

EGEDA update

EGEEC56 and EGNRET55 Joint Meeting
11-14 May 2021

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Outline

- Regular energy data collection
- Training courses and workshops on energy statistics
- EGEDA meetings
- Tracking the APEC energy intensity goal
- Tracking the APEC RE doubling goal

1. Regular energy data collection

Annual energy data

- Annual energy supply and demand data of 21 member economies for 2018 have been collected, processed and analysed
 - **APEC Energy Statistics 2018** and **APEC Energy Handbook 2018** publications are still undergoing APEC Secretariat review
- Annual energy supply and demand data for 2019 are now being collected
 - All data are expected to be in by September 2021
 - The secretariat will finish the draft **APEC Energy Statistics 2019** and **APEC Energy Handbook 2019** and submit to the APEC secretariat for review by end of October 2021
 - Hopefully, the 2019 publications are released in January 2022

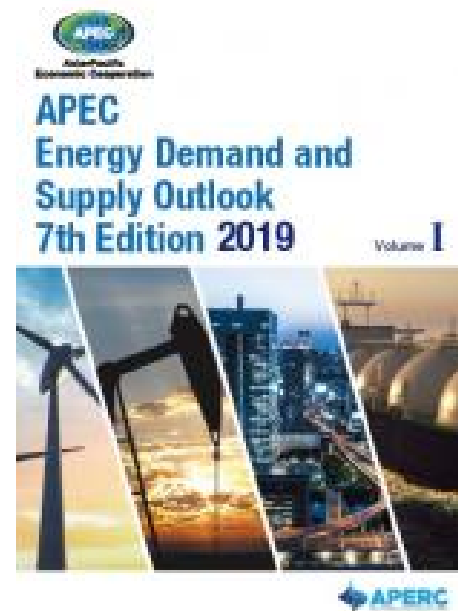
Other energy data

- Regular **quarterly** and **monthly** data collection continues.
 - Monthly **JODI Oil** and **JODI Gas** are submitted one month after the end of the month
 - **Quarterly supply** data are submitted 4 months after the end of the quarter

- Low response rate on the **energy efficiency indicators template, energy prices** and **CO₂ emissions**
 - No available end-use energy consumption (heating, cooling, lighting, etc.) data in many non-IEA member economies
 - The secretariat requests IEA member economies to submit the templates submitted to IEA
 - Not all economies have official CO₂ emissions data

Uses of APEC energy data

- APEC energy overview
- APERC is now using APEC data that is produced by EGEDA for the 8th APEC energy outlook
 - Outlook will use petajoules (PJ) instead of million tons of oil equivalent (mtoe)
 - EGEDA also used PJ in data analysis and in the 2018 energy statistics publications
- APEC energy data is also used to track the progress of APEC aspirational goals



2. Energy statistics trainings/workshops

18th APEC workshop on energy statistics

□ Held on 15-17 December 2020

- Focused on renewable energy statistics with the objective of improving data for more accurate tracking of the doubling goal
- A joint training workshop with IRENA
- EGNRET participated

□ Agenda

- Overview of renewable energy (sources and technologies)
- Importance of accurate renewable energy data in tracking APEC's renewable energy doubling goal
- APEC's renewable energy road map analysis
- Methodologies for estimating production and consumption of renewable energy in the non-power sector and in off-grid renewable energy installations

19th APEC workshop on energy statistics

- Schedule: 6-8 July 2021 (online)
 - To discuss the importance of energy efficiency indicators for energy policy analysis and sharing of experiences on end-use energy consumption data collection/estimation
 - A joint training workshop with IEA
 - We would like to invite EGEEC to actively participate

19th APEC workshop on energy statistics

□ Agenda

- Energy intensity trends in APEC from 2005 to 2018
- APEC cooperation in energy efficiency
- The energy efficiency indicators template
- APEC energy data and energy balances – the need for more data
- The IEA weather database
- Collection/estimation of sectoral energy and activity indicators
- Tracking sectoral energy efficiency (with hands-on exercises)
 - Residential and commercial sectors (buildings)
 - Industrial sector
 - Transport sector
- Development of action plan to track impacts of energy efficiency –
What to do and how to get the right data

EGEDA's training courses on energy statistics

- ❑ All courses were cancelled
 - Short-term: 19-30 October 2020 (2 weeks)
 - Middle-term: 19 October to 11 December 2020 (8 weeks)
 - Special training course for Viet Nam: 28 September to 2 October 2020 (5 days)
- ❑ The secretariat is considering to hold a one-week course in September 2021

3. EGEDA meetings

31st EGEDA meeting (Joint with EGEEC54)

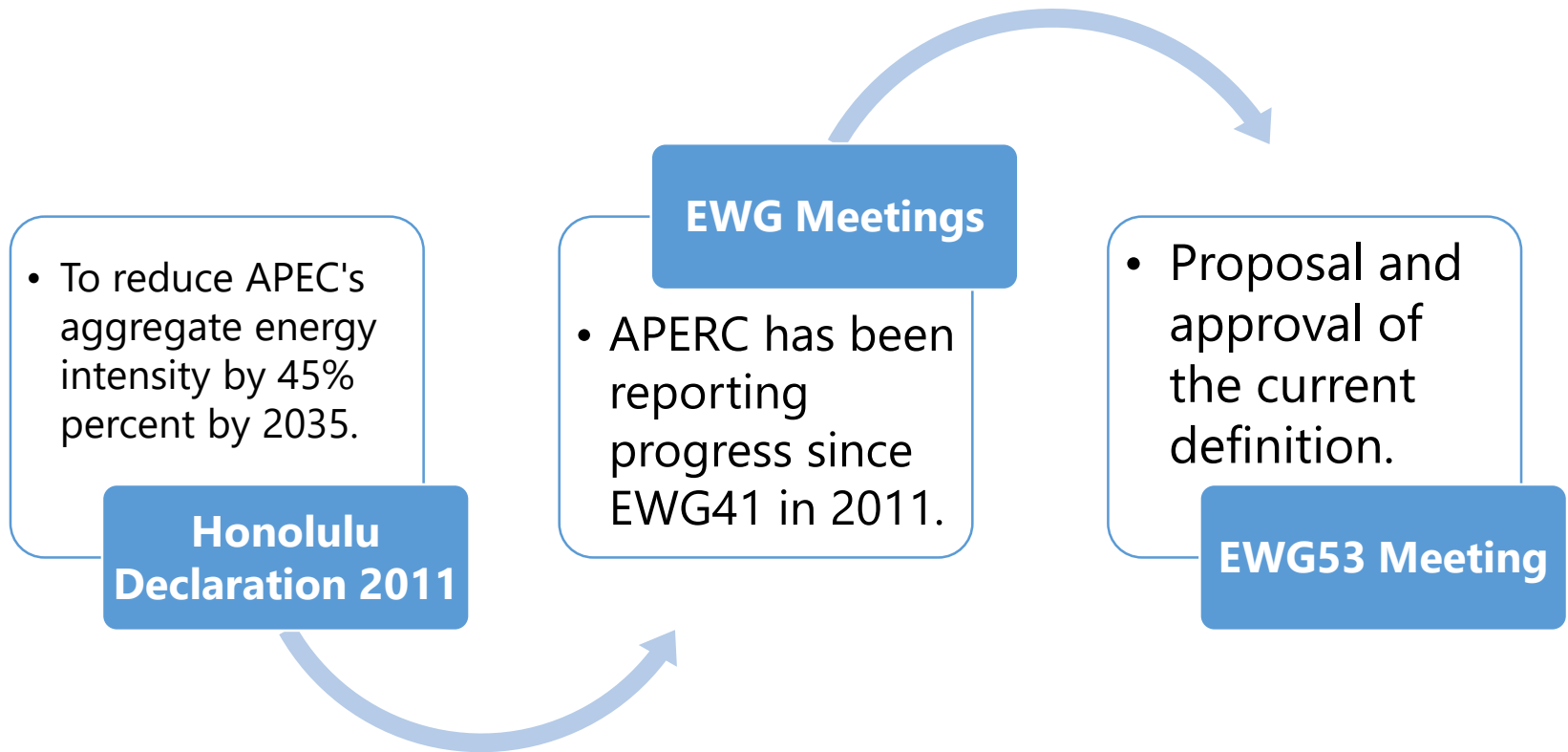
- Held on 19-20 November 2020
- EGEEC and EGEDA agreed to further collaborate in the future on:
 - Organising joint meetings and workshops;
 - Data collection in district cooling/heating systems,
 - End-use energy data;
 - Exploring energy efficiency applications and energy data collection in green data centers

32nd EGEDA meeting

- To be hosted by China (online, 19-20 October 2021)
- Agenda
 - Report on the 18th APEC workshop and directives from EWG
 - Report on energy data collection and energy supply and demand trends by the secretariat
 - Tracking the APEC energy goals
 - Energy efficiency indicators template and training workshop on collection/estimation of end-use energy consumption data
 - Election of EGEDA chair
 - Other matters

4. Progress of APEC energy intensity goal

APEC energy intensity indicator milestones



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

Energy intensity continued to decline in 2018...

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% | 0.08% | -2.3% | -2.3% | -2.3% | --2.9% | -2.9% | -2.6% | -0.4% | -48.9% |

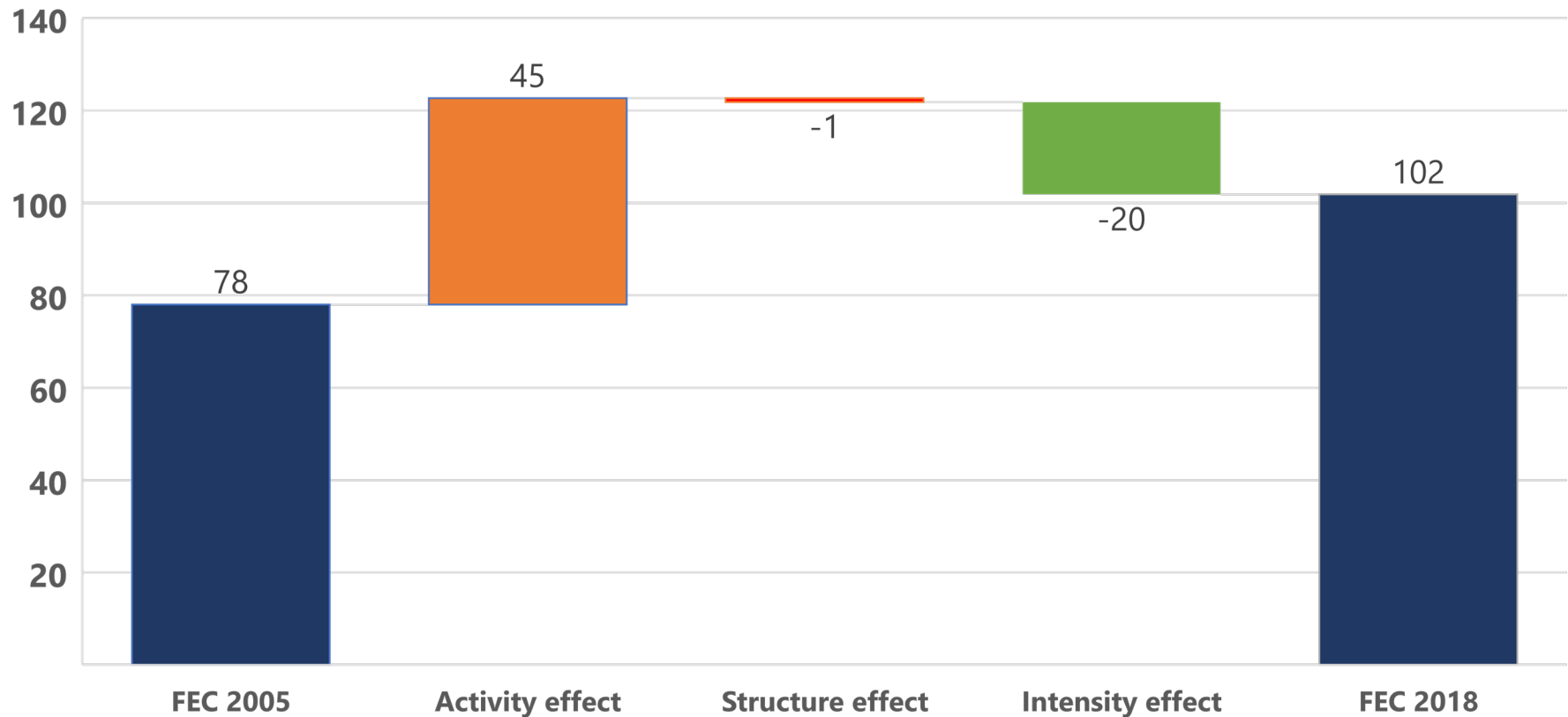
Sources: APEC statistics, WB, DGBAS (CT) and APERC analysis.

- ❑ *Final energy intensity has been improving reasonably consistently year-on-year, with 0.4% reduction in 2018*
- ❑ *Final energy intensity fell 21.8% between 2005 and 2018.*
- ❑ *If the current trend continues, the APEC final energy intensity goal of 45% will be met in 2033;*

Decomposition of the change in energy consumption

Analysis

Decomposition : Final energy consumption(PJ), 2005-18



- Energy efficiency or intensity effect played a significant role in offsetting the increases in final energy consumption brought about by the rapid growth (activity) of the APEC region*

Better data = better analysis

- Note that energy intensity is not the same as energy efficiency. Energy intensity is often used as a proxy to analyse energy efficiency improvements in an economy.
- To better understand true trends in energy consumption as well as trends in economic activity that influence energy consumption in APEC, decomposition method is recommended. It allows us to separate structural shifts or activity shifts, understanding.
- However, more useful analysis (i.e. analysis by sector) requires more detailed data or disaggregation of end use demand. Decomposition of aggregate intensity is already a challenge.
- For example: Transport (passenger-km travel and number of vehicles)--initially tried with three OECD APEC economies with detailed activity data--and residential (floor area and weather effect), these sectors will be challenging.

5. Progress of APEC RE doubling goal

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

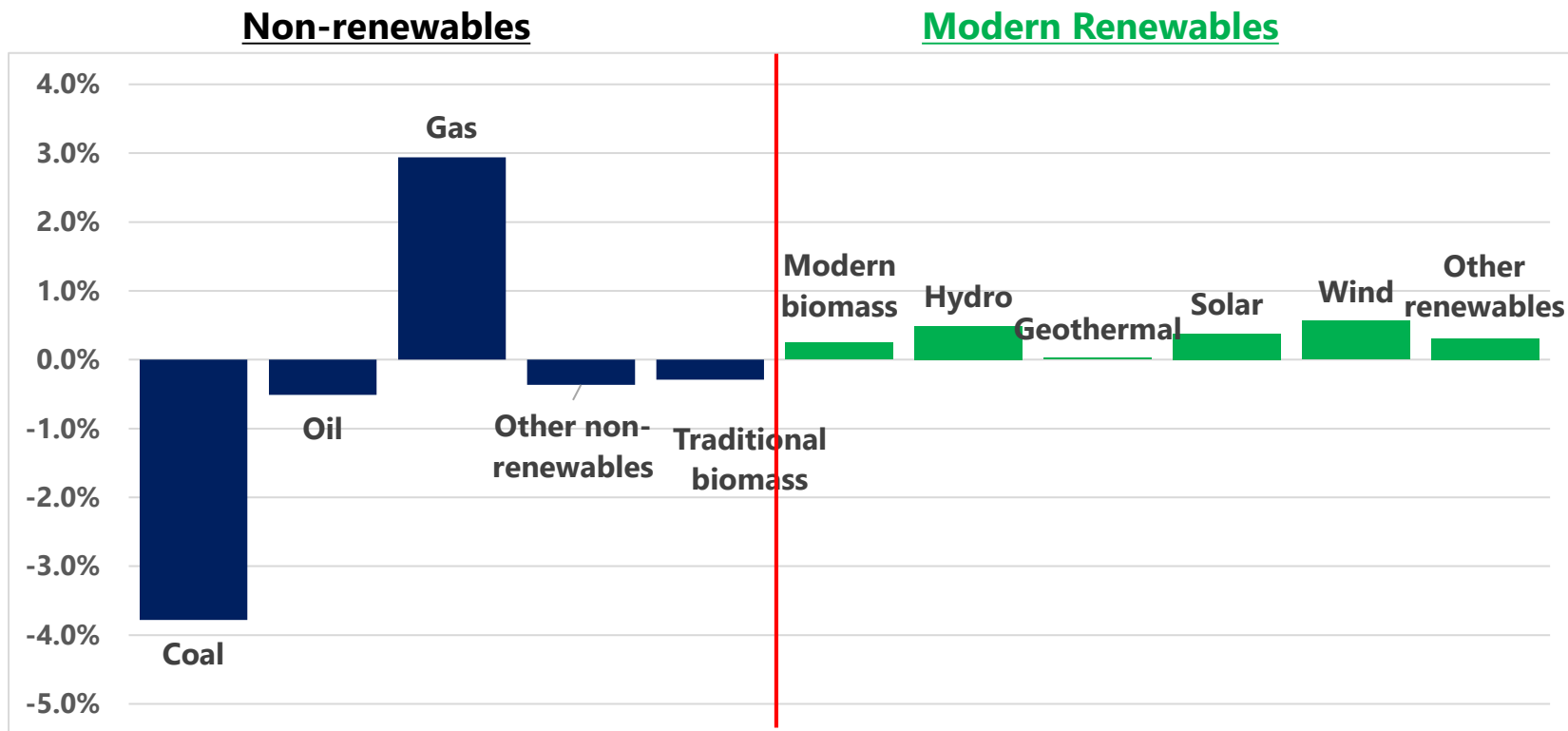
| | 2010 | 2018 | % change |
|--------------------------------|----------------|----------------|---------------|
| Non-renewables | 287,578 | 318,619 | 10.8% |
| Coal | 116,655 | 118,589 | 1.7% |
| Oil | 90,630 | 100,519 | 10.9% |
| Gas | 61,375 | 79,425 | 29.4% |
| Other non-renewables | 18,917 | 20,086 | 6.2% |
| Traditional biomass | 3,551 | 3,006 | -15.4% |
| Modern renewable energy | 14,996 | 23,861 | 59.1% |
| Modern biomass | 4,491 | 5,919 | 31.8% |
| Hydro | 6,396 | 8,896 | 39.1% |
| Geothermal | 1,486 | 1,753 | 17.9% |
| Solar | 152 | 1,490 | 877.0% |
| Wind | 586 | 2,612 | 346.0% |
| Other renewables | 1,885 | 3,192 | 69.3% |
| Total | 306,125 | 345,486 | 12.9% |
| Modern RE share | 4.9% | 6.9% | 41.0% |

| | 2010 | 2018 | % change |
|--------------------------------|----------------|----------------|---------------|
| Non-renewables | 164,441 | 186,329 | 13.3% |
| Coal | 30,630 | 28,095 | -8.3% |
| Oil | 65,017 | 72,873 | 12.1% |
| Gas | 26,187 | 34,791 | 32.9% |
| Electricity | 34,553 | 40,784 | 18.0% |
| Heat | 7,839 | 9,483 | 21.0% |
| Other non-renewables | 215 | 303 | 40.8% |
| Traditional biomass | 3,551 | 3,006 | -15.4% |
| Modern renewable energy | 10,744 | 17,905 | 66.7% |
| Electricity | 6,242 | 11,595 | 85.8% |
| Heat | 61 | 115 | 88.2% |
| Modern biomass | 2,862 | 3,268 | 14.2% |
| Other renewables | 1,579 | 2,927 | 85.4% |
| Total | 178,736 | 207,240 | 15.9% |
| Modern RE share | 6.0% | 8.6% | 43.7% |

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



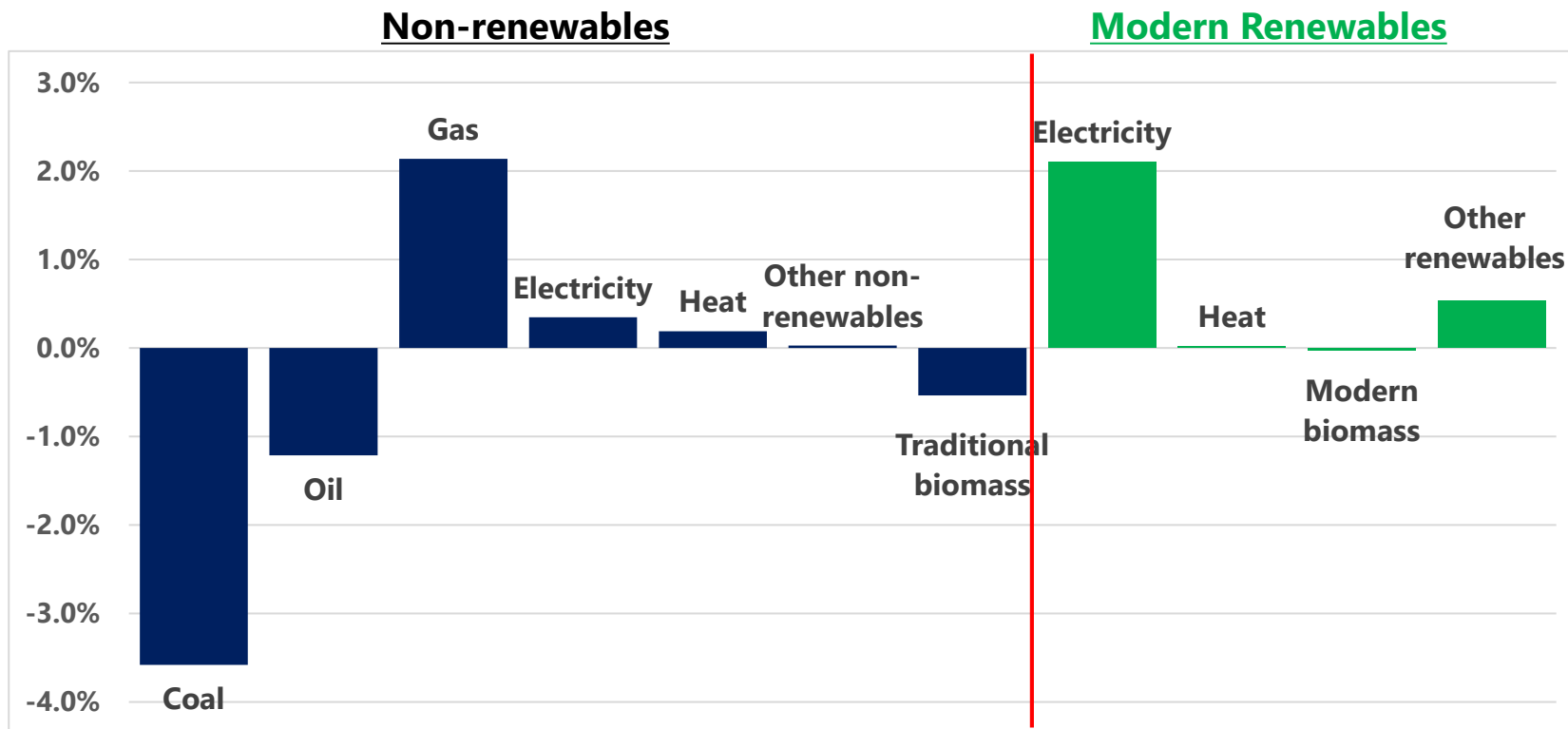
Note: Renewable energy includes electricity and heat generated from renewable energy sources

Source: APEC data

From 2010 to 2018, the renewable share increased 2.0 percentage points, 41% 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 2018, the renewable share increased 2.6 percentage points, 44% of the way to the goal.

Renewable energy supply and consumption

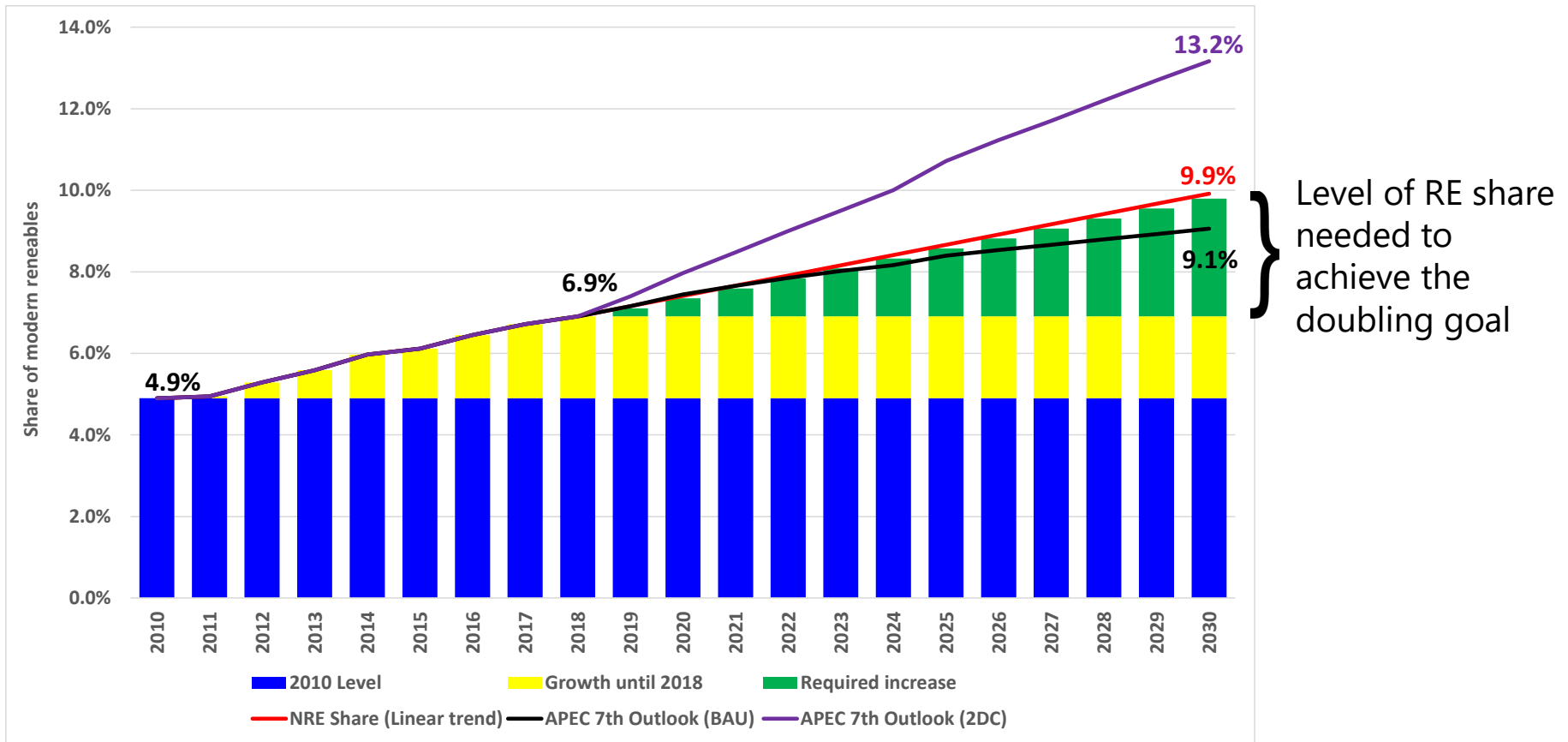
Electricity Generation, TWh

| | 2010 | 2018 | % change |
|--------------------------------|---------------|---------------|--------------|
| Non-renewables | 11,362 | 13,289 | 17.0% |
| Coal | 6,572 | 7,694 | 17.1% |
| Oil | 331 | 210 | -36.7% |
| Gas | 2,711 | 3,587 | 32.3% |
| Nuclear | 1,658 | 1,681 | 1.4% |
| Other non-renewables | 89 | 117 | 31.3% |
| Modern renewable energy | 2,120 | 3,827 | 80.5% |
| Modern biomass | 73 | 163 | 124.4% |
| Hydro | 1,780 | 2,474 | 39.0% |
| Geothermal | 53 | 60 | 13.5% |
| Solar | 9 | 367 | 3972.5% |
| Wind | 163 | 725 | 345.9% |
| Other renewables | 43 | 37 | -13.0% |
| Total | 13,482 | 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%

Supply outlook BAU extrapolation fails to meet the goal

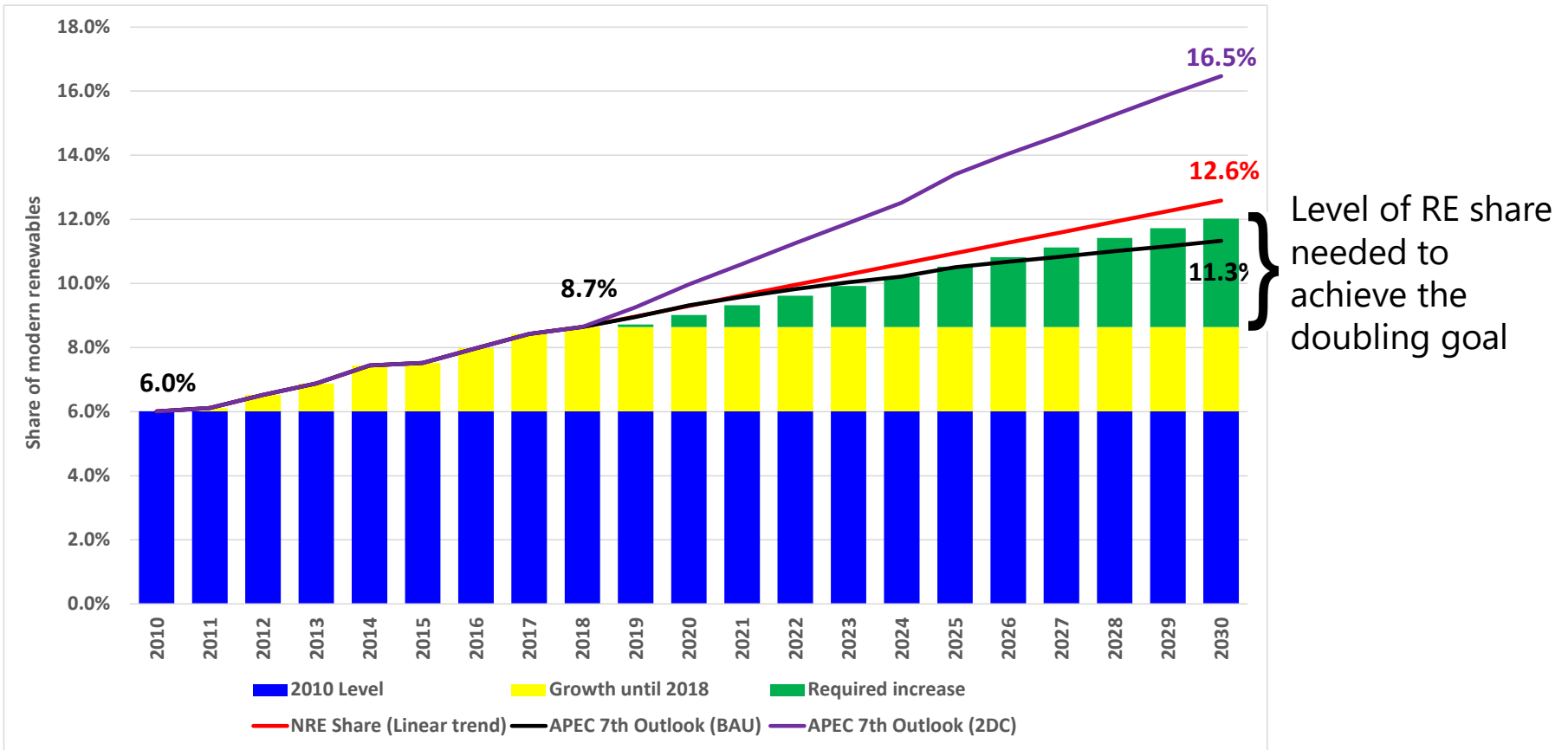
Renewable energy share in total primary energy supply, 2010-2030



Source: APEC data and APERC analysis.

Demand outlook BAU extrapolation also fails to meet the goal

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



Source: APEC data and APERC analysis.

Closing thoughts

- ❑ From 2010 to 2018, real progress has been made toward achieving the renewable doubling goal
 - Enabled by rapid decrease in costs and favorable government policies (FIT, RPS, etc.)
- ❑ Further increases in the share of VREs will require back-up generation and/or substantial increases in electricity storage to ensure grid stability
 - There are many options, although some are high cost with current technologies
 - An APERC study shows that one option for storage is battery electric vehicles (BEVs)
- ❑ We expect the grid stability challenge to be addressed on an economy-by-economy basis and APERC will continue to monitor progress and identify lessons learned over the coming years.



Thank you for your kind attention.

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