Asia-Pacific Economic Cooperation

APERC Asia Pacific Energy Research Centre

# 13.b. Progress toward Energy Intensity Reduction Goal and Renewable Energy Doubling Goal

The 61st Meeting of the APEC Energy Working Group (EWG)
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# Outline

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

# Progress toward APEC energy intensity goal

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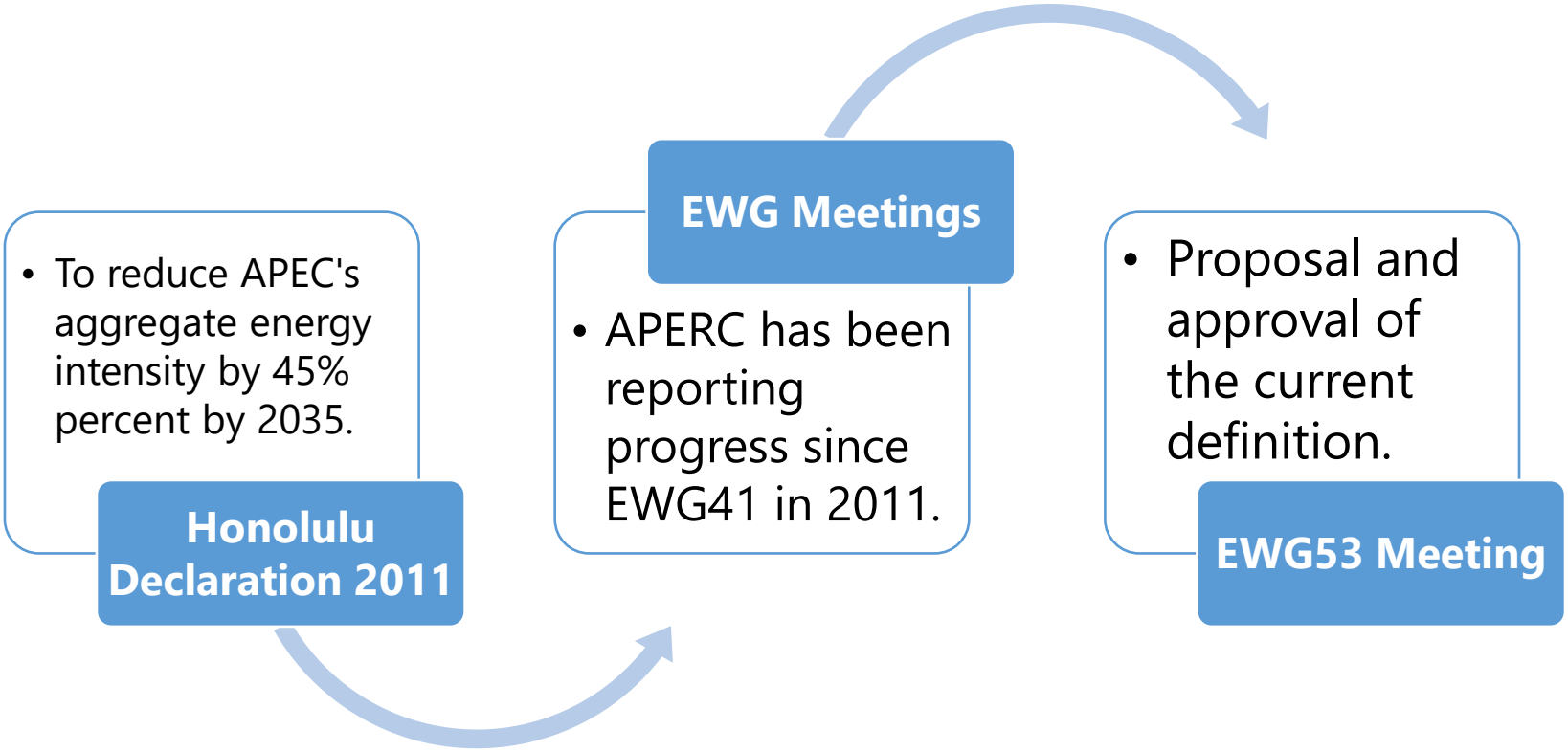
# APEC energy intensity indicator milestones




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

# Energy intensity declined in 2018, but at a slower rate

Annual change in APEC final energy intensity, 2006-18

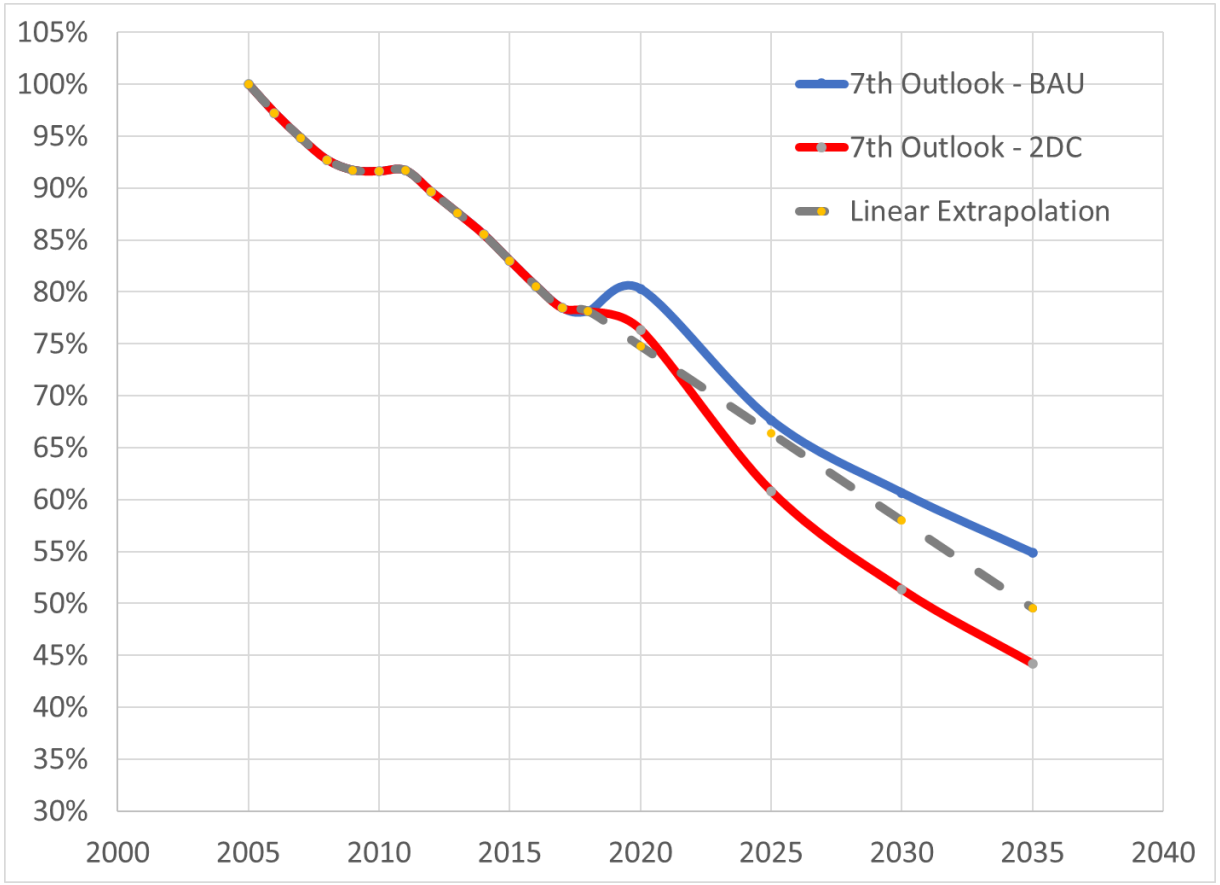
| | 2006 | 07 | 08 | 09 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | Trend to 2035 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Change in final energy consumption | 2.4% | 2.9% | 0.7% | -1.3% | 5.5% | 4.3% | 1.9% | 1.5% | 1.4% | 0.6% | 0.4% | 1.3% | 3.7% | |
| Change in GDP (PPP, constant 2017 US dollars) | 5.4% | 5.5% | 2.9% | -0.2% | 5.7% | 4.2% | 4.2% | 3.8% | 3.8% | 3.6% | 3.4% | 4.1% | 4.1% | |
| Change in final energy intensity | -2.8% | -2.5% | -2.2% | -1.1% | -0.1% | 0.09% | -2.3% | -2.3% | -2.4% | -2.9% | -2.9% | -2.6% | -0.4% | **-48.9%** |

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

- ***Final energy intensity has declines every year except 2011.***
- ***Final energy intensity fell 21.8% between 2005 and 2018. The 2018 decline was less than normal.***
- ***A linear extrapolation of the 2005-2018 trend implies the APEC final energy intensity goal of 45% will be met in 2032, but the actual declines are unlikely to be linear***

# APEC energy intensity: three projections

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

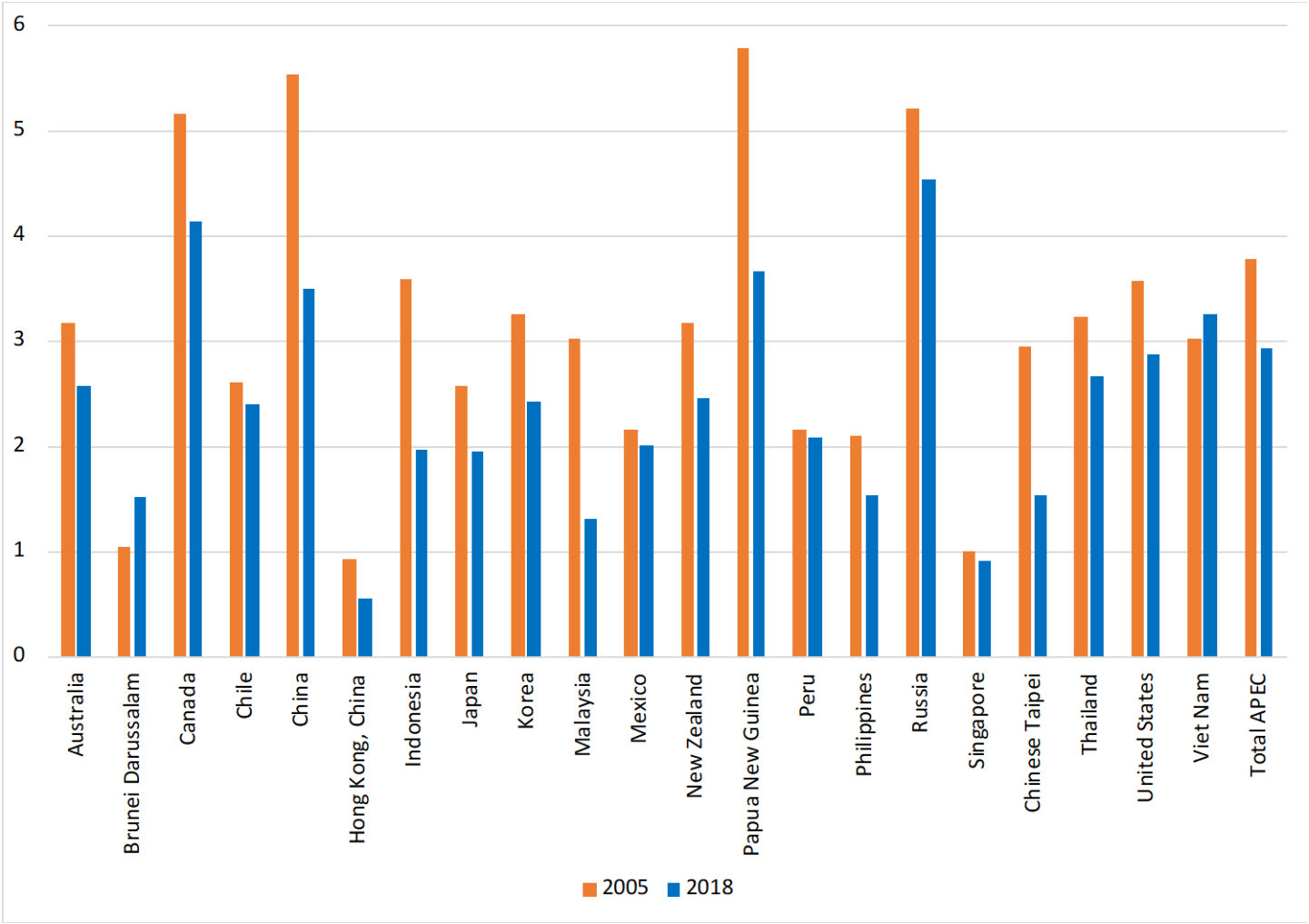



- *Actual energy intensity unlikely to follow linear extrapolation*
- *8th Outlook will project energy intensity for two scenarios*

Source: APEC Data; 7th APERC Demand and Supply Outlook

# Energy intensity varies widely between economies

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




Sources: APEC Data

# Progress toward APEC renewable energy doubling goal

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# Renewable share doubling goal milestones

1. **EWG 47 (May 2014)** – U.S. 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

| | 2010 | 2018 | % change |
|---|---|---|---|
| **Non-renewables** | **287,644** | **318,688** | **10.8%** |
| Coal | 116,766 | 118,720 | 1.7% |
| Oil | 90,598 | 100,467 | 10.9% |
| Gas | 61,370 | 79,430 | 29.4% |
| Other non-renewables | 18,909 | 20,072 | 6.1% |
| **Traditional biomass** | **3,551** | **3,006** | **-15.4%** |
| **Modern renewable energy** | **15,010** | **23,839** | **58.8%** |
| Modern biomass | 4,491 | 5,920 | 31.8% |
| Hydro | 6,396 | 8,896 | 39.1% |
| Geothermal | 1,486 | 1,753 | 17.9% |
| Solar | 157 | 1,494 | 852.7% |
| Wind | 586 | 2,612 | 346.0% |
| Other renewables | 1,893 | 3,164 | 67.1% |
| **Total** | **306,205** | **345,532** | **12.8%** |
| **Modern RE share** | **4.9%** | **6.9%** | **40.7%** |

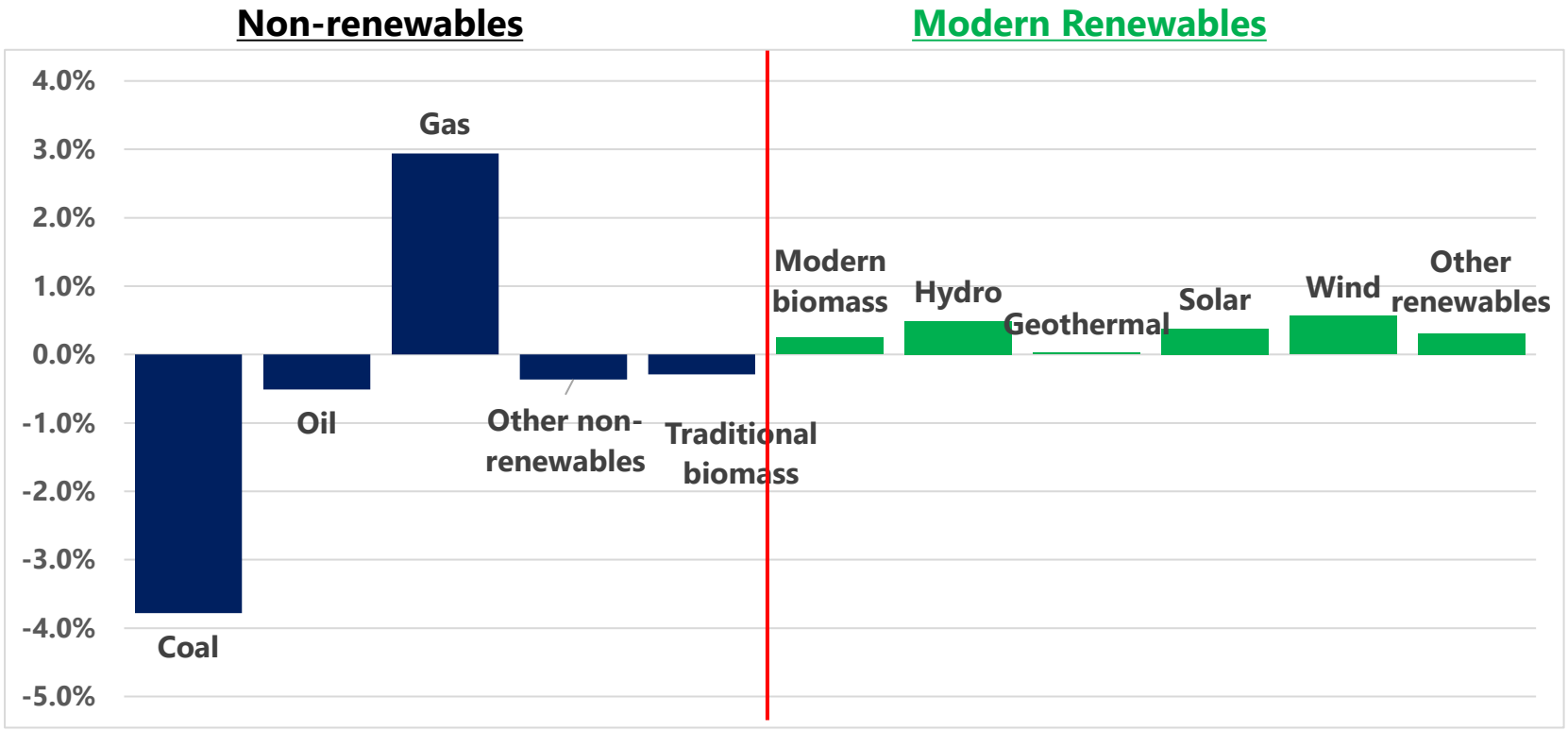
Final energy consumption, PJ

| | 2010 | 2018 | % change |
|---|---|---|---|
| **Non-renewables** | **164,191** | **186,216** | **13.4%** |
| Coal | 30,210 | 27,720 | -8.2% |
| Oil | 65,029 | 72,879 | 12.1% |
| Gas | 26,223 | 34,900 | 33.1% |
| Electricity | 34,633 | 40,936 | 18.2% |
| Heat | 7,887 | 9,486 | 20.3% |
| Other non-renewables | 208 | 296 | 41.8% |
| **Traditional biomass** | **3,551** | **3,006** | **-15.4%** |
| **Modern renewable energy** | **10,762** | **17,891** | **66.3%** |
| Electricity | 6,250 | 11,611 | 85.8% |
| Heat | 61 | 116 | 89.8% |
| Modern biomass | 2,863 | 3,268 | 14.2% |
| Other renewables | 1,588 | 2,896 | 82.4% |
| **Total** | **178,504** | **207,113** | **16.0%** |
| **Modern RE share** | **6.0%** | **8.6%** | **43.3%** |

*Note: Consumption of electricity and heat from renewables is calculated from the share of total electricity and heat production.*
*Source: APEC data.*

# *Primary Energy Supply:*
# Gas and Renewables took share from Coal and Oil

Percentage point changes in market shares, 2018 vs. 2010



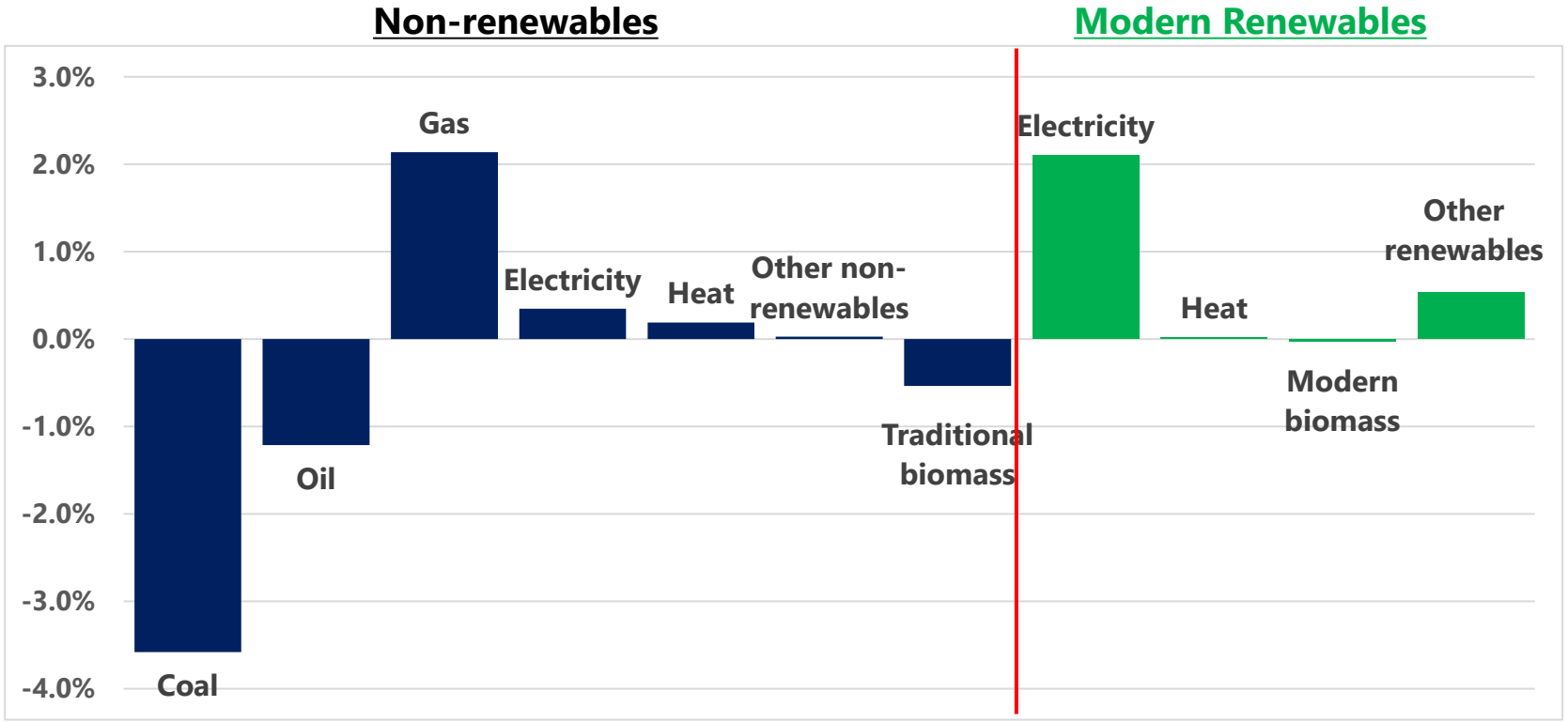

Note: Renewable energy includes electricity and heat generated from renewable energy sources

Source: APEC data

***From 2010 to 2018, the renewable share increased 2.0 percentage points, 40.7% of the way to the goal.***

# *Final Energy Consumption:*
# Electricity from Renewables took share from Coal and Oil

Percentage point changes in market shares, 2018 vs. 2010




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

Source: APEC data.

***From 2010 to 2018, the renewable share increased 2.6 percentage points, 43.3% of the way to the goal.***

# Renewable energy supply and consumption

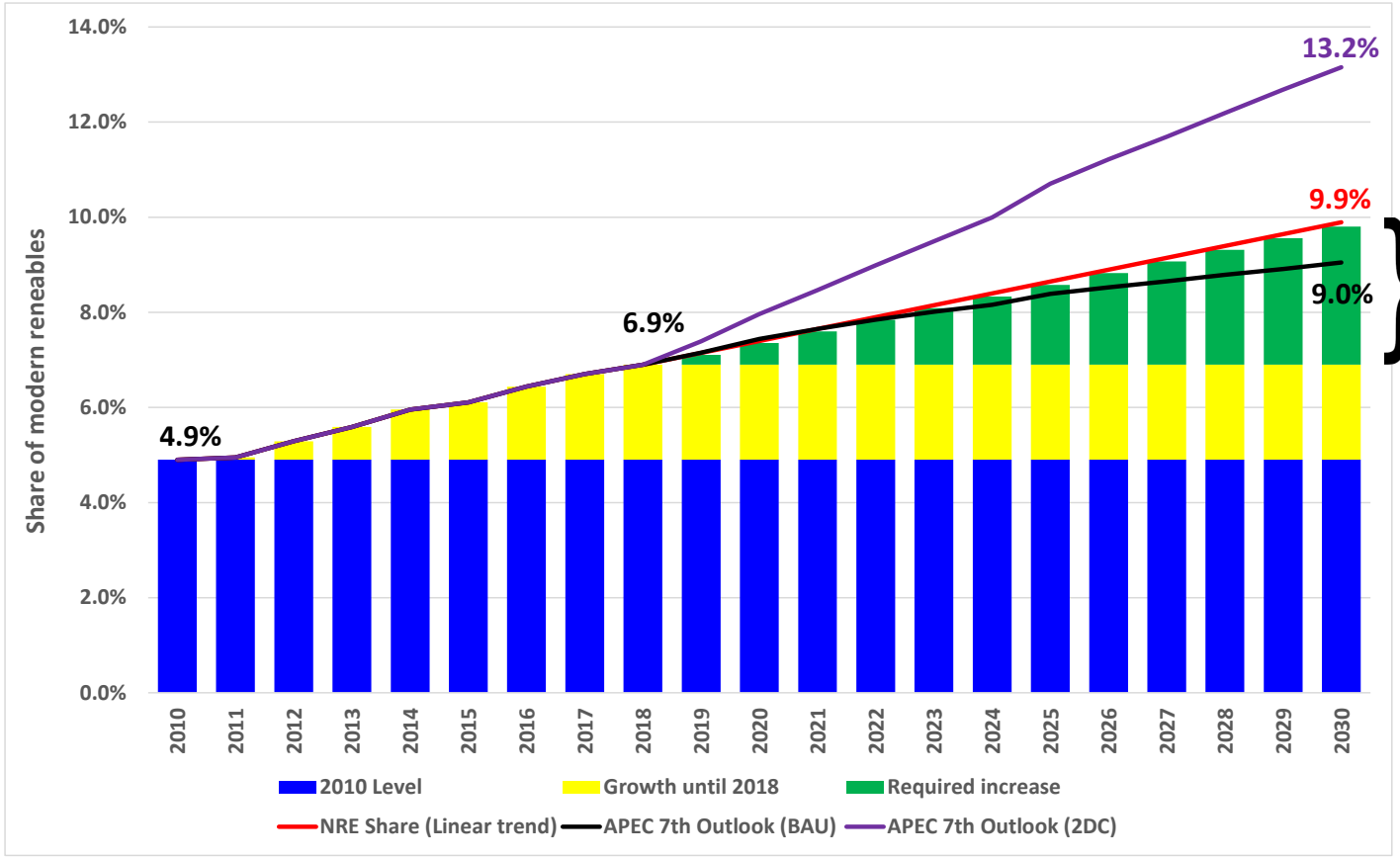
Electricity Generation, TWh

| | 2010 | 2018 | % change |
|---|---|---|---|
| **Non-renewables** | **11,362** | **13,288** | **17.0%** |
| Coal | 6,570 | 7,694 | 17.1% |
| Oil | 332 | 210 | -36.8% |
| Gas | 2,713 | 3,587 | 32.2% |
| Nuclear | 1,658 | 1,681 | 1.4% |
| Other non-renewables | 89 | 117 | 31.2% |
| **Modern renewable energy** | **2,119** | **3,827** | **80.6%** |
| Modern biomass | 72 | 163 | 125.5% |
| Hydro | 1,780 | 2,474 | 39.0% |
| Geothermal | 53 | 60 | 13.5% |
| Solar | 9 | 367 | 3973.9% |
| Wind | 163 | 726 | 346.0% |
| Other renewables | 43 | 37 | -12.9% |
| **Total** | **13,481** | **17,115** | **27.0%** |
| **Modern RE share** | **15.7%** | **22.4%** | **42.2%** |

***Even in electricity generation, for just 40% of the time to 2030, APEC has already increased renewable energy share by 42%***

# *Primary Energy Supply:*
# 7th Outlook BAU fails to meet the renewables goal

Renewable energy share in total primary energy supply, 2010-2030

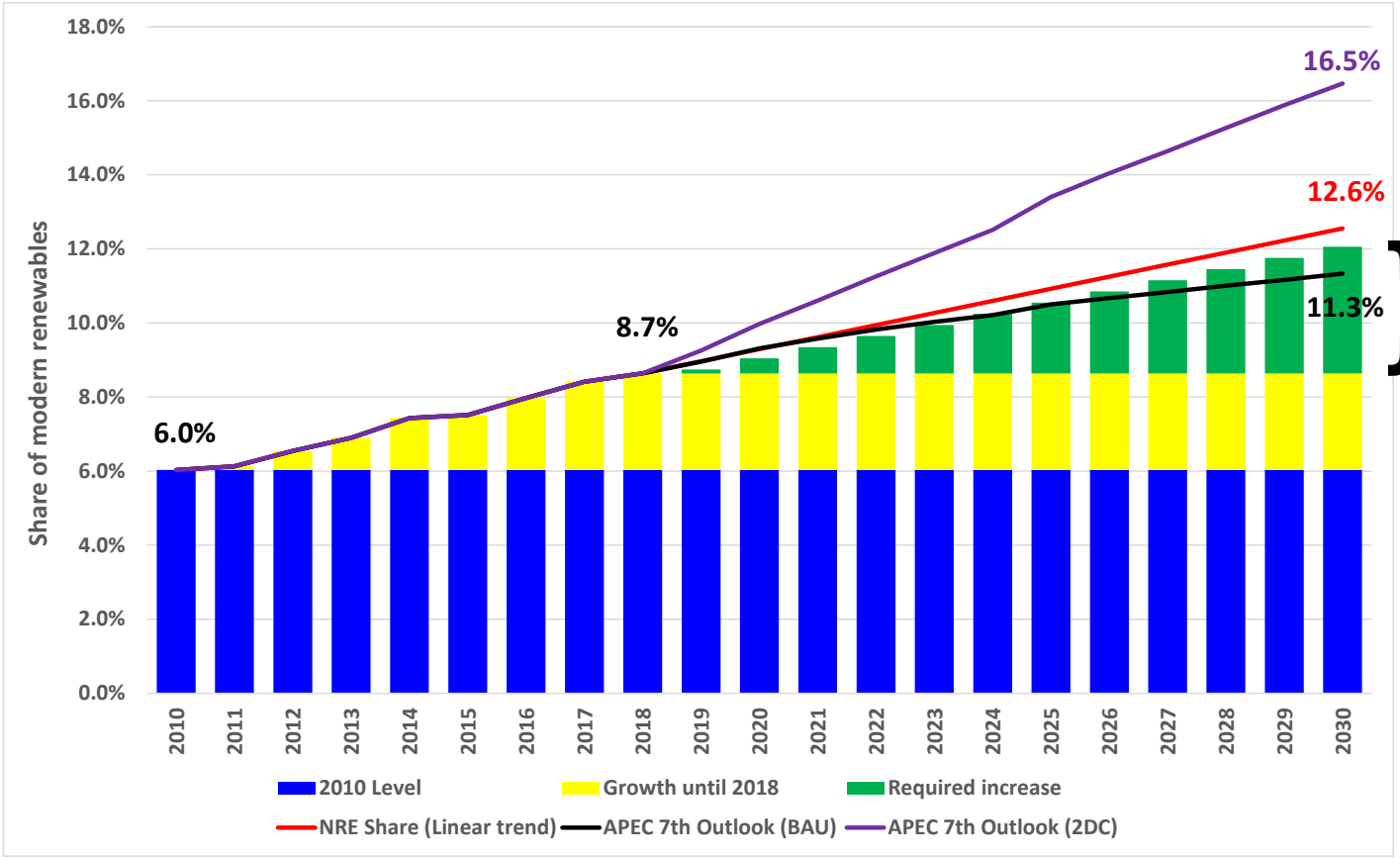



Level of RE share needed to achieve the doubling goal (9.8%)

Source: APEC data and APERC analysis.

# *Final Energy Consumption:*
# 7th Outlook BAU fails to meet the renewables goal

Renewable energy share in total final energy consumption, 2010-2030




Level of RE share needed to achieve the doubling goal (12.0%)

Source: APEC data and APERC analysis.

# Closing thoughts

- Energy intensity levels and renewable energy shares vary widely among economies, and across sectors within economies.
- Linear extrapolation of historic trends can be misleading.
- APERC researchers look forward to working with experts from each economy to refine our projections for the 8th Outlook, including expected levels of energy intensity and shares of renewable energy for two scenarios.
- We also look forward to assisting in the identification of opportunities to reduce energy intensity and increase the share of renewable energy

# Thank you for your kind attention.

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