



The 49<sup>th</sup> Meeting of APEC Expert Group on New and Renewable Energy Technologies (EGNRET49)  
Tokyo, Japan

# Tracking APEC's Renewable Energy Doubling Goal

James Kendall  
Acting Chair, EGEDA  
Vice President, APERC



# Outline

- APEC's renewable energy (RE) doubling goal
- Considerations in tracking progress
- APEC renewable energy data collection
- Renewable energy in primary energy supply
- Renewable energy in final energy consumption
- Recommendation for tracking the renewable energy doubling goal

# APEC's renewable energy doubling goal

- EMM 11 2014: “Doubling the **share** of renewables in the APEC energy mix, including in power generation, from 2010 levels by 2030.”
- Energy ministers instructed the EWG through the EGNRET to develop the road map
- Leaders' meeting 2015: reaffirmed the doubling goal

# APEC renewable energy data collection

- APERC collects annual data on all energy products from the 21 member economies including the following:
  - Hydroelectricity
  - Geothermal heat and electricity
  - Solar heat and electricity
  - Wind electricity
  - Biomass (fuelwood, wood wastes, agricultural waste, etc.)
  - Liquid biofuels
  - Biogases
  - Wastes

# Considerations in tracking progress

- In tracking progress, What data should be used? IEA or APEC data?
  - APERC energy outlook uses IEA data
  - In tracking progress in energy intensity reduction, APERC uses APEC data (final energy consumption without non-energy use divided by GDP @PPP)
  - Should APEC data be used in tracking RE share?
- What to measure? Share in ***total primary energy supply (TPES)*** or ***total final energy consumption (TFEC)***?
  - TPES can be calculated using three different methods resulting in different values
  - TFEC always has the same value for all the three methods



# Considerations in tracking progress

- Traditional biomass, exclude or include?
  - Three member economies are not able to report consumption of this energy source
  - It is possible that some member economies cannot disaggregate biomass into modern and traditional biomass
- Large hydro
  - Except for pumped-storage hydro, UN IRES definition consider hydro regardless of size of the power plants as renewable energy
- Geothermal
  - UN IRES consider geothermal as renewable energy

# Renewable energy in primary energy supply

- ESTO prepares the energy balances using the ***physical energy content method***\*
  - In this method, the normal physical value of the primary energy form is used for the production figure
  - For hydro, solar PV and wind, the primary energy form is the electricity output
  - For electricity generation from primary heat such as: nuclear, geothermal and concentrating solar; heat is the primary energy form
  - Since it is difficult to measure the heat flow to the turbines, UN IRES recommends that an estimate of heat input be used based on an efficiency of ***33% for nuclear and concentrating solar***, and ***10% for geothermal***
- The other methods are ***substitution method*** and ***direct equivalent method***

\* UNSD. 2016. International Recommendations on Energy Statistics. New York.

# Primary RE supply calculated using three methods

Unit: ktoe

	Physical Energy Content Method		Direct Equivalent Method		Substitution Method	
	2010	2015	2010	2015	2010	2015
Coal	2,771,873	2,895,653	2,771,873	2,895,653	2,771,873	2,895,653
Oil	2,176,940	2,298,595	2,176,940	2,298,595	2,176,940	2,298,595
Gas	1,491,403	1,684,013	1,491,403	1,684,013	1,491,403	1,684,013
Nuclear	433,564	395,217	<b>143,076</b>	<b>130,422</b>	433,564	395,217
Other non-renewables	25,927	32,977	25,927	32,977	25,927	32,977
<b>Renewable Energy</b>	<b>467,633</b>	<b>578,697</b>	<b>435,429</b>	<b>544,308</b>	<b>785,548</b>	<b>1,034,289</b>
Biomass	211,317	229,546	211,317	229,546	211,317	229,546
Hydro	153,422	190,692	153,422	190,692	<b>460,265</b>	<b>572,075</b>
Geothermal	35,782	38,210	<b>3,578</b>	<b>3,821</b>	<b>10,843</b>	<b>11,579</b>
Solar	3,754	11,853	3,754	11,853	<b>11,376</b>	<b>35,918</b>
Wind	13,983	37,814	13,983	37,814	<b>42,372</b>	<b>114,589</b>
Others	49,376	70,581	49,376	70,581	49,376	70,581
<b>Total</b>	<b>7,367,341</b>	<b>7,885,152</b>	<b>7,044,649</b>	<b>7,585,967</b>	<b>7,685,256</b>	<b>8,340,744</b>
<b>Renewable Energy Share</b>	<b>6.3%</b>	<b>7.3%</b>	<b>6.2%</b>	<b>7.2%</b>	<b>10.2%</b>	<b>12.4%</b>

Note: Thermal efficiency used in the substitution method is 33%. Traditional and modern biomass are included. Unreported biomass is excluded.

Source: APEC data.



# Renewable energy in final energy consumption

**Unit: ktoe**      **Including all biomass**

	2010	2015
<b>Non-renewables</b>	<b>3,979,635</b>	<b>4,282,516</b>
Coal	733,659	774,478
Oil	1,596,319	1,719,021
Gas	629,517	692,095
Electricity	830,359	897,620
Heat	186,542	195,744
Other non-renewables	3,239	3,558
<b>Renewable Energy</b>	<b>354,067</b>	<b>445,716</b>
Electricity and Heat	146,514	219,524
Biomass	176,789	183,649
Geothermal Heat	512	749
Solar Heat	2,871	3,372
Others	27,382	38,421
<b>Total</b>	<b>4,333,703</b>	<b>4,728,232</b>
<b>RE Share</b>	<b>8.2%</b>	<b>9.4%</b>

**Excluding traditional biomass**

	2010	2015
<b>Non-renewables</b>	<b>3,979,635</b>	<b>4,282,516</b>
Coal	733,659	774,478
Oil	1,596,319	1,719,021
Gas	629,517	692,095
Electricity	830,359	897,620
Heat	186,542	195,744
Other non-renewables	3,239	3,558
<b>Renewable Energy</b>	<b>292,145</b>	<b>380,235</b>
Electricity and Heat	146,514	219,524
Biomass	114,867	118,168
Geothermal Heat	512	749
Solar Heat	2,871	3,372
Others	27,382	38,421
<b>Total</b>	<b>4,271,780</b>	<b>4,662,751</b>
<b>RE Share</b>	<b>6.8%</b>	<b>8.2%</b>

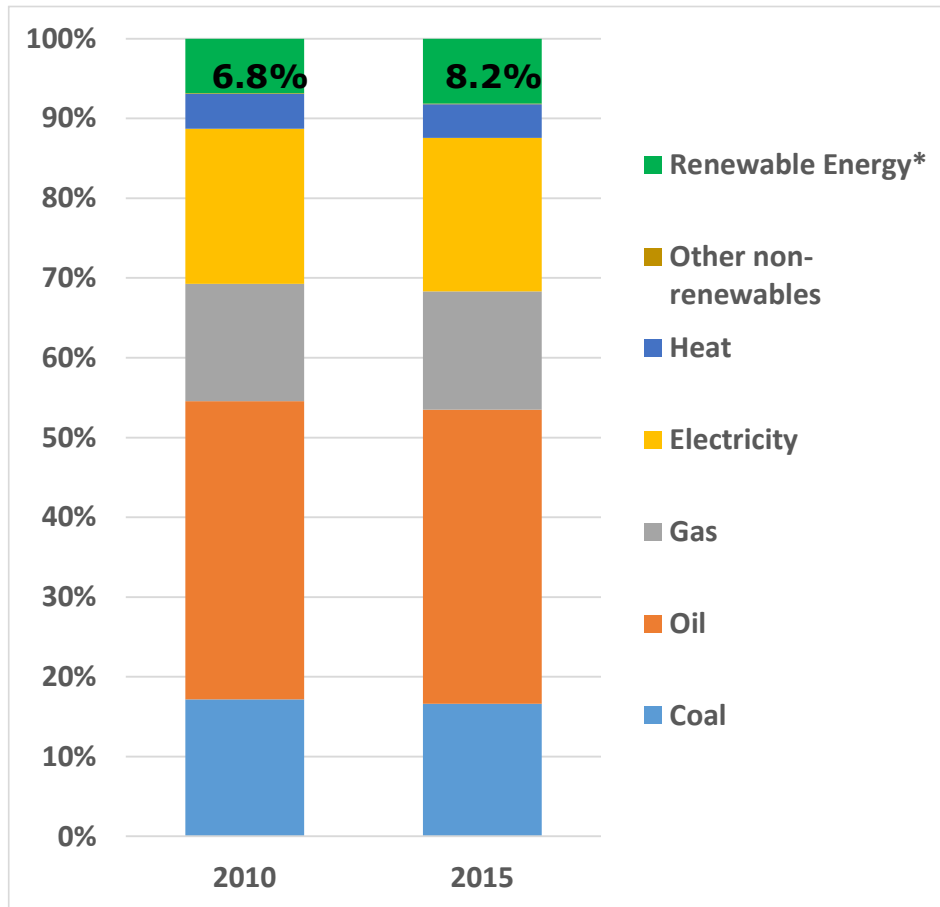
Note: Consumption of electricity and heat from renewables is calculated from the share of total electricity and heat production. Unreported biomass is excluded.

Source: APEC data.

# Findings

- The quality of data on traditional biomass is non-OECD APEC economies may not be reliable yet and three economies are not able to report consumption of this energy source
- There are different ways of calculating primary energy from non-combustible sources resulting in different values while final energy consumption are the same using the same methodologies
- It would therefore be reasonable to:
  - Exclude traditional biomass in the calculation of total consumption and renewable energy share
  - Track the renewable energy doubling goal as a share in final energy consumption

# Recommendation for tracking RE doubling



ESTO would like to recommend that the **share of renewable energy in total final energy consumption excluding traditional biomass** should be the indicator that should be used to track progress in the doubling goal

Note: Renewable energy includes electricity and heat generated from renewable energy sources.

Source: APEC data.



# Thank you for your kind attention

<http://aperc.ieej.or.jp/>