The 16th APEC Workshop on Energy Statistics Tokyo, Japan, 10-12 July 2018 **3.1 APEC NRE questionnaire and**

tracking APEC's RE doubling goal

Edito BARCELONA Senior Research Fellow, APERC ESTO





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 shou be used for monitoring progress.	definition of
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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
	Landfill gas	Landfill gas
Biogas	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 0



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



Revising the APEC RE questionnaire



The revised APEC NRE questionnaire

APEC-ASEAN joint format Supply (Table 1)	for annu	al new and	renew	able ene	ergy da	ıta																																	-
		nclwood & woodwaste						-				Biogas			-	Industrial was		Munici	pal solid waste				Liquid Bie	ofinale				Hydro			Cout	bermal	-	Solar				Wind	
		ood and		Bagasse 1	Rice husks	Straw	Charcoal ²	Other vegetal and	Other primary solid				Other	Biogases		Industri tai was	Non-			ion- Black	k liquor		- April 10		Other liquic			nyaro			CA DA			Juli		Tide, wave &			T
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Net calorific values (Table 4b)

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			Fuelwood &	& woodwaste						Other vegetal				Biogas				Industrial waste		Mu	unicipal solid wa	ste			I	iquid Biofuels		
		Total	Wood and straw pellets / briquettes	Fuelwood	Woodwaste	Bagasse	Rice husks	Straw	Charcoal ²	and	Other primary solid biomass	Total	Landfill gas	Sewage sludge gas	Other biogases from anaerobic fermentation	Biogases from thermal processes	Total	Renewable	Non- renewable	Total	Renewable	Non- renewable	Black liquor	Total	Biogasoline	Biodiesels	Bio-jet kerosene	Other liquid biofuels
		select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select unit	select uni
		A	В	С	D	E	F	G	Н	I	J	K	L	М	N	0	Q	R	S	Q	R	S	Т	U	V	W	Х	Y
Production	5																											
Imports	6									[[1	1
Exports	7																											
Average	8																											



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
ruel wood & woodwaste	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
	Landfill gas	Landfill gas
Biogas	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 0



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



APERC consideration of traditional biomass

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

Final Energy Consumption

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

	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.

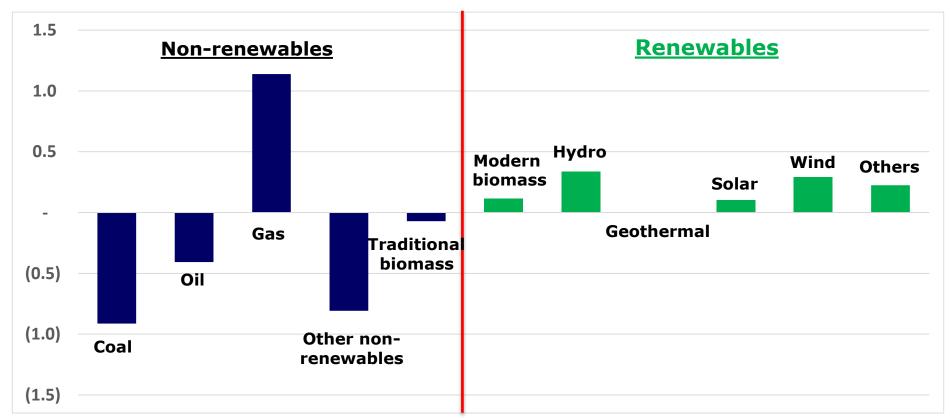
Source: APEC data.

Unit: ktoe



Coal and oil gas lost shares to gas and renewables

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



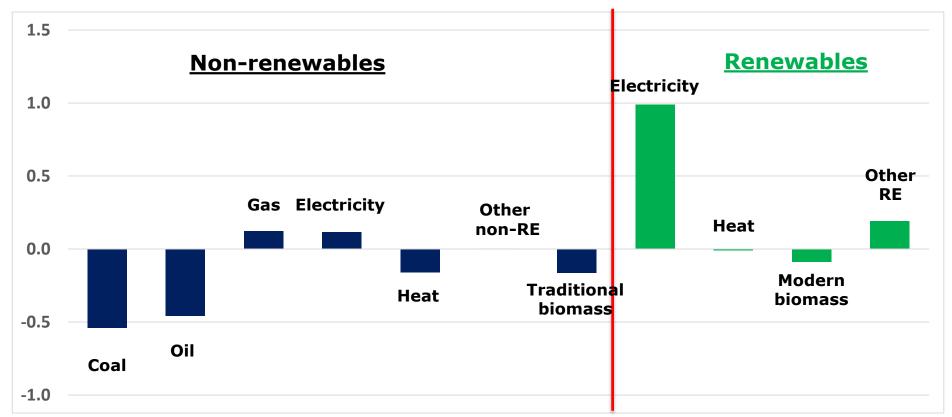
From 2010 to 2015, the renewable share increased only 1.06 percentage point, just 21.9% of the way to the goal

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



Coal and oil lost share to renewables in electricity

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

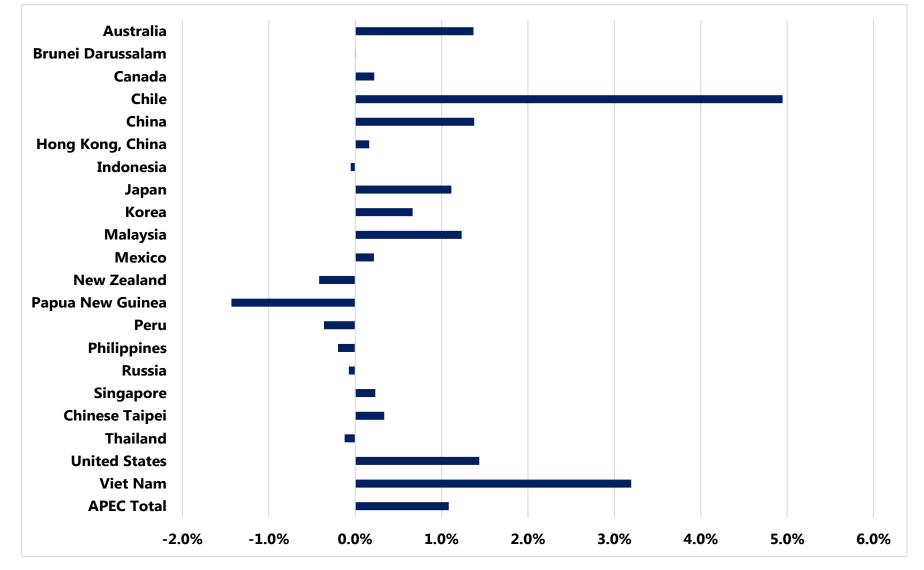


From 2010 to 2015, the renewable share increased only 1.08 percentage point, just 18.4% of the way to the goal

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

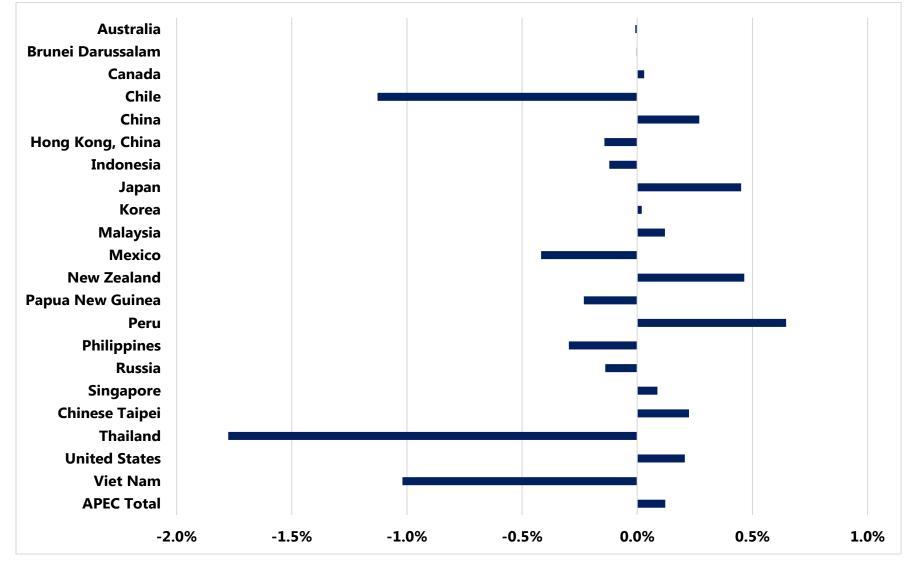


Change in modern RE share per economy, 2010-2015





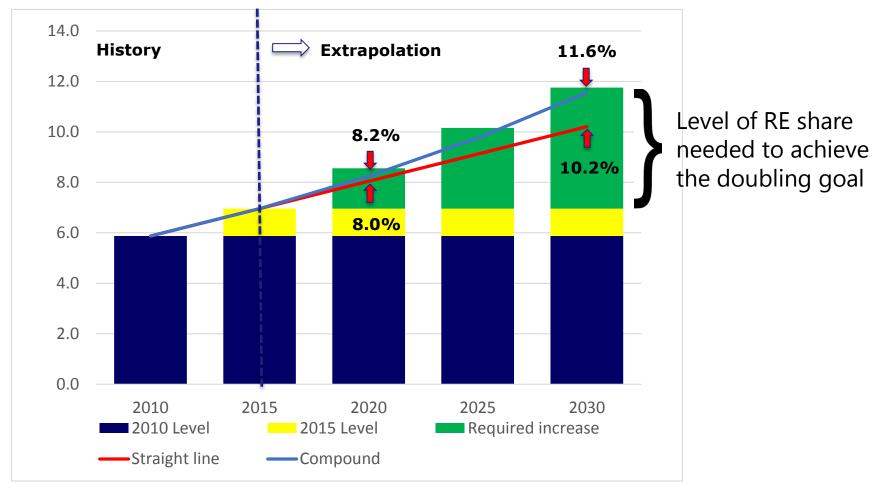
Change in modern RE share per economy, 2014-2015





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

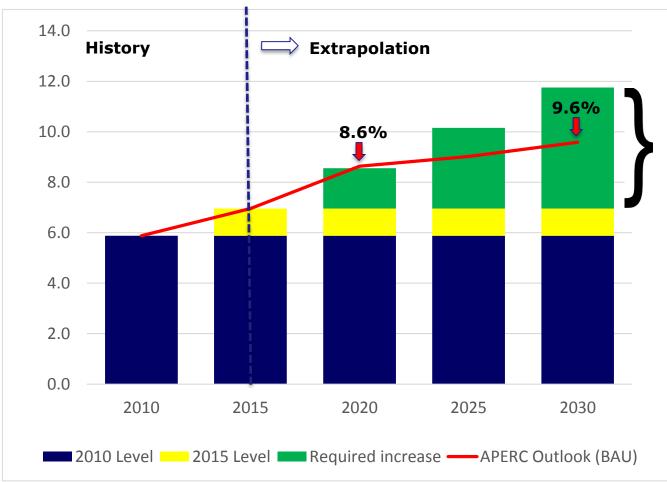
Renewable energy share





Are we on track? (APEC outlook)

7th edition projections



Level of RE share needed to achieve the doubling goal

Source: APEC statistics and APERC analysis.



- 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

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