CEEDS Phase 3: Energy Saving Potential in Urban Passenger Transportation

5 March, 2012

Ralph D. Samuelson

APERC Workshop, Kuala Lumpur
### APEC’s Urban Population is Expected to Increase Dramatically

<table>
<thead>
<tr>
<th>(million people)</th>
<th>2010</th>
<th>2035</th>
<th>2050</th>
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<tbody>
<tr>
<td>Total APEC Urban Population</td>
<td>1,531</td>
<td>2,107</td>
<td>2,313</td>
</tr>
<tr>
<td>% Change from 2010</td>
<td>+38%</td>
<td>+51%</td>
<td></td>
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<tr>
<td>Total APEC Non-OECD Urban Population</td>
<td>868</td>
<td>1324</td>
<td>1492</td>
</tr>
<tr>
<td>% Change from 2010</td>
<td>+53%</td>
<td>+72%</td>
<td></td>
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<tr>
<td>Total APEC Non-OCED + Mexico and Chile Urban Population</td>
<td>969</td>
<td>1,451</td>
<td>1,624</td>
</tr>
<tr>
<td>% Change from 2010</td>
<td>+50%</td>
<td>+68%</td>
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• The consequences are likely to include growing oil security and oil price risks, traffic congestion, air pollution, and greenhouse gas emissions.

• Under business-as-usual, by 2035 we expect road transport energy use to increase 250% in the participating CEEDs developing economies of China, Philippines, Thailand, Vietnam and Indonesia.
Urban Design Influences Transport Energy Use In A Number of Ways

- Diversity (land-use mix, jobs-housing balance)
- Design (street connectedness, pedestrian/bicycle friendliness)
- Transport Infrastructure (transit vs. motorway investment, parking)
Urban Population Density As an Energy Efficiency Indicator

• In general, more compact cities (those with a higher population density) tend to have lower energy use than less dense ‘sprawling’ cities
  – Direct effect: compact cities have shorter travel distances; and
  – Indirect effect: compact cities tend to have more of the low-energy design characteristics discussed above
  – Reverse effect: cities with the low-energy design characteristics discussed above tend to develop in a more compact way
Urban Design Has Dramatic Impact on Urban Transport Energy Use
Our goal here is to roughly estimate the potential contribution of urban design to energy saving.

- We are not too concerned with exactly what design features drive this.

We ask, ‘What if cities in developing economies grow to be like the more compact cities in the developed world, rather than like the more sprawling cities in the developed world?’

- Note that we are not claiming that population density alone is the cause of low-energy urban design.
Declining Trend in Urban Density

Guangzhou, China

T₁: 13-Oct-90

T₂: 14-Sep-00

Manila, Philippines

T₁: 2-Apr-93

T₂: 3-Apr-02
World Bank density assessment of 120 cities globally diverse cities

Satellite imaging captured at two discrete times 10 years apart

Conclusion: urban density has been declining on average 1.7% per year

Higher decline rates noticeable in developed cities

General Density Trends
## History of Rapid Density Decline in Major CEEDS Cities

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<tbody>
<tr>
<td>Bangkok, Thailand</td>
<td>139</td>
<td>107</td>
<td>39</td>
<td>8.1%</td>
</tr>
<tr>
<td>Manilla, Philippines</td>
<td>206</td>
<td>160</td>
<td>147</td>
<td>2.3%</td>
</tr>
<tr>
<td>Jakarta, Indonesia</td>
<td>150</td>
<td>116</td>
<td>79</td>
<td>4.2%</td>
</tr>
<tr>
<td>Mexico City, Mexico</td>
<td>107</td>
<td>83</td>
<td>97</td>
<td>0.7%</td>
</tr>
<tr>
<td>Ho Chi Minh City, Vietnam</td>
<td>356</td>
<td>269</td>
<td>92</td>
<td>8.6%</td>
</tr>
<tr>
<td>Guangzhou, China</td>
<td>119</td>
<td>92</td>
<td>56</td>
<td>4.9%</td>
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</table>
• Business-as-Usual (BAU) - Density declines at the global average of 1.7% per annum from 2010 data

• Alternative – Density remains constant from 2008
Fuel Use Projection – Bangkok, Thailand

BAU 1.7% pa density decline
Alternative constant density
Fuel Use Projection – Guangzhou, China

- BAU 1.7% pa density decline
- Alternative constant density

Graph showing fuel use projection from 2010 to 2050 in ktoe/year.
Fuel Use Projection – Manila, Philippines

- BAU 1.7% pa density decline
- Alternative constant density
Fuel Use Projection – Jakarta, Indonesia

- BAU 1.7% pa density decline
- Alternative constant density
Fuel Use Projection – Ho Chi Minh City, Vietnam

- BAU 1.7% pa density decline
- Alt 2008 const density
Conclusions

• How cities are designed will strongly impact the patterns of urban transport and transport energy use

• Business-as-usual is likely to lead to sprawling cities with high energy demand

• Our analysis suggests the potential energy savings from better urban design in the 5 CEEDS participating economy cities examined ranges from 30-50% by 2050 compared to business-as-usual
Time for Action is Now!

- How these growing cities are designed will strongly impact the patterns of urban transport and transport energy use.
- But once the cities are built, these patterns become very hard to change.
- Given the rapid urban growth expected in the APEC region, a unique window of opportunity exists for a long-term reduction in APEC’s energy demand.
Thank you for your kind attention

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