



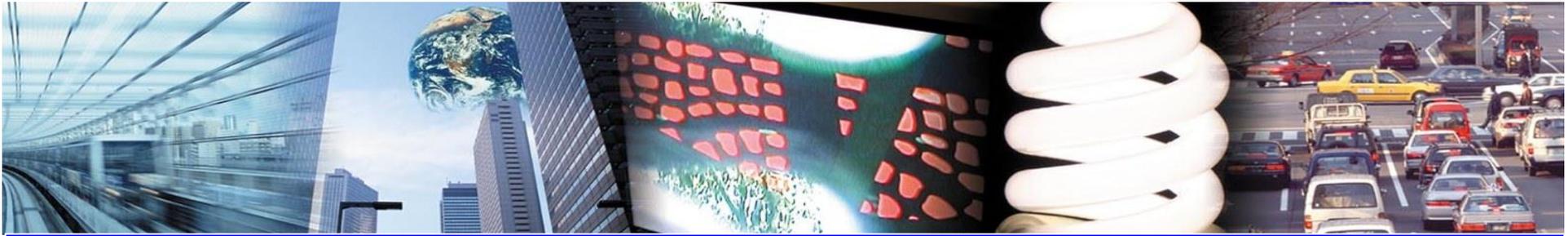
**APERC Workshop at EWG47, Kunming, China
19 May 2014**

***2. Toward APEC Energy Demand & Supply
Outlook 6th Edition***

**Brantley Liddle
Vice President, APERC**



**Asia-Pacific
Economic Cooperation**



The APEC Energy Outlook



APEC

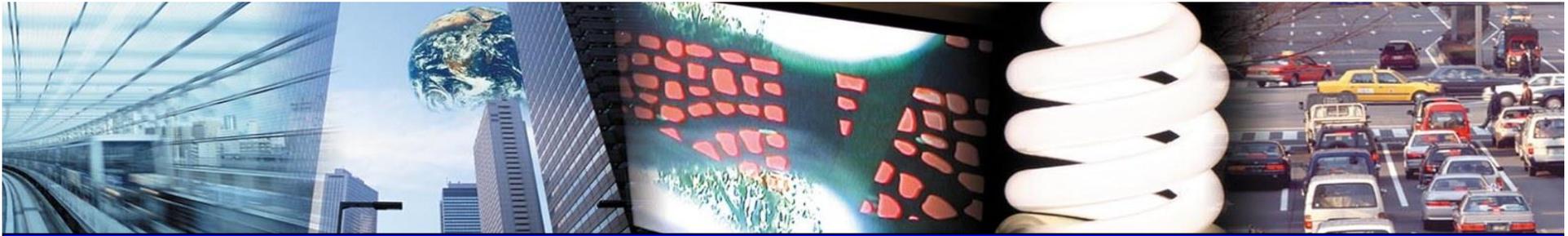
**Energy Demand and
Supply Outlook
5th Edition**

February 2013



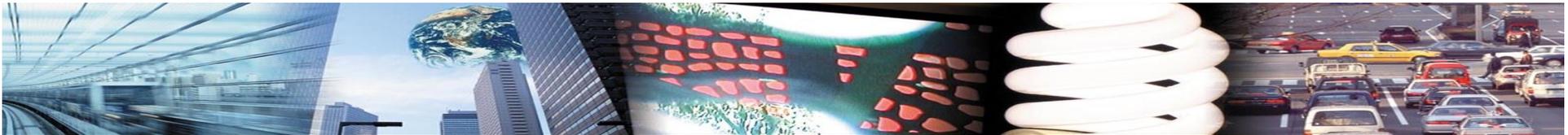
APERC
Asia Pacific Energy Research Centre

- “ The 5th Edition was published February 2013
- “ The 6th Edition is being developed
- “ Anticipated publication in late 2015

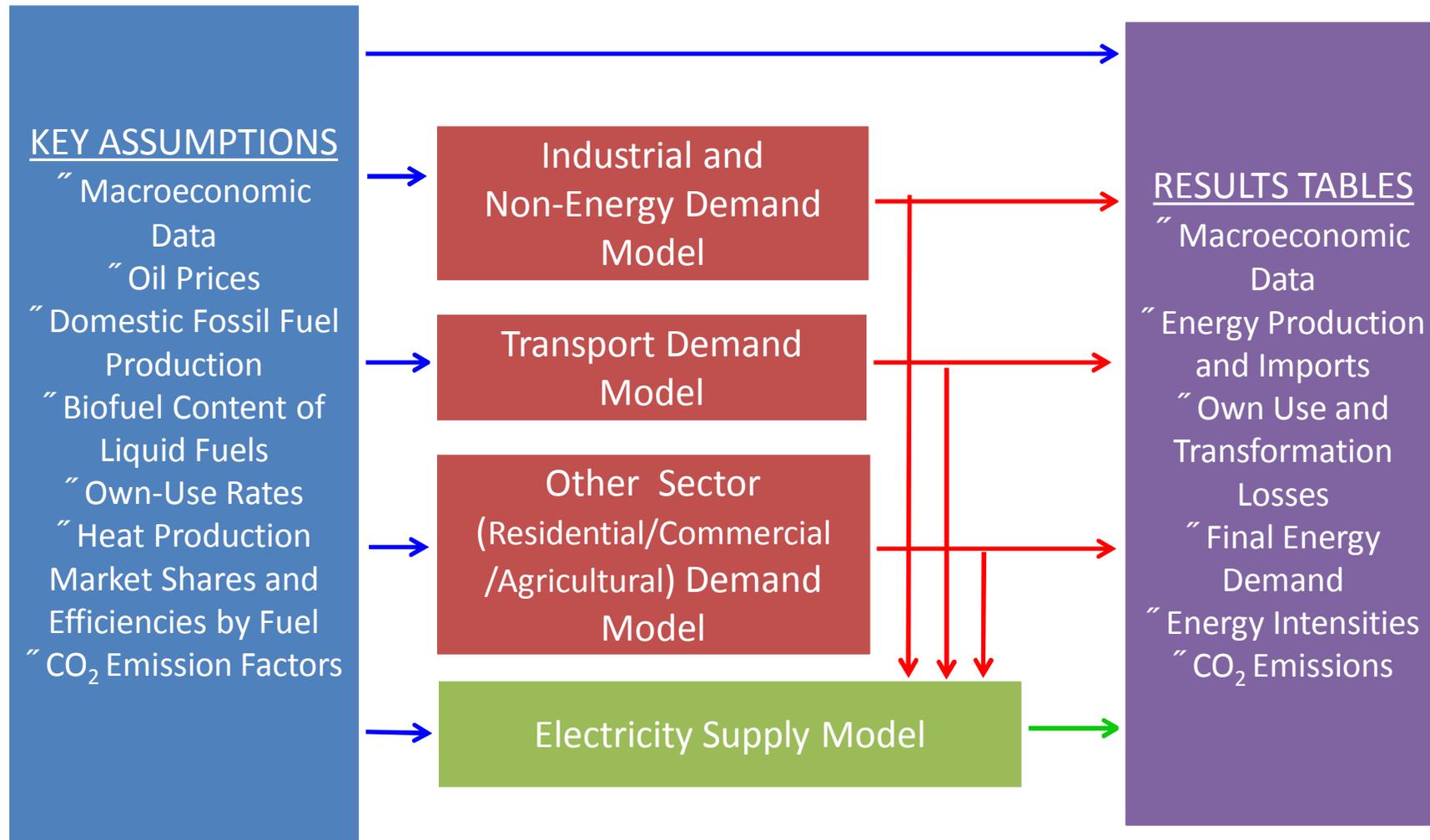


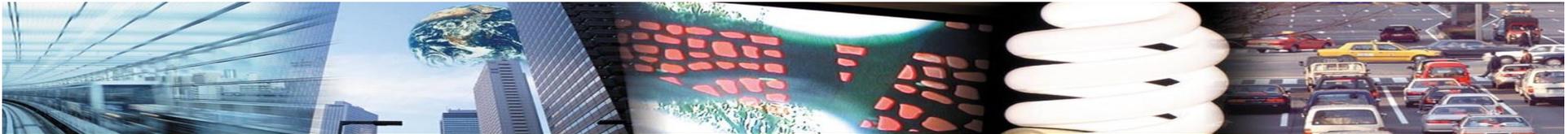
Outlook 6th Edition Description

- “ A 28 year look ahead (2012-2040) assuming business-as-usual and several alternative cases
- “ Project energy supply by fuel and demand by sector, electricity generation by fuel; installed generation capacity, CO₂ emissions, energy intensity
- “ Published in two volumes:
 - . Volume 1: Sector discussions
 - . Volume 2: Individual economy discussions



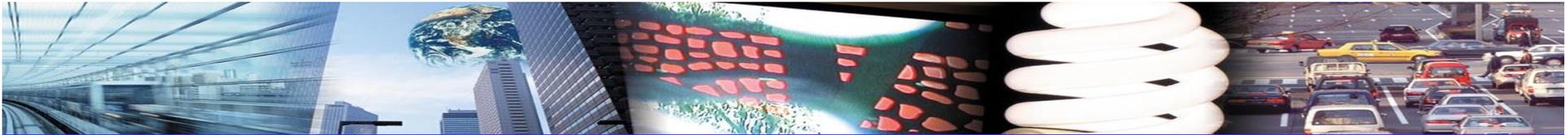
Outlook Model Structure





Outlook Model Enhancements Finished/Nearly Finished

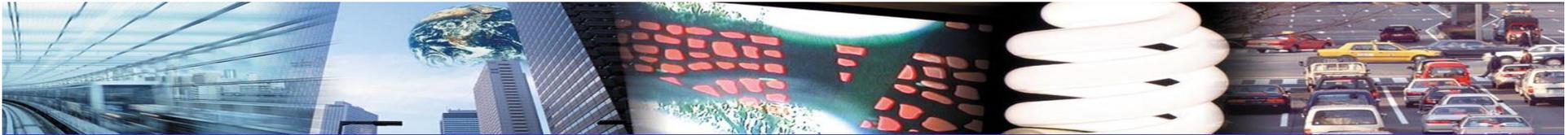
- “ Electricity Supply Model
 - “ Dr. Aishah Mohd Isa & Takashi Otsuki
- “ Transportation Fleet Model
 - “ Dr. Atit Tippichai
- “ Investment Model
 - “ Parminder Raeewal
- “ Residential, Commercial, & other Demand
 - “ Dr. Yeong-Chuan Lin



Outlook Work in Progress

- “ Industry Model
 - “ Kensuke Kanekiyo & Tran Thi Lien Phuong

- “ Database Management
 - “ Naomi Wynn & Dr. Yeong-Chuan Lin



Outlook-Related Work in Progress

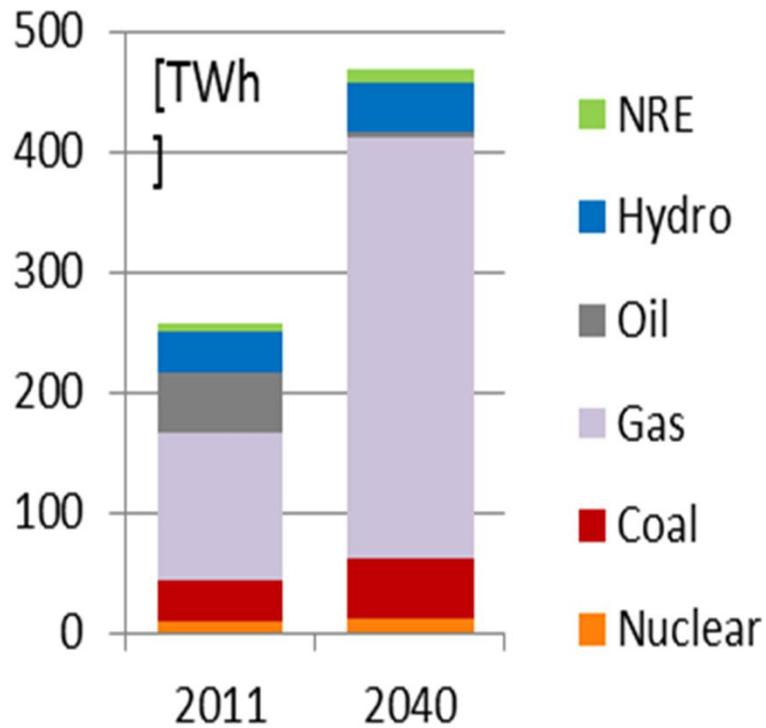
- “ Topical Work
 - “ Barriers to Shale Gas Development
 - “ Barriers to Geothermal Electricity Development
 - “ Benefits of Electricity Interconnection in Northeast Asia

- “ Cooperative Work with IEEJ
 - “ Nuclear, Fossil Fuel, & Renewables Projections
 - “ Bottom-up Residential & Commercial Demand Model

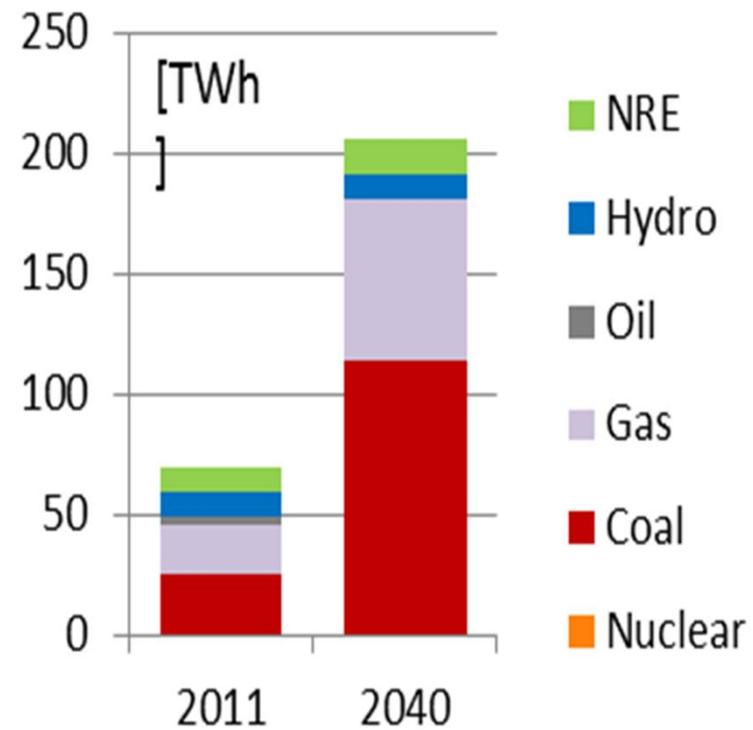


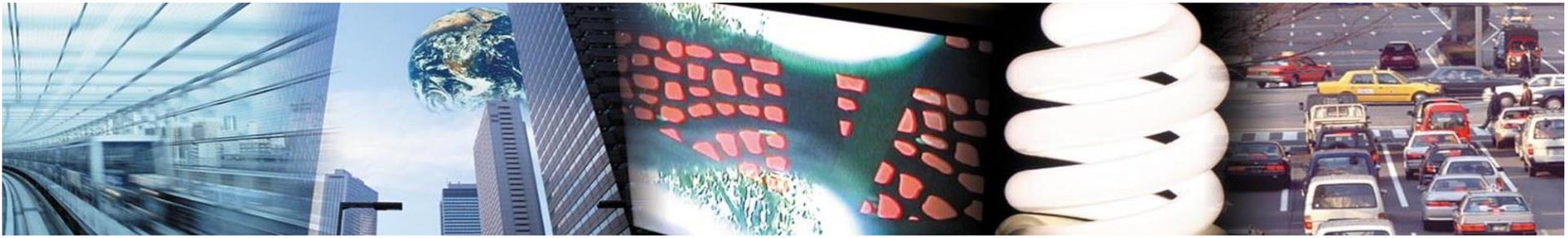
Preliminary Results: Electricity Model BAU

Mexico



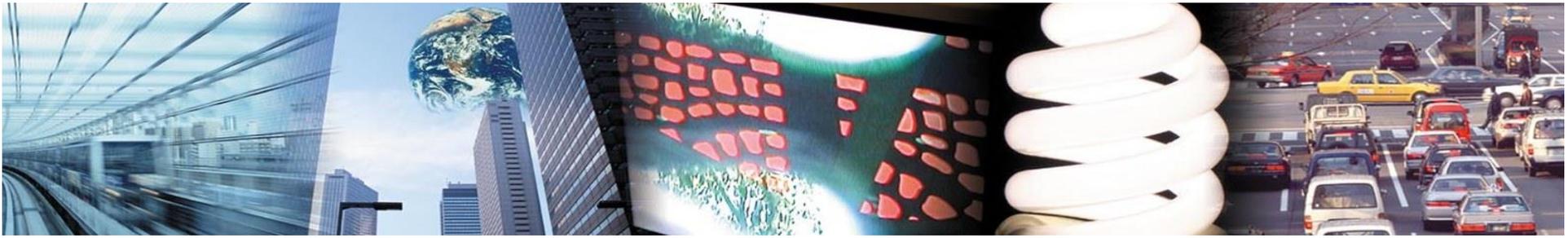
Philippines



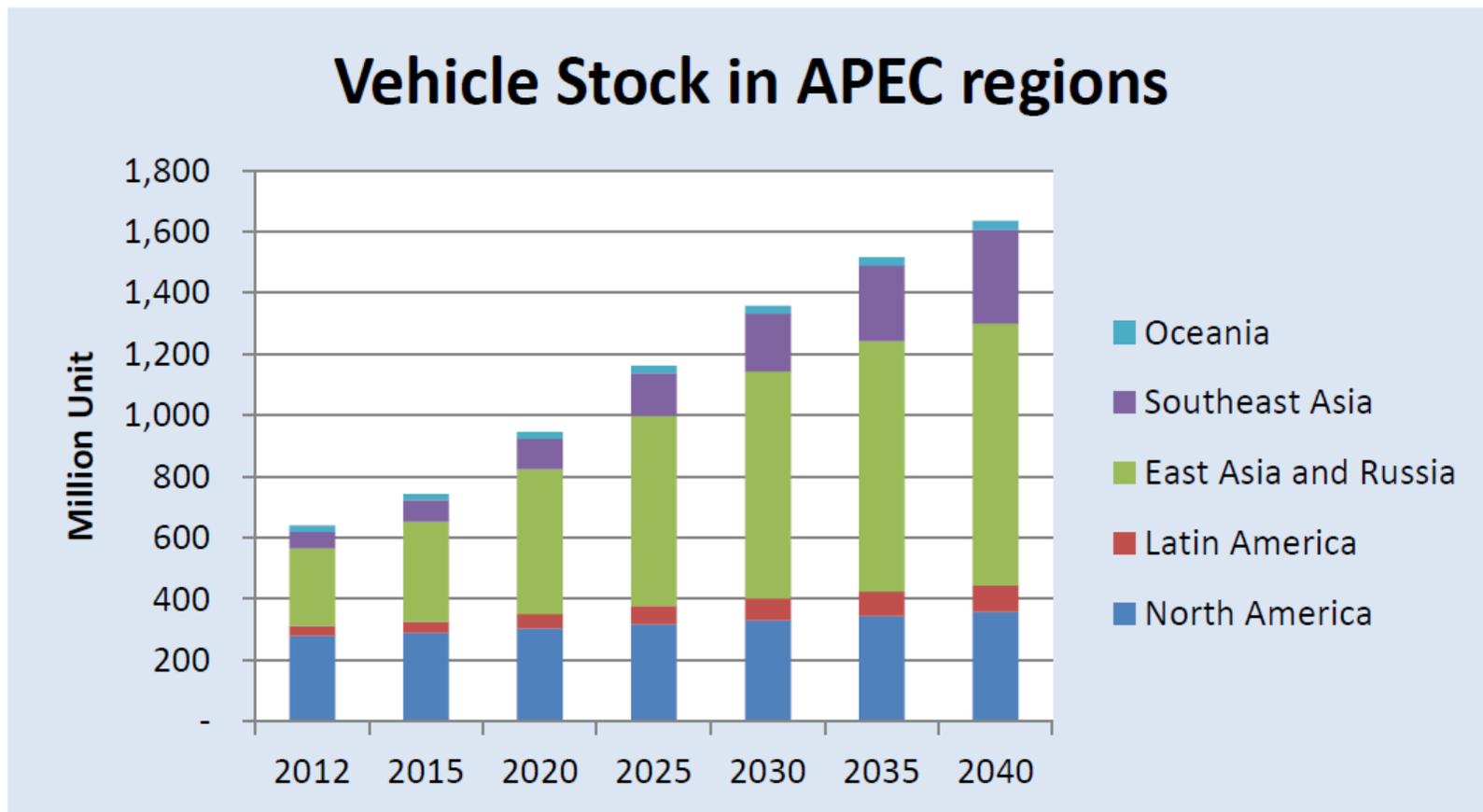


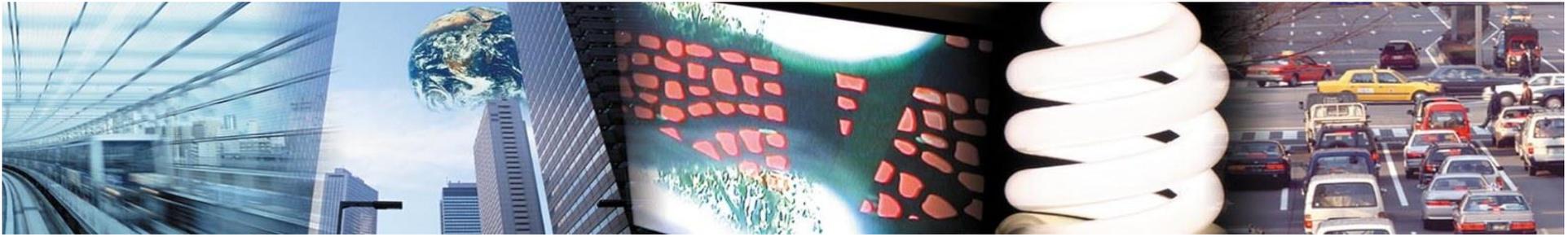
Preliminary Results: Vehicle Stock

| | Vehicle Stock (millions) | | | | Compound Annual Growth Rates | | | |
|-------------------|--------------------------|--------------|----------------|----------------|------------------------------|-------------|-------------|--------------|
| | 2012 | 2020 | 2030 | 2040 | 2012-2020 | 2020-2030 | 2030-2040 | 2012-2040 |
| Canada | 21.71 | 24.69 | 27.98 | 30.80 | 1.6% | 1.3% | 1.0% | 1.26% |
| United States | 258.79 | 278.67 | 303.49 | 326.57 | 0.9% | 0.9% | 0.7% | 0.83% |
| Mexico | 25.90 | 37.72 | 53.03 | 63.63 | 4.8% | 3.5% | 1.8% | 3.26% |
| Peru | 2.21 | 4.78 | 9.39 | 13.41 | 10.1% | 7.0% | 3.6% | 6.66% |
| Chile | 3.75 | 5.82 | 8.14 | 9.58 | 5.6% | 3.4% | 1.6% | 3.40% |
| Russia | 44.57 | 55.44 | 65.46 | 70.39 | 2.8% | 1.7% | 0.7% | 1.65% |
| Korea | 19.00 | 21.80 | 23.26 | 23.33 | 1.7% | 0.7% | 0.0% | 0.74% |
| Japan | 75.71 | 79.54 | 80.39 | 77.60 | 0.6% | 0.1% | -0.4% | 0.09% |
| China | 105.51 | 307.32 | 563.31 | 677.45 | 14.3% | 6.2% | 1.9% | 6.87% |
| Chinese Taipei | 7.35 | 7.63 | 7.70 | 7.44 | 0.5% | 0.1% | -0.3% | 0.04% |
| Hong Kong | 0.60 | 0.66 | 0.73 | 0.77 | 1.2% | 0.9% | 0.6% | 0.88% |
| Singapore | 0.83 | 0.92 | 1.00 | 1.03 | 1.3% | 0.8% | 0.3% | 0.78% |
| Thailand | 13.30 | 22.53 | 34.87 | 42.07 | 6.8% | 4.5% | 1.9% | 4.20% |
| Malaysia | 11.99 | 17.37 | 22.72 | 26.29 | 4.7% | 2.7% | 1.5% | 2.84% |
| Indonesia | 18.84 | 38.61 | 83.69 | 146.37 | 9.4% | 8.0% | 5.7% | 7.60% |
| Philippines | 7.89 | 16.08 | 38.21 | 68.27 | 9.3% | 9.0% | 6.0% | 8.01% |
| Vietnam | 1.60 | 3.45 | 9.16 | 21.36 | 10.1% | 10.3% | 8.8% | 9.70% |
| Brunei Darussalam | 0.22 | 0.25 | 0.28 | 0.31 | 1.5% | 1.2% | 0.9% | 1.15% |
| Papua New Guinea | 0.07 | 0.13 | 0.36 | 0.99 | 8.2% | 10.5% | 10.6% | 9.89% |
| Australia | 16.04 | 18.48 | 21.00 | 22.91 | 1.8% | 1.3% | 0.9% | 1.28% |
| New Zealand | 3.22 | 3.64 | 4.12 | 4.47 | 1.6% | 1.2% | 0.8% | 1.18% |
| APEC | 639.1 | 945.5 | 1,358.3 | 1,635.0 | 5.0% | 3.7% | 1.9% | 3.41% |



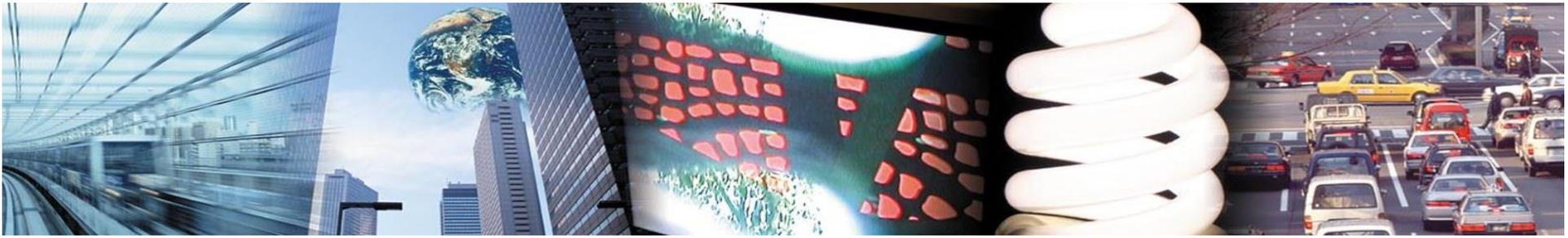
Preliminary Results: Vehicle Stock



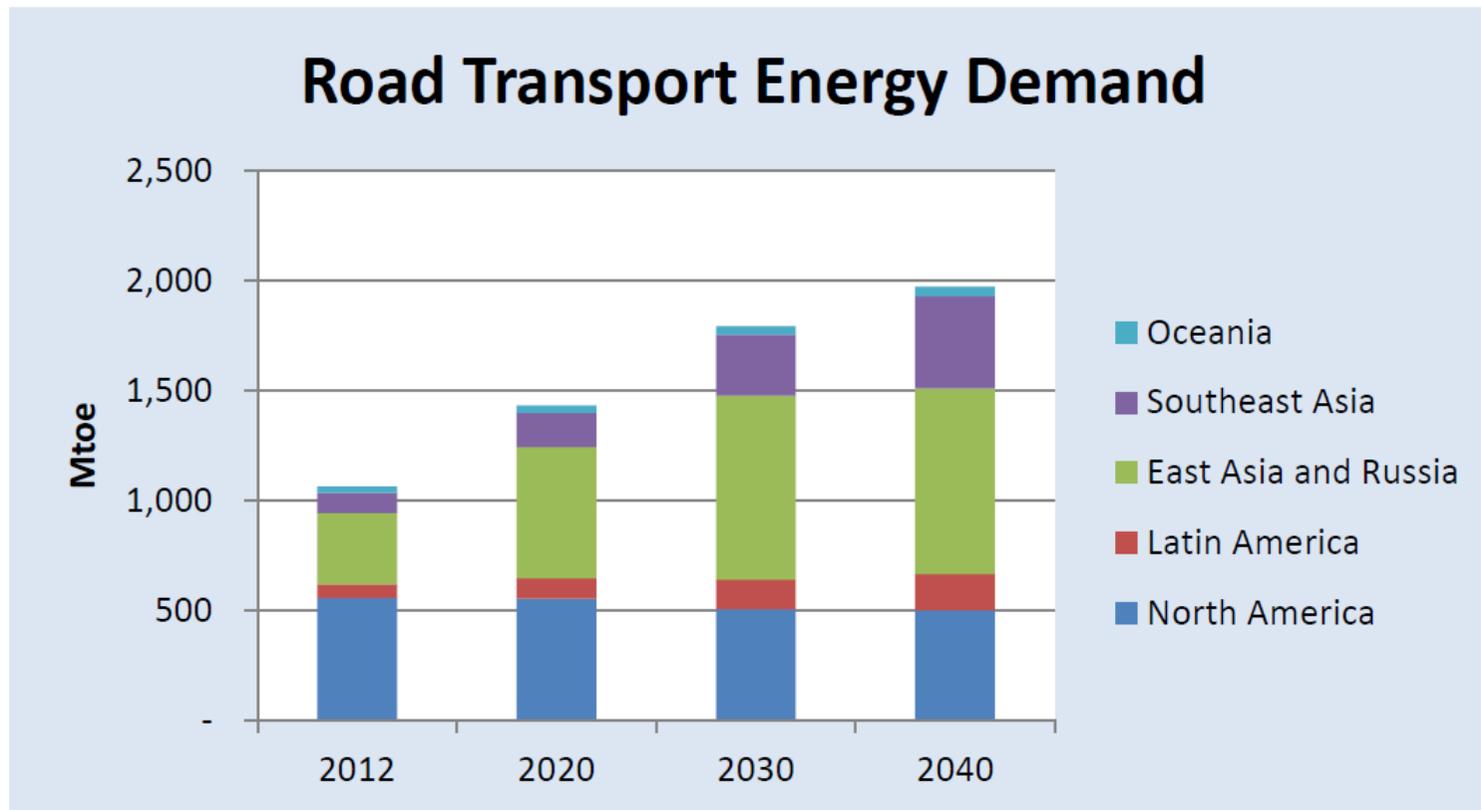


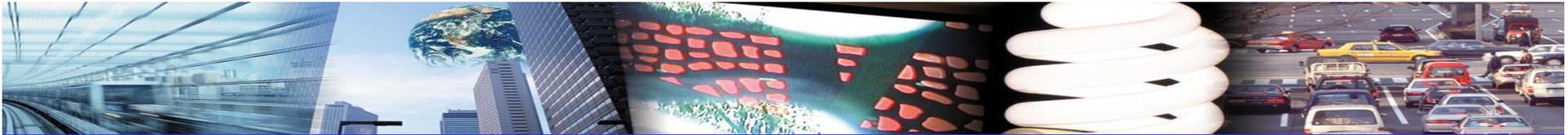
Preliminary Results: Energy Demand

| | Energy Demand (Mtoe) | | | | Compound Annual Growth Rates | | | |
|-------------------|----------------------|----------------|----------------|----------------|------------------------------|-------------|-------------|--------------|
| | 2012 | 2020 | 2030 | 2040 | 2012-2020 | 2020-2030 | 2030-2040 | 2012-2040 |
| Canada | 48.97 | 54.89 | 62.84 | 70.01 | 1.4% | 1.4% | 1.1% | 1.28% |
| United States | 507.59 | 498.87 | 441.96 | 430.08 | -0.2% | -1.2% | -0.3% | -0.59% |
| Mexico | 50.46 | 71.80 | 96.87 | 112.67 | 4.5% | 3.0% | 1.5% | 2.91% |
| Peru | 5.36 | 11.48 | 24.00 | 36.42 | 10.0% | 7.7% | 4.3% | 7.08% |
| Chile | 6.60 | 10.18 | 14.34 | 16.84 | 5.6% | 3.5% | 1.6% | 3.40% |
| Russia | 48.10 | 58.20 | 66.52 | 69.69 | 2.4% | 1.3% | 0.5% | 1.33% |
| Korea | 28.39 | 31.69 | 32.51 | 31.48 | 1.4% | 0.3% | -0.3% | 0.37% |
| Japan | 66.03 | 67.86 | 68.94 | 66.56 | 0.3% | 0.2% | -0.4% | 0.03% |
| China | 168.43 | 422.21 | 651.09 | 656.86 | 12.2% | 4.4% | 0.1% | 4.98% |
| Chinese Taipei | 11.96 | 13.63 | 17.37 | 19.11 | 1.7% | 2.5% | 1.0% | 1.69% |
| Hong Kong | 1.80 | 2.00 | 2.31 | 2.50 | 1.3% | 1.4% | 0.8% | 1.17% |
| Singapore | 2.72 | 2.99 | 3.29 | 3.37 | 1.2% | 0.9% | 0.2% | 0.77% |
| Thailand | 20.17 | 33.48 | 52.22 | 64.45 | 6.5% | 4.5% | 2.1% | 4.24% |
| Malaysia | 14.29 | 20.13 | 27.44 | 33.91 | 4.4% | 3.1% | 2.1% | 3.14% |
| Indonesia | 34.94 | 63.34 | 113.56 | 169.46 | 7.7% | 6.0% | 4.1% | 5.80% |
| Philippines | 7.04 | 15.57 | 40.25 | 73.46 | 10.4% | 10.0% | 6.2% | 8.73% |
| Vietnam | 11.15 | 20.26 | 39.40 | 72.20 | 7.8% | 6.9% | 6.2% | 6.90% |
| Brunei Darussalam | 0.43 | 0.48 | 0.56 | 0.62 | 1.4% | 1.6% | 1.0% | 1.34% |
| Papua New Guinea | 0.44 | 0.73 | 1.68 | 4.19 | 6.5% | 8.7% | 9.6% | 8.37% |
| Australia | 24.76 | 28.15 | 31.78 | 34.62 | 1.6% | 1.2% | 0.9% | 1.20% |
| New Zealand | 4.09 | 4.49 | 4.95 | 5.27 | 1.2% | 1.0% | 0.6% | 0.92% |
| APEC | 1,063.7 | 1,432.4 | 1,793.9 | 1,973.8 | 3.8% | 2.3% | 1.0% | 2.23% |



Preliminary Results: Energy Demand





Preliminary Alternative Transport Case

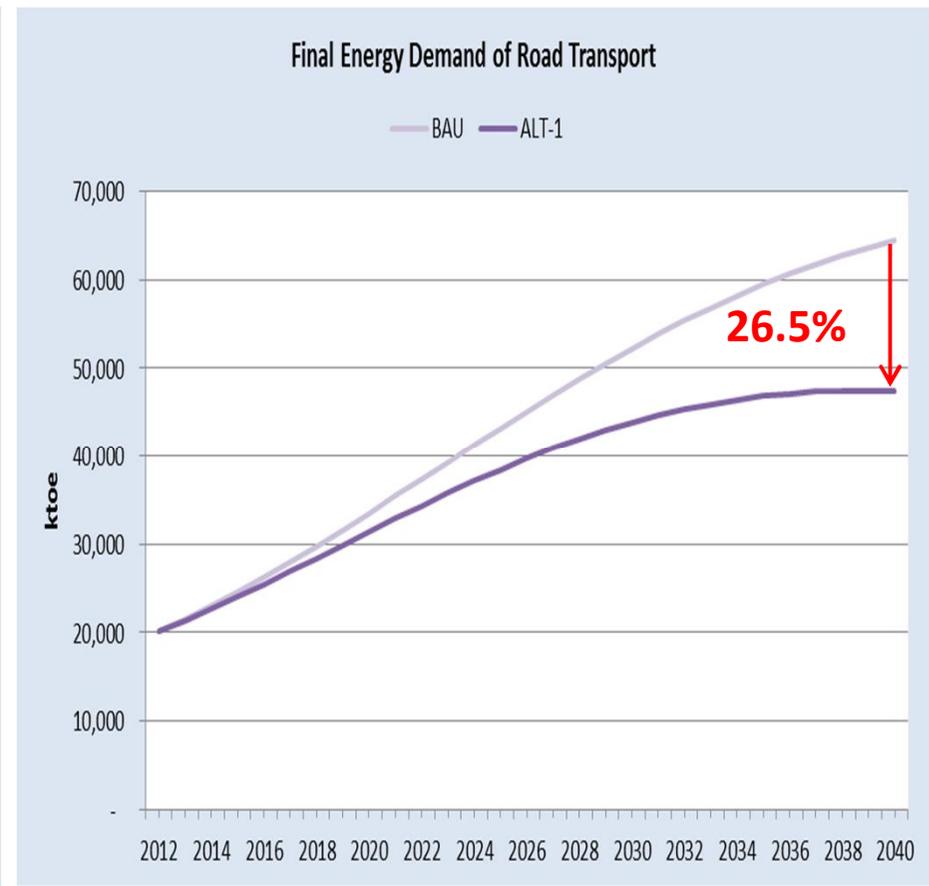
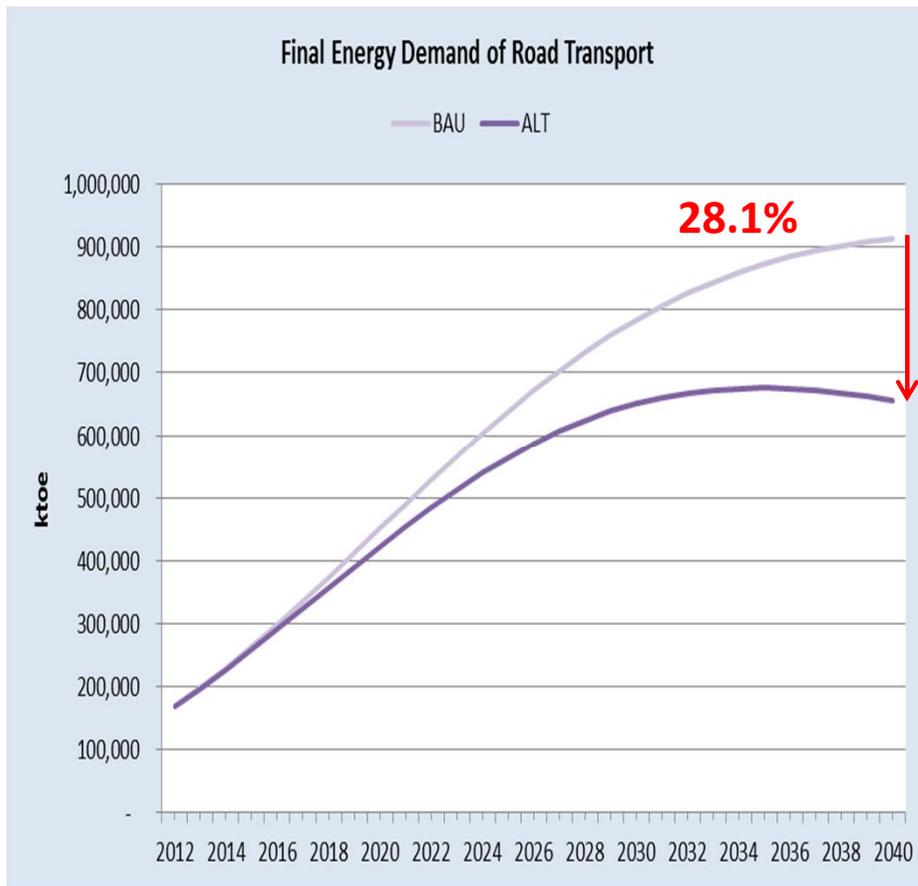
- “ Fuel economy of new vehicles improves 1-3% p.a.
- “ High energy efficient vehicles promoted
- “ Efficient driving promoted



BAU vs Alternative Case

China

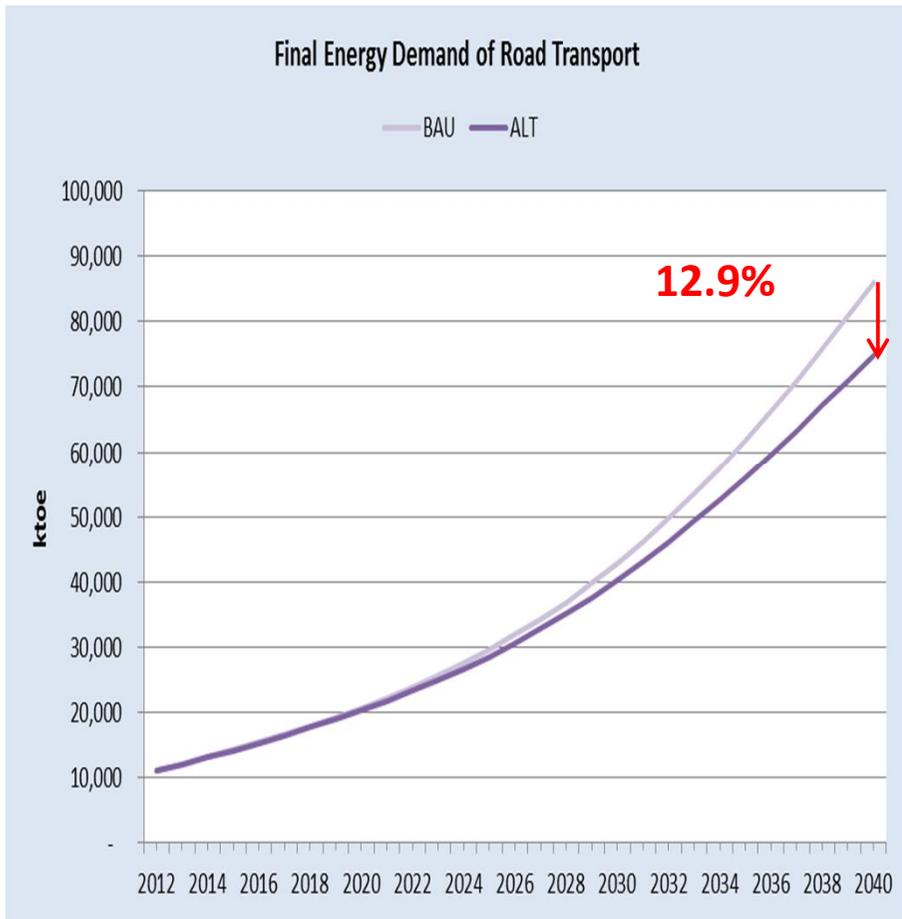
Thailand



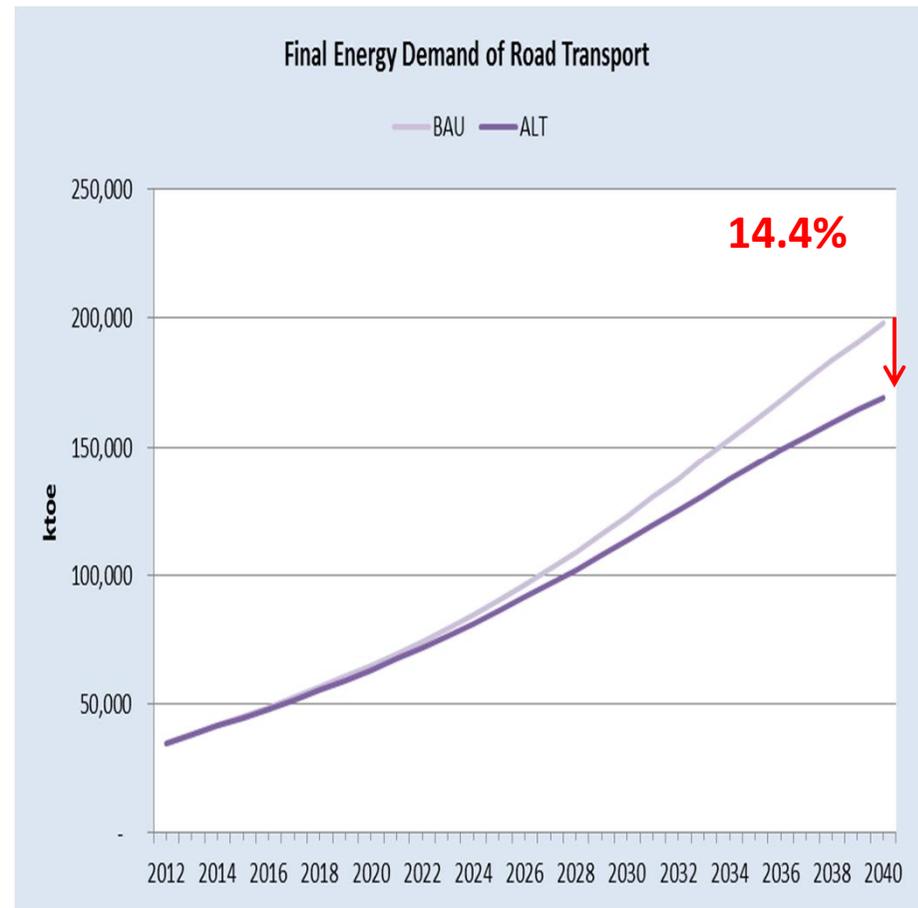


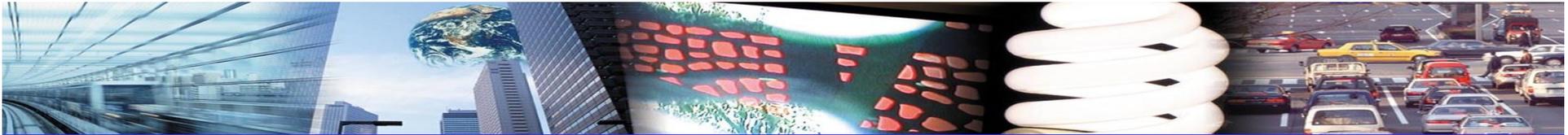
BAU vs Alternative Case

Vietnam



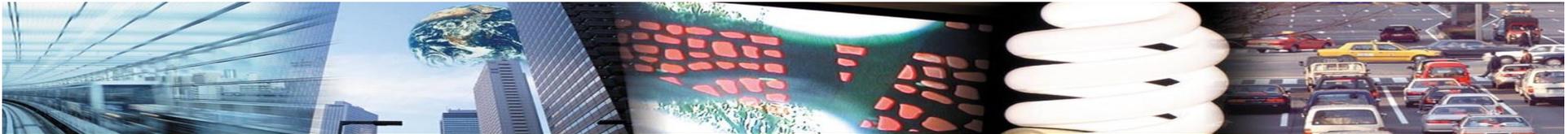
Indonesia





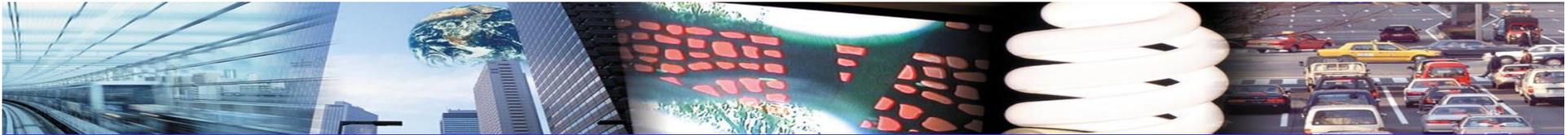
6th Edition Potential Alternative Cases

- “ Analyze impact of specific policies, goals
 - . Energy/fuel efficiency standard (vehicles & buildings)
 - . Alternative urban development
 - . Carbon tax/price
 - . Electricity/Gas interconnection in Northeast Asia
 - . Increased shares for bio-fuels



6th Edition Potential Alternative Cases

- “ Analyze effort need to reach particular targets
 - . Energy intensity
 - . Renewable energy
 - . Two degree CO₂ emissions
 - . Greater energy security (lower fossil fuel import ratios)
- “ High Shale Gas/Natural Gas Case
- “ High Renewables Case
- “ High Nuclear Case



Schedule for Outlook 6th Edition

- “ Northern Summer 2014 – Model results for BAU scenario
- “ Early Fall 2014 – Alternative scenarios designed
- “ Late 2014 – Models results for alternative cases finalized

- “ October-November 2015– Outlook 6th Edition published