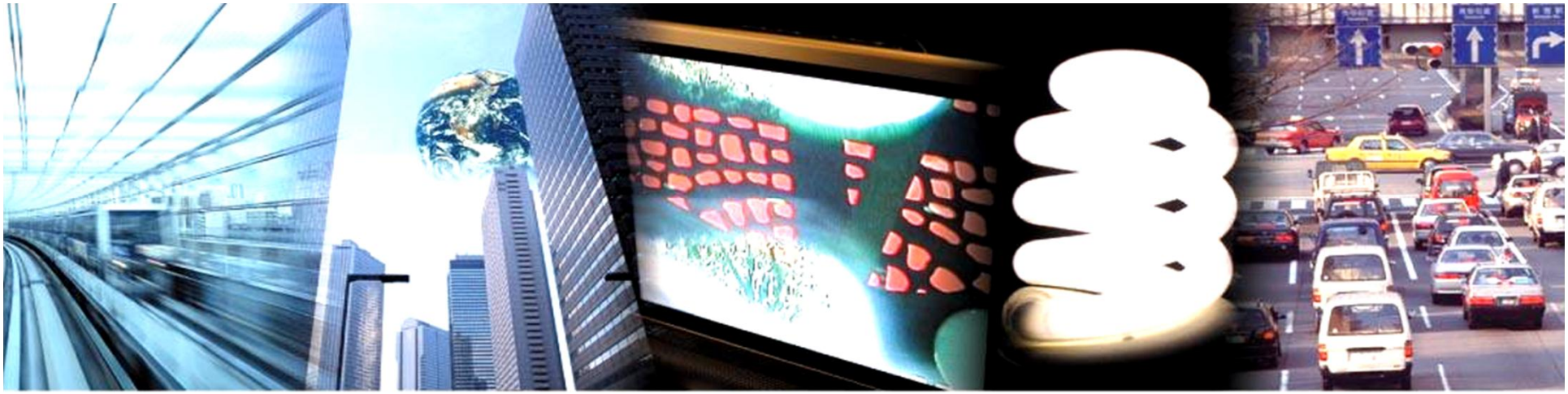


Asia Economic Community Forum 2013/Energy Session

1 November 2013

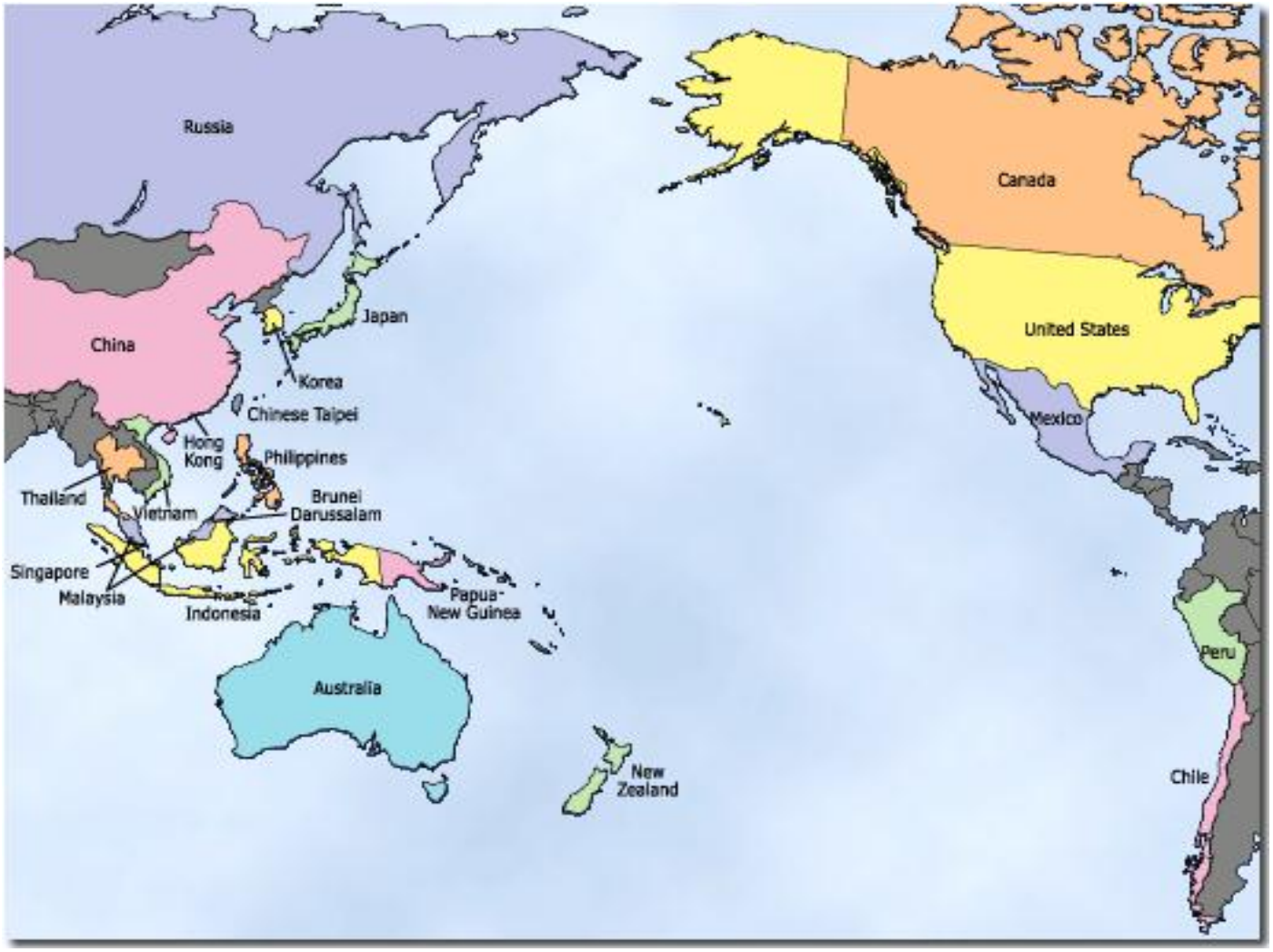
Meeting the Energy Challenges of the Asia-Pacific Region

Takato Ojimi

Asia Pacific Energy Research Centre (APERC)

Asia-Pacific Economic Cooperation

APEC Member Economies

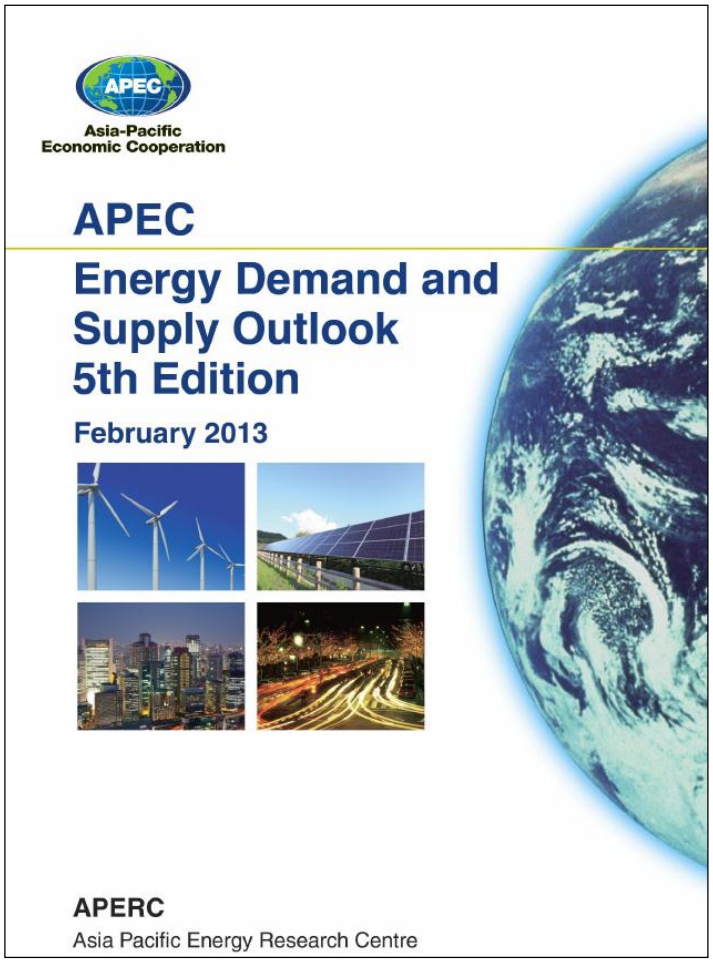


From APEC website, http://hrd.apec.org/index.php/Image:APEC-map.gif

Background on APERC

- Asia Pacific Energy Research Centre (APERC) supports the energy activities of APEC with
  - Research, especially analysis of energy supply, demand, and greenhouse gas emissions
  - Cooperative programs to promote energy efficiency and low-carbon energy
- Funded by the Japanese government and based in Tokyo
- Currently has 19 staff members, including 10 visiting researchers from APEC economies

APEC Energy Outlook



- APERC has historically produced an APEC Energy Demand and Supply Outlook every 3 or 4 years
- Looks ahead 25 years, considering both business as usual and how to make it better
- The 5th Edition was published in February, 2013

The Asia-Pacific Regionôs Energy Challenges

The three major energy challenges that the current Asia-Pacific region is facing are:

1. Energy Access for All
2. Energy Security
3. Climate Change

1. Energy Access for All ï The Problem

- Worldwide1.3 billion people still lack access to electricity
- Worldwide 2.6 billion people lack access to commercial cooking fuels

Source: IEA, *World Energy Outlook 2012,* p. 532

1. Lack of Energy Access for All ï The Consequences

- Nearly 2.0 million deaths/year from indoor air pollution (WHO estimates)
- Barrier to school performance for children
- Barrier to economic development

Source: http://www.who.int/mediacentre/factsheets/fs292/en/

1. Lack of Energy Access for All ï Where Is the Problem?

- In APEC Asia,
  - Significant lack of access to electricity still exists in Indonesia, the Philippines, and Papua New Guinea
  - Significant lack of access to commercial cooking fuels still exists in the above plus China and Vietnam
- But biggest challenge is in Sub-Saharan Africa and Central Asia (India)

1. Lack of Energy Access for All ï Is It Really an Energy Problem?

According to the UN Millennium Project,

- 2.7 billion people live on US$2/day or less
- 1 billion people live on US$1/day or less

Source: http://www.unmillenniumproject.org/documents/UNMP-FastFacts-E.pdf

1. Lack of Energy Access for All ï Just One of Consequences of Poverty?

- Safe drinking water (1 billion people lack it)
- Food (800 million people go hungry)
- Basic healthcare (11 million children/year die of preventable diseases)
- Basic education

(40% of women in Africa lack access)

- é

Source: http://www.unmillenniumproject.org/documents/UNMP-FastFacts-E.pdf

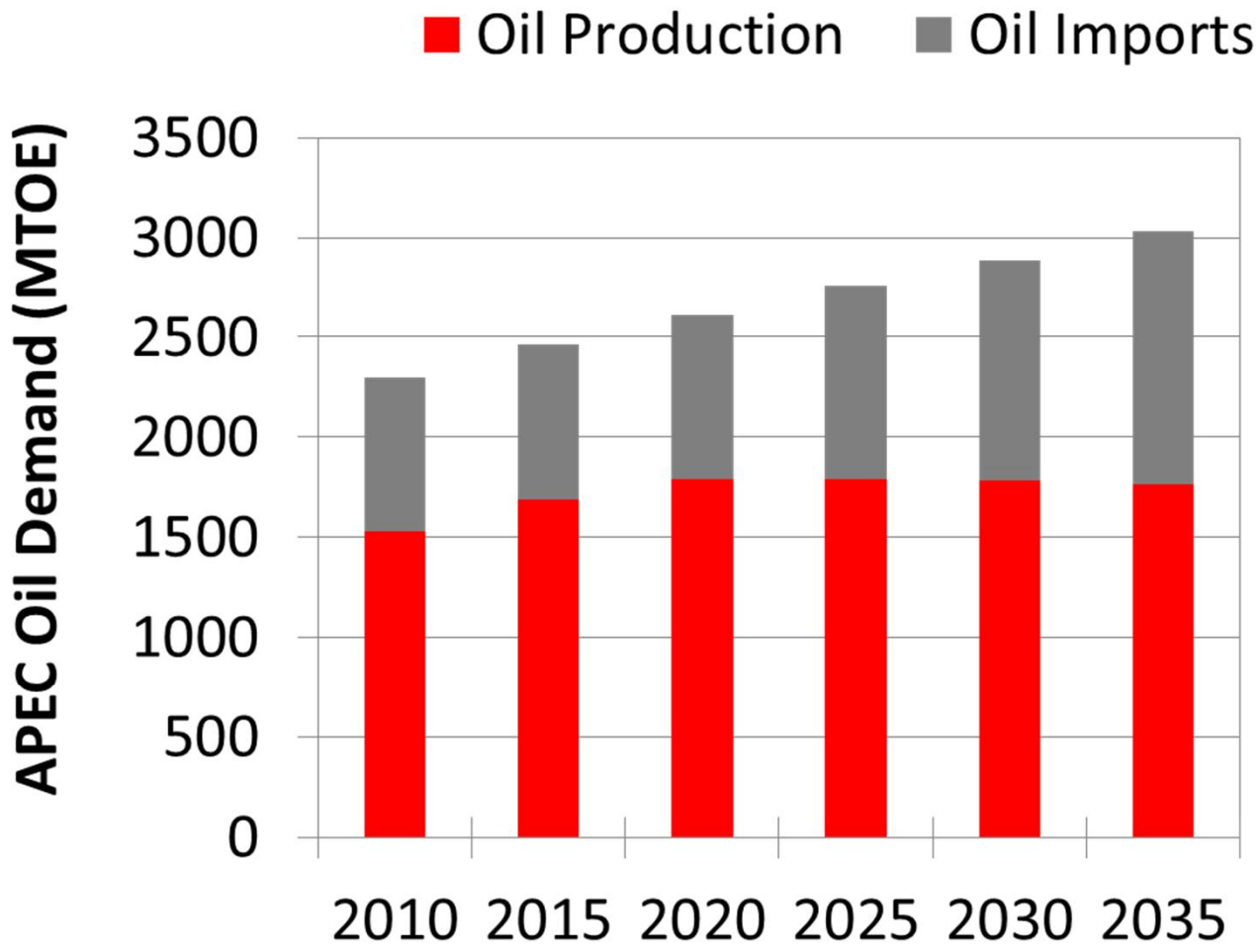
1. Lack of Energy Access for All ï Conclusions

- Lack of energy access is just one symptom of the larger problem of poverty
- Best way to provide energy access for all is therefore to lift people out of poverty
- The developing APEC region is doing just that, and could have much to teach the rest of the world!

2. Energy Security ï The Problem

- Mainly a problem for oil
- Oil demand growing rapidly, especially in developing economies
- Oil production has become more concentrated in a few countries in the Middle East and Africa

2. Energy Security ï APECôs Oil Production and Imports



Source: *APEC Energy Demand and Supply Outlook 5th Edition* (2013)

2. Energy Security ï Possible Solutions

1. Have peace and stability in the Middle East and Africa!
2. Emergency preparedness
3. Increase oil production elsewhere?
4. Improve oil efficiency
   - ¶Avoidô - Urban Planning
   - ¶Shiftô - Public Transport/ Bicycling/Walking
   - ¶Improveô - Vehicles
5. Find environmentally-friendly alternatives to oil

2. Energy Security
ï Emergency Preparedness

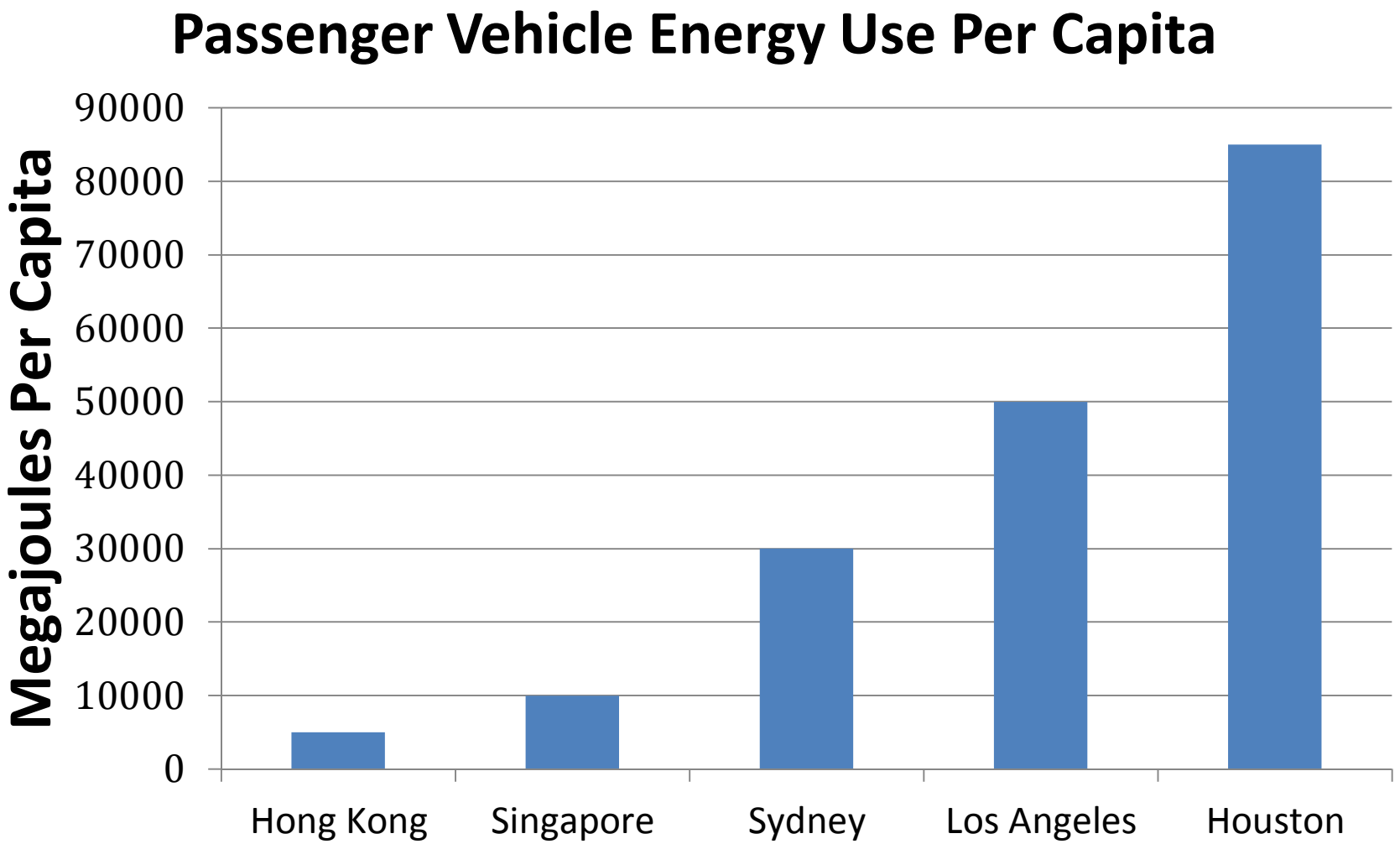
APEC Energy Ministers agreed at St. Petersburg, Russia in June 2012:

ñMinisters encourage the EWG and APERC to work ··· on activities to improve the response to oil and gas emergency situations in the APEC region ···.ò

APERC has implemented two

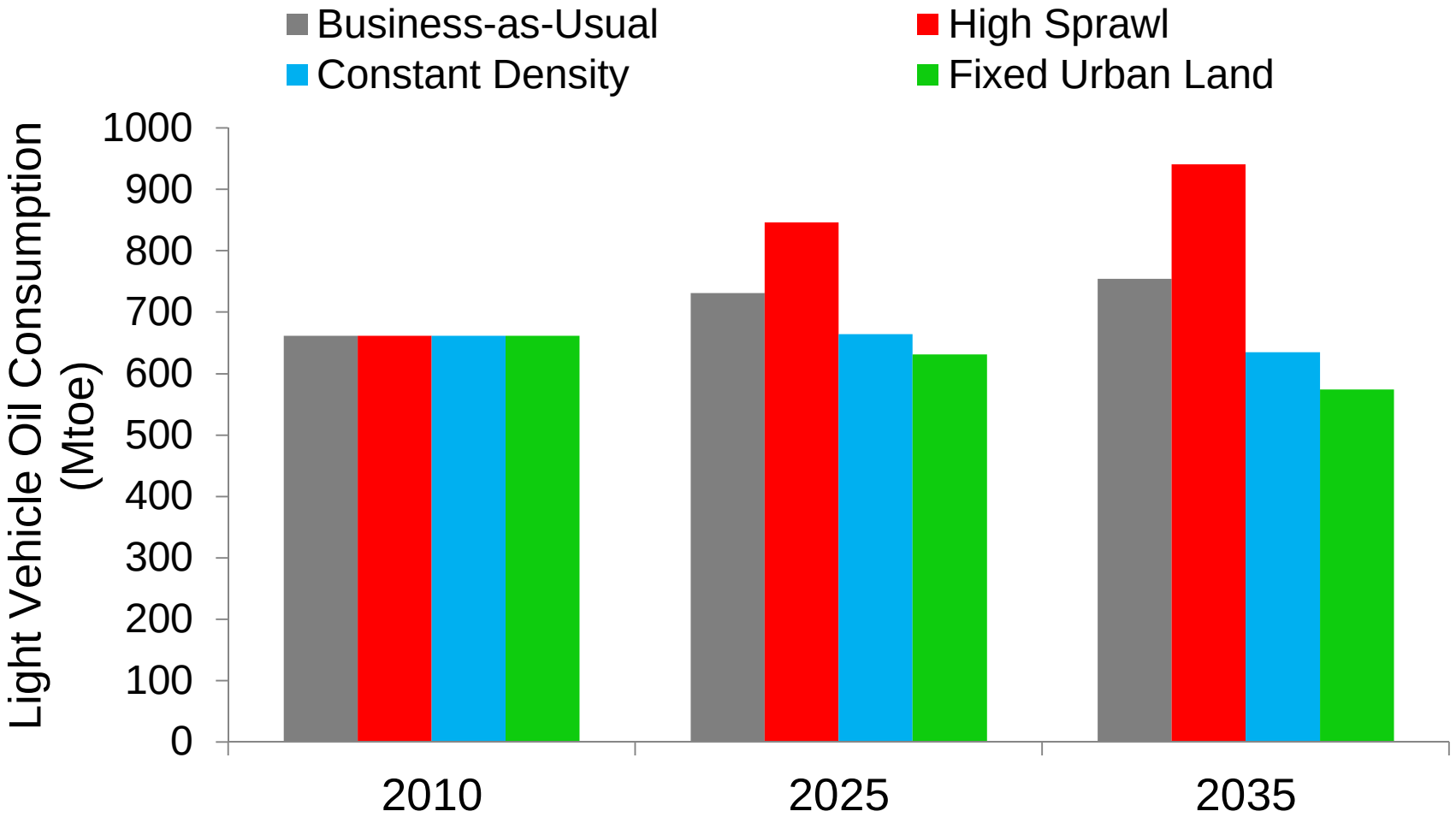
ñOil and Gas Security Exercisesò in collaboration with IEA and ASEAN and will report back to Energy Ministers next year.

2. Energy Security – Better Urban Planning Reduces Oil Demand



Source: Kenworthy and Laube (2001), *UITP Millennium Cities Database for Sustainable Transport*

2. Energy Security – Impacts of Better Urban Planning



Source: *APEC Energy Demand and Supply Outlook 5th Edition* (2013)

3. Climate Change ï The Problem

- Consequences of climate change could be catastrophic for humanity

- The best science is saying we need to cut greenhouse gas emissions dramatically and soon

- Yet emissions continue to grow

3. Climate Change ï The Impacts

- Water ï Reduced availability, more frequent droughts
- Ecosystems ï Major extinctions, ocean coral destroyed
- Agriculture - Reduced agricultural productivity
- Coasts ï Rising sea levels, loss of low-lying lands
- Health ï Increase in tropical diseases
- Singular Events ï Floods, heat-waves, etc.

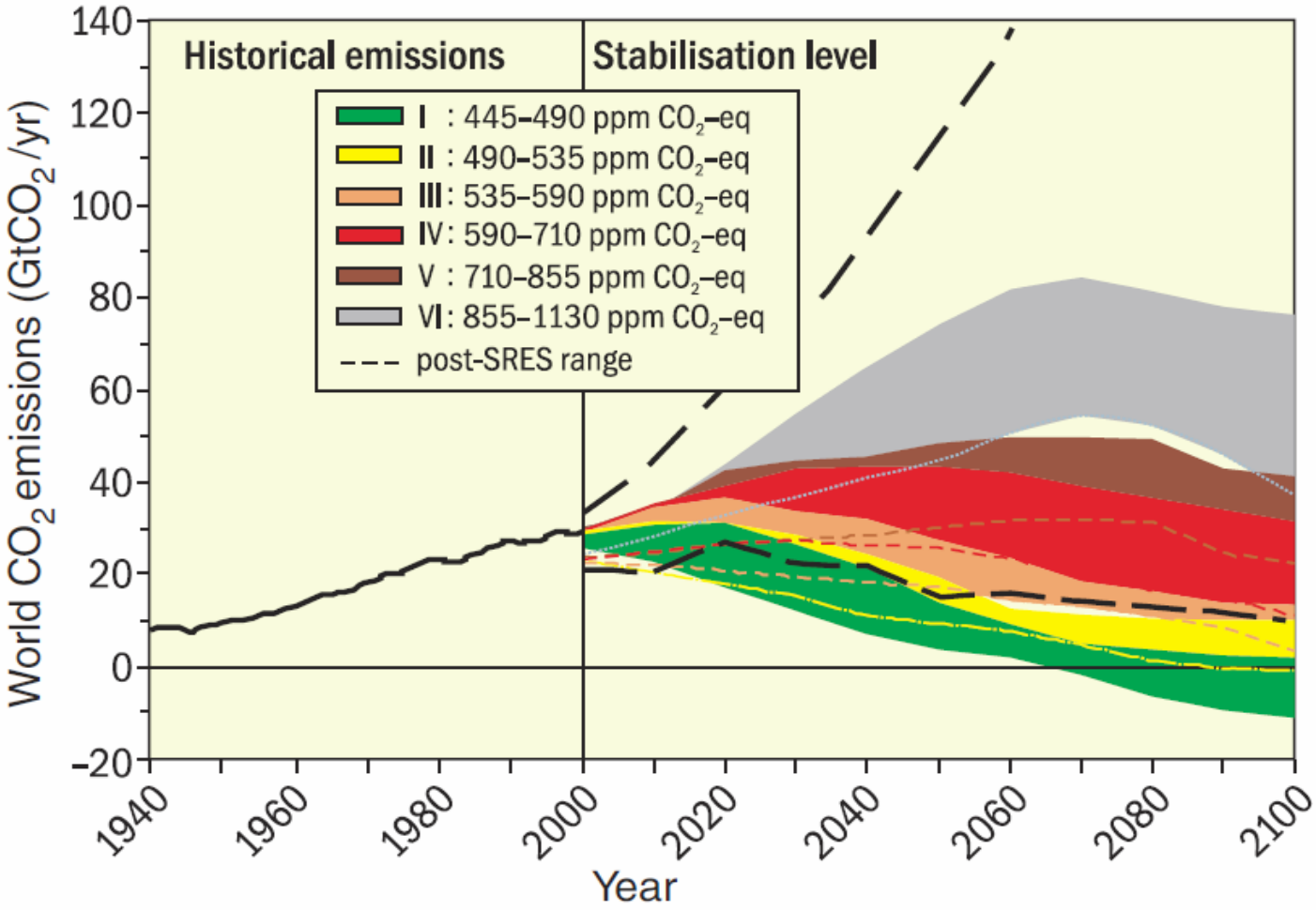
Source: Intergovernmental Panel on Climate Change, *Fourth Assessment Report: Working Group II Report, Impacts, Adaptation and Vulnerability (2007), Technical Summary*, Table TS.3

3. Climate Change ï 2º C Limit Needed

From Copenhagen Accord with 139 Parties Agreeing:

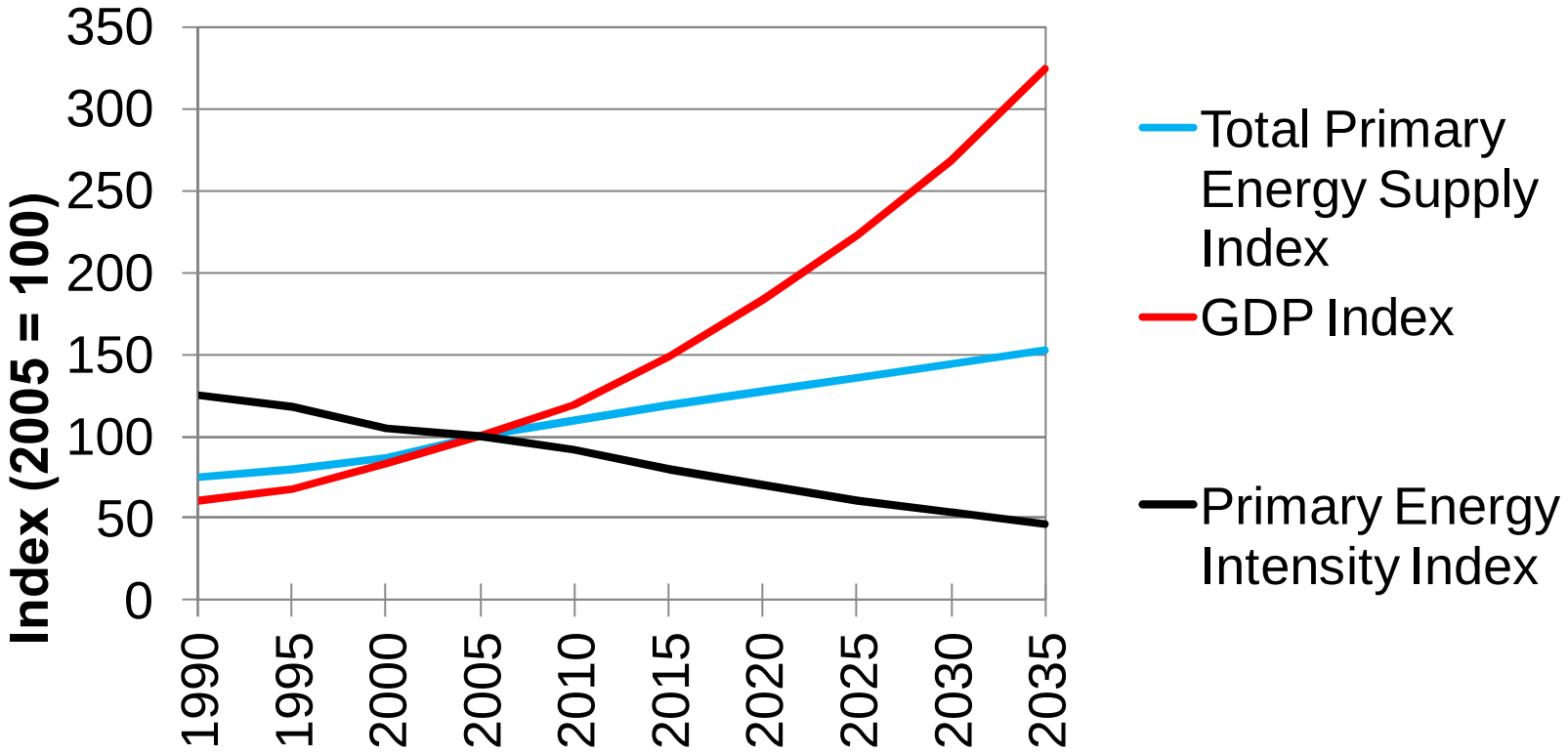
ñWe agree that deep cuts in global emissions are required according to science, as documented by the IPCC Fourth Assessment Report with a view to reduce global emissions so as to hold the increase in global temperature below 2 degrees Celsiusé ò

3. Climate Change - What We Need to Do



Source: Intergovernmental Panel on Climate Change, *Climate Change 2007: Synthesis Report*, Figure 5.1, p 66.

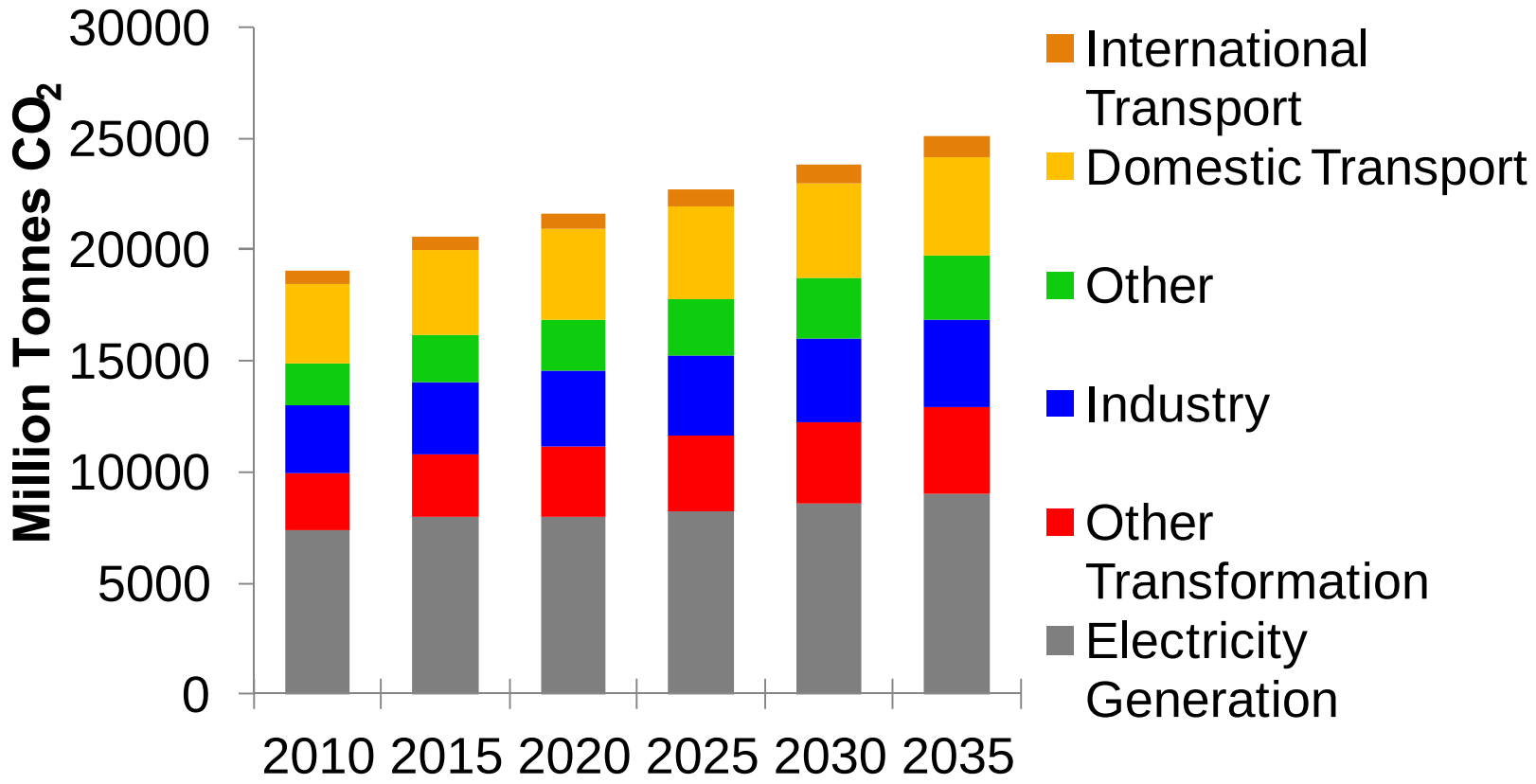
3. Climate Change - Although APEC's Energy Intensity Will Decline Rapidly



Source: *APEC Energy Demand and Supply Outlook 5th Edition* (2013)

3. Climate Change - é Yet APECôs Emissions Are Expected to Continue Increasing

APEC CO_2 emissions from fuel combustion



Source: *APEC Energy Demand and Supply Outlook 5th Edition* (2013)

3. Climate Change ï Steps to a Solution

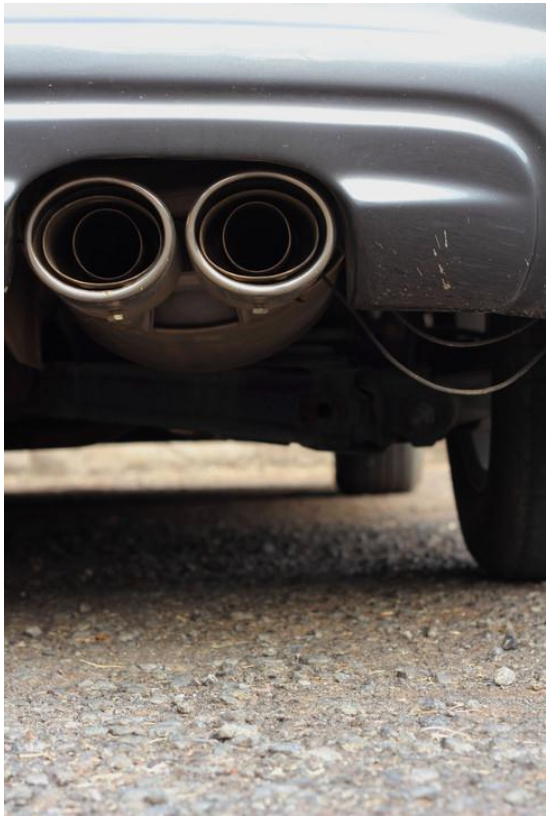
A. Rationalize and phase out wasteful **fossil fuel subsidies**
ï to reduce fossil fuel demand
in the short term

B. **Replace coal with gas**
ï to reduce emissions
in the medium term

C. Promote development and implementation of **low-emissio energy technology**
ï to provide sustainable energy
in the long term

A. Fossil Fuel Subsidies ï Why Are They Harmful?

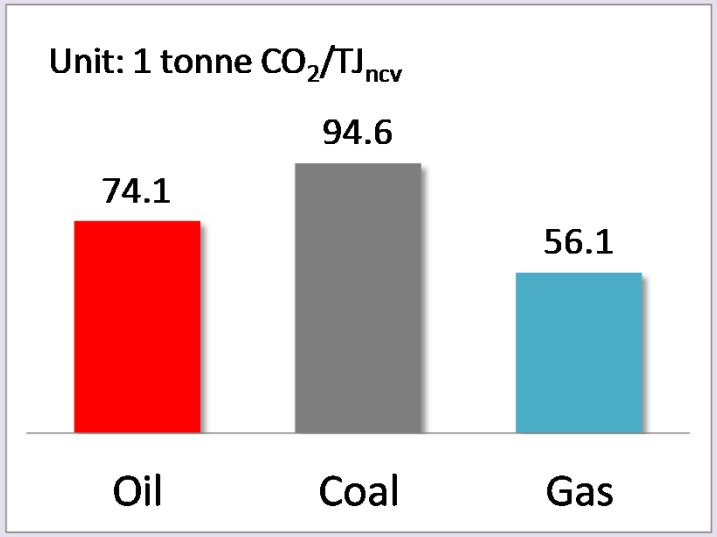
1. They encourage waste
2. They have huge costs to the economy and to government budgets
3. They mostly help the middle class and the wealthyð little goes to help the poor
4. They promote smuggling and corruption
5. They discourage investment in low-carbon energy supply



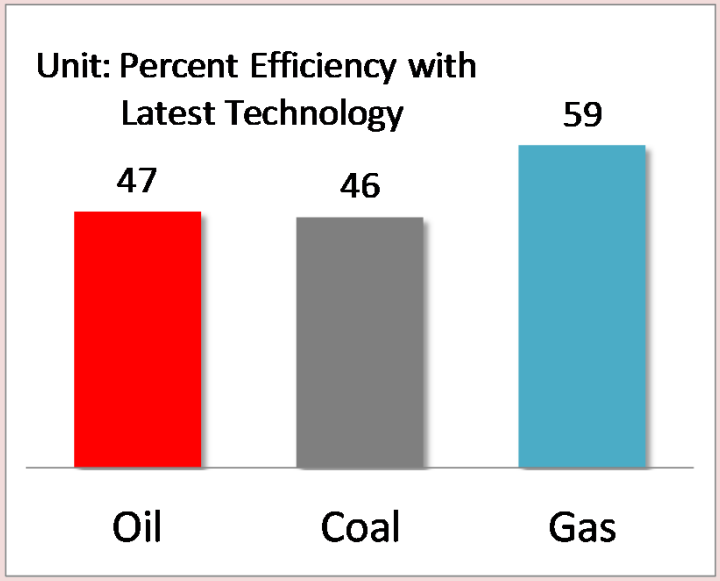
A. Fossil Fuel Subsidies ï Dealing with Political Reality

1. Educate, educate, educateé .
2. Link rationalizing subsidies to popular things the government will be able to afford only if the subsidies are ended, such as:
   - Å Tax cuts
   - Å Cash payments
   - Å Improving the quality of specific government services
3. Make sure those who are truly in need have access

B. Replacing Coal with Gas ï Why Do It?



Gas combustion **produces less CO_2** per unit of heat

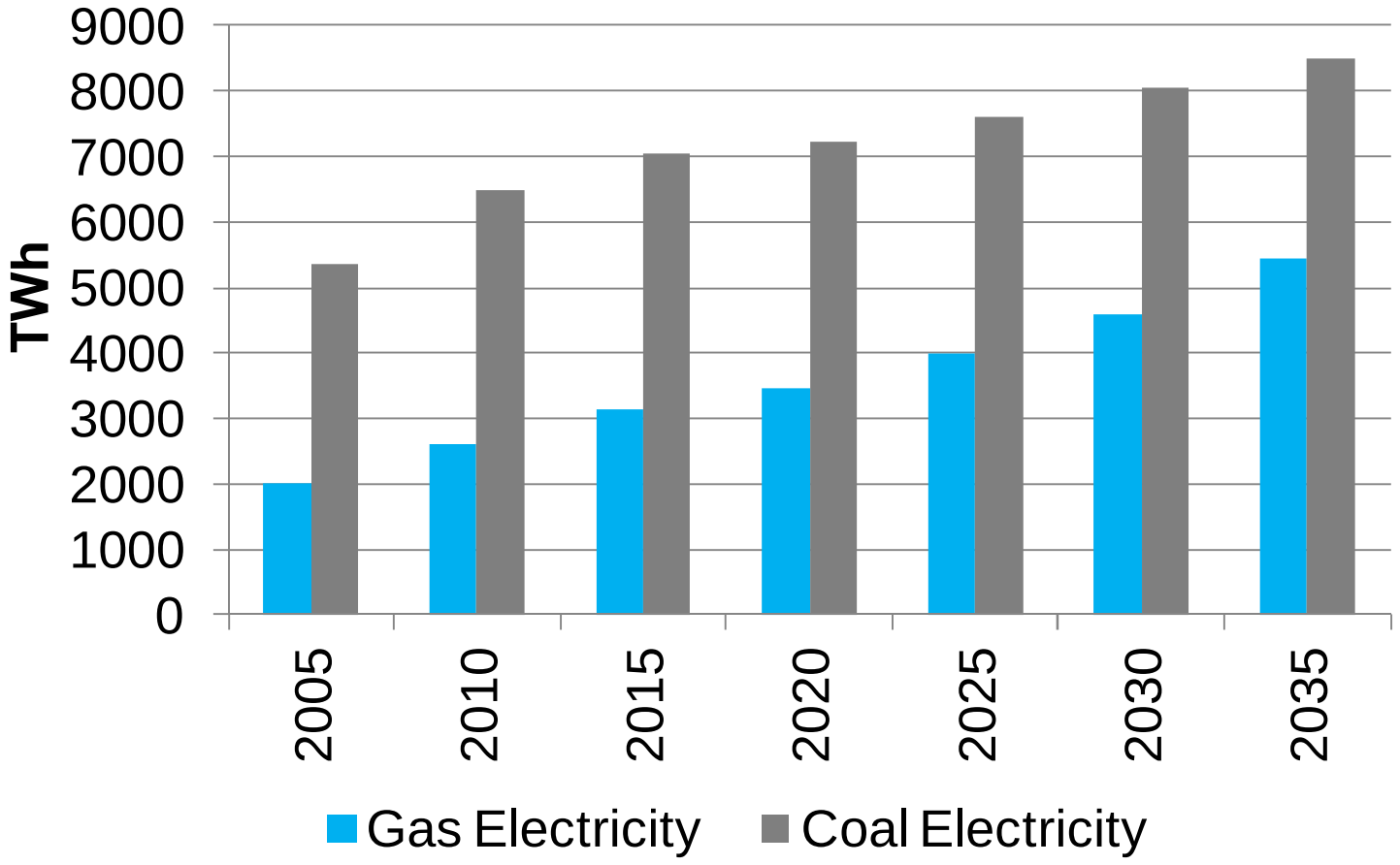


Gas power plants are **more efficient**

- When efficiently burned:
  - ✓Gas produces much **less local air pollution** than coal
  - ✓Gas production is typically **less damaging to land and water resources**
- Gas electricity generation can be rapidly cycled on and off,
  - → **nicely complements wind and solar generation**

Source: Ecofys Netherlands 2012

B. Replacing Coal with Gas ï Gas Production Growth Speeds Up, and Could Challenge Coal



Source: *APEC Energy Demand and Supply Outlook 5th Edition* (2013)

B. Replacing Coal with Gas - But the Resources Are There to Do More

APEC Economy	Technically Recoverable Resources (MTOE)			2009 Production (MTOE)	Years of Production
	Conventional Gas	Shale Gas	Conventional+ Shale Gas		
United States	30750	21550	52300	515	102
Canada	8650	9700	18350	140	131
Mexico	2375	17025	19400	45	431
Russia	86125	N/A	86125	475	181
China	5225	31875	37100	73	512
Australia	5700	9900	15600	43	326
Chile	87	1600	1687	1	>1600

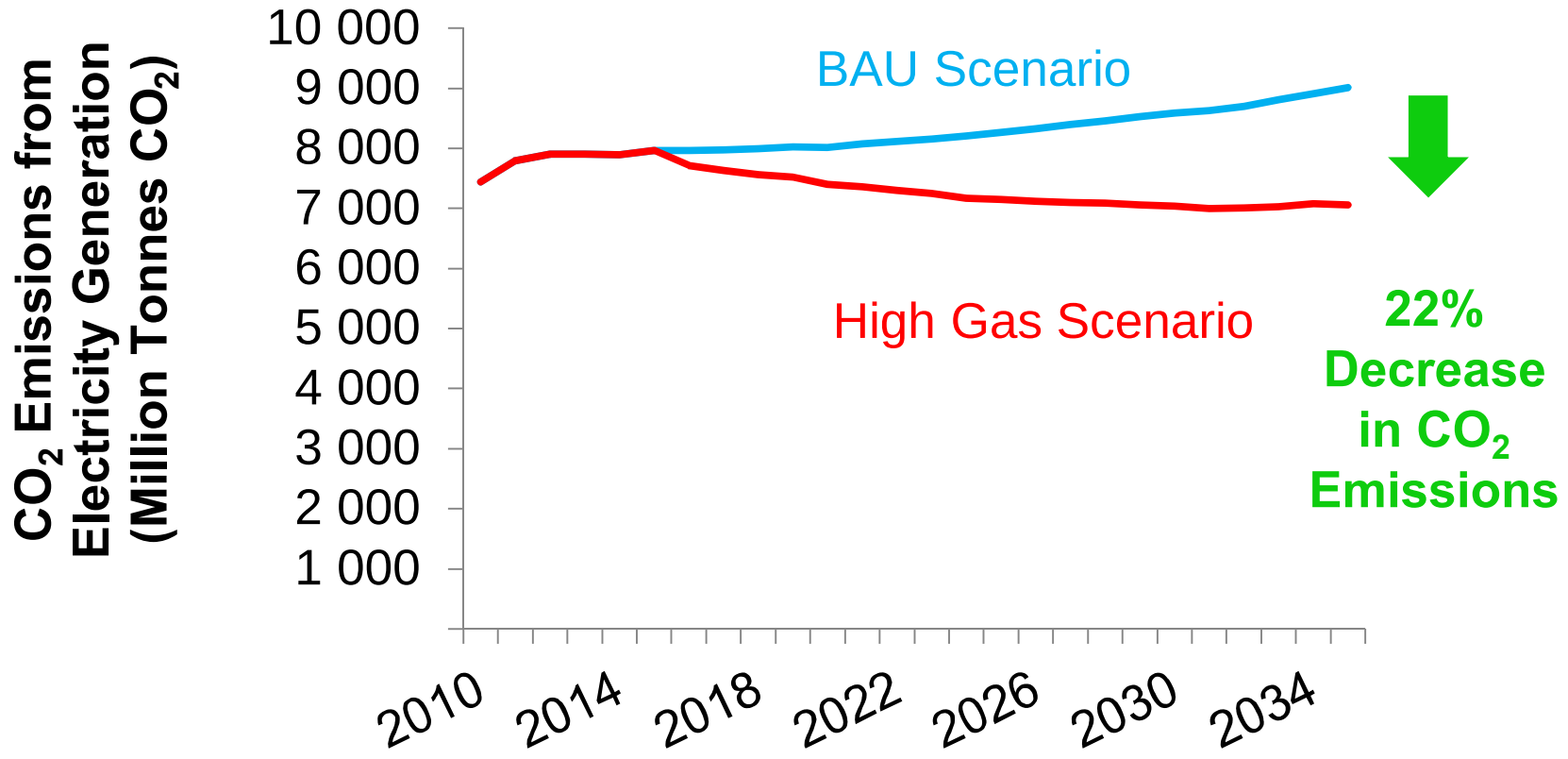
Recoverable with **today's technology**

Availability > 100 years

Sources: Conventional Gas :—MIT, The Future of Natural Gas, 2011
Shale Gas :– USEIA, World Shale Gas Resources, 2011
Production:- BP Statistical Review of World Energy 2011

B. Replacing Coal with Gas - Impact on Electricity Sector CO_2 Emissions

Key Assumption: All additional gas is used to **replace coal** in electricity generation → Environmental benefits



Source: *APEC Energy Demand and Supply Outlook 5th Edition* (2013)

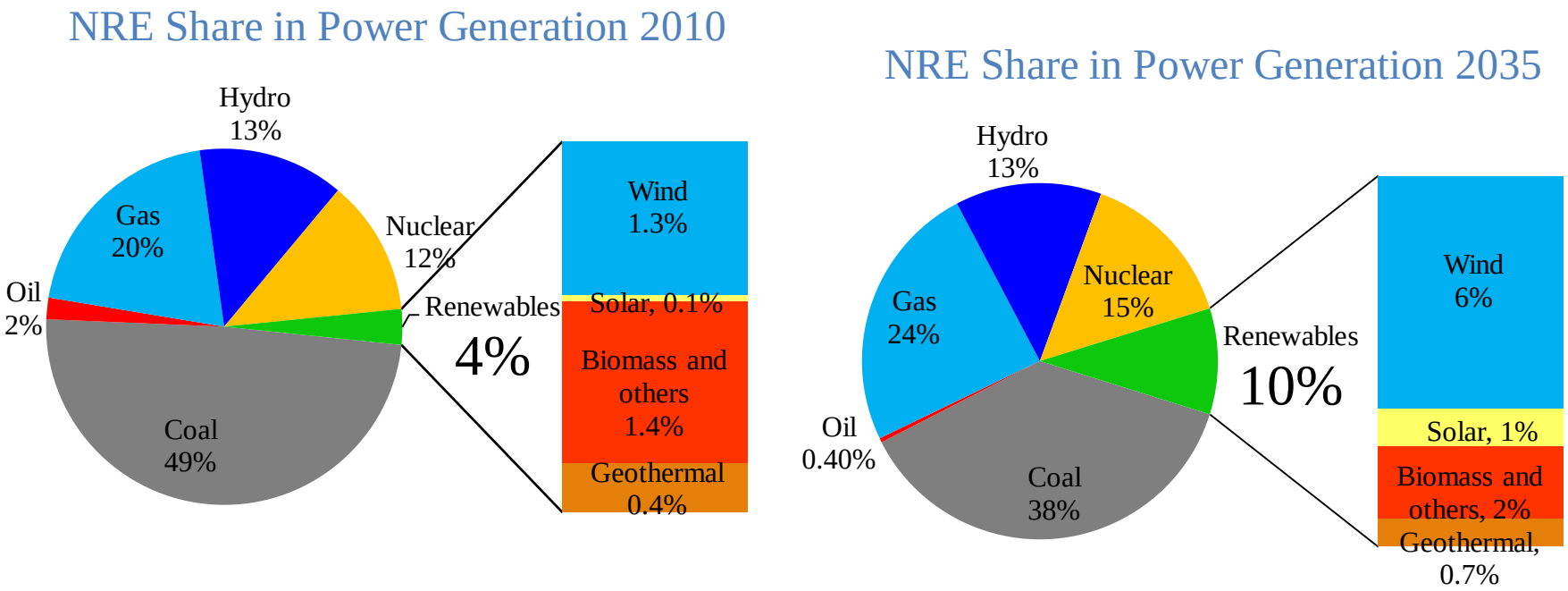
B. Replacing Coal with Gas - Some Potential Constraints

1. Policies requiring a domestic price of gas below market levels (a form of subsidy)
2. Policies restricting the export of gas
3. Policies granting a monopoly on gas development to certain domestic firms
4. Slow and cumbersome regulatory approvals and land access processes for gas producers

C. Low-Emission Energy Technology ï Why de we need to develop?

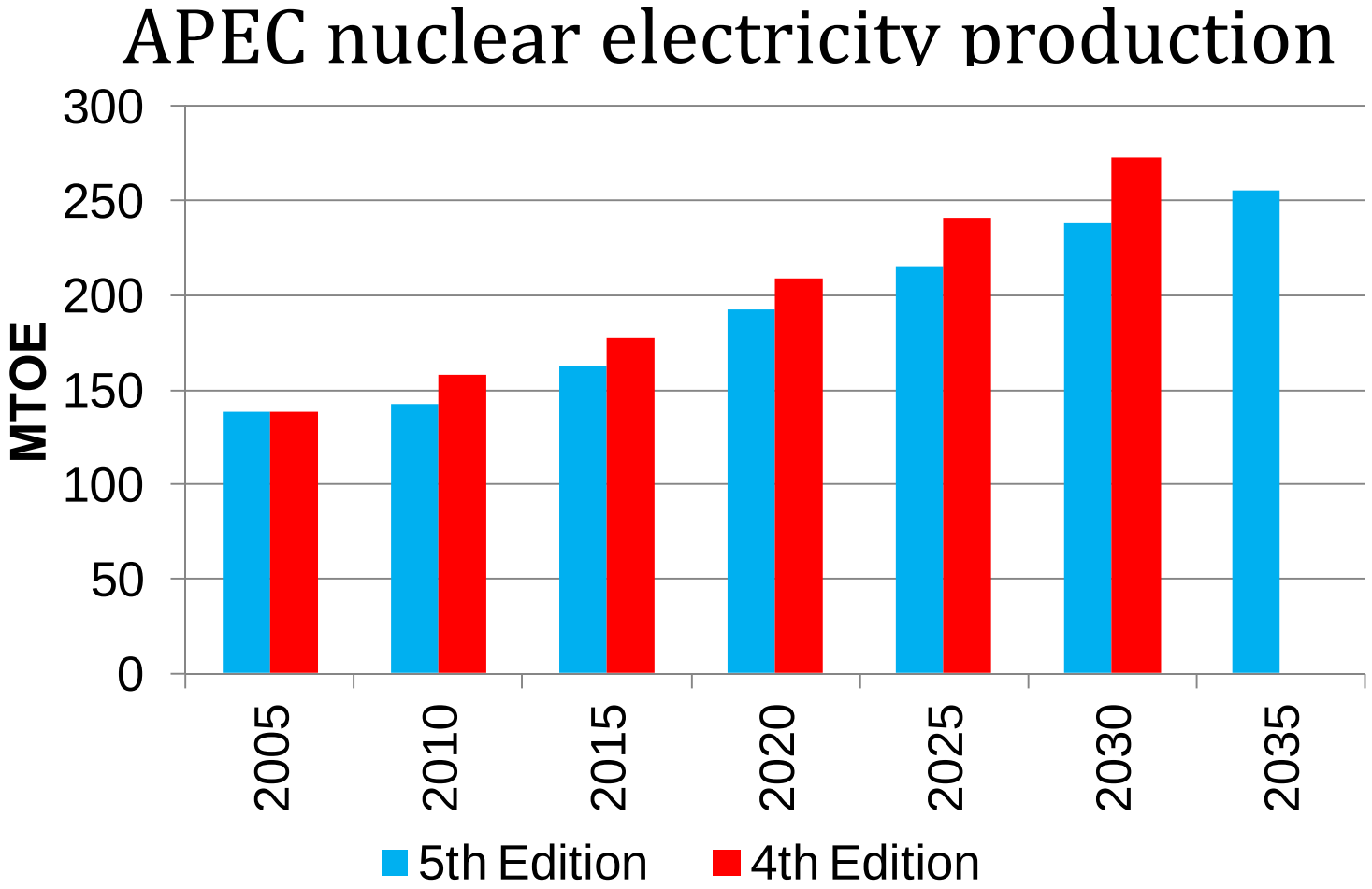
1. We wonôt solve the climate change problem without it
2. We wonôt have truly secure energy without it
3. Low-emission energy technology will bring economic benefits

C. Low-Emission Energy Technology ï New Renewable Energy Goes Mainstream



Source: *APEC Energy Demand and Supply Outlook 5th Edition* (2013)

C. Low-Emission Energy Technology i Although Nuclear Development Slows Down, the Difference Is Small



Source: *APEC Energy Demand and Supply Outlook 5th Edition* (2013)

C. Low-Emission Energy Technology ï Ways to Promote

1. Invest in energy technology education and R&D
2. Feed-in-tariffs (FIT) and Renewable Portfolio Standards (RPS)
3. Put a price on emissions

   (Carbon Tax, etc.)

C-3. Putting a Price on Emissions ï Why Is It Needed?

- Right now, no one has to pay for the damage their emissions do the environment
- So no one has a financial incentive to reduce emissions
- Emission pricing would fix this problem!

C-3. Putting a Price on Emissions ï Did Someone Say ćTaxč?

Å Emission pricing not necessarily a tax *increase*

Å Right now, income taxes discourage people from working and investing

Å So replace taxes on work and investing with taxes on emissions!

C. Low-Emission Energy Technology ï Becoming a World Leader in the Asia Pacific Region

- Educated people
- Technological leadership
- Renewable resources including sunshine, wind, geothermal heat, ocean wavesé

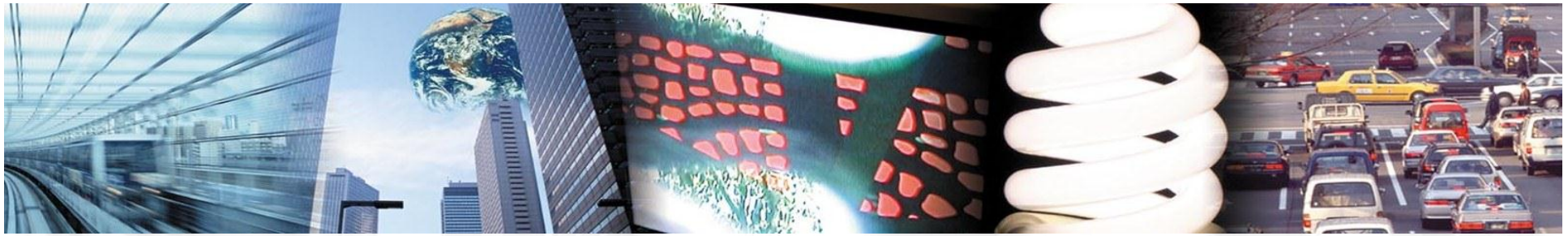
C. Low-Emission Energy Technology ï How to get started?

APECôs Cooperative Efforts

- Peer Review of Energy Efficiency *(PREE)*
- Peer Review of Low-Carbon Energy *(PRLCE)*
- APEC Low Carbon Model Towns *(LCMT)*

Delivering a Sustainable Energy Future for the World - Conclusions

- Policies to promote a sustainable energy future are sensible, affordable, and could help promote economic growth and prosperity
- Gaining political acceptance is the main challenge
- But with the right efforts to educate stakeholders and the public, it can be done



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