ASEAN Faces Energy Challenges

• Formerly net exporter, now net importer, of oil
• Rising demand to meet needs of rapid economic growth
• Rising electrification with coal the primary fuel
• Highly susceptible to impacts of climate change
Energy Security is a Thematic Track of the ASEAN Krabi Initiative

ASEAN Focus Groups Considered Energy Security

- Three energy focus groups held as part of this Integrated Foresight effort
  - January 17-18, 2013 Nakorn Pathom, Thailand
  - April 1-2, 2013 Jakarta, Indonesia
  - April 4-5, 2013 Hanoi, Vietnam

- Three Horizons foresight method used to develop energy scenario logic
  - 3rd Horizon: future aspiration
  - 1st Horizon: current problems and issues
  - 2nd Horizon: conflict resolution—future pathway
ASEAN Energy Focus Groups Developed a Future Vision for Energy Security

Figure from "Seeing in Multiple Horizons: Connecting Futures to Strategy," Andrew Curry and Anthony Hodgson, Journal of Futures Studies, 13(1), 2008, p.2

• Affordable energy widely available
• Increased efficiency
• Increased use of renewables
• Use of indigenous and local resources
• Improved social equity
• Reduced environmental impact

ASEAN Energy Focus Groups Developed Scenario Logic

Navigating Tough Conditions

Constraints from GHG emissions, cost and availability of imported fuels

Strong

Effective

Smooth Sailing

Actions to promote energy efficiency, and alternative and renewable energy

Weak

Ineffective

Future is Past

Constraint Domination
ASEAN Countries are at Different Levels of Development

Source: 3rd ASEAN Energy Outlook, Institute of Energy Economics, Japan and ASEAN Centre for Energy, February, 2011.

ASEAN Countries May Follow Different Energy Efficiency Paths (1)

Source: 3rd ASEAN Energy Outlook, Institute of Energy Economics, Japan and ASEAN Centre for Energy, February, 2011.

BAU: Business as Usual
APS: Alternate Policy Scenario
Brun: Brunei
Ind: Indonesia
Ma: Malaysia
Ph: Philippines
Sing: Singapore
Thai: Thailand
ASEAN Countries May Follow Different Energy Efficiency Paths (2)

Source: 3rd ASEAN Energy Outlook, Institute of Energy Economics, Japan and ASEAN Centre for Energy, February, 2011

ASEAN Energy Development May Follow Different Meta-Scenarios

<table>
<thead>
<tr>
<th></th>
<th>Hands Off</th>
<th>Minimal Policies</th>
<th>Prudent Policies</th>
<th>Aggressive Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy Growth</td>
<td>High</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Low</td>
</tr>
<tr>
<td>Energy Efficiency</td>
<td>Very Low</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Alternative and Renewable Energy Use</td>
<td>Decrease</td>
<td>Possible Increase</td>
<td>Increase</td>
<td>Increase</td>
</tr>
<tr>
<td>Key Characteristics</td>
<td>High import dependence, low diversity in fuel mix</td>
<td>Increased environmental footprint and coal use for electrification</td>
<td>Reduced energy intensity, improved energy technologies</td>
<td>Reduced energy intensity, full electrification, diverse fuel mix</td>
</tr>
</tbody>
</table>

Hedging Policies: Increase public awareness of true cost of energy, provide incentives for resource development, energy efficiency, decarbonization
### ASEAN Countries Can Be Given an Energy Constraint Preparedness Score

<table>
<thead>
<tr>
<th>Hands-off Policies</th>
<th>Minimal Policies</th>
<th>Prudent Policies</th>
<th>Aggressive Policies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

- Brunei
- Cambodia
- Indonesia
- Laos
- Malaysia
- Myanmar
- Philippines
- Singapore
- Thailand
- Vietnam

### ASEAN Countries Are Currently on Different Scenario Paths

- Navigating Tough Conditions
- Effective
- Smooth Sailing
- Brunei
- Malaysia
- Singapore
- Thailand
- Strong
- Constraints from GHG emissions, cost and availability of imported fuels
- Weak
- Ineffective
- Future is Past
- Actions to promote energy efficiency, and alternative and renewable energy
Acknowledgements

• The Rockefeller Foundation
• Science, Technology and Innovation (STI) Policy Office of Thailand
• APEC Center for Technology Foresight
• Members of the Energy Focus Groups
• Shawn Kimmel, Ron Johnston, Howard Shatz, Jack Smith

Backup Slides
ASEAN Countries May Follow Different Decarbonization Paths (1)

Source: 3rd ASEAN Energy Outlook, Institute of Energy Economics, Japan and ASEAN Centre for Energy, February, 2011

Slide 16

ASEAN Countries May Follow Different Decarbonization Paths (2)

Source: 3rd ASEAN Energy Outlook, Institute of Energy Economics, Japan and ASEAN Centre for Energy, February, 2011

Slide 16
ASEAN Countries May Follow Different Carbon Efficiency Paths (1)

Source: 3rd ASEAN Energy Outlook, Institute of Energy Economics, Japan and ASEAN Centre for Energy, February, 2011

ASEAN Countries May Follow Different Carbon Efficiency Paths (2)

Source: 3rd ASEAN Energy Outlook, Institute of Energy Economics, Japan and ASEAN Centre for Energy, February, 2011
ASEAN Countries Ranked Differently on Energy Sustainability Index

- Indonesia modest decline
  - Key concerns were decline in wholesale margin on gasoline, social equity (low electrification) and environment
- Philippines significant decline
  - Key concerns across all dimensions
- Thailand modest rise
  - Due to improved energy security

BUT ALL ASSESSED AS UNDERPERFORMING ON MITIGATION OF ENVIRONMENTAL IMPACTS COMPARED TO PEERS IN ENERGY PER CAPITA
Projections of Indonesian Energy Efficiency Cover a Broad Range

Sources: H.D. Ibrahim et al, National Energy Council (NEC), Jakarta (2010)
R.G. Dewi et al (ITB/IPB), 18th AIM International Workshop, NIES, Japan (2012)

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