Global and Regional Perspective

Presentation by
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29 January 2008

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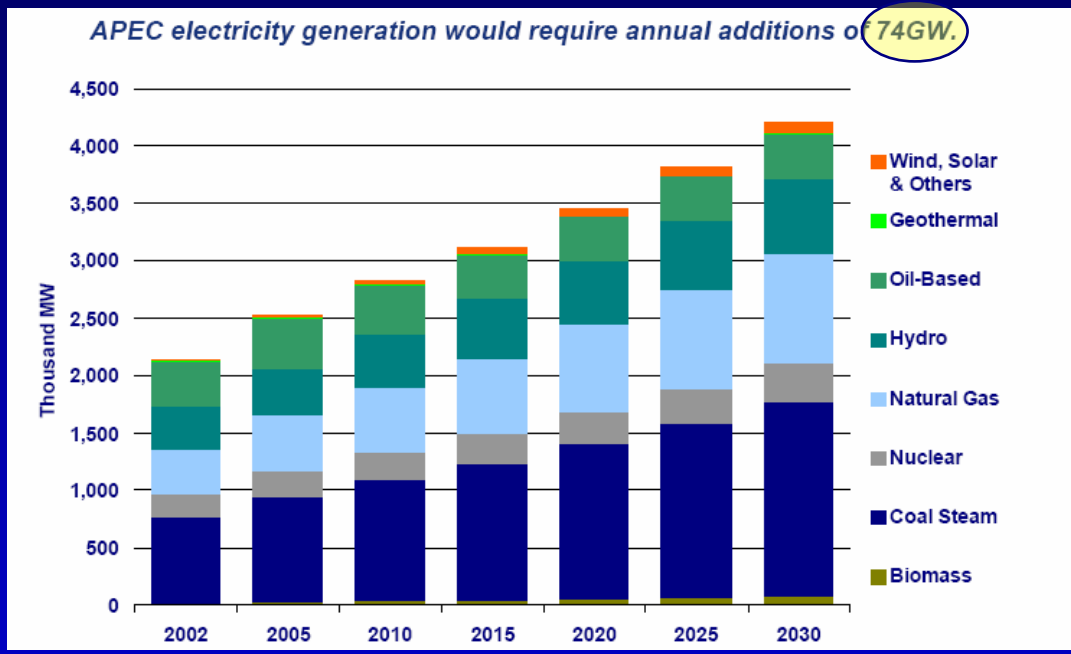
Electricity Demand and Supply

APEC's Electricity Demand (TWh)

Economy	1980	2002	2030	1980-2002 (%)	2002-2030 (%)
Australia	79.1	190.1	234.1	4.1	2.2
BD	0.3	2.3	2.7	9.7	0.6
Canada	303.5	486.7	689.4	2.2	1.3
Chile	9.3	40.8	160.8	6.7	5.0
China	247.7	1,193.9	6,582.3	7.4	6.3
HKC	10.5	38.1	82.8	5.9	2.8
Indonesia	5.8	87.0	307.5	12.7	4.6
Japan	512.8	983.5	1,280.3	3.0	0.9
Korea	32.6	294.2	821.4	10.5	3.7
Malaysia	8.1	68.8	249.0	9.9	4.7
Mexico	57.0	167.4	445.4	5.0	3.6
NZ	19.8	34.5	61.3	2.6	2.1
PNG	1.2	2.7	7.1	3.9	3.5
Peru	8.1	19.9	60.4	3.8	4.0
Philippines	17.4	39.2	184.5	3.9	5.7
Russia	n.a.	586.7	985.7	-	1.9
Singapore	5.8	29.2	82.4	7.9	3.8
CT	37.2	158.5	416.3	6.9	3.5
Thailand	12.8	98.4	495.6	9.6	5.9
USA	2,025.6	3,467.7	5,648.4	2.5	1.8
Viet Nam	2.3	30.1	245.7	11.6	7.8
APEC	4,152	8,019	19,163	3.6	3.2

Source: APERC Analysis (2006)



74,000 MW of new generation each year

APEC: Asia-Pacific Economic Cooperation

APERC: Asia Pacific Energy Research Centre

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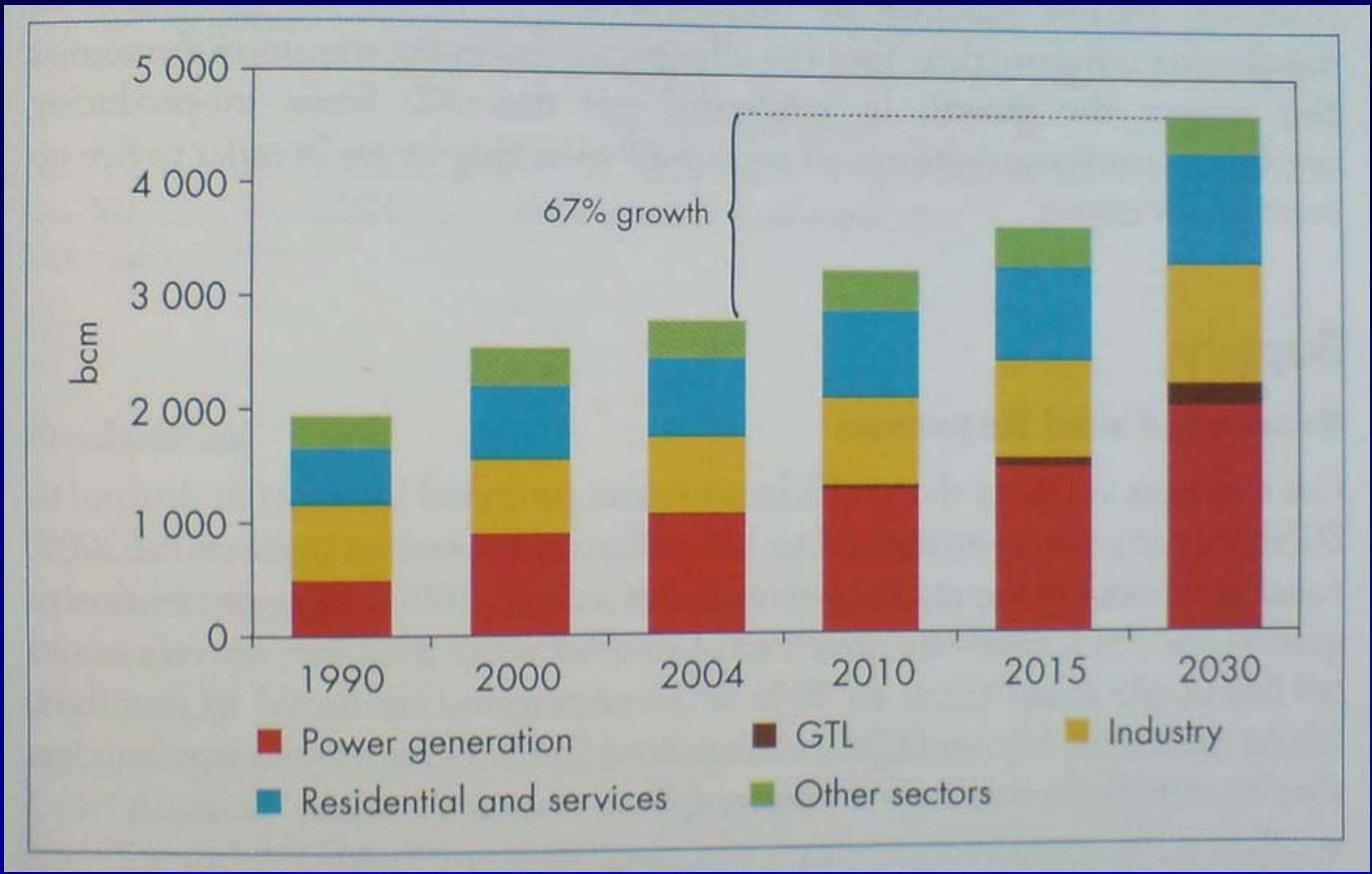
World Primary Natural Gas Demand by Sector



Source: IEA – World Energy Outlook 2006

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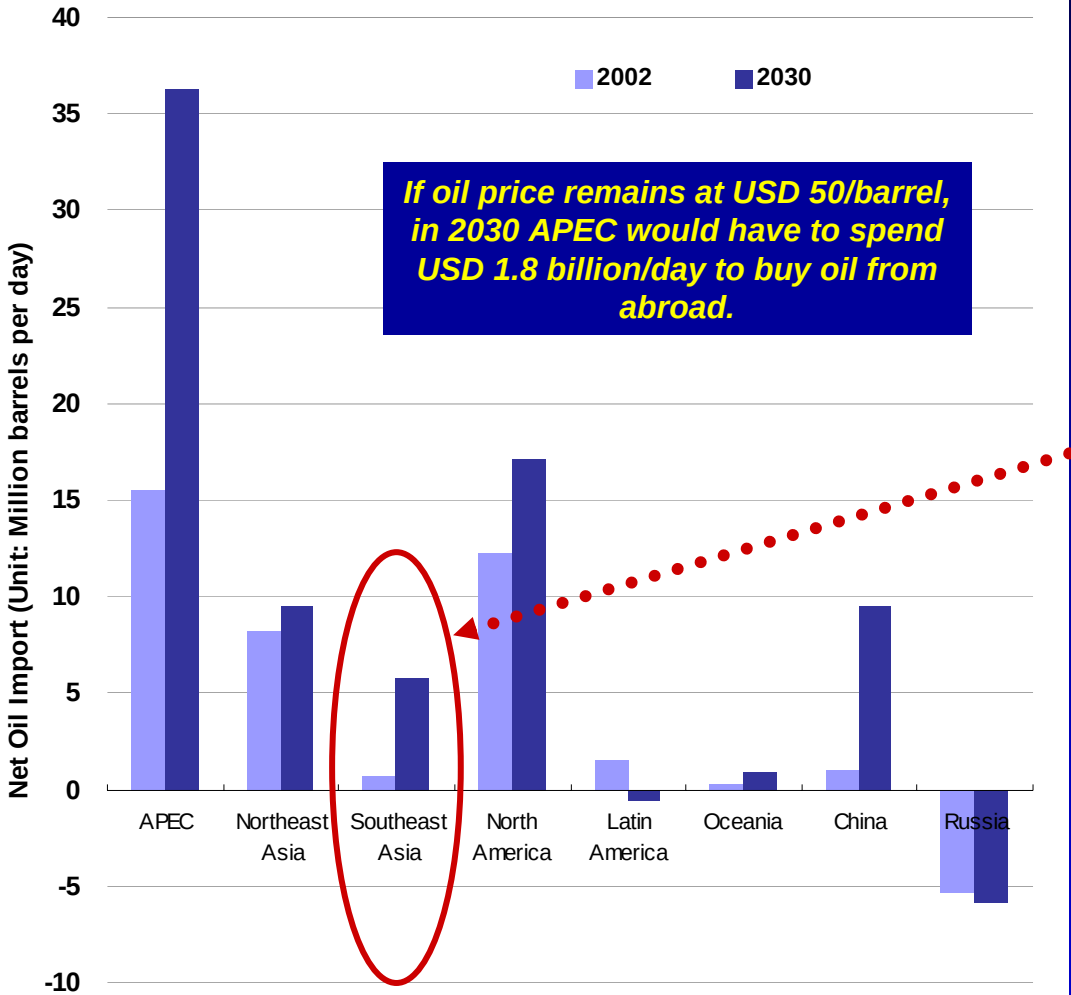
Rising Oil Import

Net Oil Import (2002 and 2030)



Rising Net Oil Import Dependency across the Region

	APEC	NEA	SEA	NA	OCE	China
2002	36%	100%	19%	55%	26%	22%
2005	37%	100%	27%	53%	29%	34%
2010	38%	100%	35%	49%	42%	44%
2015	41%	100%	44%	51%	50%	46%
2020	44%	100%	56%	50%	55%	57%
2025	50%	100%	63%	53%	59%	65%
2030	52%	100%	69%	56%	62%	70%

(Note) Net Oil Import Dependency = (Oil Import + Oil Export)/Primary Oil Demand

(Source) Asia Pacific Energy Research Centre (2006), "APEC Energy Demand and Supply Outlook"

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Philippines

Energy consumption grew by 3.5% in the last 20 years and expected to grow even faster until 2030

- **44%** transport – growth forecast 4.6%
- **20%** residential – growth forecast 2.9%

Status Quo (Reference Scenario, RS)

Not sustainable!

The world faces two threats:

(i) security of supply and high prices, and

(ii) environmental harm caused by burning of fossil fuels

Alternative Scenario

If countries adopted all policies under consideration in relation to energy security and green house gas reduction.

- 10% reduction of World primary energy demand (roughly equivalent of all of PRC's energy consumption today)
- Less reliance of developing Asia on oil import than RS (fall of 13 million barrels per day by 2030)
- Energy-related CO2 emission reduced by 16% in 2030 and 5% by 2015 relative to RS
- 80% of the avoided CO2 from efficiency and 20% from fuel switching. Efficienct use of fuels (car and trucks) almost 36%

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Policies included in the Alternative Policy Scenario – Biofuels

Country	Policy / measure	Implementation in the Alternative Policy Scenario
Biofuels		
US	EPACT 2005 requires ethanol use to increase to 7.5 billion gallons in 2012, and remain at that percentage from 2013 onwards.	Target met and strengthened
Japan	A target of biofuel use in the transport sector of 500,000 kilolitres of oil equivalent in 2010.	Target met and prolonged
EU	To boost the percentage of biofuels to 5.75% of fuels sold by 2010.	Target met and strengthened
China	National standard for ethanol fuel usage. Pilot programmes are installed in 9 trial provinces.	Ethanol use increased
India	To promote biofuels through fiscal incentives, plus design and development efforts.	Increased use of biofuels

Source: IEA – World Energy Outlook 2006

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Policies included in the Alternative Policy Scenario – Renewable Energy

Country	Policy / measure	Implementation in the Alternative Policy Scenario
Renewable Energy		
US	State-based Renewable Portfolio Standards ensure that a minimum amount of renewable energy is included in the portfolio of electricity resources.	Met and strengthened over the period
EU	The Biomass action Plan outlines measures in heating, electricity and transport to increase the use of biomass to about 150 Mtoe by 2010.	Met by 2020
China	Targets in 2020 for renewable energy for small-scale hydropower, wind, biomass-fired electricity, and small increases in solar, geothermal, ocean and tidal energy.	Overall target met and prolonged
India	To promote renewables (e.g. wind and solar) through fiscal incentives, plus design and development efforts.	Increased use of renewables

Source: IEA – World Energy Outlook 2006

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Policies included in the Alternative Policy Scenario – Industry Sector

Country	Policy / measure	Implementation in the Alternative Policy Scenario
Industry sector		
Japan	Energy Conservation Law strengthened by raising the number of factories and workplaces responsible for promoting energy conservation from 10,000 to about 13,000.	Improved energy efficiency in industry
China	The Top 1,000 Enterprises programme requires monitoring with targets to improve efficiencies of the largest energy consumers in 9 industrial sectors.	Met and strengthened

Source: IEA – World Energy Outlook 2006

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Policies included in the Alternative Policy Scenario – Building Sector

Country	Policy / measure	Implementation in the Alternative Policy Scenario
Building sector		
EU	The Ecodesign Directive for minimum environmental performance requirements focusing on energy and water consumption, waste generation and extension of machinery lifetime of energy-using products.	Improved energy efficiency in industry
China	The energy conservation level of residential and public buildings to be close to, or reach, modern, medium-developed countries by 2020.	Improved efficiency in residential and services sector
India	Minimum requirements for the energy-efficient design and construction of buildings that use significant amounts of energy.	Met and strengthened

Source: IEA – World Energy Outlook 2006

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Policies included in the Alternative Policy Scenario – Transport Sector

Country	Policy / measure	Implementation in the Alternative Policy Scenario
Transport sector		
US	Structural reform of Corporate Average Fuel Economy (CAFE) standards to allow for size-based fuel efficiency.	Implemented and strengthened
Japan	Top Runner programme sets efficiency standards for passenger cars and trucks according to the most efficient vehicle in each category.	Met and prolonged
EU	Expansion of the EU Emissions Trading Scheme (ETS) to other sectors, including civil aviation. Applicable to all flights departing from the EU for both EU and non-EU carriers.	Reduced aviation fuel demand
China	National standards require the car industry to limit vehicle fuel consumption, limits based on vehicle weight.	Met and strengthened

Source: IEA – World Energy Outlook 2006

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Policies included in the Alternative Policy Scenario – Other

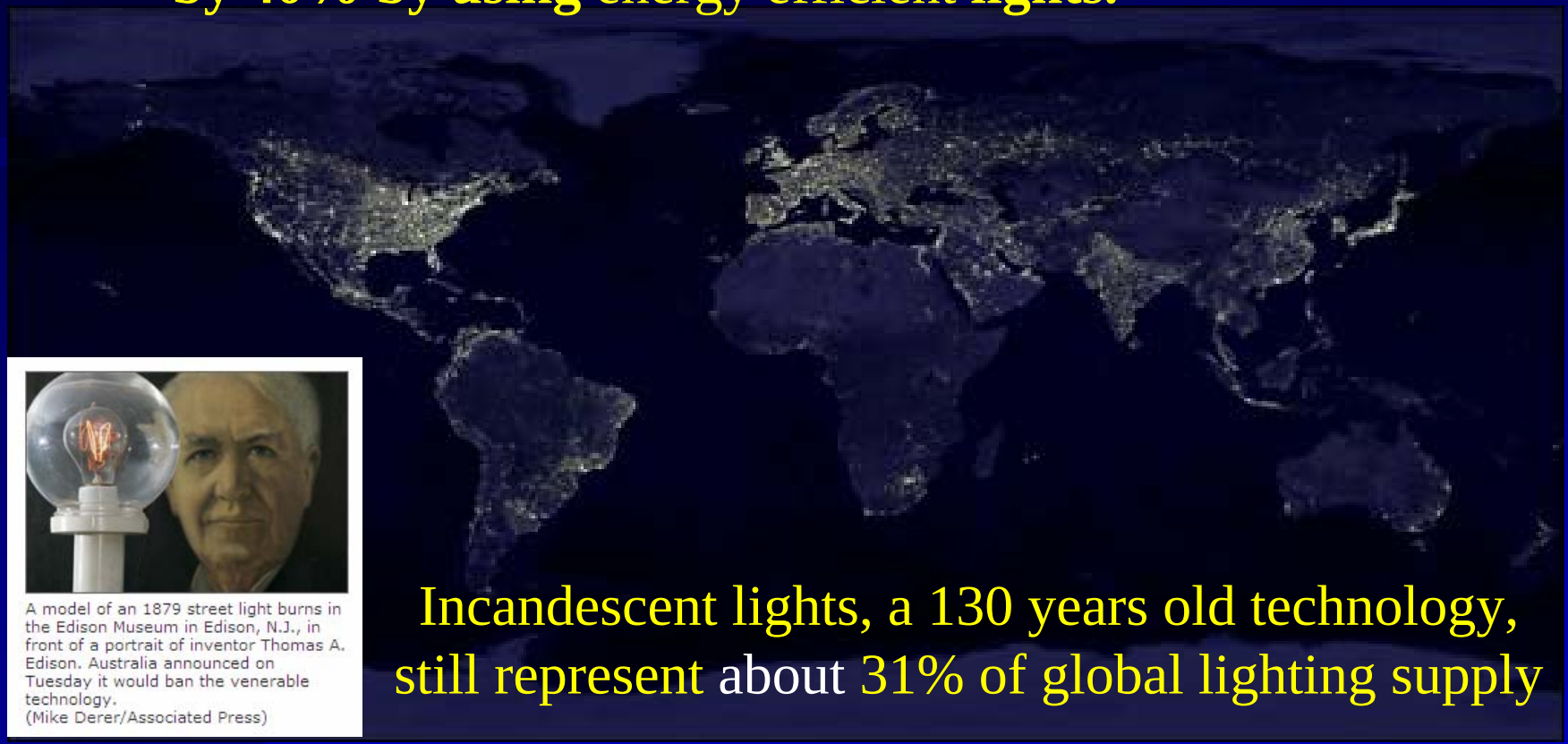
Country	Policy / measure	Implementation in the Alternative Policy Scenario
Other		
US	EPACT 2005 provides for tax credits for the construction of coal-fired generation projects, requisite on meeting efficiency and emissions targets.	Increased share of IGCC and clean coal
US	EPACT 2005 includes royalty relief for oil and gas production in Gulf of Mexico.	Increased share of domestic oil production
EU	Directive on the promotion of end-use efficiency and energy services ensures that all member States save at least 1% more energy each year.	Met and strengthened
China	The 11th 5-year plan stipulates massive restructuring and amalgamation of the coal industry, seeing the closure of many small plants and increased efficiency in large plants.	Improved efficiency of coal industry

Source: IEA – World Energy Outlook 2006

Opportunities in Lighting

- Grid-based electric lighting consumes **19%** of the total global electricity production

Globally, electricity demand for lighting **can be reduced by 40% by using** energy efficient **lights.**



A model of an 1879 street light burns in the Edison Museum in Edison, N.J., in front of a portrait of inventor Thomas A. Edison. Australia announced on Tuesday it would ban the venerable technology.
(Mike Derer/Associated Press)

Incandescent lights, a 130 years old technology, still represent about 31% of global lighting supply

Source: NASA http://antwrp.gsfc.nasa.gov/apod/ap001127.html

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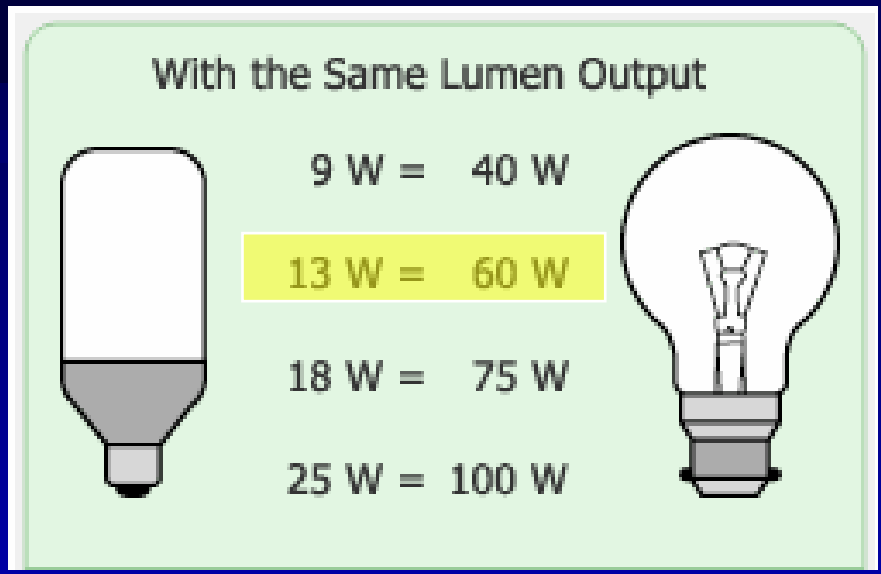
Power consumption for 1,000,000 lights

1,000,000
CFLs
13 Watt each



1,000,000
incandescent
60 Watt each

13,000,000 watts

60,000,000 watts

13 MW ← 47 MW less at customer end → **60 MW**

Savings of at least **50 MW** of equivalent generation

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1,000,000 CFL is the same as a new 50 MW power station

1 million CFLs cost

$1.5 million

A 50 MW Power Station **costs**

$50 million

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Greenpeace India seeks ban on incandescent bulb

New Delhi, April 16th, 2007: Greenpeace today launched a national campaign calling for a phase out of inefficient light bulbs in India by 2010. Four Greenpeace activists suspended themselves from the top of the 269 meters high Vikas Minar building at the Center of New Delhi this morning and unfurled a 85 by 45 feet large banner with the message "Stop Climate Change, Ban the Bulb" and the campaign logo.

Ministry

The Energy Ministry wi
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The government ho
help phase out the us
Energy Minister Piy
incorporated in the na
"Thailand has been
and millions are switc
Within three years,
light will be from pow
The country's electric
education campaign starting next month w
football squad to promote their use. The Bt
energy-saving bulbs from importers and lo
resold to consumers at subsidised prices. F
subsidised bulbs at 7-Elevens and offices o
Electricity authorities.
Piyasvasti said the ministry would regula
light sources in new buildings. This will be
dards are in place.
"We're campaigning for the use of the bu
saving class. The recommended products
Right now, they're still expensive: Bt80 to B
about Bt15," he said. The Electricity Genera
manage the campaign. It has asked manuf
making and importing conventional bulbs.
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Languages

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bulbs. Lawmakers and
rope are laying plans to replace
ient incandescent bulbs. (Photo Illustration by
y Images)

McDiarmid reports for

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PLN to distribute energy-saving bulbs

The Jakarta Post
Jakarta

As part of its push for energy saving, state electricity firm PT Perusahaan Listrik Negara (PLN) revealed Friday it would begin distribution of some 51 million energy-saving light bulbs in the third week of March.

In the first phase, up to 1 million bulbs would be given to households mainly in eastern Indonesia, chairman of the PLN's demand side management team, Syaiful B. Ibrahim, said Friday.

Each household would be entitled to receive three units.

"We target the distribution of all units to be completed by October," Syaiful said as reported by *detik.com*.

He said each household would need to exchange the units with conventional bulbs used previously used around their homes with a capacity of between 25 and 40 watts.

"This (barter) is to avoid misuse. We're concerned they will not use the bulbs or sell them to others."

The Indonesian Association of Electric Lights (Aperlindo) has estimated that 2.8 million units would be distributed to West Sumatra, Aceh, and Riau, and 3.1 million units to North Sumatra.

The association said Lampung, South Sumatra, Jambi, Bangka Belitung and Batam would receive 2.97 million, while South Kalimantan, West Kalimantan and East Kalimantan would get 2.56 million units.

It added North Sulawesi, South Sulawesi, Central Sulawesi and Gorontalo province would get 2.97 million units, while East Java 9.47 million, Central Java and Yogyakarta some 9.1 million and West Java around 9.6 million.

Jakarta and Banten will get 5.47 million while Bali, West Nusa Tenggara, East Nusa Tenggara, Papua and Maluku get 2.3 million units.

Source: **The Jakarta Post, 26 Jan 2008**

Benefits

Savings of:

- 1,200 MW generating capacity
- 670 million Liters of fuel each year
- 5 million tons of CO2 each year

Expected cash benefits

- $1.3 billion from deferred generation investment
- $450 million from fuel cost savings
- $30 million of CDM credits

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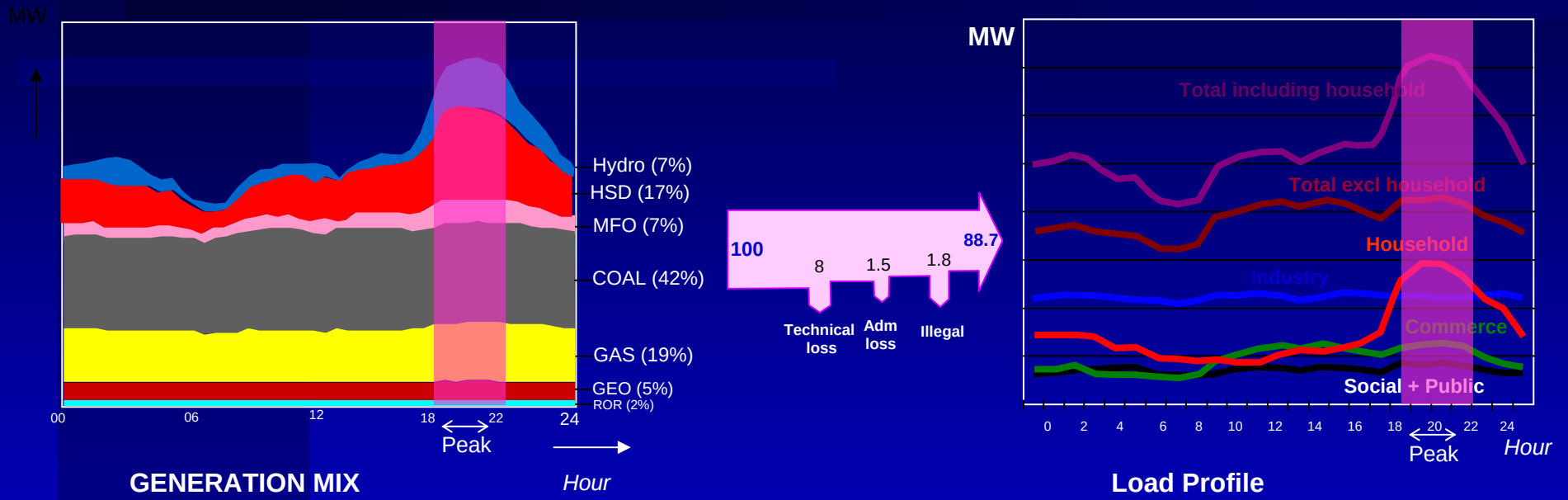
Production vs consumers' behavior.....



- System peak during 18.00 – 22.00
- Residential consumers dominate peak hours.
  - Average cost of marginal generation
    - 5.3 c/.kWh marginal revenue
    - 20 c/kWh marginal cost (using oil at peak times)

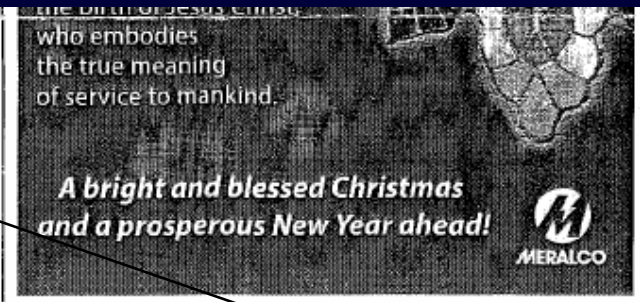
SOURCE: PLN, Indonesia

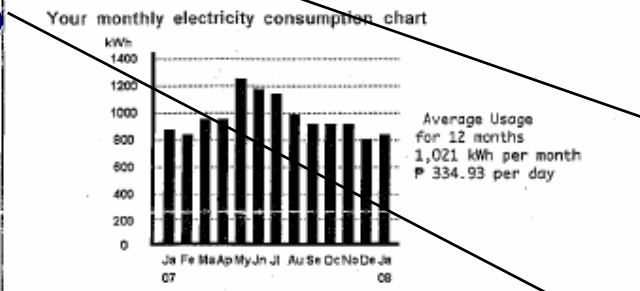
Billing Info

Bill Date	: 11 JAN 2008
Billing Period	: 13 DEC 2007 to 11 JAN 2008
Due Date	: 20 JAN 2008
Total kWh	: 874
Total Current Amount	: P 8,252.10

Billing Summary

BILL SUBGROUP	SUBTOTAL	PERCENTAGE
Generation	3,786.35	45.9%
Transmission	800.85	9.7%
System Loss	640.73	7.8%
Distribution (Meralco)	2,130.66	25.8%
Subsidies	98.94	1.2%
Government Taxes	759.79	9.2%
Universal Charges	34.79	0.4%
Other Charges	0.00	0.0%
Total	8,252.10	100.0%

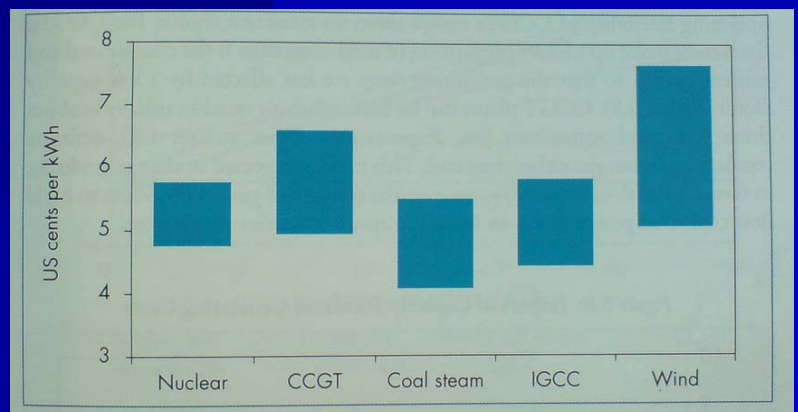




P 8,252 / 874 kWh
or
P 9.44 /kWh

23 c/kWh

Generation cost
10.4 c/kWh



Note: The ranges of capital and fuel costs largely reflect regional differences. *Capital costs* range as follows: $2 000 to $2 500 per kW for nuclear; $550 to $650 per kW for CCGT; $1 200 to $1 400 per kW for coal steam; $1 400 to $1 600 per kW for IGCC and $900 to $1 100 per kW for onshore wind. *Fuel cost* ranges are $0.4 to $0.6 per MBtu for nuclear; $5 to $7 per MBtu for gas and $40 to $70 per tonne for coal. Wind average capacity factor ranges from 25% to 32%.

Source: IEA

Additional Policy Challenge!

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Summit Outcome

The summit's objectives are to:

- Develop an alternative energy path for the Philippines
- Establish specific action plans including outcomes within each policy outcome

For More Information

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