Best Practices in EE and RE in Industry



# EWG 19/2011A: Best Practices in Energy Efficiency and Renewable Energy Technologies in the Industrial Sector in APEC Region

## APEC EGEE&C 42<sup>nd</sup> Meeting

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Best Practices in EE and RE in Industry	AREC
EE & RE Examples Selected	
<ul> <li>Bagasse Power in Sugar Mills – Australia</li> <li>Bagasse Fired Cogeneration – Thailand</li> <li>Bagasse Power and Fuel Production – USA</li> <li>Bagasse Cogeneration in an Edible Oil Refinery – Ind</li> </ul>	Asia-Pacific Economic Cooperation
<ul> <li>Biomass Gasification in Ethanol Production – USA</li> <li>Biogas to Heat and Power – Canada</li> </ul>	
• Large Scale Industrial Biogas – China	
<ul> <li>Tallow Fuelled Boilers – New Zealand</li> <li>Sawmill Powered by Wood Waste – Australia</li> </ul>	
<ul> <li>Wood-waste in Different End Uses – Malaysia, New Z</li> <li>✓ Timber Drying.</li> </ul>	ealand, Singapore
Cogeneration of Heat and Power for Waste Proc	
<ul> <li>Maximizing the End Use Efficiency of Wood Was</li> <li>Production of Briguettes for Boiler Fuel.</li> </ul>	ite.
<ul> <li>Combined Application of Several Energy Efficien</li> <li>Sewage Sludge Disposal.</li> </ul>	icy Initiatives.
• Watermill Upgrading – Nepal	
<ul> <li>Micro-Hydro Electricity Generation – Indonesia</li> </ul>	
• Solar Crop Drying – Indonesia	
Solar Thermal Process Heat – USA	
Concentrated Solar Thermal Power Plant – Thailand	
Hybrid Solar Thermal and PV for Process Heat and Po	ower – USA
<ul> <li>Solar Cooling and Process Heat – Singapore</li> <li>Changbin and Taichung Wind Farms - Chinese Taipei</li> </ul>	
• Changon and raichung wind Farins - Chinese Taiper	

### Best Practices in EE and RE in Industry

- For each EE & RE Example
  - ✓ Project Description
  - ✓ Coupling with Energy Efficiency
  - ✓ Project Highlights
  - ✓ Economics
  - ✓ Obstacles Encountered
  - ✓ Lessons Learned
  - ✓ Contact Information
- From all EE & RE Examples
  - ✓ Identify obstacles
    - ➤ Generic
    - > Technology specific
    - > Industry specific
    - ✓ Establish lessons learned

#### ➤ Generic

- ➤ Financial and Economic
- > Institutional
- Technology specific



nu Khieo Bio-Energy hailanc courtesy by COGEN 3 Info

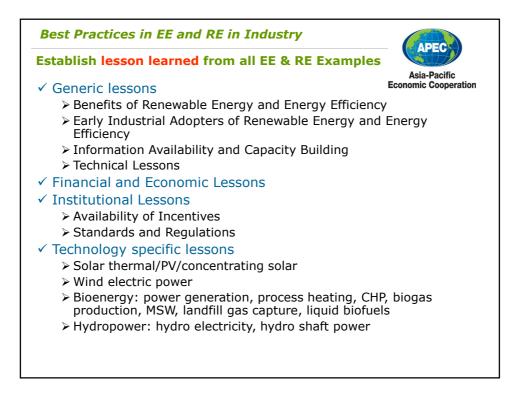
### ✓ Formulate *Best Practices*

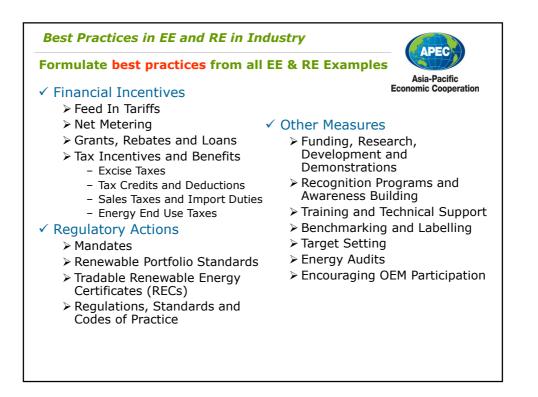
- > Financial incentives
- ➢ Regulatory actions

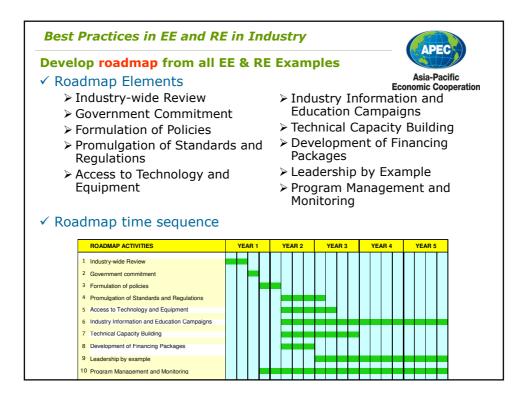
#### > Other measures

- Funding, R/D, Demos
  Recognition, awareness
- Training/technical support
- \_ Benchmarking & labeling
- Target setting
- ✓ Prepare *Roadmap* 
  - > Roadmap elements
  - ➤ Roadmap time sequence

Identify obstacles from all EE &	
<ul> <li>Generic obstacles</li> <li>Information access &amp; Implemention         <ul> <li>Access to information</li> <li>Information transfer and persection</li> <li>Implementation capacity</li> </ul> </li> <li>Project ownership issues         <ul> <li>Management and worker persection</li> <li>Championship</li> <li>Stakeholder engagement</li> </ul> </li> <li>Financial &amp; Economic issues         <ul> <li>Establishment costs</li> <li>Economic viability</li> </ul> </li> </ul>	Asia-Pacific Economic Cooperation entation capacity sonnel training ceptions ✓ Technology specific obstacles > Solar thermal: conservative nature of building and architecture > Bioenergy: availability of
<ul> <li>Access to capital</li> <li>Institutional obstacles         <ul> <li>Incentives</li> <li>Standards and regulations</li> <li>Administrative barriers</li> </ul> </li> </ul>	feedstock/land/stockpiling ✓ Industry specific obstacles > Availability of suitable land for large-scale installation > Cost to accommodate RE & EE infrastructure > Availability and effective utilization of waste heat



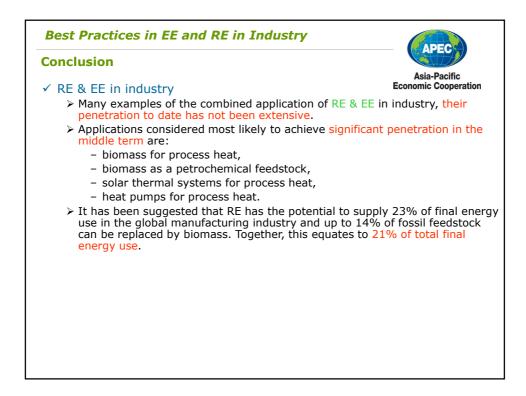








Conclusion	
✓ Combination of RE & EE	Asia-Pacific Economic Cooperation
Combined application of RE & EE in industries	ry is a natural marriage
<ul> <li>industry operators who have the fores fossil fuels to renewable fuels are very renewable fuel by maximizing the efficiency of the fourthinking to include energy in industry to achieve maximum vacommunity, economy and planet with its in</li> </ul>	y likely to maximize the value of th ciency of its use in their plants. the efficient use of renewable alue for <b>ALL</b> (industrial end user,
<ul> <li>Combined use of RE &amp; EE in industry need can maximize the benefits that can be ach</li> <li>minimizing the specific energy consum</li> </ul>	ieved, e.g
production, – maximizing revenues and economic va – minimizing the use of fossil fuels,	alue for an industrial company,
<ul> <li>reducing GHG emissions,</li> <li>managing waste disposal,</li> </ul>	
<ul> <li>minimizing environmental impacts,</li> <li>job creation,</li> </ul>	
<ul> <li>improvement of industrial working cor</li> <li>Combined RE &amp; EE initiatives may be quite targeted by a particular industry or industrial</li> </ul>	e different depending on which is



Conclusion		
✓ Barrier & Obstacles	Asia-Pacific Economic Cooperation	
Obstacles encountered in industry are very n the introduction of new and unconventional t		
No particular obstacles unique for the introdu industry other than those applicable to speci	uction of RE & EE initiatives in	
Individual industries, technologies and locati characteristics and obstacles that may be of situation can be quite minor in another.	ons have their own	
Obstacles that can be addressed by Governme Obstacles that can	nents include:	
<ul> <li>lack of information about how the introduction industries,</li> </ul>	of RE & EE can benefit specific	
<ul> <li>insufficient capacity to implement the technolo manner,</li> </ul>	ogy in a timely and cost effective	
<ul> <li>high project establishment costs,</li> </ul>		
<ul> <li>reduced economic viability due to competition</li> </ul>	with subsided fossil fuels,	
<ul> <li>difficulties in accessing capital,</li> </ul>		
<ul> <li>institutional obstacles such as:</li> <li>ack, or inadequacy, of appropriate incentive</li> </ul>	was	
<ul> <li>ineffective regulatory regimes that are not</li> <li>inadequate administrative structures and p</li> </ul>	supportive,	
These issues have been addressed successful economies and industries and are diminishin gained, capacity built and costs reduced.		

