



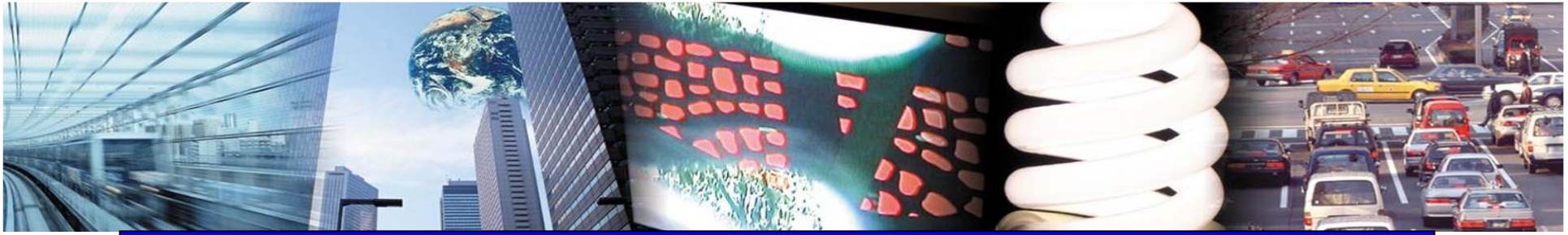
APEC Cooperative Pathways to Sustainable Energy Development

9 March 2010

Ralph D. Samuelson

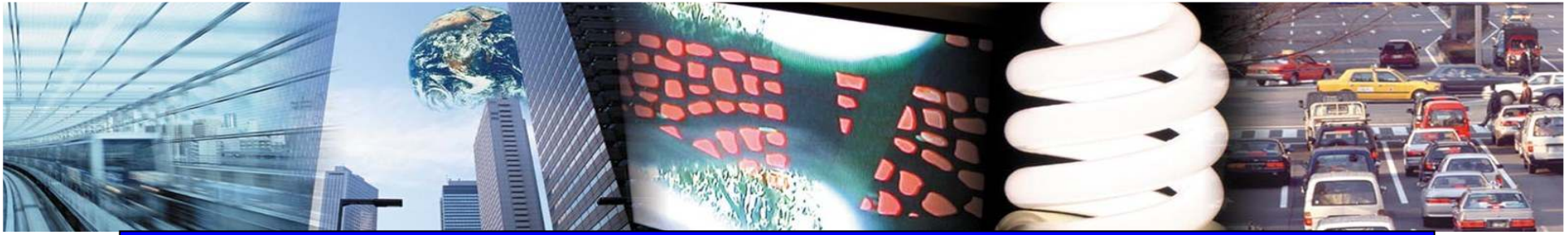


Asia-Pacific
Economic Cooperation



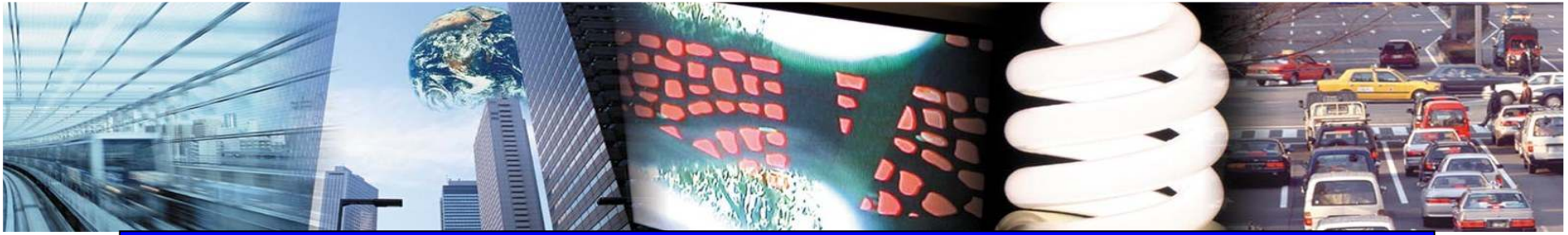
Background (1)

- *2007 Darwin EMM8 Declaration on Achieving Energy Security and Sustainable Development Through Efficiency, Conservation, and Diversity* –
 - “We direct EWG to develop a voluntary Energy Peer Review Mechanism, with initial focus on progress toward attaining energy efficiency goals”
- *2007 Sydney APEC Leaders’ Declaration on Climate Change, Energy Security and Clean Development* –
 - “Agree to work towards achieving an APEC-wide regional aspirational goal of a reduction in energy intensity of at least 25 per cent by 2030 (with 2005 as the base year)”

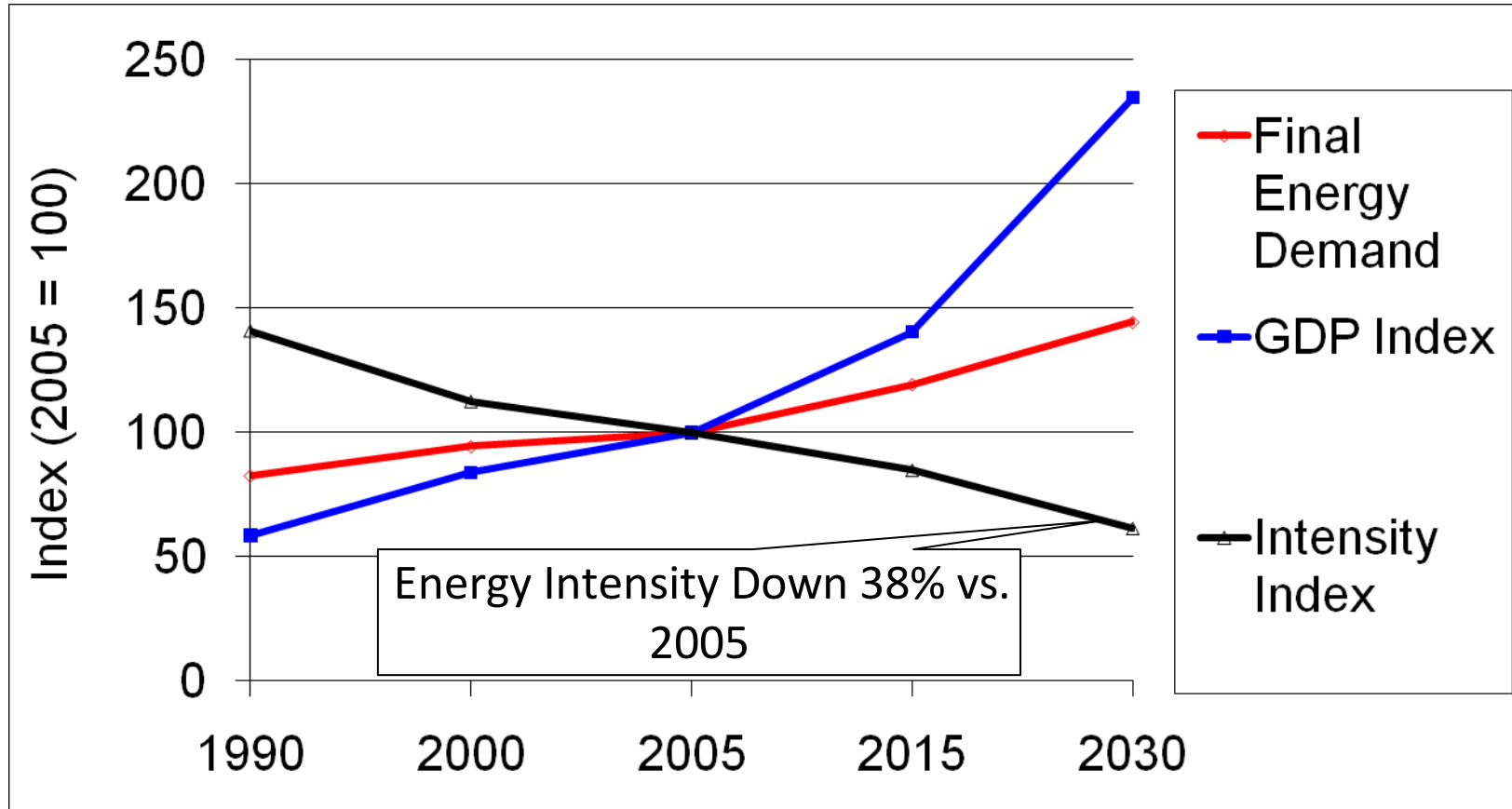


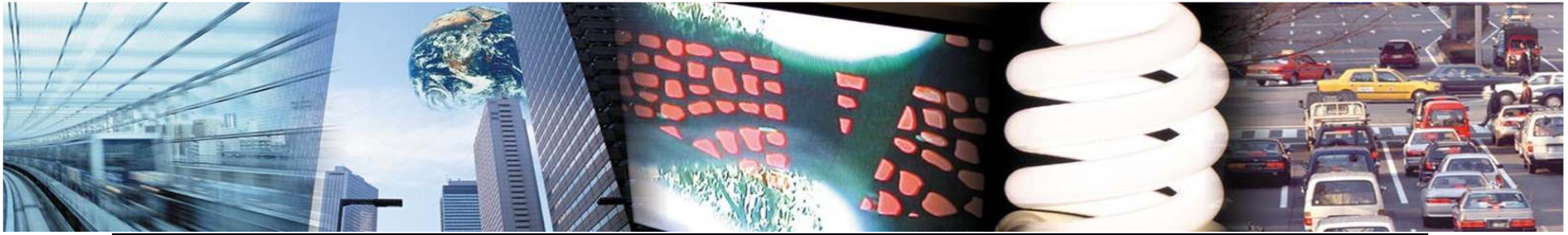
Background (1)

- *2009 APEC Leaders' Declaration on Sustaining Growth, Connecting the Region –*
 - “We will ensure that economic growth in our region is consistent with sustainable development.”
 - “We recognize the role of renewable energy in reducing emissions and encourage its development in the APEC region.”



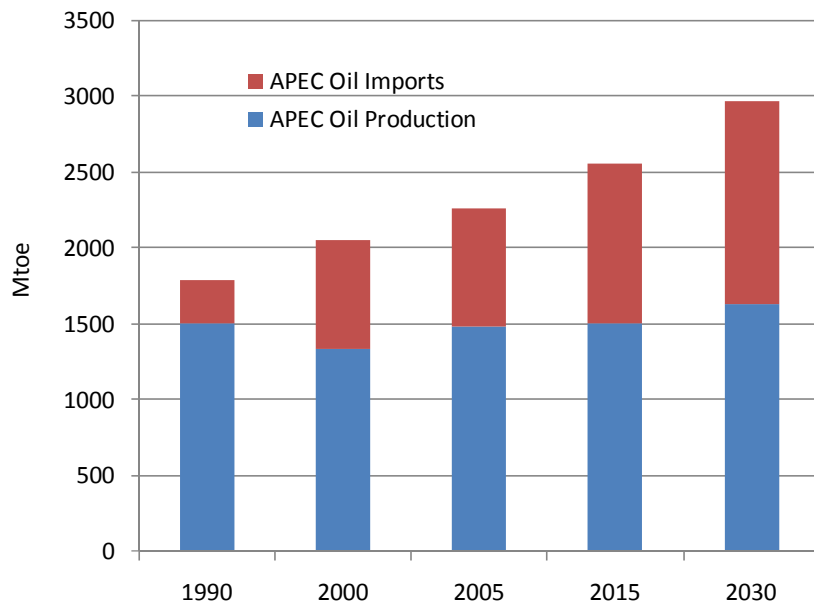
Minimum Energy Intensity Goal Can Be Met in BAU



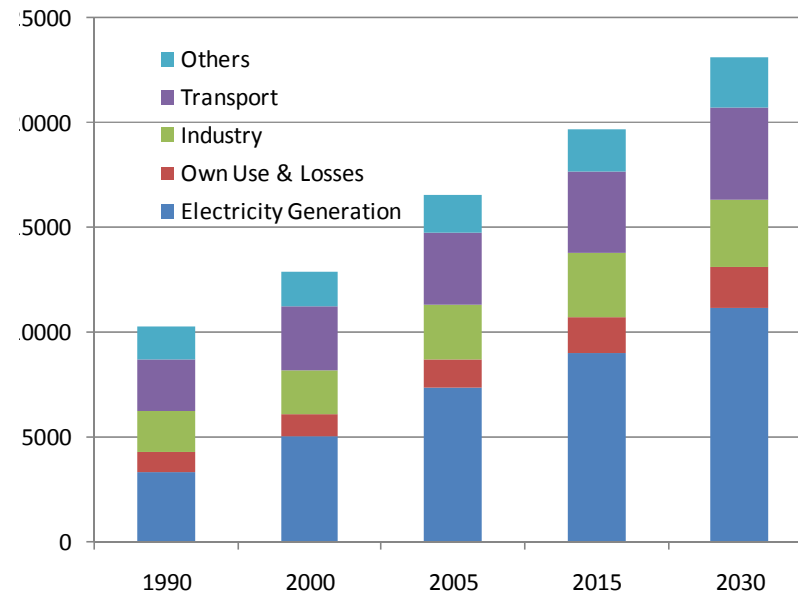


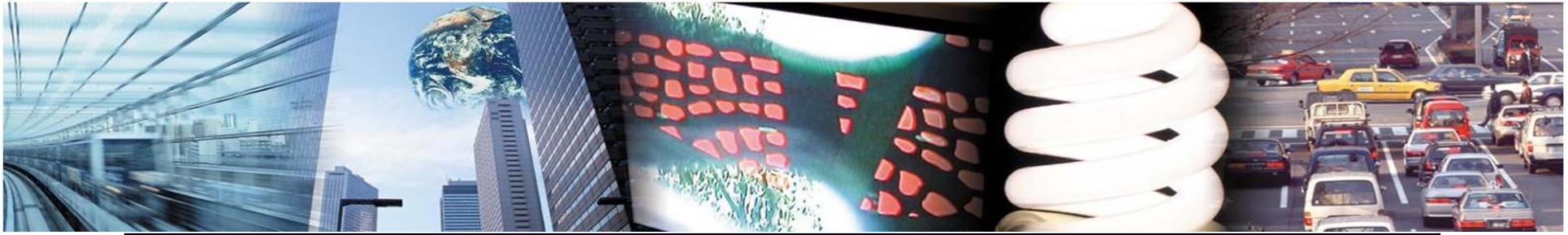
BAU Is Not Sustainable

APEC Oil Production and Imports



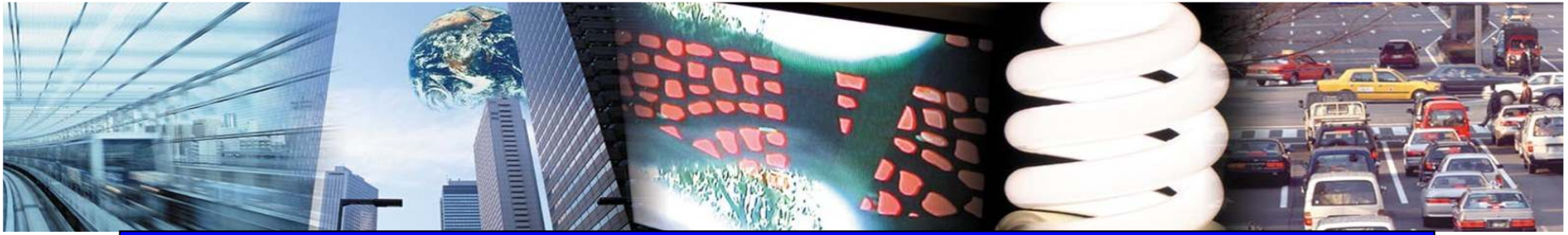
CO₂ Emissions from Fuel Combustion





Purpose of *APEC Cooperative Pathways to Sustainable Energy Development*

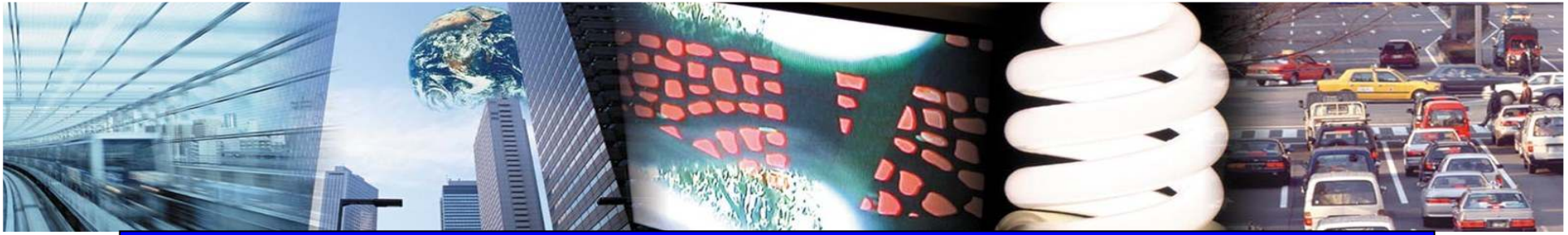
- Although APEC has undertaken many useful activities that contribute to energy sustainability (such as PREE and CEEDS), however
 - There has been limited comprehensive analysis of the APEC-wide goals which the APEC economies should be seeking to achieve through their cooperative efforts
- The APEC Energy Ministers will be holding their ninth meeting in June
 - The study is designed to provide useful analysis to APEC member economies in reviewing their goals for the APEC region and plans for APEC activities in the years ahead



Key Questions

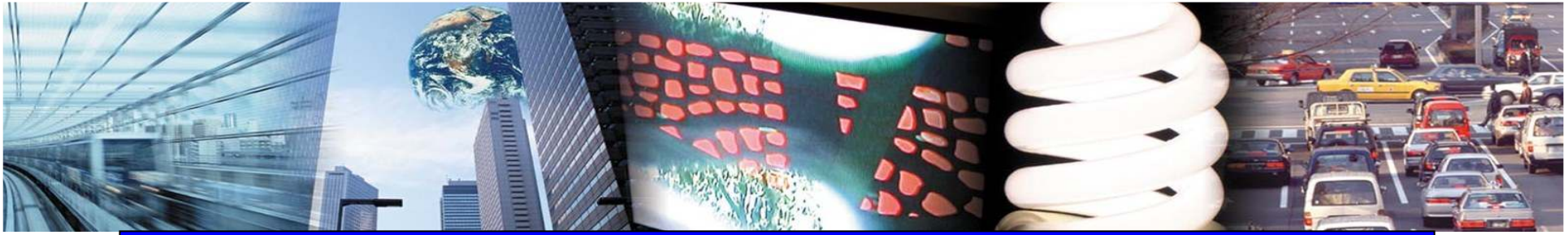
The study will examine three key questions

1. What would a sustainable energy development path for the APEC economies look like?
2. How adequate are current efforts to achieve such a path?
3. What APEC-wide cooperative goals would put the APEC region on a more secure and sustainable path?

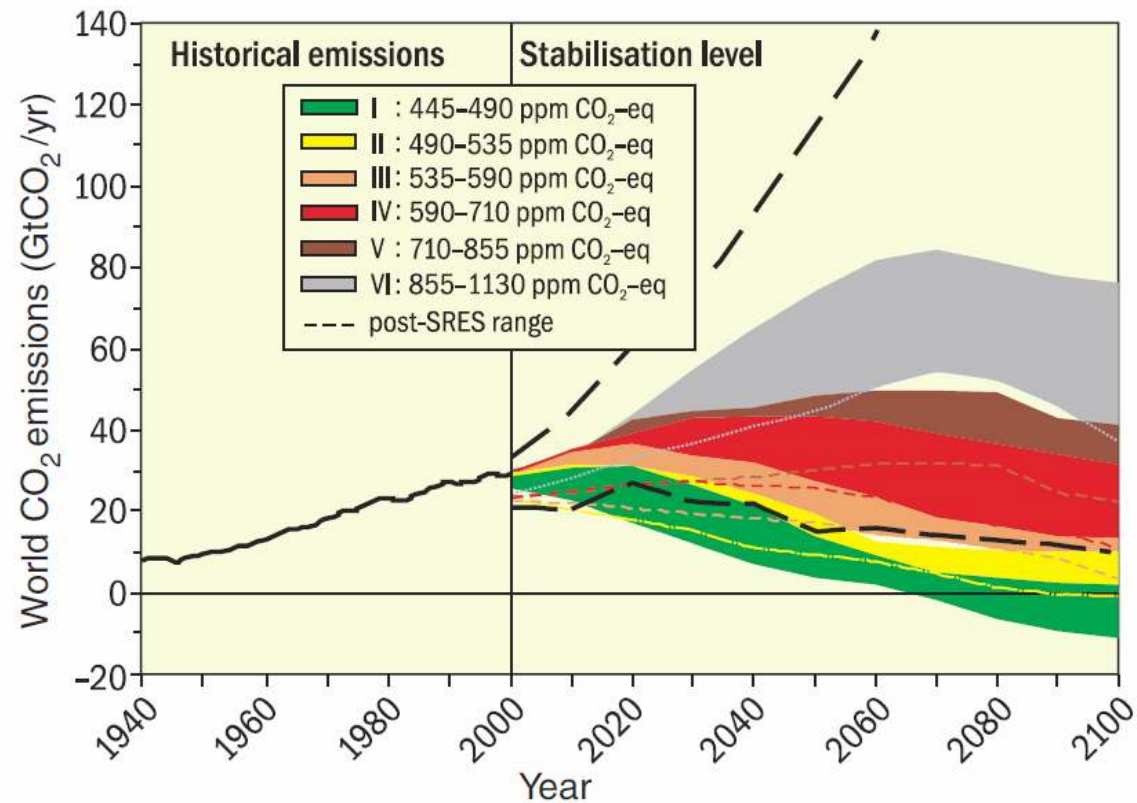


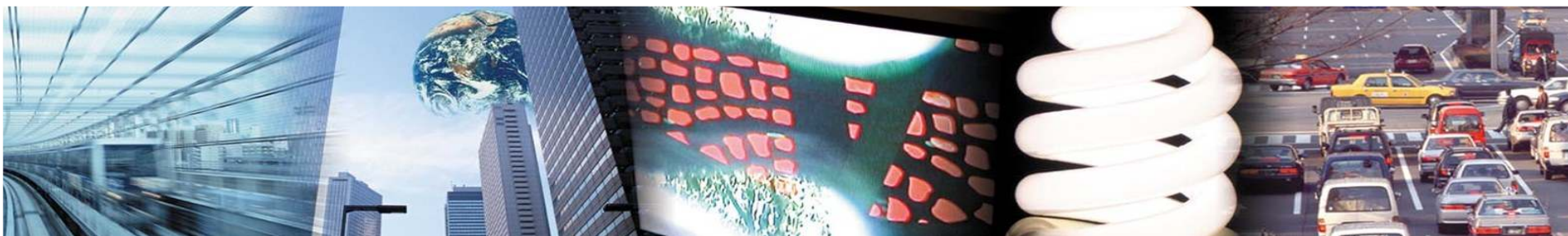
What Would a Sustainable Path Look Like for APEC?

- IPCC sees 2° C temperature rise as likely to avoid the worst impacts of climate change
- IPCC also sees 450ppm CO₂-equivalent concentrations resulting in warming of 2° C *as the best estimate*

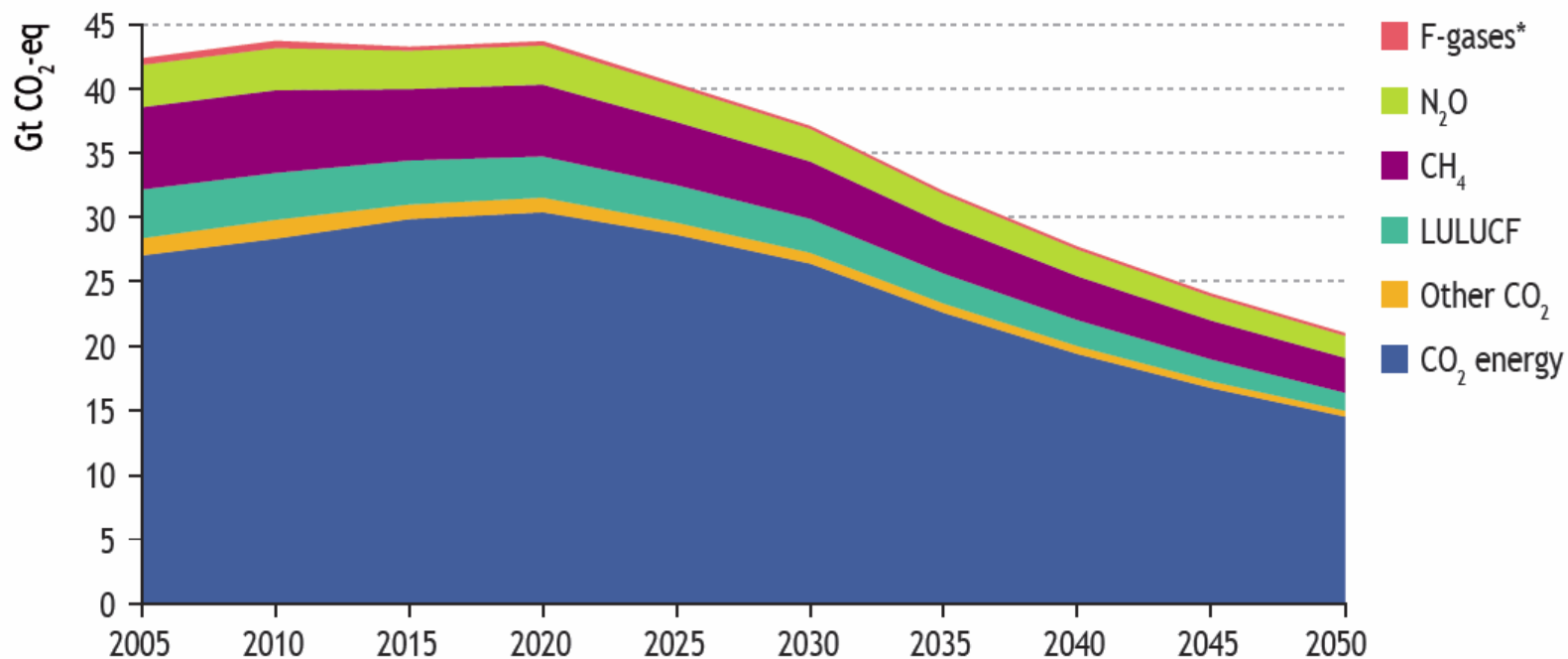


Why 450 PPM?



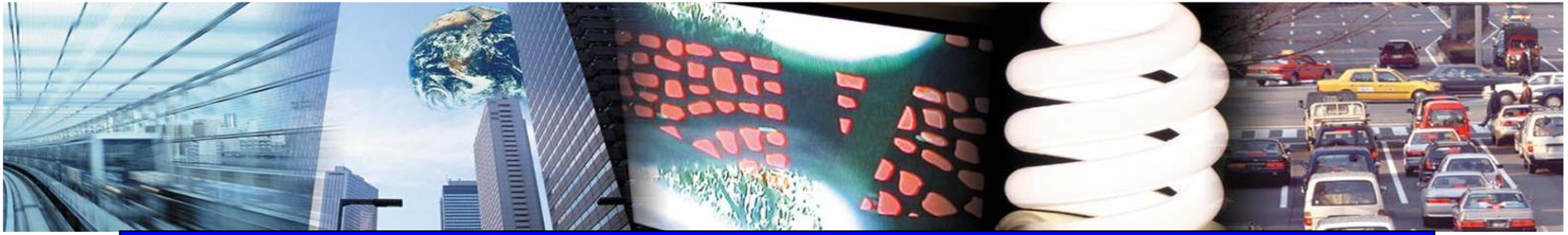


A Worldwide 450 PPM Scenario



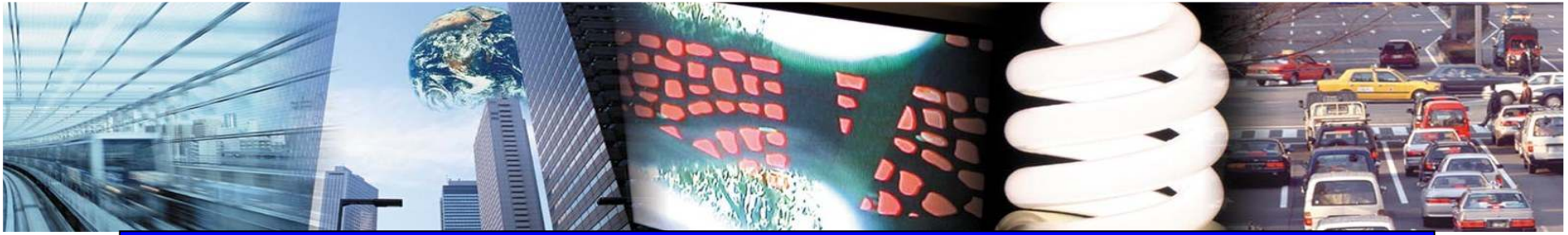
F-gases include hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆) from several sectors, mainly industry.

From IEA, *World Energy Outlook 2009*, p. 200, based on analysis using MAGICC and ENV-linkages model.
World Energy Outlook 2009 © OECD/IEA 2009.



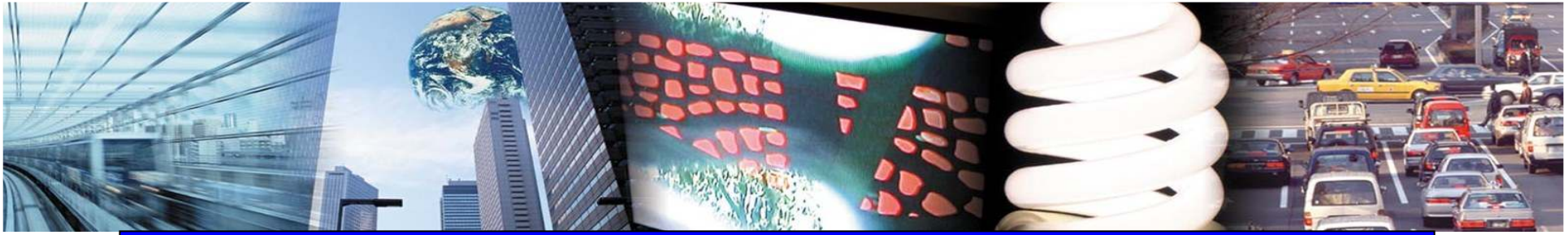
What Emission Reductions Would 450 PPM Require?

- Total CO₂-equivalent greenhouse gas emissions
 - Peak just before 2020 at about 3% above 2005 levels
 - Then decline to 12% below 2005 levels by 2030
 - Then continue to decline reaching about 50% of 2005 levels by 2050
- Energy-related CO₂ emissions
 - Peak just before 2020 at about 14% above 2005 levels
 - Then decline to 2% below 2005 levels by 2030
 - Then continue to decline reaching about 46% below 2005 levels by 2050



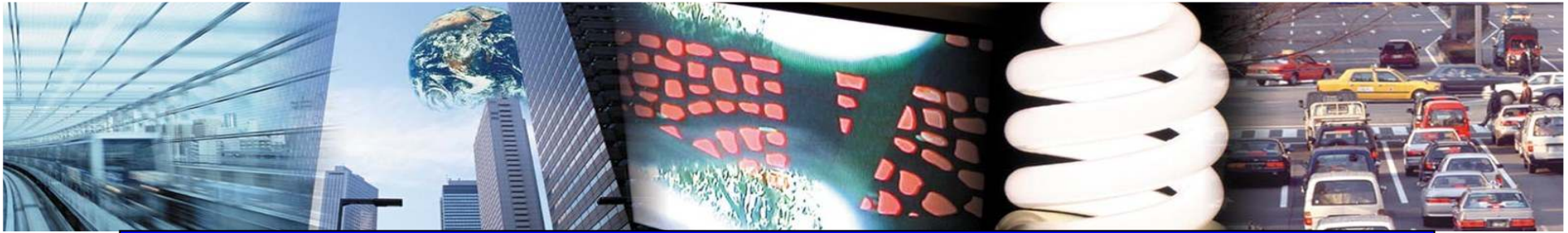
The IEA's Model

- Very detailed and sophisticated
 - 16,000 equations
 - Developed over a 16 year period
- Comprehensive--modeling takes into account:
 - Highly disaggregated demand
 - Specific supply technologies
 - Investment costs
 - Macro-economic impacts
 - Field-by-field oil production
 - Vehicle stock model
 - Refinery model
 - Electricity access

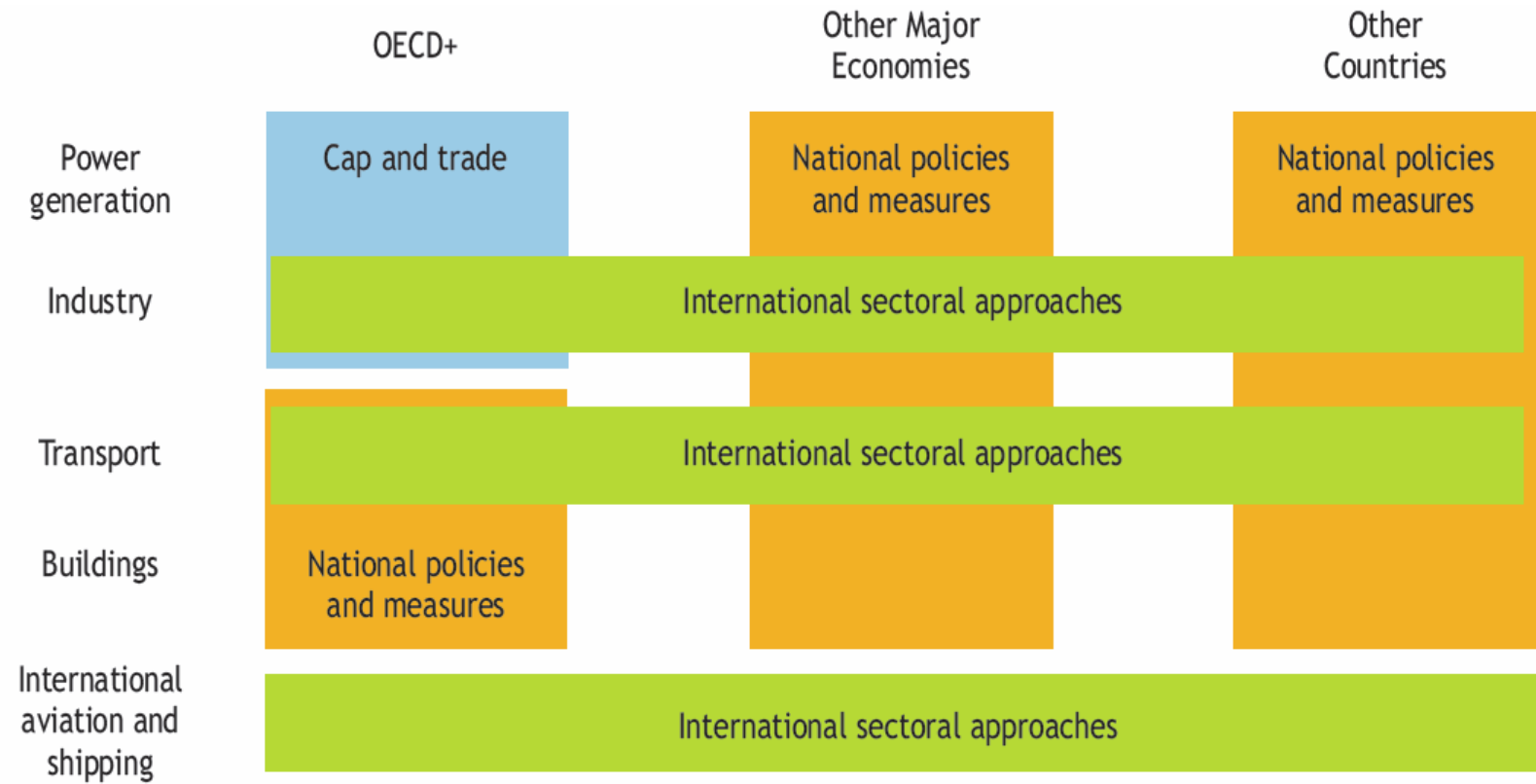


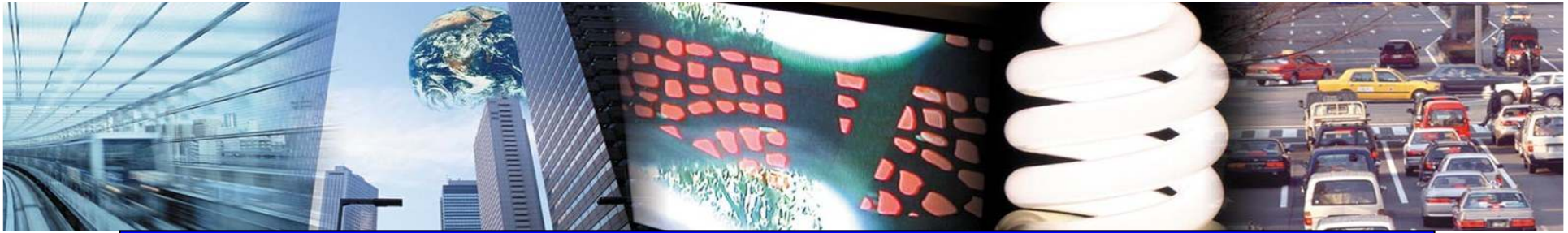
Fairness

- Our work is focused on overall goals which APEC economies could pursue voluntarily
 - Won't deal with allocation of efforts or emissions among economies
- Please bear in mind:
 - Any allocation of emissions between economies is potentially fair given the ability to offer compensation in other ways



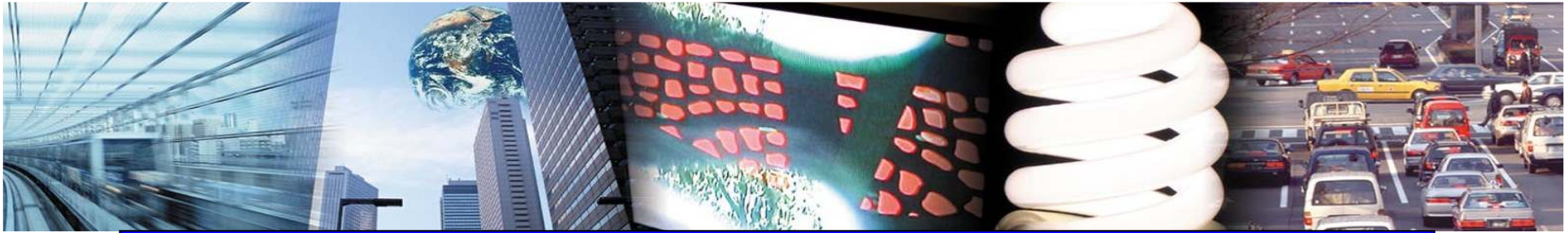
Policy Framework 2013-2020



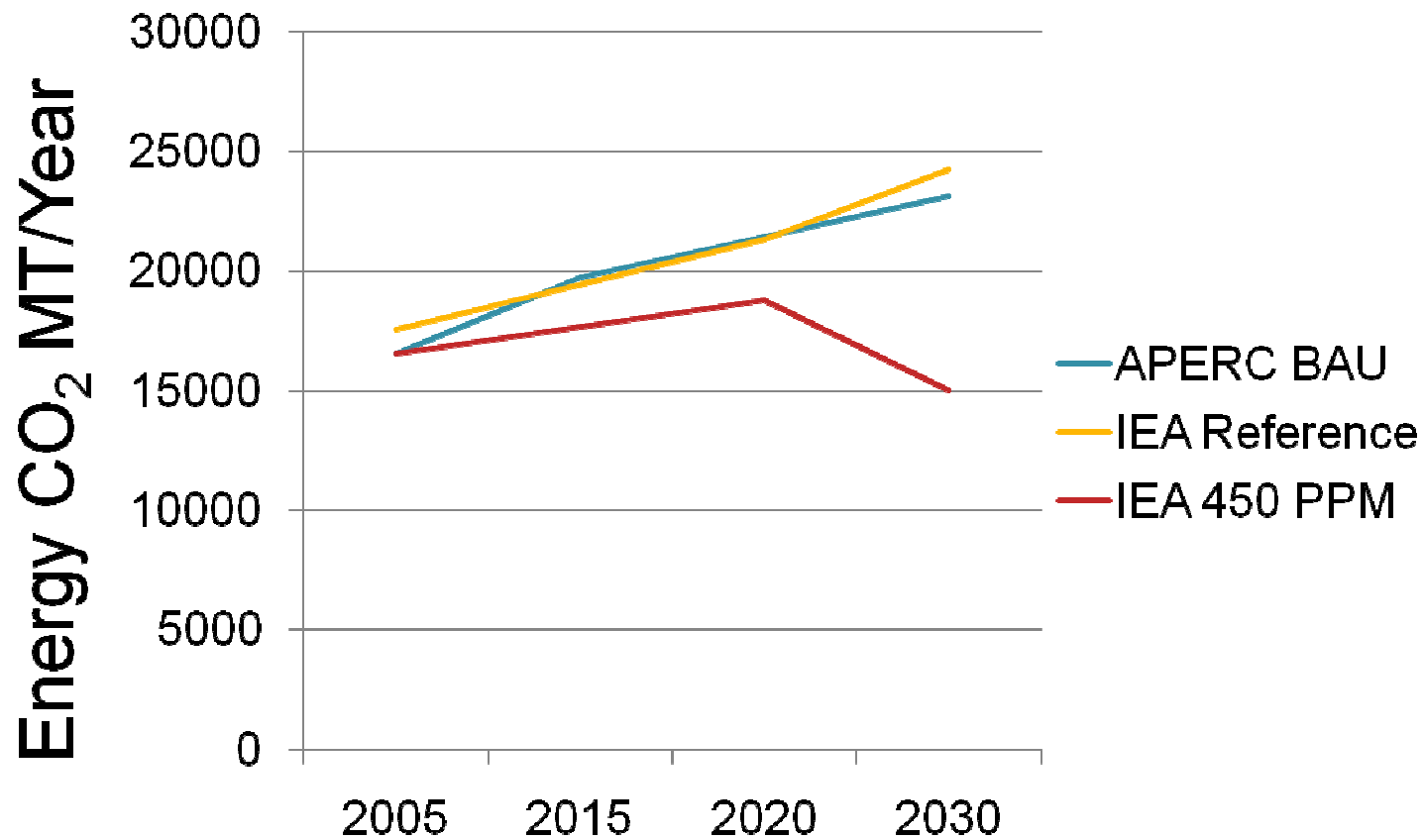


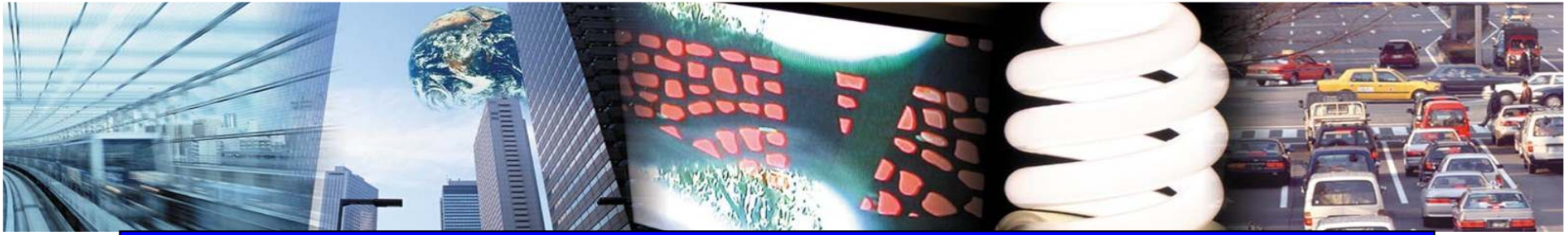
Policy Framework 2021-2030

	OECD+	Other Major Economies	Other Countries
Power generation	Cap and trade	Cap and trade	National policies and measures
Industry	International sectoral approaches		
Transport	International sectoral approaches		
Buildings	National policies and measures	National policies and measures	National policies and measures
International aviation and shipping	International sectoral approaches		

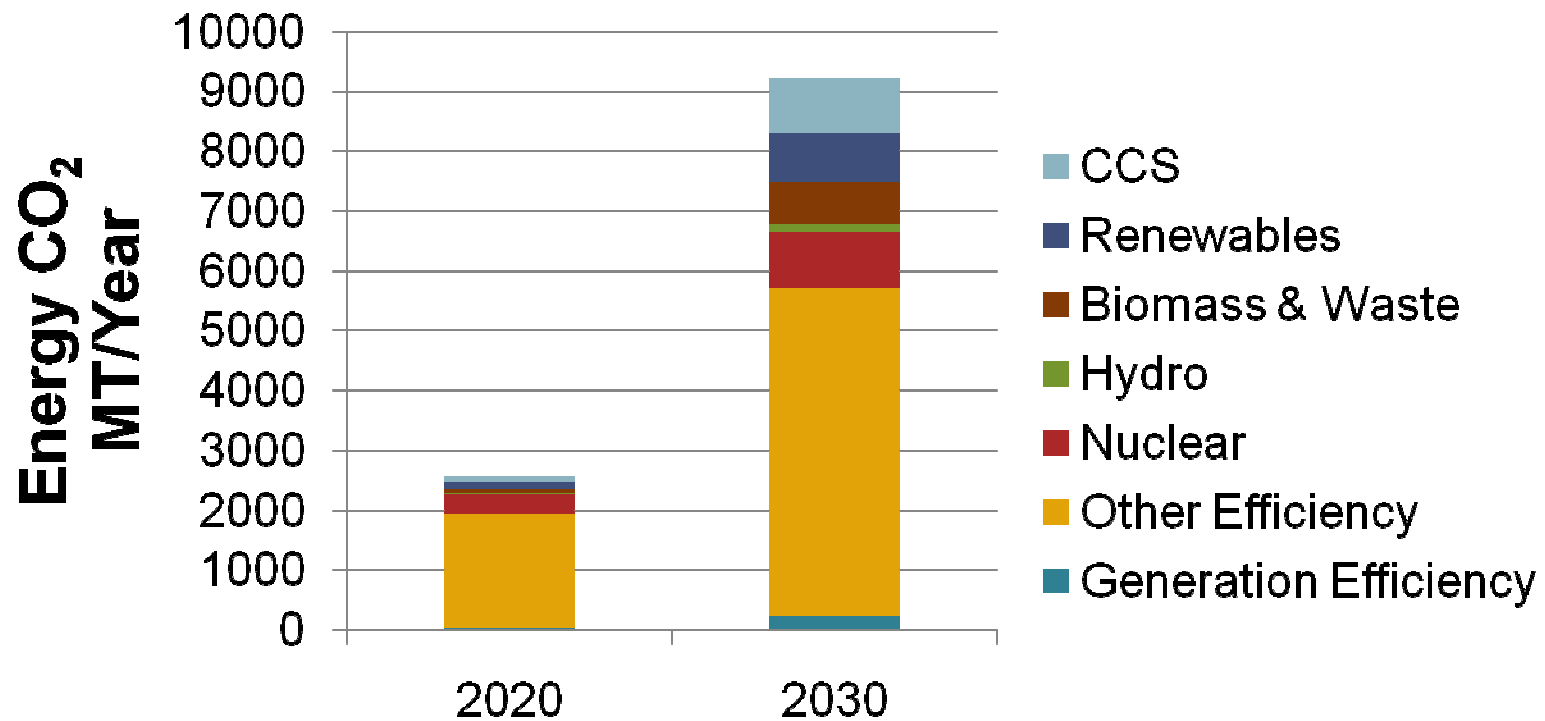


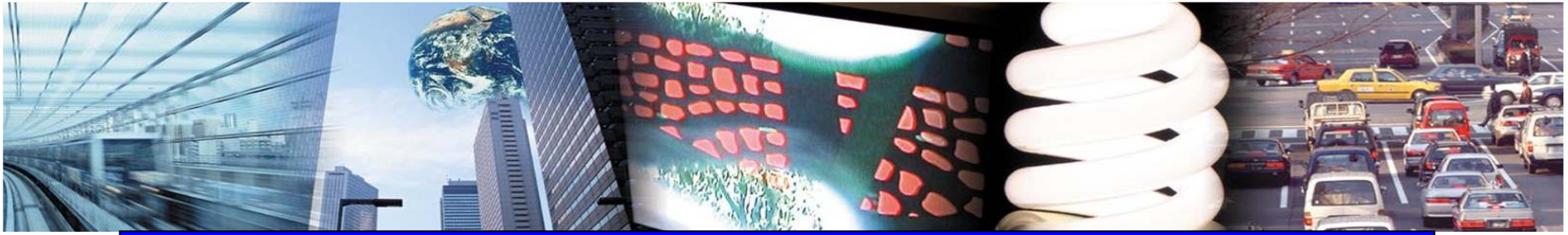
APEC Region Emissions Results



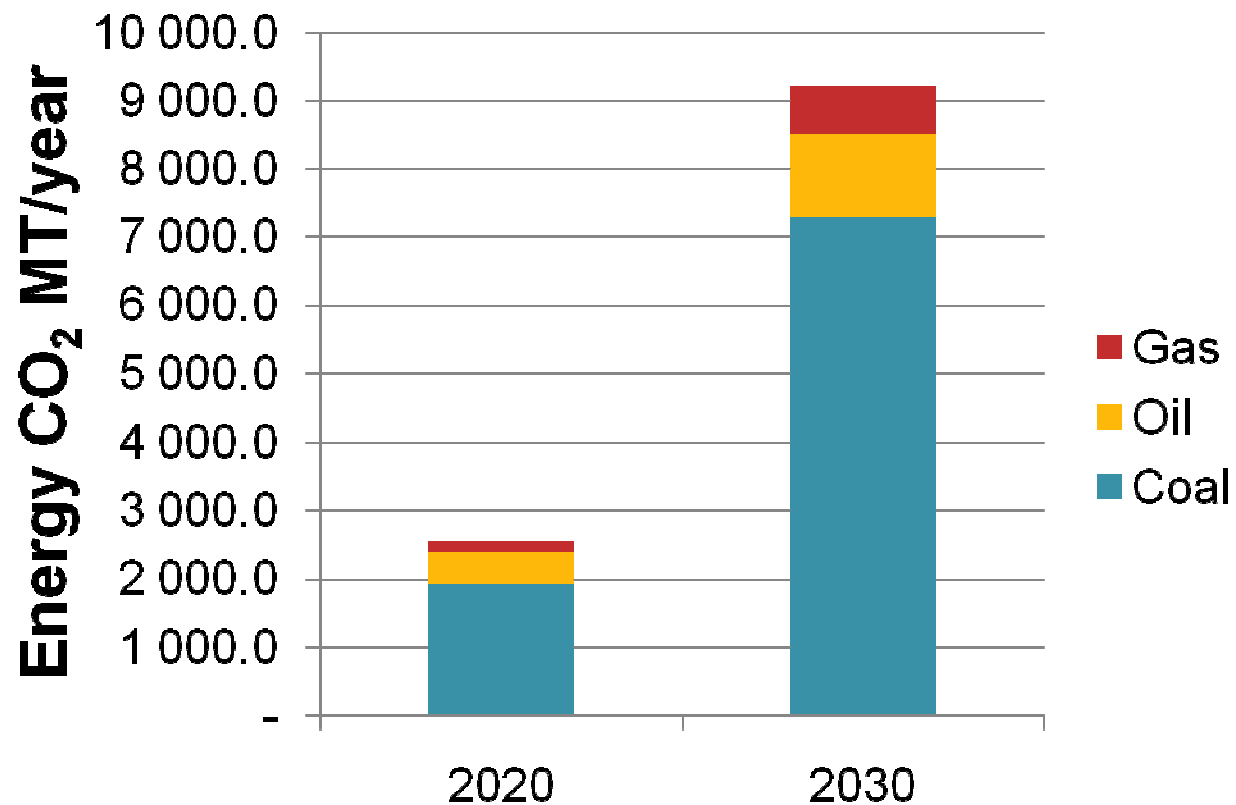


APEC Region Mitigation Results by Measure (vs. IEA Reference)

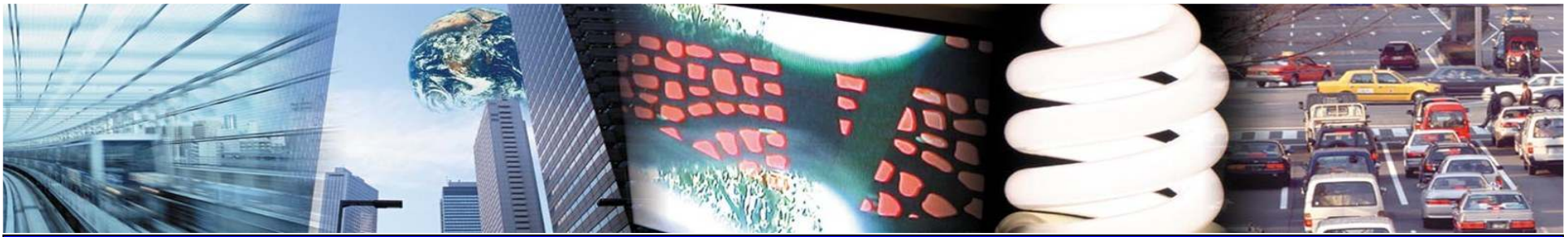




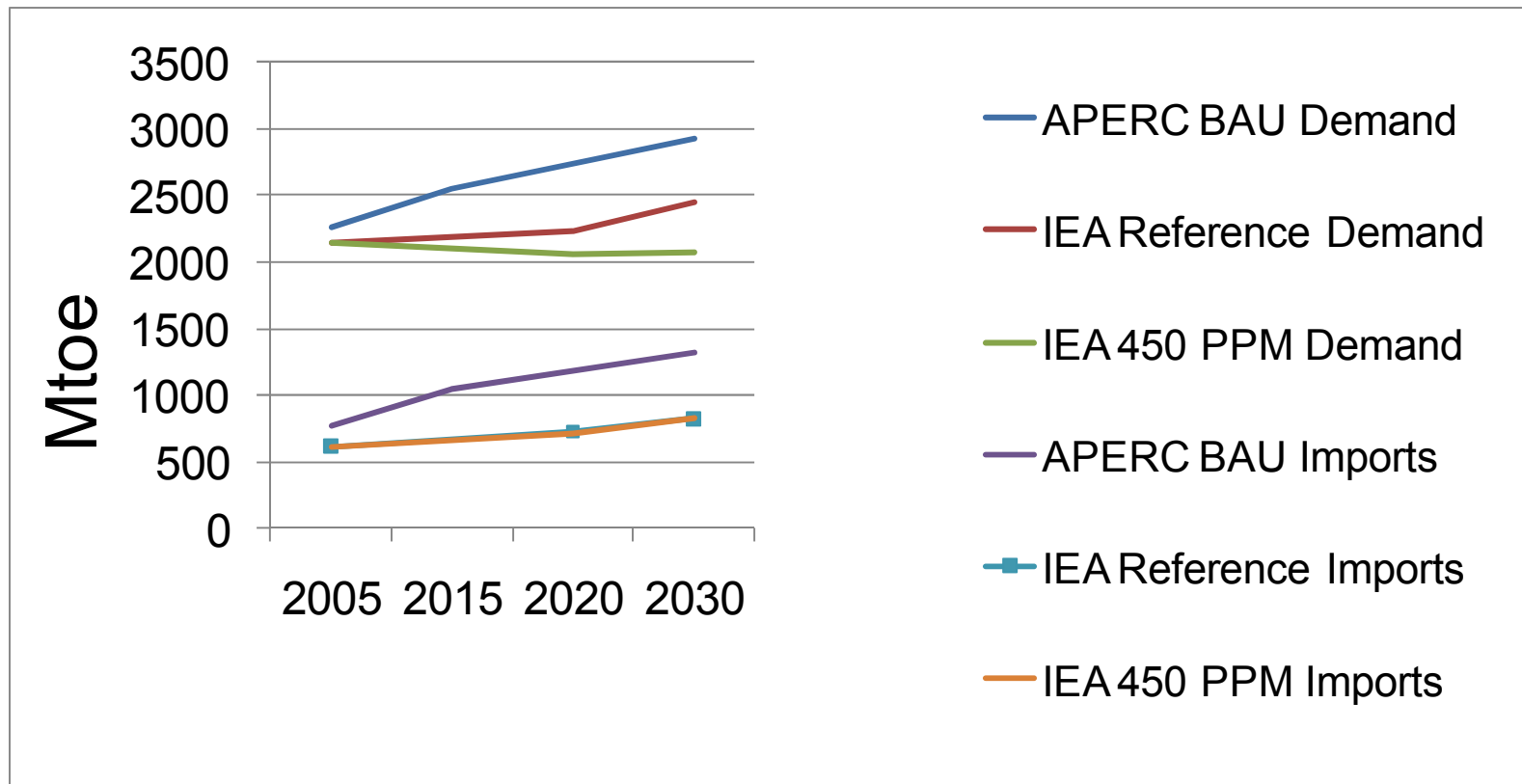
APEC Region Mitigation Results by Fuel (vs. IEA Reference)

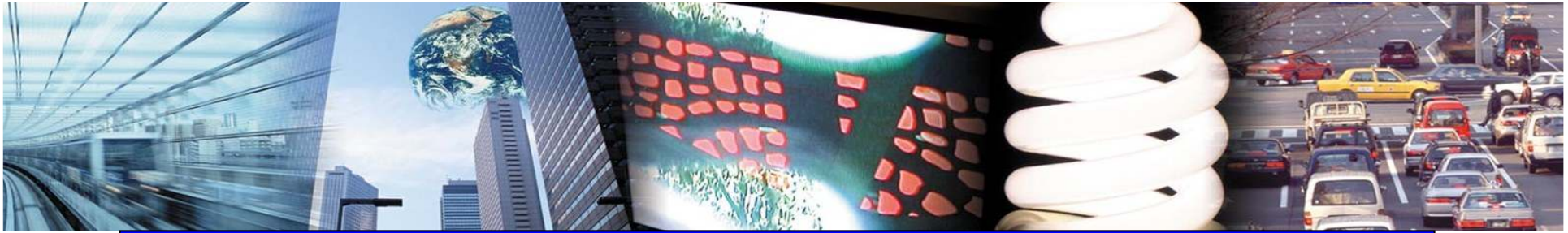


Raw Data © OECD/IEA 2009; calculations by APERC



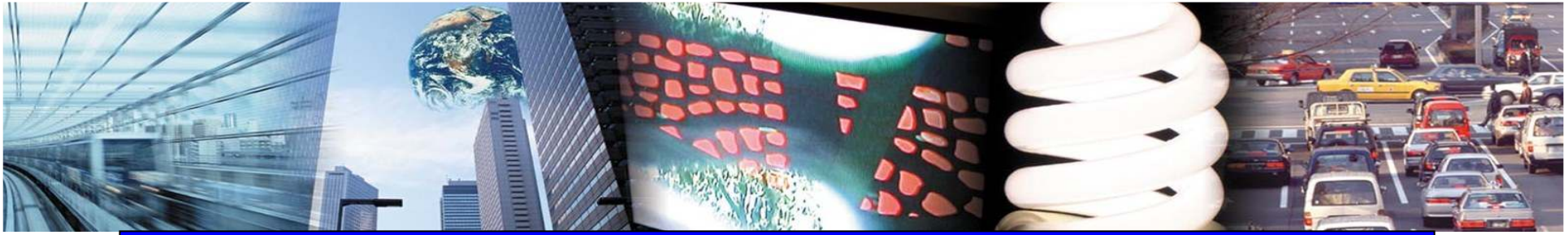
APEC Region Oil Demand and Oil Import Results





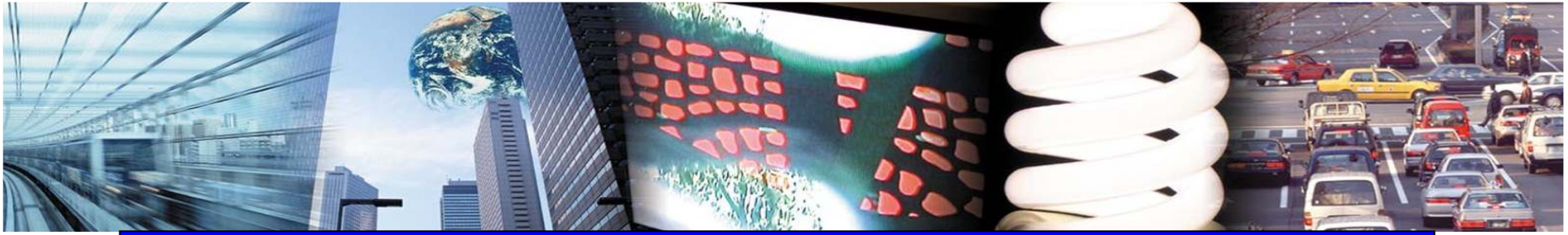
APEC Key Indicators (1)

- Energy Intensity Improvement 2005-2030
(primary energy/constant \$ GDP)
 - APERC BAU: 38%
 - IEA 450 PPM: ~50%
- Non-Fossil Primary Energy Share
 - 2005 Actual: 16%
 - 2030 APERC BAU: 18%
 - 2030 IEA 450 PMM: 30%



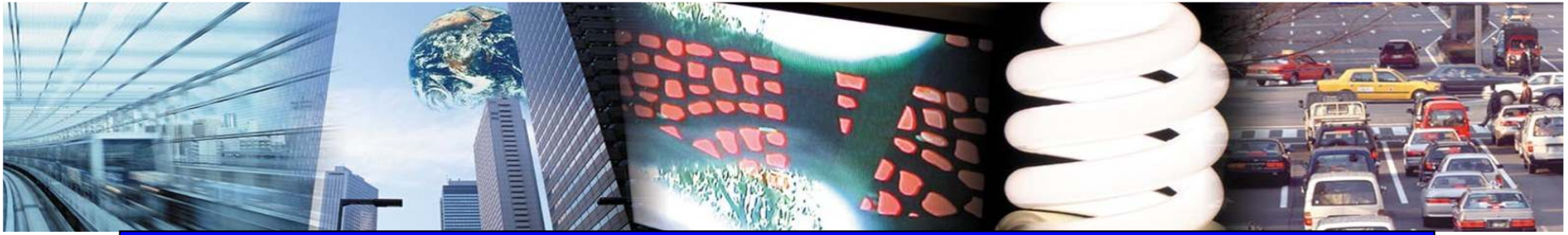
APEC Key Indicators (2)

- 2030 Low-Carbon Electricity Output Share ('Low-Carbon' Means Non-Fossil + CCS)
 - 2005 Actual: 29%
 - APERC BAU: 33% (No CCS Included)
 - IEA 450 PPM: 59% (52% Non-Fossil+7% CCS)



Economics - Worldwide

- GDP Impacts of 450 PPM case compared to IEA Reference Scenario
 - GDP down 0.1% to 0.2% in 2020
 - GDP down 0.9% to 1.6% by 2030
 - However, these impacts would be offset by reduced climate change mitigation costs and health benefits from reduced pollution
 - Net effect on GDP hard to quantify
- Additional investment 2010-2030 of \$10,500 billion
 - Offset by lower energy bills of \$8,600 billion 2010-2030 (\$17,100 billion over life of investments) and other benefits



Suggestion for APEC Cooperation

- A more sustainable and secure energy future for the APEC economies can be accomplished affordably provided there is sufficient cooperation between economies
- There is a opportunity for APEC to help facilitate this cooperation, especially in knowledge sharing (such as peer reviews) and capacity building for
 - Improving energy efficiency
 - Promoting low carbon energy
- Oil dependency and oil imports will be a continuing challenge
 - More analysis and cooperation needed on this issue