, Rio Negro, Tucuman about to be bidded out
- Preparation of pilot Wind Home Systems component in Chubut

*Implementation suffered months of delay due to elections and change of administration*



# Conclusions: Changes in the Role of Government in Rural Electrification

- **What do we keep? *Role of market enabler, subsidy provider***
  - provide right policy environment.
  - market nurturing.
    - credit programs
    - information/training.
    - consumer protection, etc
  - poverty alleviation mandate
- **What do we throw overboard? *Doer of everything***
  - blanket subsidies.
  - central detailed planning.
  - restrictive regulations.



# **CLEAN DEVELOPMENT MECHANISM**

## **Opportunities and Challenges**



**Asia Pacific Economic Cooperation  
Seminar-Workshop  
*Lessons on Energy Sector Liberalization***

**Atty. Ma. Cecilia G. Dalupan  
3 to 5 December 2001**

# UNFCCC - Objective

- 1. Stabilization of GHG concentrations in the atmosphere**
- 2. That would prevent anthropogenic climate change with the climate system**
- 3. To be achieved within a time frame that:**
  - allows for ecosystems to adapt naturally to climate change**
  - ensures that food production is not threatened.**
  - enables economic development to proceed in a sustainable manner.(Art. 2 of UNFCCC and preamble of Kyoto protocol)**

# Kyoto Protocol



- targets and timetables
- cooperative implementation mechanisms
- entry into force
  - 90 days after 55 ratifications
  - including Annex I countries representing at least 55% of total 1990 CO<sub>2</sub> emissions.

# Obligations of Annex B Parties under the Kyoto Protocol

- Undertake activities to achieve their  
Emission Limitation and Reduction Commitment
  - - Energy efficiency
  - - Protect and enhance sinks
  - - Sustainable agriculture
  - - New energy, carbon sequestration technology
  - - Changes in fiscal policies
  - - Sectoral reform
  - - Transport sector
  - - Management of wastes & energy sectors.
  - - Cooperative efforts
  - - Aviation & marine sector

# Emission Reduction Targets of Annex B Countries

- by at least 5% below 1990 levels
- in the commitment period 2008 - 2012.
- To be achieved by Annex-i countries *as a whole*
- **.2 CRITICAL “TERMINAL DATES”**
  - 1990 (for levels)
  - - 2008-2012 (for commitment period)
- **BASELINE: 1990 total aggregate anthropogenic carbon dioxide equivalent emissions of GHG listed in annex-A of KP.**
- Reduction is of the cluster of GHGs in annex A of KP *taken as a whole.*
- Net changes in GHG emission determined through
  - sources
  - sinks

# *ANNEX A – KYOTO PROTOCOL*

- GREENHOUSE GASES

– CO<sub>2</sub> CH<sub>4</sub> HFC PFC SF<sub>6</sub>

## SECTORS / SOURCE CATEGORIES

- ENERGY
  - INDUSTRIAL PROCESSES
- SOLVENT AND OTHER PRODUCT USE
  - AGRICULTURE
  - WASTE



***ANNEX B –KYOTO PROTOCOL***  
*QELRC (percentage of base year or period)*

- 
- 92 Austria, Belgium, Bulgaria, Czech Republic, Denmark, Estonia, EC, Finland, France, Germany, Greece, Ireland, Lichtenstein, Italy, Latvia, Luxemburg, Netherlands, Monaco, Portugal, Spain, Sweden, UK and Northern Ireland
  - 93 USA
  - 94 Canada, Hungary, Japan, Poland
  - 100 New Zealand, Ukraine, Russian Federation
  - 101 Norway
  - 108 Australia
  - 110 Iceland

# ***EMISSIONS LIMITATION AND REDUCTION COMMITMENTS***



## **– KEY CONCEPTS**

- **ANTHROPOGENIC**
- **CO2 EQUIVALENT EMISSIONS**
- **GHG IN ANNEX A**
- **ASSIGNED AMOUNTS**
- **QUANTIFIED EMISSION LIMITATION AND  
REDUCTION COMMITMENTS**
- **REDUCING OVERALL GHG EMISSIONS**
- **5%BELOW1990 LEVELS**
- **COMMITMENT PERIOD-2008-2012**

# *COOPERATIVE ENFORCEMENT MECHANISMS OF KYOTO PROTOCOL*

---

- *Emissions trading*: the buying and selling of emissions credits among AI countries
- *Joint implementation (JI)*: Allowing an AI country to receive emissions credits for an emissions reduction project undertaken in another AI country
- **Clean development mechanism (CDM)**:  
**Allowing AI countries to receive CERs for projects that promote SD and reduce emissions in developing countries**

# ***CLEAN DEVELOPMENT MECHANISM***



- Project-based, between AI and NonAI parties**
- GOALS / BENEFITS**
  - Assist developing countries (NonAI) in
    - achieving sustainable development**
    - contributing to objectives of the UNFCCC****
  - Assist AI Parties in complying with their QELARC.**

# *SUPERVISION*



- **MEETING OF PARTIES  
KYOTO PROTOCOL**
- **EXECUTIVE BOARD**
- **INDEPENDENT AUDITORS TO  
VERIFY PROJECT ACTIVITIES**

# ***OPERATIONAL ISSUES***



- **PROJECT VALIDATION  
REGISTRATION**
- **DETERMINATION OF SUSTAINABLE  
DEVELOPMENT**
- **PROJECT MONITORING AND  
VERIFICATION**
- **CERTIFICATION AND ISSUANCE OF  
CERS**

# ***CERTIFICATION***



**PROCEDURE TO BE DEVELOPED, BASED ON THREE CONDITIONS:**

- 1. VOLUNTARY/APPROVED BY EACH NATION**
- 2. REAL, MEASURABLE, LONG TERM BENEFITS ON MITIGATION OF CLIMATE CHANGE**
- 3. REDUCTION OF EMISSIONS WHICH ARE “ADDITIONAL”.**

## *PARTICIPATION*



- **PRIVATE/PUBLIC ENTITIES CAN PARTICIPATE**
- **MUST FOLLOW CDM GUIDELINES.**



## ACQUISITION PERIOD

- **CERTIFIED EMISSION REDUCTIONS (CERS) CAN BE OBTAINED FROM 2000**
- **CERS CAN BE USED TO ACHIEVE COMPLIANCE FOR 1<sup>ST</sup> COMMITMENT PERIOD I.E. 2008-2012.**

## *SHARE OF PROCEEDS*




- **ADMINISTRATIVE EXPENSES**
- **ASSIST NON-AI PARTIES (developing) PARTICULARLY VULNERABLE TO CLIMATE CHANGE TO MEET COST OF ADAPTATION**

# ***Major Aspects of COP-7 Accord***



- Operating rules for the flexibility mechanisms and rules on eligibility
- A compliance regime that sets out the consequences of failing to meet an emissions target but defers until a later COP whether these are legally binding.
- Creation of a new type of emissions unit for sinks credits that cannot be banked for future commitment periods.
- A decision to consider at the next COP how to proceed with a review of commitments that could frame discussion of future developing country efforts.
- Approval of a declaration to the WSSD.



“The global market for renewable energy is expected to undergo rapid growth. The World Energy Assessment of UNEP and UNDP projects it will be worth between \$40 and \$78 billion by 2010.”

# *Renewable energy sources*



Wind Power

Wind Pump

Biogas

Geothermal heat and power

Solar thermal heat

Solar thermal electricity

Fuel-efficient stoves

Solar cookers

Wave power

Renewable fuel cells

Small hydro under 10 Megawatt (MW)

Photovoltaic (PV) solar electric systems

Biomass gasification of forest products and agricultural residues

# *Demand-Side Technologies*



Energy-efficient domestic appliances  
(refrigerators, washing machines, lighting,  
air conditioners, etc)

Energy-efficient industrial plant (e.g. iron &  
steel, cement, ammonia, pulp & paper,  
cogeneration, etc.)

*Modalities and procedures for small-scale projects - to be developed by the Executive Board by COP 8 (Oct-Nov 2002).*

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- Small-scale projects are defined as:
  - renewable energy projects with a maximum output capacity equivalent of up to 15MW
  - energy efficiency improvement projects which reduce energy consumption, on the supply and/or demand side by up to the equivalent of 15GW/h per year, or
  - other emission reduction projects which both reduce emissions and directly emit less than 15Kt of ktCO<sub>2</sub>e annually.)

## *NEXT STEPS*



- Ratification
- Setting up institutional and administrative frameworks
- For Non-AI:
  - Establishing indicators or criteria for ‘sustainable development’
  - Preparing portfolio of projects





“The CDM is intended to be the primary vehicle to encourage investment in sustainable energy projects in the developing world.”

“Effective rules for the CDM can accelerate the growth of domestic industries for developing countries, giving them a firm foothold in emerging clean energy markets.”



**"Used properly, the CDM  as a  
springboard for technological change".**

Environmental integrity  
Genuine GHG abatement  
Host-country driven  
Verification and certification  
Transparency and accountability

Contribution to sustainable development



**THANK YOU !**

## Annex H-1

**APEC SEMINAR-WORKSHOP on  
"Lessons on Energy Sector Liberalization"  
Makati Shangri-La Hotel  
Makati City, Philippines  
3 to 6 December 2001**

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**ASIA-PACIFIC ECONOMIC COOPERATION**  
**"Lessons on Energy Sector Liberalization"**  
December 3 to 6, 2001

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