

13.d.i Progress toward Energy Intensity Reduction Goal and Renewable Energy Doubling Goal

The 62nd Meeting of the APEC Energy Working Group (EWG)
19-21 October 2021 (EDT)

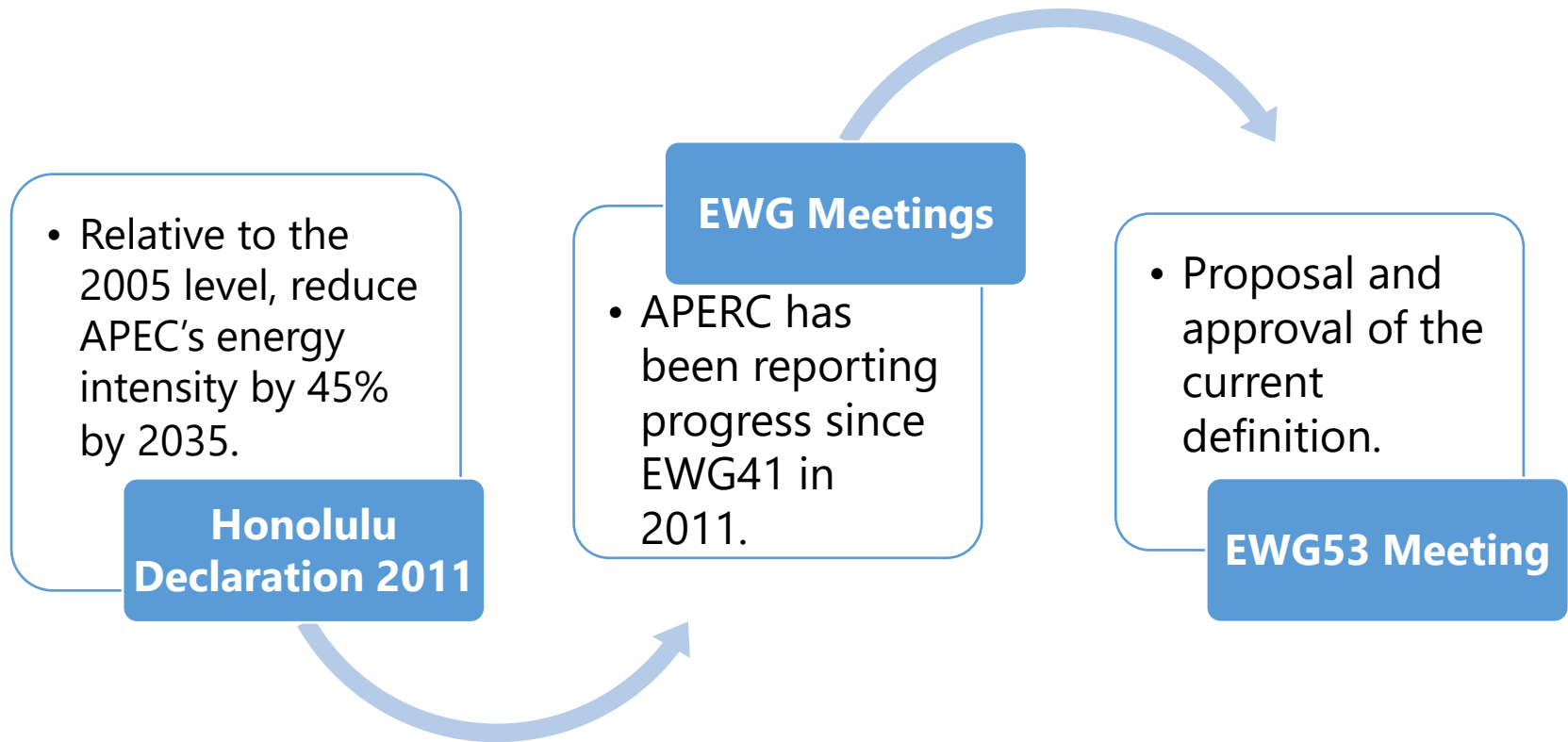
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Senior Vice President, APERC



Outline

- Progress toward APEC energy intensity goal
- Progress toward APEC renewable energy doubling goal
- Closing thoughts

APEC energy intensity indicator milestones



- ❑ Agreement was reached at EWG53 to analyse final energy consumption intensity (excluding non-energy), using APEC data.

Energy intensity declined significantly in 2019

Annual change in APEC final energy intensity, 2006-19

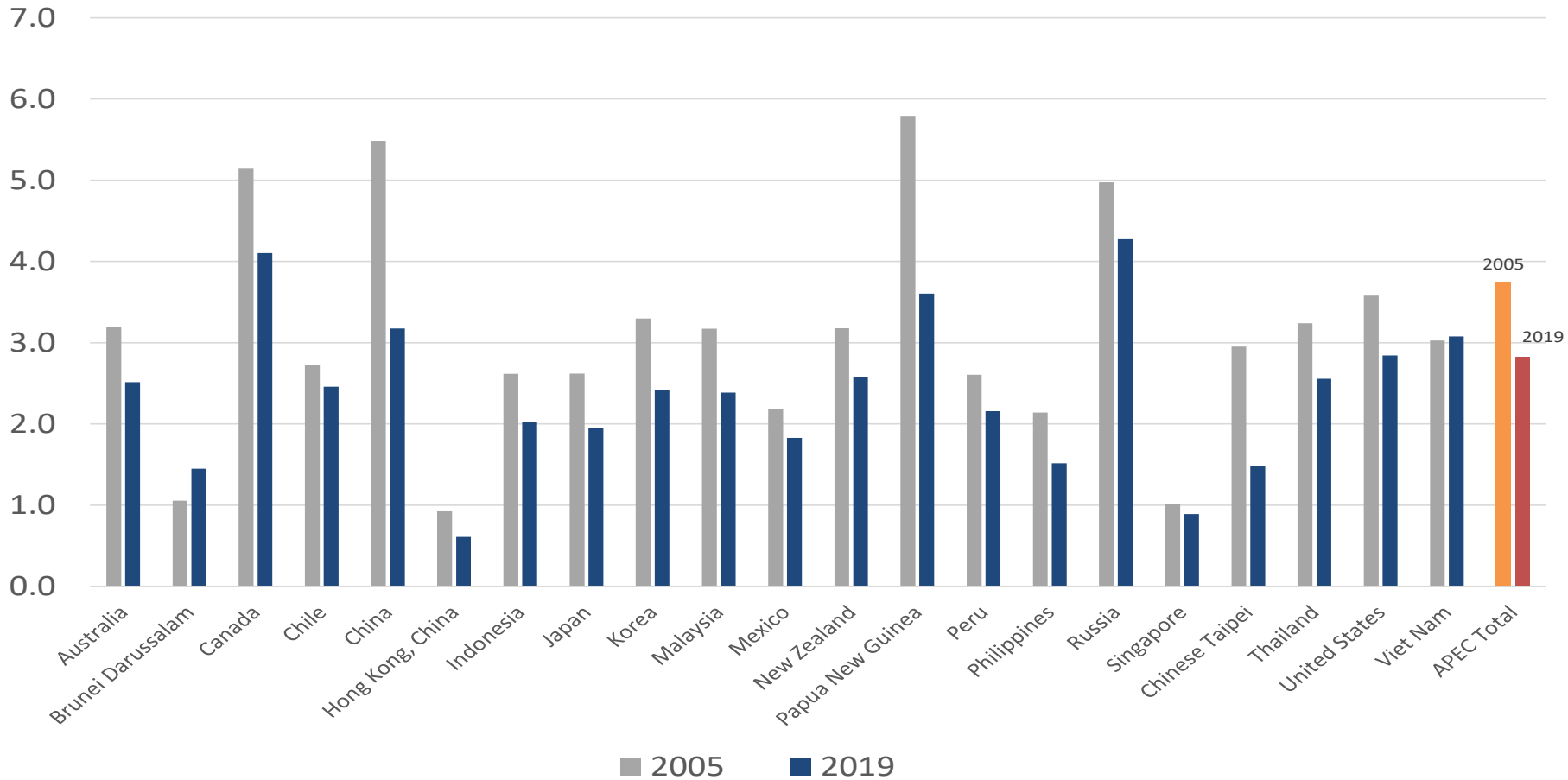
	06	07	08	09	10	11	12	13	14	15	16	17	18	19	Trend to 2035
Δ in final energy consumption	2.5%	3.5%	0.6%	-1.3%	5.6%	4.3%	1.8%	1.4%	1.3%	0.8%	0.3%	1.5%	3.4%	-0.7%	
Δ in GDP (PPP, constant 2018 USD)	5.4%	5.5%	2.9%	-0.2%	5.7%	4.2%	4.2%	3.8%	3.8%	3.7%	3.4%	4.1%	4.2%	3.3%	
Δ in final energy intensity	-2.7%	-1.9%	-2.2%	-1.1%	-0.1%	0.9%	-2.3%	-2.3%	-2.4%	-2.7%	-3.0%	-2.5%	--0.7%	-3.9%	47.6%

Sources: APEC statistics (EGEDA), WB, DGBAS (CT) and APERC analysis.

- ❑ *Final energy intensity has declined every year, except 2011.*
- ❑ *2019 has the biggest reduction since 2005.*
- ❑ *Final energy intensity fell 24.5% between 2005 and 2019.*
- ❑ *A linear extrapolation of the 2005-2019 trend implies the APEC final energy intensity goal of 45% will be met in 2034, but the actual declines are unlikely to be linear*

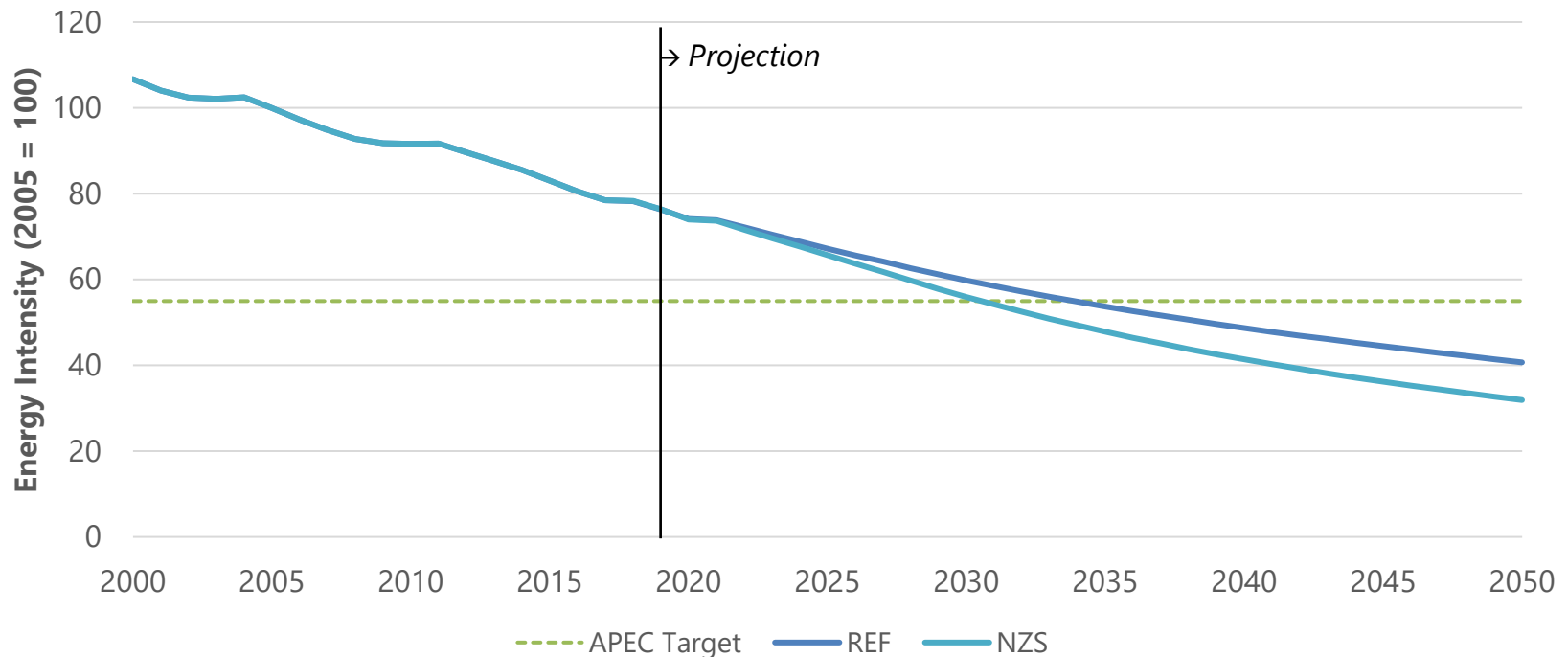
Energy intensity varies widely between economies

Energy intensity: Petajoules per billion 2018 USD (PPP GDP)



Sources: APEC statistics (EGESA, WB, DGBAS (CT) and APERC analysis.

Based on preliminary results, APEC is on track to achieve its energy intensity goal early



Source: APERC analysis

- In the 8th edition preliminary results, APEC is expected to achieve the energy intensity goal ahead of the 2035 target:
 - 2034 in the Reference scenario (REF)
 - 2030 in the Net Zero Scenario (NZS)

Renewable share doubling goal milestones

- 1. EWG 47 (May 2014)** - US proposed the APEC aspirational goal of doubling the share of renewable energy by 2030 and noted that it interacted with APEC's aspirational energy intensity goal.
- 2. EMM 11 (Sep 2014)** - "Doubling the share of renewables in the APEC energy mix, including in power generation, from 2010 levels by 2030."
- 3. EWG 54 (Nov 2017)** - 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; and the goal should be monitored on both the supply and demand side.

Renewable energy supply and consumption

Primary energy supply, PJ

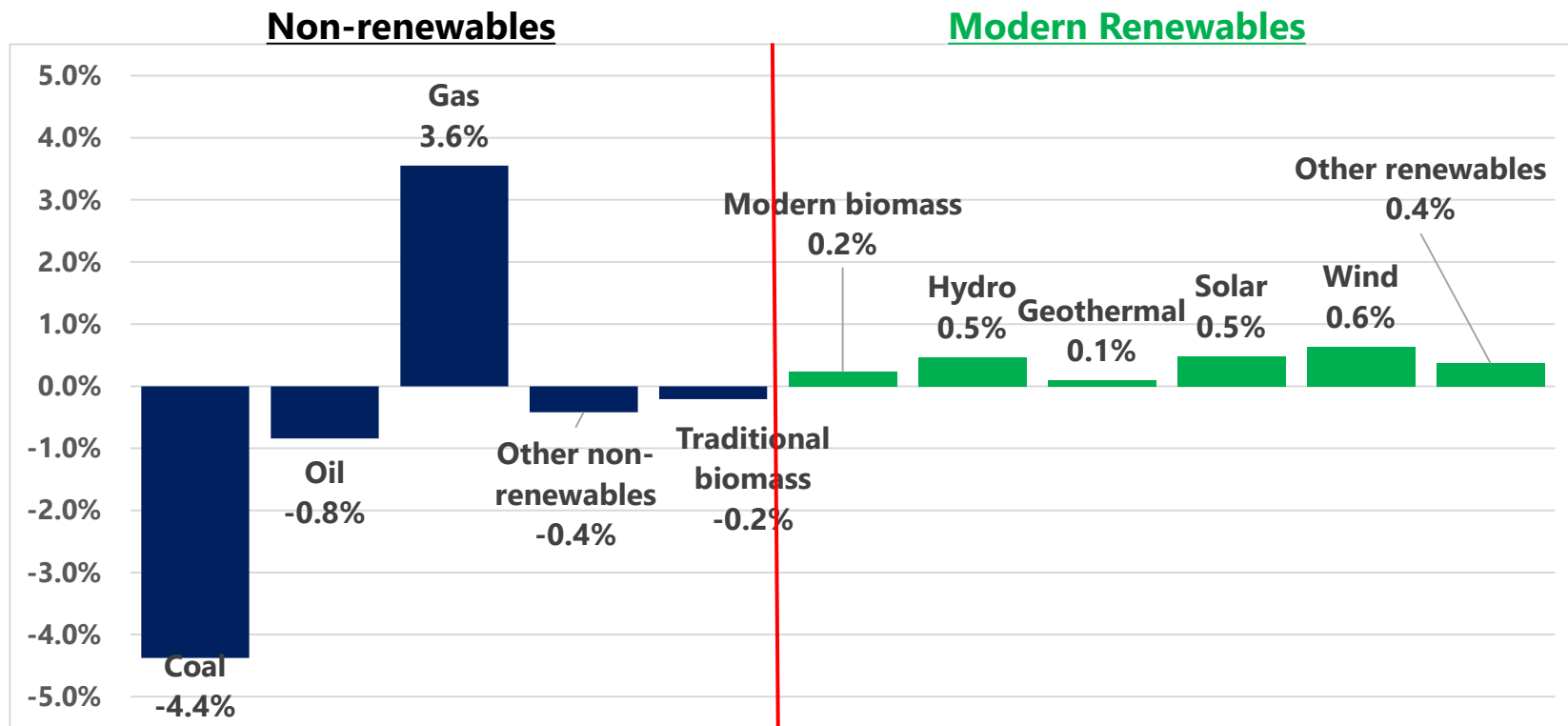
Final energy consumption, PJ

	2010	2019	% change		2010	2019	% change
Non-renewables	287,243	323,311	12.6%	Non-renewables	161,035	180,875	12.3%
Coal	116,937	119,228	2.0%	Coal	27,672	19,274	-30.3%
Oil	90,203	100,868	11.8%	Oil	64,677	74,756	15.6%
Gas	60,811	82,479	35.6%	Gas	26,020	35,885	37.9%
Other non-renewables	19,292	20,736	7.5%	Electricity	34,568	41,045	18.7%
Traditional biomass	3,256	3,015	-7.4%	Heat	7,884	9,573	21.4%
Modern renewable energy	14,692	24,963	69.9%	Other non-renewables	213	342	60.2%
Modern biomass	4,189	5,655	35.0%	Traditional biomass	3,256	3,015	-7.4%
Hydro	6,396	9,015	41.0%	Modern renewable energy	10,752	18,546	72.5%
Geothermal	1,473	2,021	37.2%	Electricity	6,225	12,220	96.3%
Solar	166	1,881	1030.2%	Heat	62	55	-10.9%
Wind	586	2,913	397.4%	Modern biomass	2,875	3,199	11.3%
Other renewables	1,883	3,477	84.7%	Other renewables	1,591	3,072	93.1%
Total	305,192	351,289	15.1%	Total	175,044	202,436	15.6%
Modern RE share	4.8%	7.1%	47.6%	Modern RE share	6.1%	9.2%	49.1%

Note: Consumption of electricity and heat from renewables is calculated from the share of total electricity and heat production.
 Data of China for 2018 are estimated based on preliminary information.
 Source: APEC data.

Coal and other energy lost shares to gas and renewables

Percent change in fuels in primary energy supply market share, 2010-2018



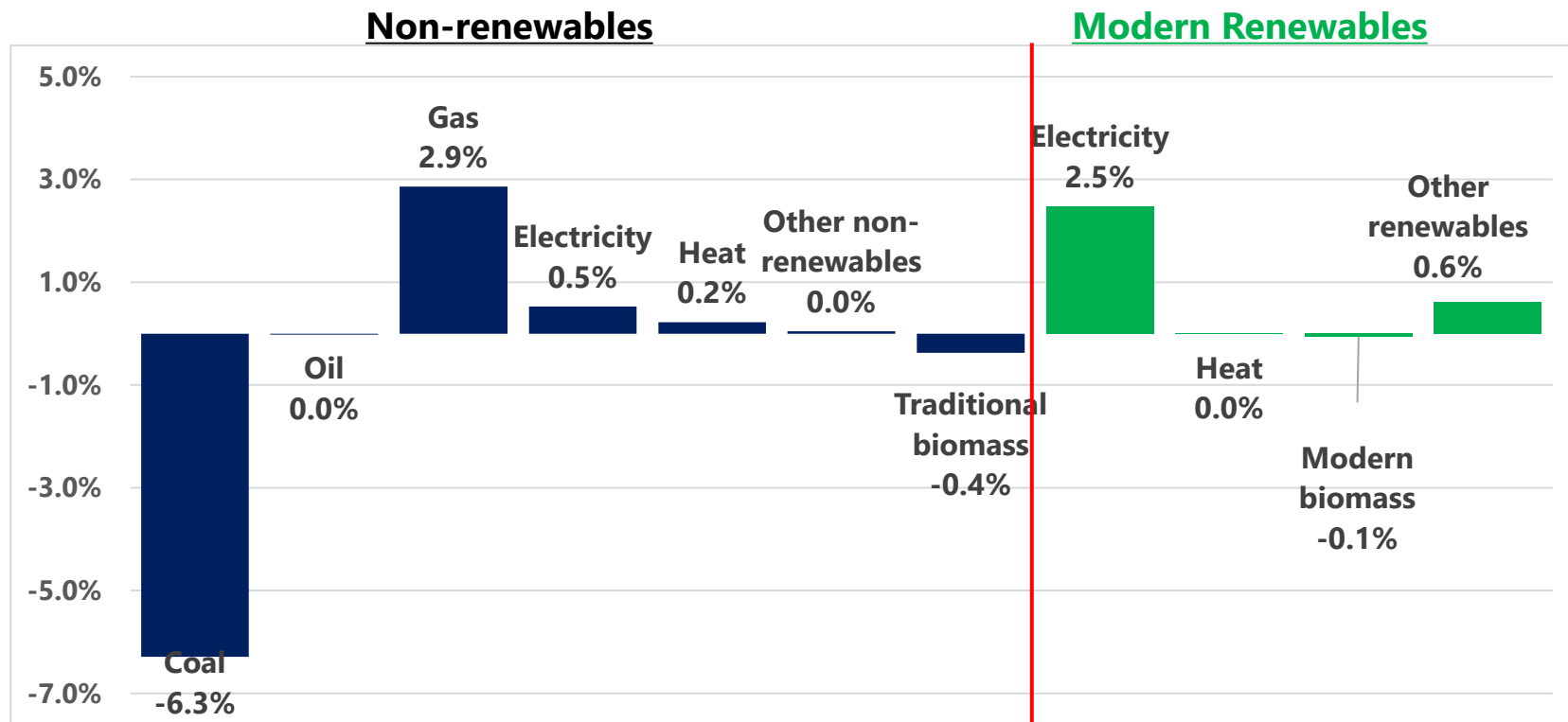
Note: Renewable energy includes electricity and heat generated from renewable energy sources

Source: APEC data

From 2010 to 2019, the renewable share increased 2.3 percentage points, 48% of the way to the goal.

Coal and oil lost shares to electricity from renewables

Percent change in fuels in final energy consumption market share, 2010-2018



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

Source: APEC data.

From 2010 to 2019, the renewable share increased 3.0 percentage points, 49% of the way to the goal.

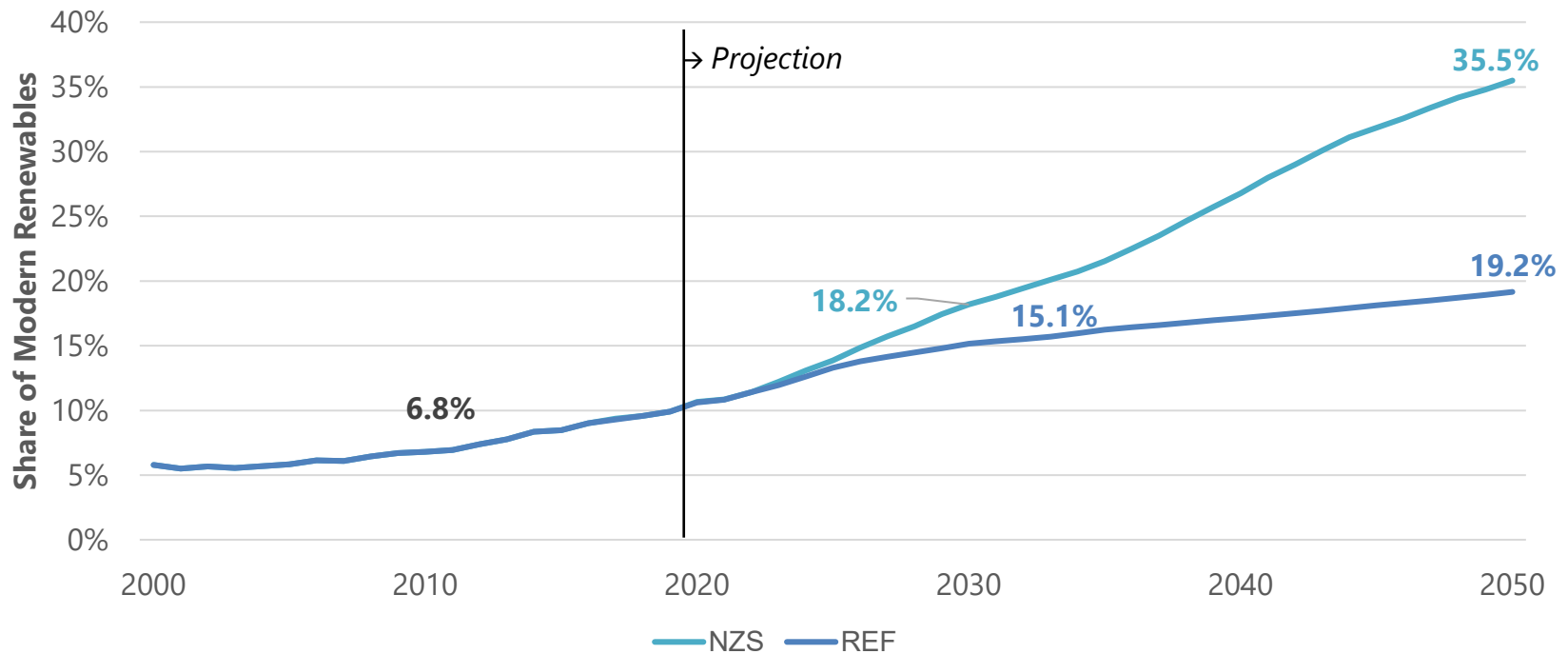
Renewable power generation

Electricity Generation, TWh

	2010	2019	% change
Non-renewables	11,342	13,368	17.9%
Coal	6,576	7,647	16.3%
Oil	326	182	-44.1%
Gas	2,712	3,705	36.6%
Nuclear	1,658	1,755	5.8%
Other non-renewables	69	78	12.9%
Modern renewable energy	2,097	4,024	91.9%
Modern biomass	67	164	145.6%
Hydro	1,780	2,511	41.1%
Geothermal	53	62	16.9%
Solar	9	456	4962.8%
Wind	163	799	391.0%
Other renewables	26	33	26.9%
Total	13,439	17,392	29.4%
Modern RE share	15.6%	23.1%	48.3%

In just 45% of the time to 2030, APEC had already increased power generation from renewables by 48%

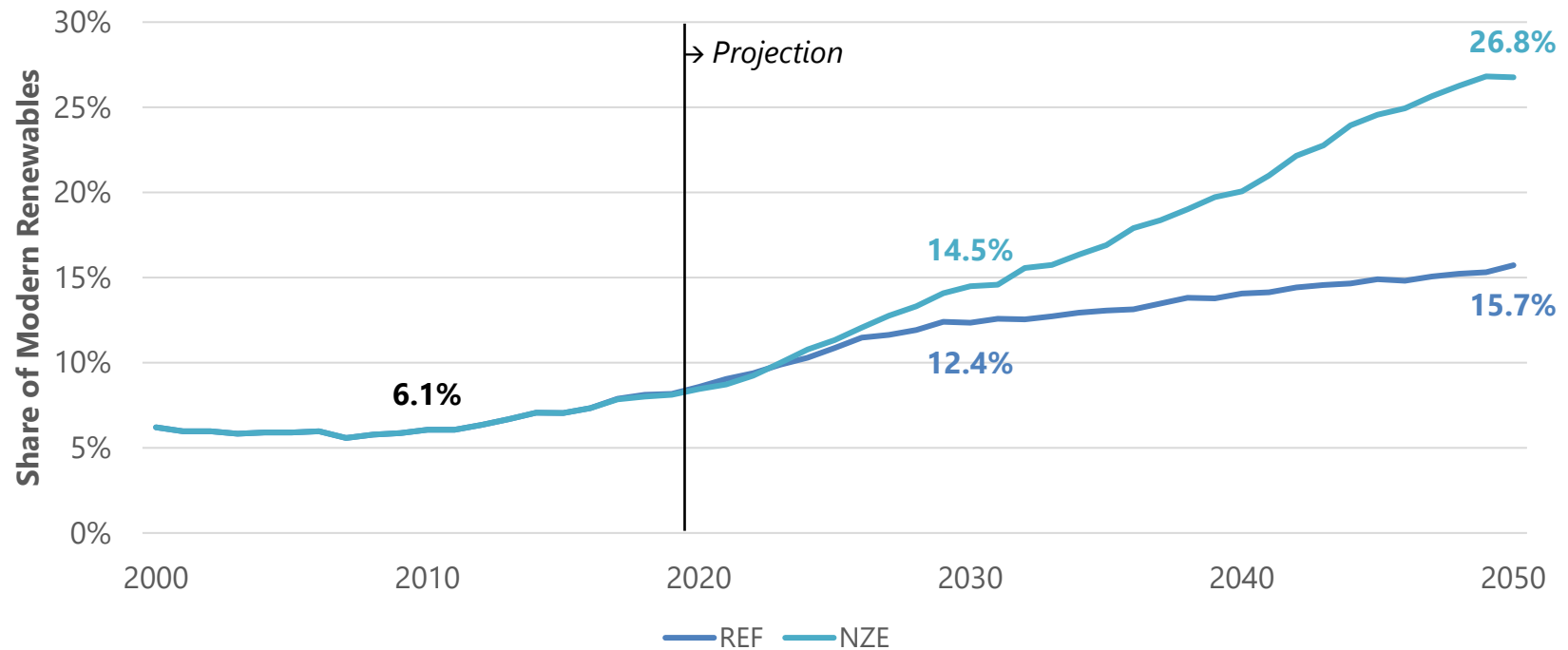
Energy consumption: APEC surpasses the modern renewables doubling goal



Source: APERC analysis

- Relative to the 2010 level, preliminary total final energy consumption results show APEC achieves its modern renewables share doubling goal before 2030 in both scenarios:
 - 15.1% in 2030 in REF
 - 18.2% in 2030 in NZS

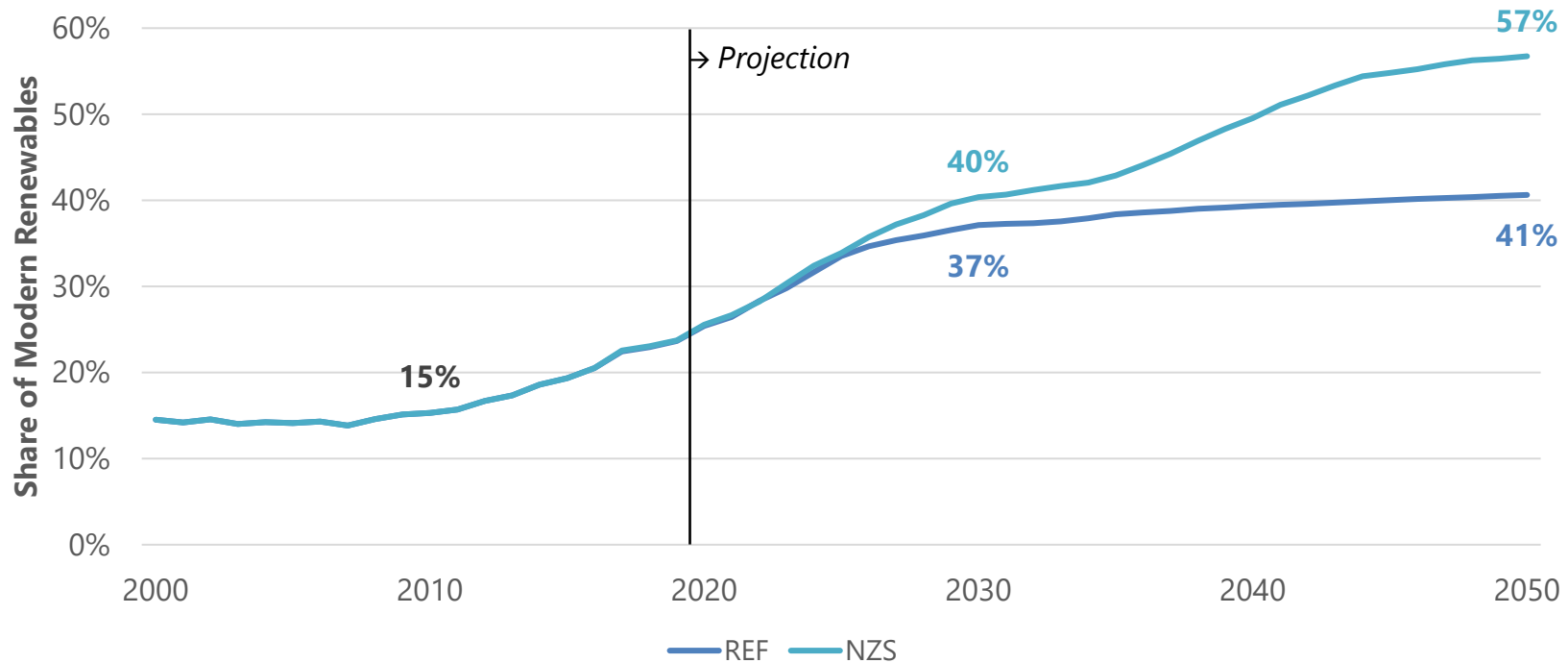
Primary energy supply: Modern renewables share more than doubles by 2030



Source: APERC analysis

- The share of modern renewables in APEC's primary energy supply to double before 2030:
 - 12.4% in 2030 in REF
 - 14.5% in 2030 in NZS

Power generation: Modern renewables share more than doubles by 2030



Source: APERC analysis

- Renewables are expected to grow to a 37% share in REF and 40% share in NZS by 2030.
- Solar, wind and hydro lead the growth in renewable power generation in both scenarios.

Closing thoughts

- APERC's preliminary model results imply that APEC will meet its energy intensity goal by 2034 in REF and 2030 in NZS.
- There is a wide variation in energy intensity levels and rates of change among the individual APERC economies.
- Improved understanding of the reasons for the differences will likely further reduce aggregate APEC energy intensity going forward.
- APERC's preliminary model results imply that APEC will meet its renewables doubling goal on all three measures: demand, supply, and power generation.
- The estimates of renewable energy shares will change slightly as the model results are finalized.



Thank you for your kind attention.

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