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3.1 APEC NRE questionnaire and tracking APEC's RE doubling goal

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**Asia-Pacific
Economic Cooperation**

Presentation outline

- APEC's RE doubling goal
- Current status of APEC RE statistics
- Revising the NRE questionnaire
 - The new questionnaire
 - New products
 - New flows
- Tracking APEC's RE doubling goal



APEC's RE doubling goal

APEC's RE doubling goal

EWG 47
(May 2014)

US proposed the APEC aspirational goal of doubling the share renewable energy by 2030 and noted that it interacted with APEC's aspirational energy intensity goal.

EGEDA and ESTO predecessor worked together on defining the doubling goal.

EMM 11
2014
(Sept 2014)

"Doubling the **share** of renewables in the APEC energy mix, including in power generation, from 2010 levels by 2030."

EWG 54
(Nov 2017)

To calculate the goal EWG decided that traditional biomass will not be counted; IRENA's definition of renewable energy is recommended; APEC data should be used for monitoring progress.



Current status of APEC's RE data

Current status of APEC's RE data (1)

until 2014	2015	from 2016
Fuel wood & woodwaste	Fuel wood & woodwaste	Fuel wood & woodwaste
	Wood and straw pellets/ briquettes	Wood and straw pellets/ briquettes
	Fuelwood	Fuelwood
	Woodwaste	Woodwaste
Bagasse	Bagasse	Bagasse
	Rice husks	Rice husks
	Straw	Straw
Charcoal	Charcoal	Charcoal
	Other vegetal and agricultural waste	Other vegetal and agricultural waste
Other biomass	Other primary solid biomass	Other primary solid biomass
Biogas	Biogas	Biogas
	Landfill gas	Landfill gas
	Sewage sludge gas	Sewage sludge gas
	Other biogases from anaerobic fermentation	Other biogases from anaerobic fermentation
	Biogases from thermal processes	Biogases from thermal processes
Industrial waste	Industrial waste	Industrial waste
		renewable
		non-renewable
Municipal solid waste	Municipal solid waste	Municipal solid waste
	renewable	renewable
	non-renewable	non-renewable
	Black liquor	Black liquor

Current status of APEC's RE data (2)

until 2014	2015	from 2016
Liquid biofuels	Liquid Biofuels	Liquid Biofuels
Biogasoline	Biogasoline	Biogasoline
Bioethanol	Biodiesels	Biodiesels
Bio-jet	Bio-jet kerosene	Bio-jet kerosene
biodiesels	Other liquid biofuels	Other liquid biofuels
Hydro	Hydro	Hydro
	- 1MW	- 1MW
	1-10 MW	1-10 MW
	10+ MW	10+ MW
	Pumped-hydro	Pumped-hydro
Geothermal	Geothermal	Geothermal
Electricity	Electricity	Electricity
Heat	Heat	Heat
Solar	Solar	Solar
Photovoltaic	Photovoltaic	Photovoltaic
Thermal	Thermal	Thermal
	Heat	Heat
Tide, wave & ocean	Tide, wave & ocean	Tide, wave & ocean
Wind	Wind	Wind
	On-shore	On-shore
	Off-shore	Off-shore

APEC's RE data compared with IRENA (1)

from 2016	IRENA
Fuel wood & woodwaste	Fuel wood & woodwaste
Wood and straw pellets/ briquettes	Biomass pellets and briquettes
Fuelwood	Fuel wood
Woodwaste	Wood waste
	Energy crops
Bagasse	Bagasse
Rice husks	Rice husks
Straw	Straw
Charcoal	Charcoal
Other vegetal and agricultural waste	Other vegetal and agricultural waste
Other primary solid biomass	Other primary solid biomass (animal waste)
Biogas	Biogas
Landfill gas	Landfill gas
Sewage sludge gas	Sewage sludge gas
Other biogases from anaerobic fermentation	Other biogases from anaerobic fermentation
Biogases from thermal processes	Biogases from thermal processes
Industrial waste	
renewable	
non-renewable	
Municipal solid waste	Municipal solid waste
renewable	renewable
non-renewable	non-renewable
Black liquor	Black liquor

APEC's RE data compared with IRENA (2)

from 2016	IRENA
Liquid Biofuels	Liquid Biofuels
Biogasoline	Conventional biogasoline
	Advanced biogasoline
Biodiesels	Conventional biodiesels
	Advanced biodiesel
Bio-jet kerosene	Bio-jet kerosene
Other liquid biofuels	Other liquid biofuels
Hydro	Hydro
- 1MW	- 1MW
1-10 MW	1-10 MW
10+ MW	10+ MW
Pumped-hydro	Mixed plants
	Pumped-hydro
Geothermal	Geothermal
Electricity	Electricity
Heat	Heat
Solar	Solar
Photovoltaic	Photovoltaic
Thermal	Thermal
Heat	Concentrated solar power
	Other solar energy
Tide, wave & ocean	Marine energy
Wind	Wind
On-shore	On-shore
Off-shore	Off-shore

Current status of APEC RE data

- Most economies have data on the biomass products that are in the RE questionnaire although several economies aggregated them into “other biomass”
- Three economies have no estimate of biomass use in the residential sector such as firewood and wood waste, etc.
- Data of RE installations that are not grid-connected might not be estimated by some economies
- APERC ESTO considers biomass consumption in the residential, commercial and agriculture are traditional use of biomass
- There are no data yet on non-traditional biomass consumption in the aforementioned sectors
- A workshop on renewable energy might be needed to further clarify the NRE products as well as suggest estimation methodologies to energy statisticians in APEC

An aerial composite image showing a city with a complex highway interchange, a large field of solar panels, and a volcanic eruption in the background. The scene is overlaid with a blue banner containing the title text.

Revising the APEC RE questionnaire

New products collected (1)

until 2014	2015	from 2016
Fuel wood & woodwaste	Fuel wood & woodwaste	Fuel wood & woodwaste
	Wood and straw pellets/ briquettes	Wood and straw pellets/ briquettes
	Fuelwood	Fuelwood
	Woodwaste	Woodwaste
Bagasse	Bagasse	Bagasse
	Rice husks	Rice husks
	Straw	Straw
Charcoal	Charcoal	Charcoal
	Other vegetal and agricultural waste	Other vegetal and agricultural waste
Other biomass	Other primary solid biomass	Other primary solid biomass
Biogas	Biogas	Biogas
	Landfill gas	Landfill gas
	Sewage sludge gas	Sewage sludge gas
	Other biogases from anaerobic fermentation	Other biogases from anaerobic fermentation
	Biogases from thermal processes	Biogases from thermal processes
Industrial waste	Industrial waste	Industrial waste
		renewable
		non-renewable
Municipal solid waste	Municipal solid waste	Municipal solid waste
	renewable	renewable
	non-renewable	non-renewable
	Black liquor	Black liquor

New products collected (2)

until 2014	2015	from 2016
Liquid biofuels	Liquid Biofuels	Liquid Biofuels
Biogasoline	Biogasoline	Biogasoline
Bioethanol	Biodiesels	Biodiesels
Bio-jet	Bio-jet kerosene	Bio-jet kerosene
biodiesels	Other liquid biofuels	Other liquid biofuels
Hydro	Hydro	Hydro
	- 1MW	- 1MW
	1-10 MW	1-10 MW
	10+ MW	10+ MW
	Pumped-hydro	Pumped-hydro
Geothermal	Geothermal	Geothermal
Electricity	Electricity	Electricity
Heat	Heat	Heat
Solar	Solar	Solar
Photovoltaic	Photovoltaic	Photovoltaic
Thermal	Thermal	Thermal
	Heat	Heat
Tide, wave & ocean	Tide, wave & ocean	Tide, wave & ocean
Wind	Wind	Wind
	On-shore	On-shore
	Off-shore	Off-shore

New flows

- “District cooling plants” was added to capture use of renewable energy in the production of chilled water
- Final consumption cells were unlocked to allow the reporting of direct consumption of liquid biofuels



Tracking APEC's RE doubling goal

Renewable doubling goal calculation

Question	Options	EWG54 decision
Renewables	Definition	IRENA recommended
Biomass	All v. modern	Traditional excluded
Hydro	All v. small	All, per IRENA
Geothermal	In v. out	In, per IRENA
Measurement point	Supply v. demand	Both
Data	IEA v. APEC	APEC

Source: Key conclusions of EWG54

Users of traditional biomass:

- ❖ **Residential.** Wood pellets in the residential sector are a modern source, but no data are available.
- ❖ **Commercial.** Much of the biomass use in this sector is for cooking.
- ❖ **Agricultural and nonspecified.** Much of this biomass is used for crop drying.

EGNRET50 recommendations

- Recommended focusing on demand side calculations to mirror the Sustainable Energy for All (SE4All) Initiative
- Recommended calculation of individual economy progress
- Did not object to adding commercial and agricultural biomass to traditional

Renewable energy supply and consumption

Primary Energy Supply

Unit: ktoe

	2010	2015
Non-renewables	6,897,371	7,306,455
Coal	2,771,874	2,895,653
Oil	2,176,950	2,298,595
Gas	1,489,055	1,684,013
Other non-renewables	459,492	428,194
Traditional Biomass	110,407	112,615
Modern Renewable Energy	357,224	466,082
Modern Biomass	100,910	116,932
Hydro	153,422	190,692
Geothermal	35,782	38,210
Solar	3,754	11,853
Wind	13,983	37,814
Others	49,374	70,581
Total	7,365,002	7,885,152
Modern RE Share	4.85%	5.91%

Final Energy Consumption

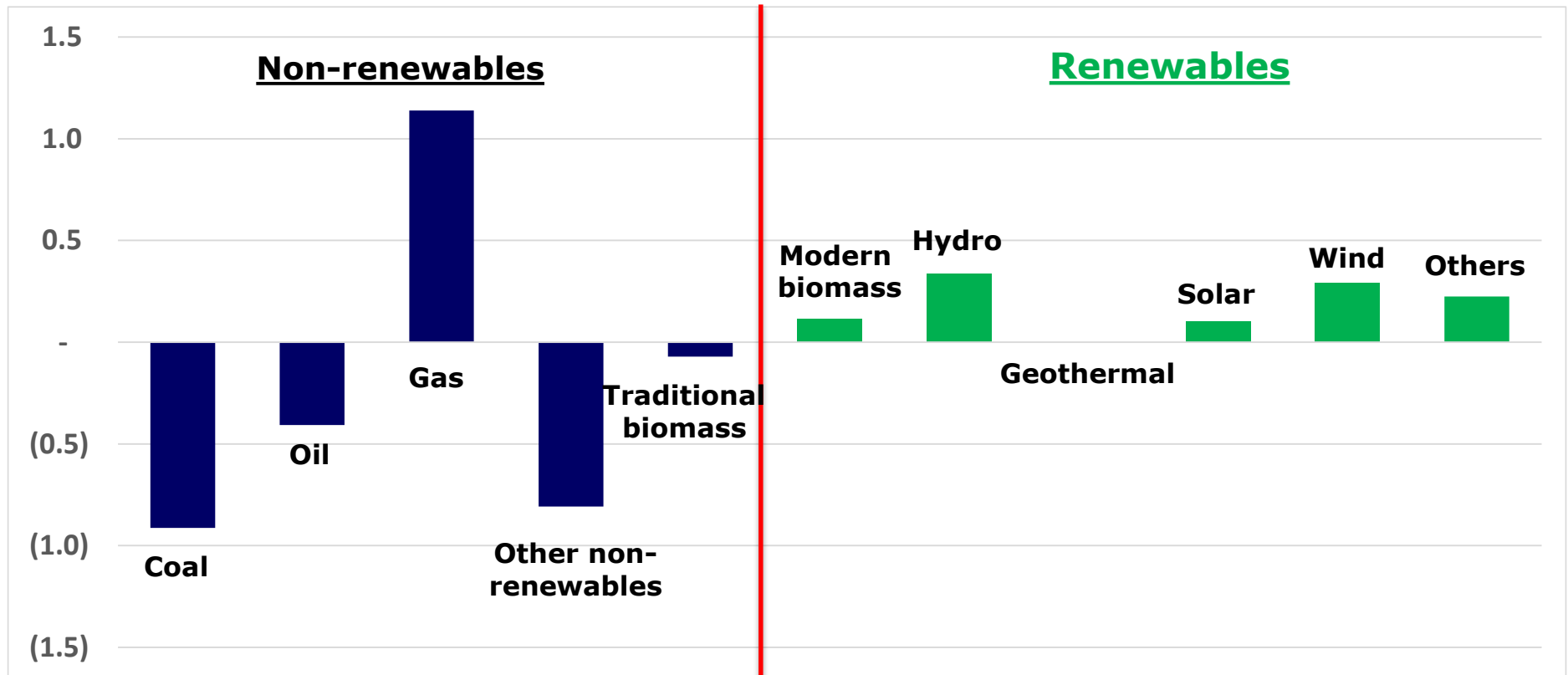
	2010	2015
Non-renewables	3,971,008	4,286,523
Coal	733,659	774,478
Oil	1,596,319	1,719,021
Gas	629,517	692,095
Electricity	821,403	901,046
Heat	186,871	196,325
Other non-renewables	3,239	3,558
Traditional Biomass	110,407	112,615
Modern Renewable Energy	254,871	329,095
Electricity	153,462	214,076
Heat	1,680	1,441
Modern Biomass	68,965	71,035
Others	30,764	42,543
Total	4,336,286	4,728,232
Modern RE Share	5.88%	6.96%

Note: Consumption of electricity and heat from renewables is calculated from the share of total electricity and heat production. China, Malaysia and Papua New Guinea have no data on traditional biomass.

Source: APEC data.

Coal and oil gas lost shares to gas and renewables

Percent Change in Fuels (primary energy supply), 2010-2015



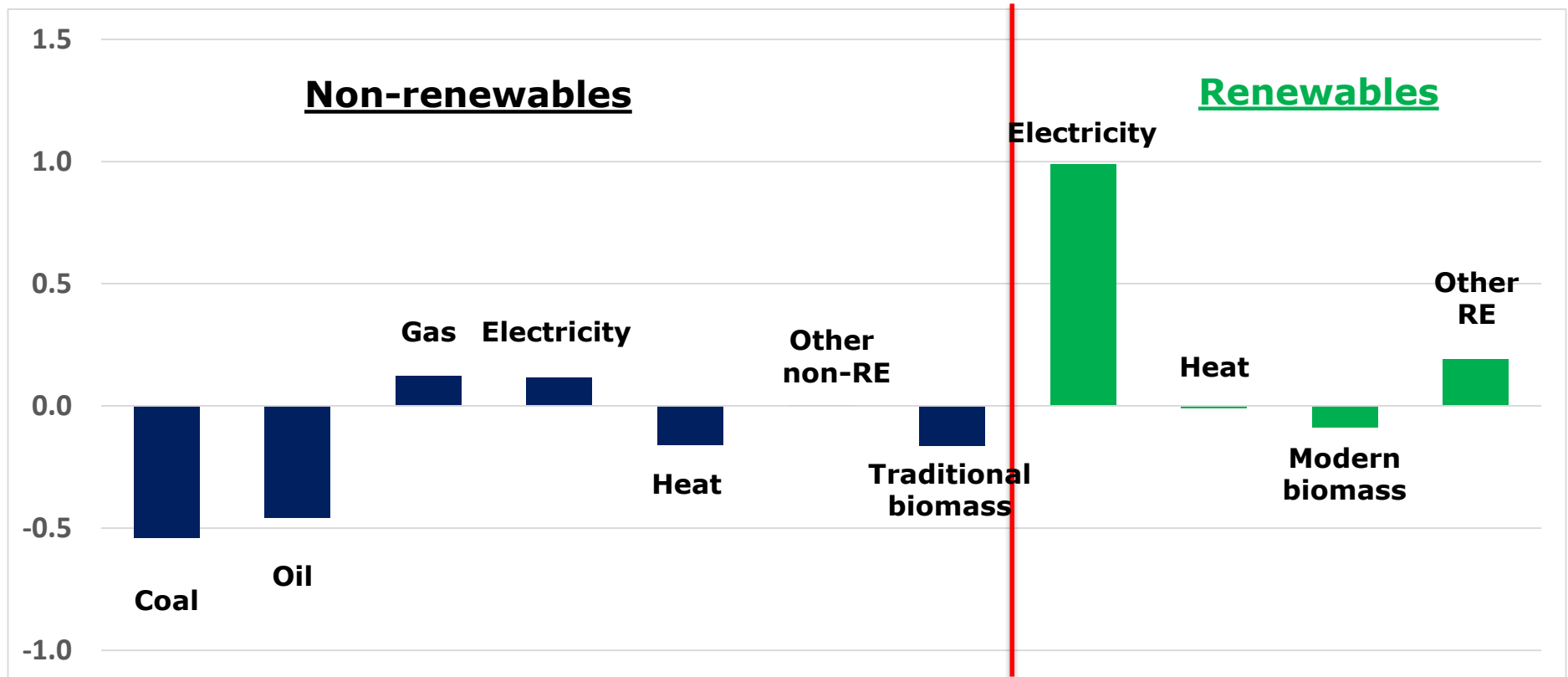
From 2010 to 2015, the renewable share increased only 1.06 percentage point, just 21.9% of the way to the goal

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

Source: APEC data.

Coal and oil lost share to renewables in electricity

Percent Change in Fuels (final energy consumption), 2010-2015

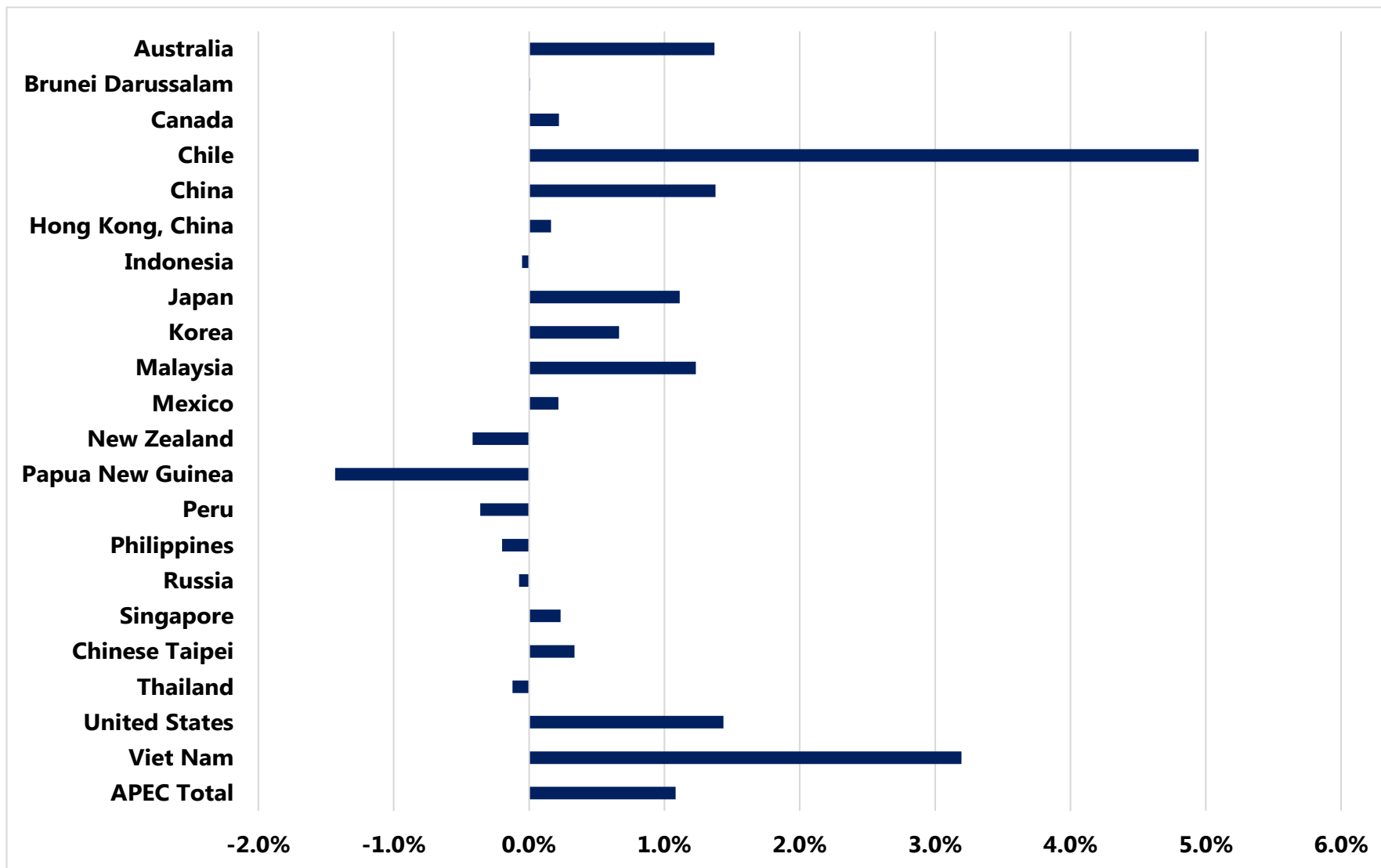


From 2010 to 2015, the renewable share increased only 1.08 percentage point, just 18.4% of the way to the goal

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

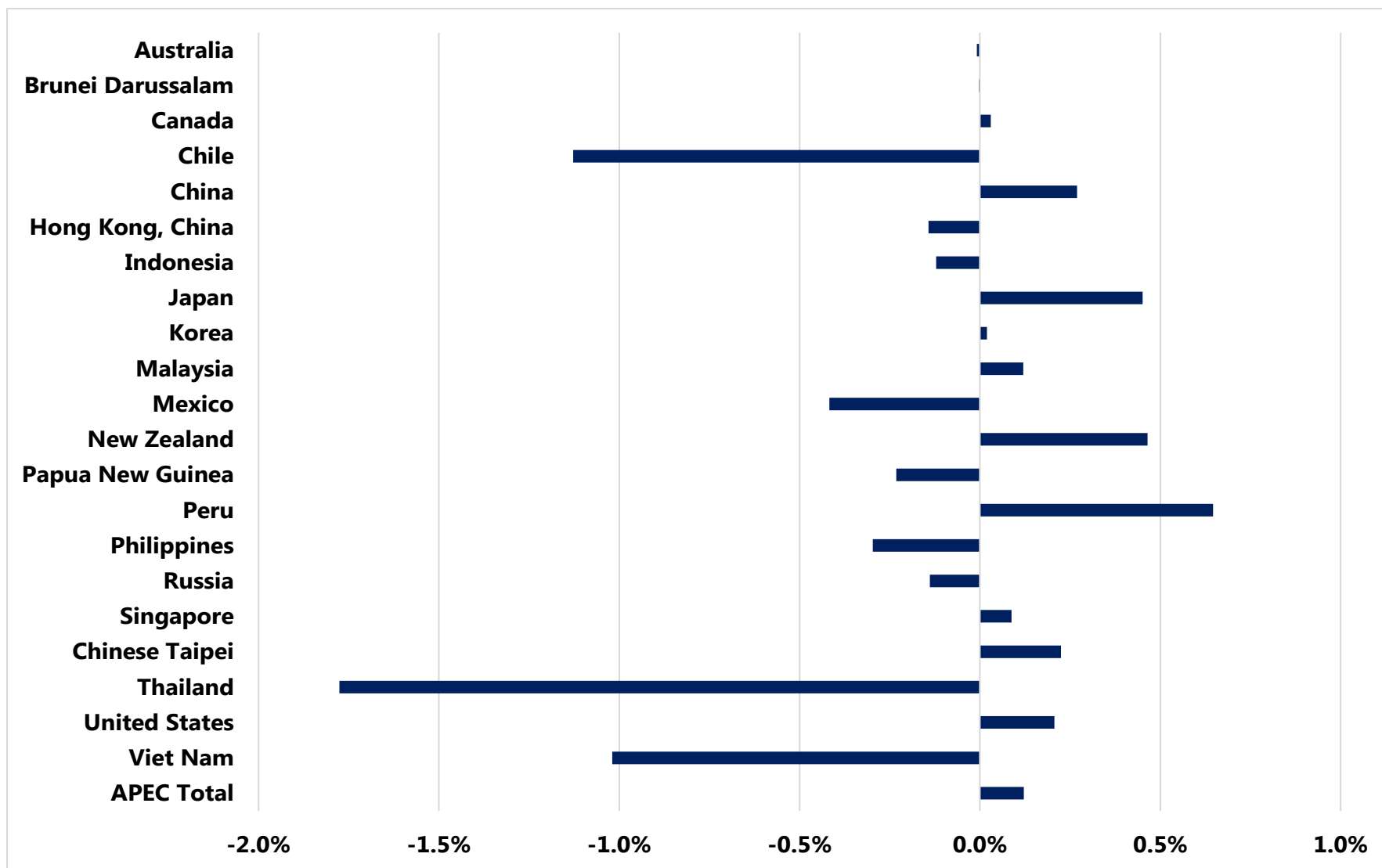
Source: APEC data.

Change in modern RE share per economy, 2010-2015



Source: APEC data.

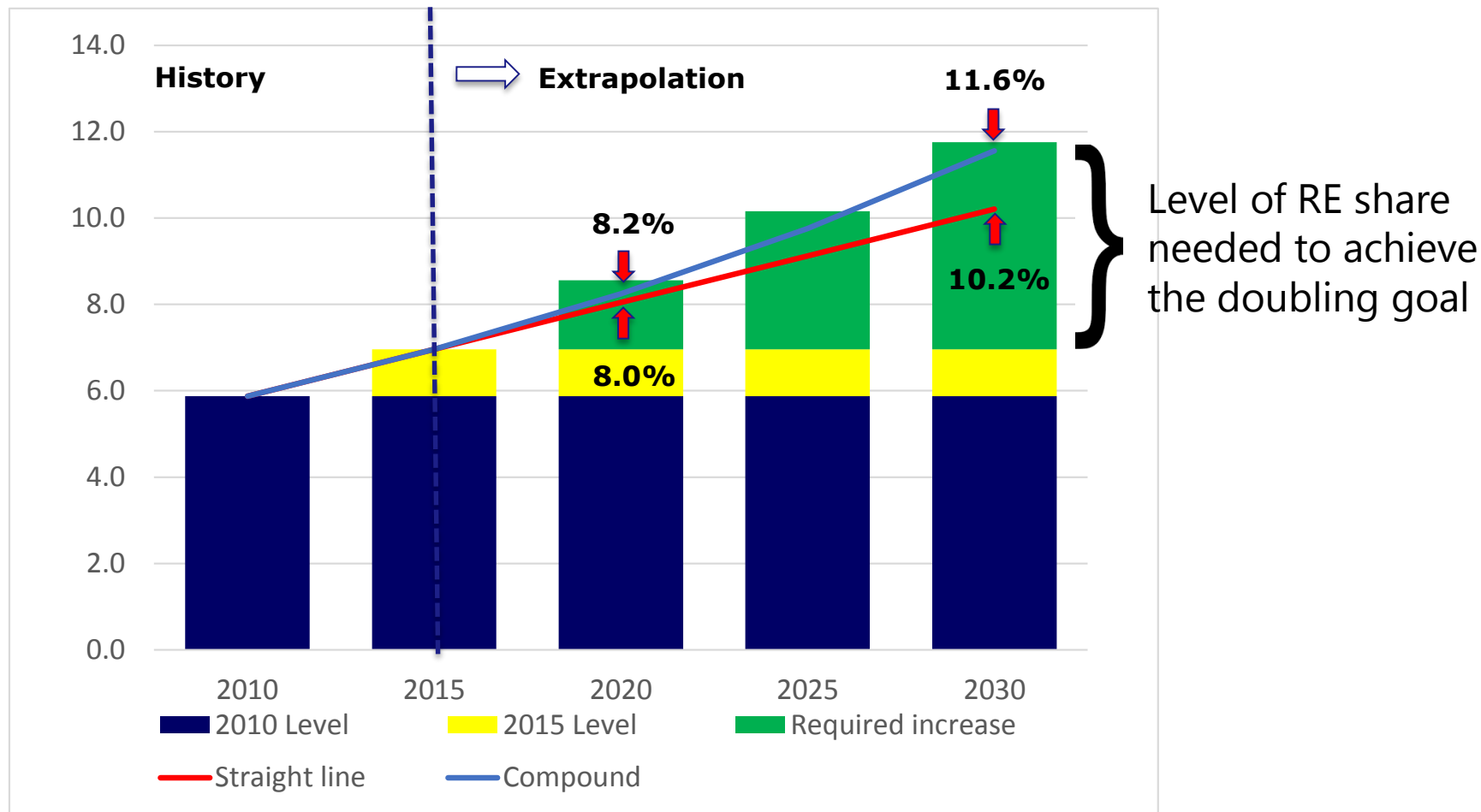
Change in modern RE share per economy, 2014-2015



Source: APEC data.

Are we on track? (straight line and compound growth)

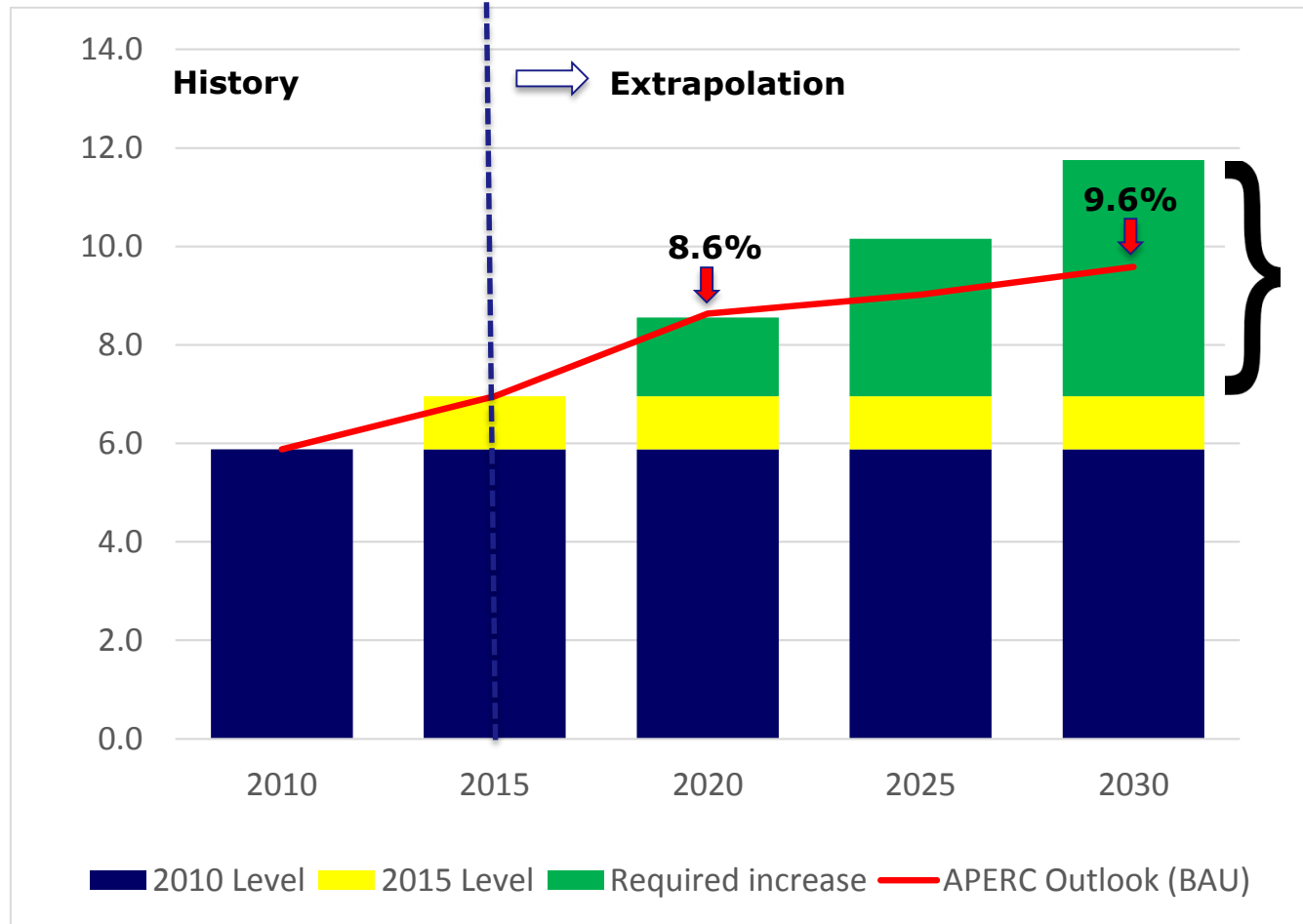
Renewable energy share



Source: APEC data.

Are we on track? (APEC outlook)

7th edition projections



Source: APEC statistics and APERC analysis.

Closing thoughts

- To more accurately track the APEC NRE doubling goal, we need more accurate statistics
- Having complete data on traditional biomass would result in better calculation of NRE share
- APEC NRE data are harmonized with those of IEA but still needs to be completely harmonized with those of IRENA
 - Should EGEDA start discussion on complete harmonization with IRENA?
 - A training workshop on NRE statistics in APEC would be necessary



Thank you for your kind attention

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