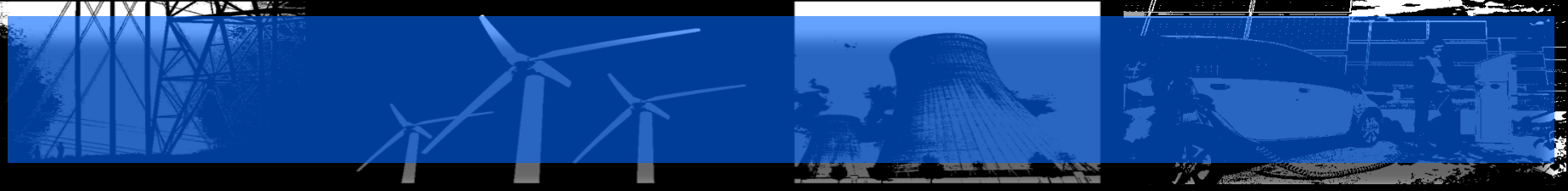




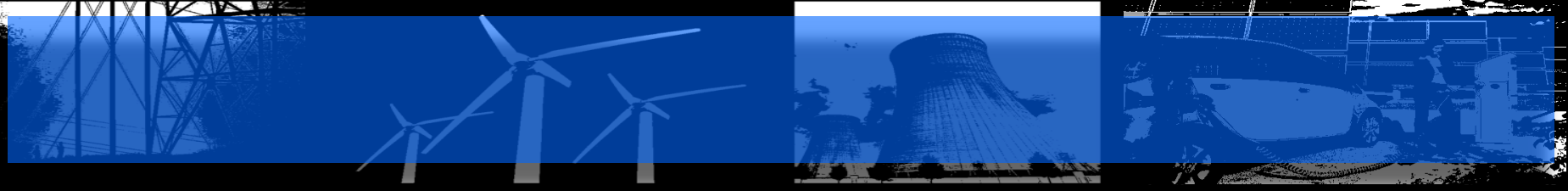
6th APEC Energy Demand and Supply Outlook

Alternative Energy Demand Scenario

Atit Tippichai
Researcher, APERC

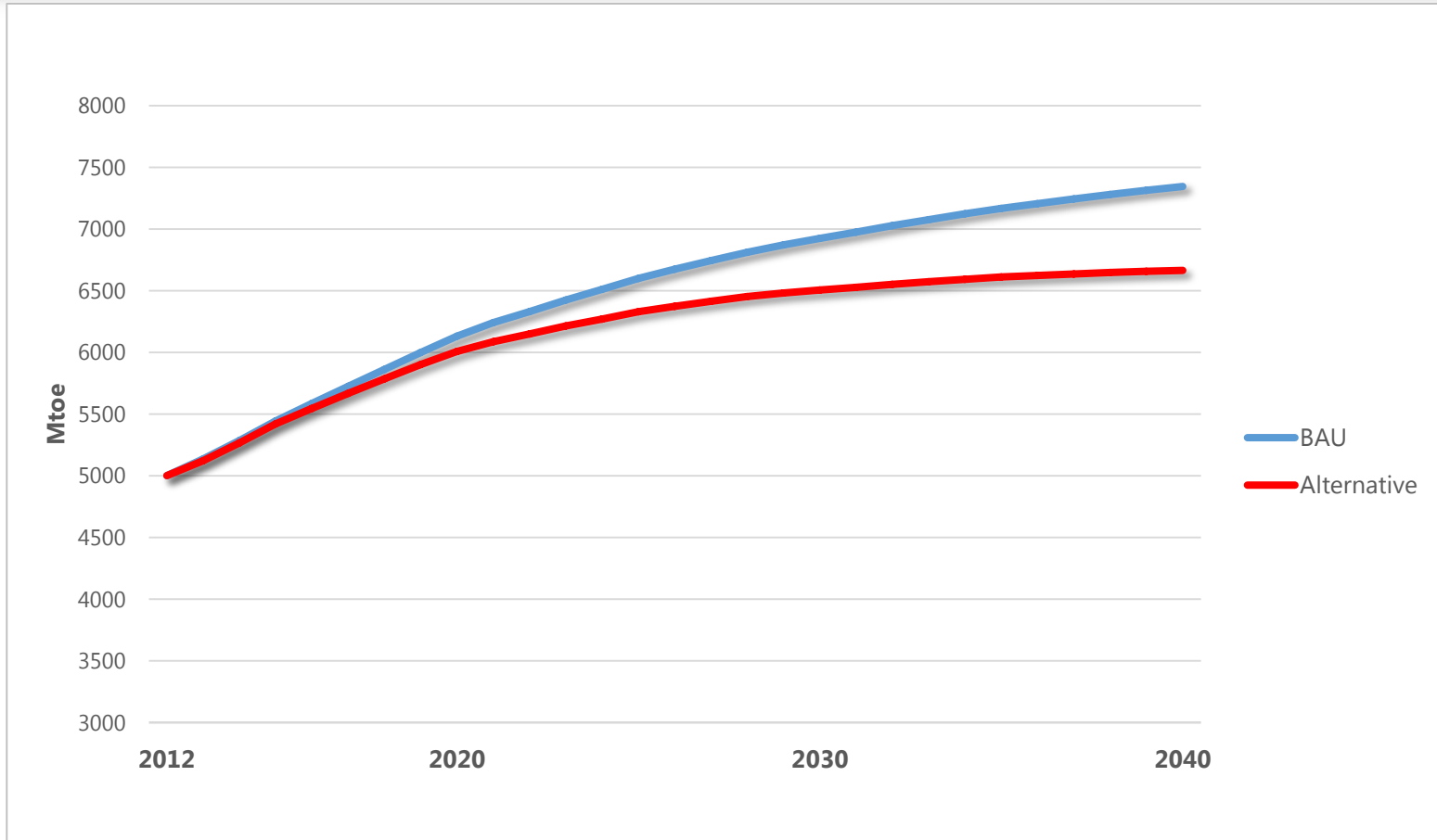


**This presentation is for review purpose.
Citation is not allowed.**



APEC's Alternative Final Energy Demand

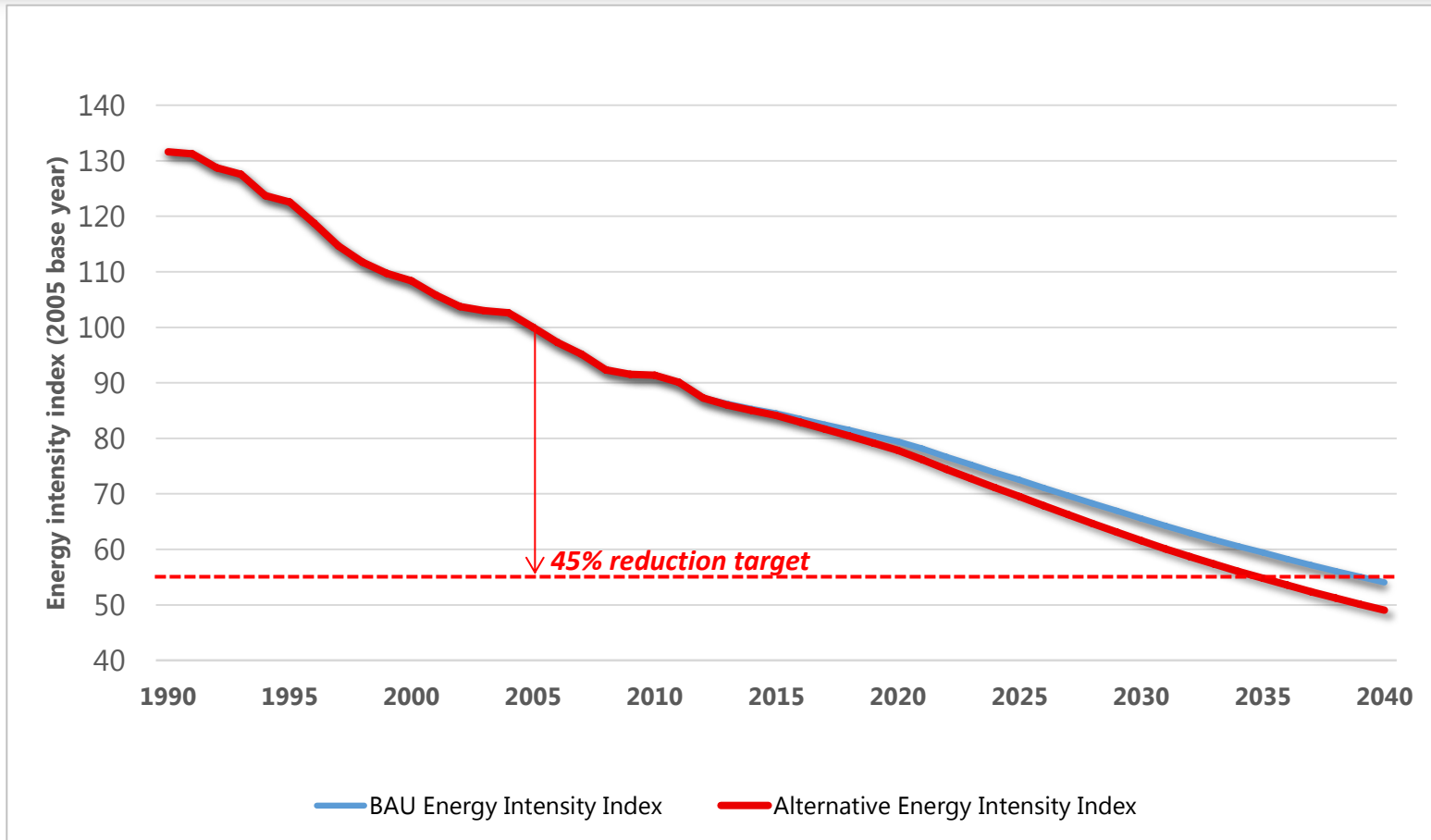
APEC's Final Energy Demand: BAU vs Alternative



(Source: APERC Analysis)

Under the alternative scenario, final energy demand drops 9.3% compared to BAU

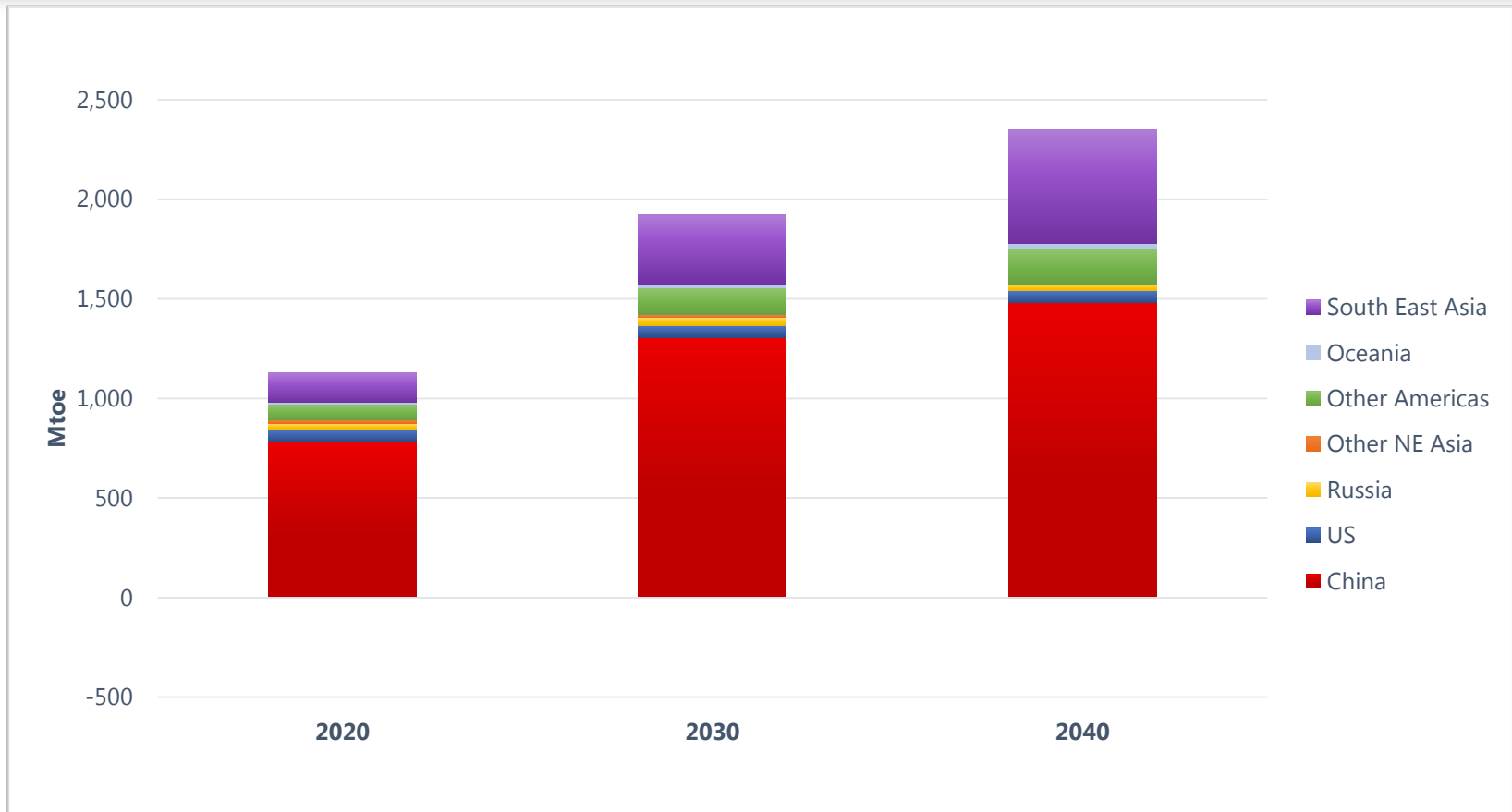
APEC's Energy Intensity BAU vs Alternative



(Source: APERC Analysis)

APEC's target in 2035 can be met under the alternative scenario

Growth in Final Energy Demand compared to 2012 (BAU)

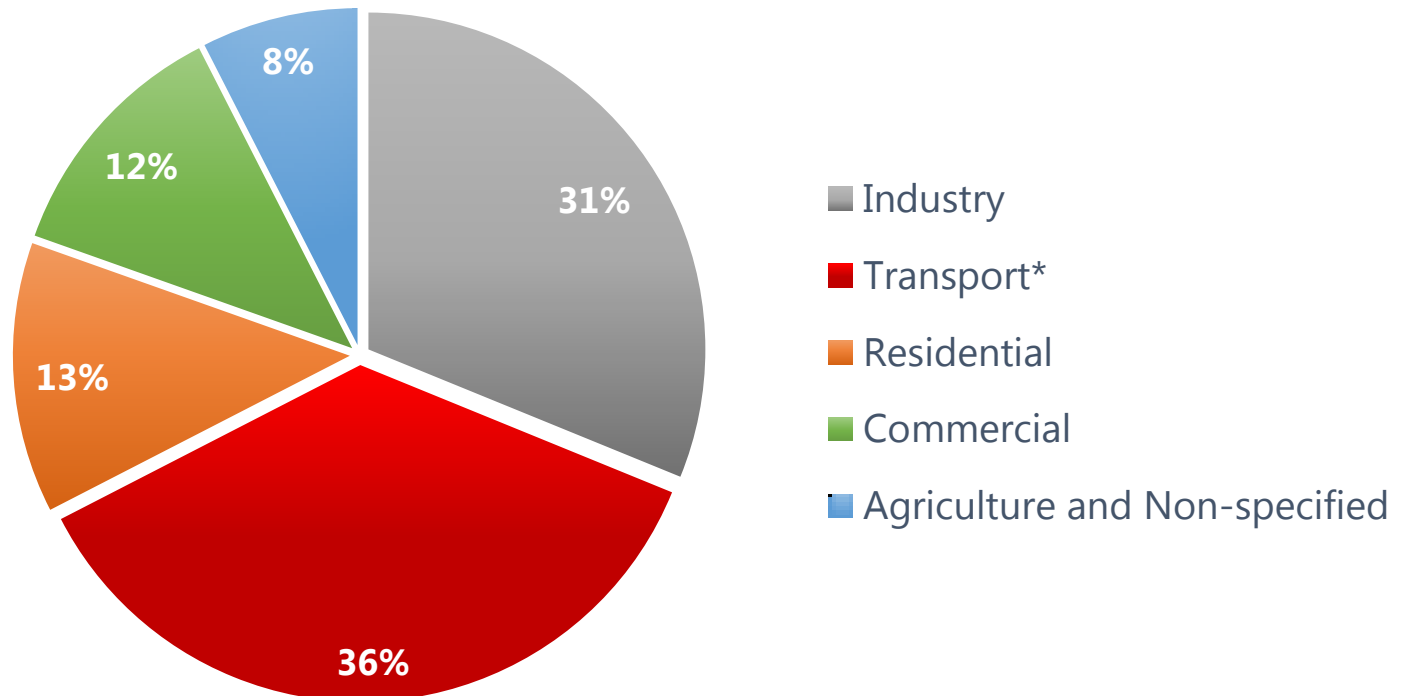


(Source: APERC Analysis)

China and South East Asia account for nearly 90% of all additional demand

Note: **Oceania** (Australia, New Zealand and PNG), **Other Americas** (Canada, Chile, Mexico and Peru), **Other North East Asia** (Hong Kong, Japan, Korea and Chinese Taipei), **South East Asia** (Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore, Thailand and Vietnam)

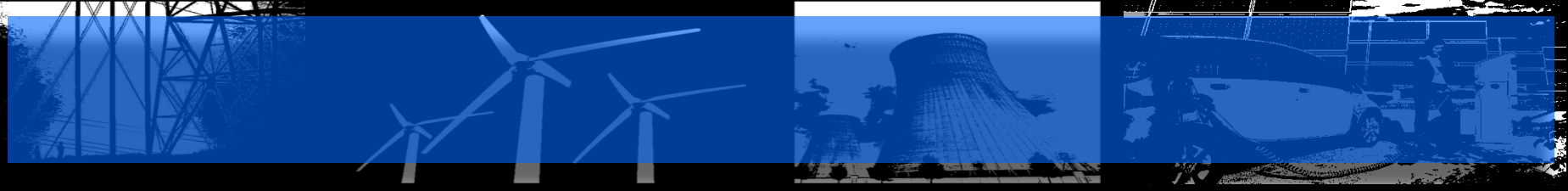
Additional Final Energy Demand in 2040 by Sector (BAU)



2,150 Mtoe

*Excluding international transportation

(Source: APERC Analysis)



Alternative Demand: Industry

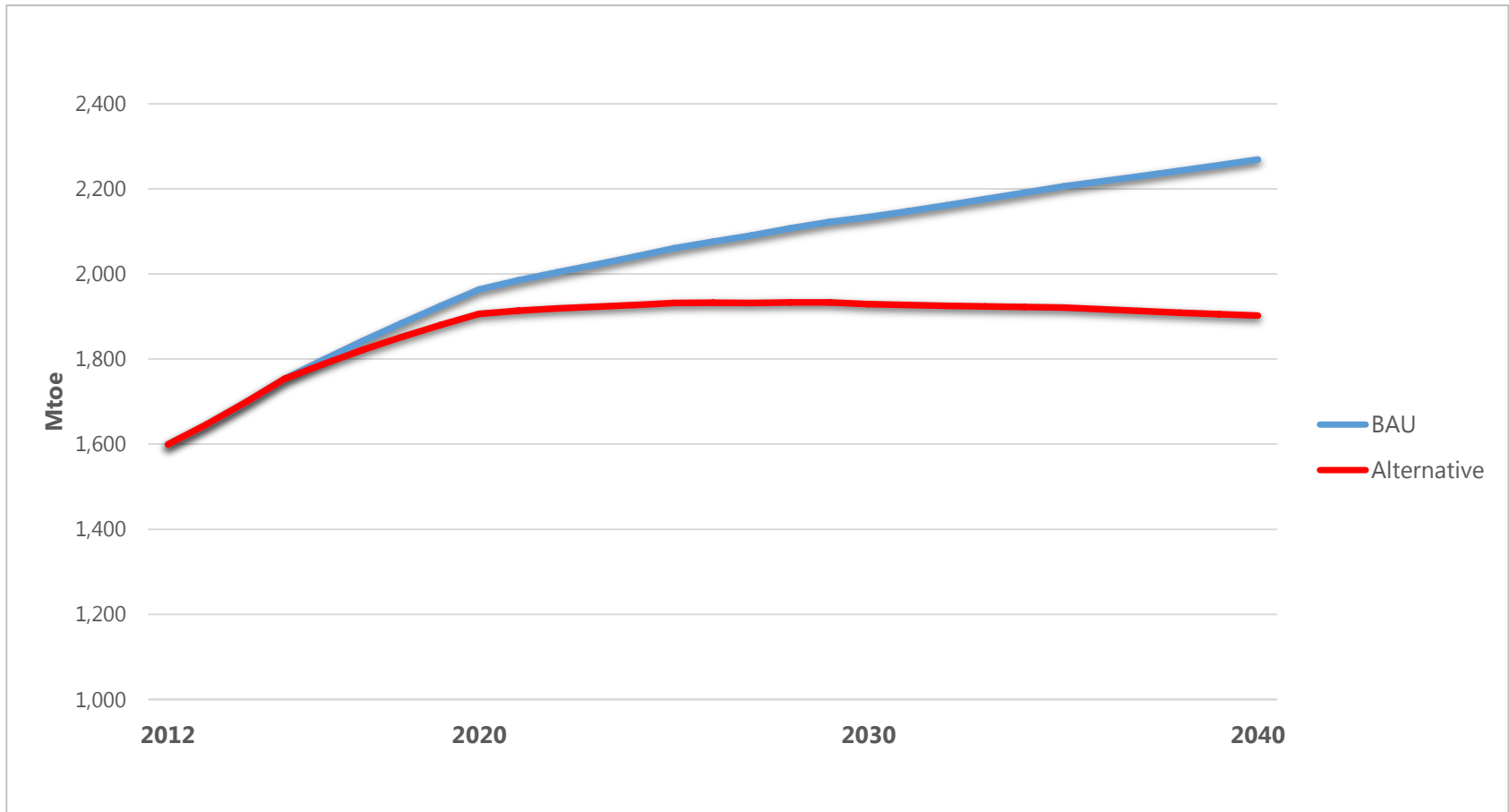
Alternative Scenario Overview - Industry

- The industrial scenario is set applying an econometric approach to estimate trends in production and energy intensity by industrial subsectors.
Thus, industrial energy demand is estimated considering efficiency gains and industry structure changes.
- For the alternative scenario APERC assumed additional efficiency gains over BAU as follows:

| Industry | Overall | Per Year |
|---|-------------|---------------|
| Iron and Steel Chemical and Petrochemical Non-metallic minerals | 10% to 2040 | 0.4% per year |
| Other Sectors | 20% to 2040 | 0.9% per year |

- The following economies were excluded from the calculations due to data limitations:
 - Brunei Darussalam, Hong Kong, Papua New Guinea, Singapore, Vietnam, Malaysia

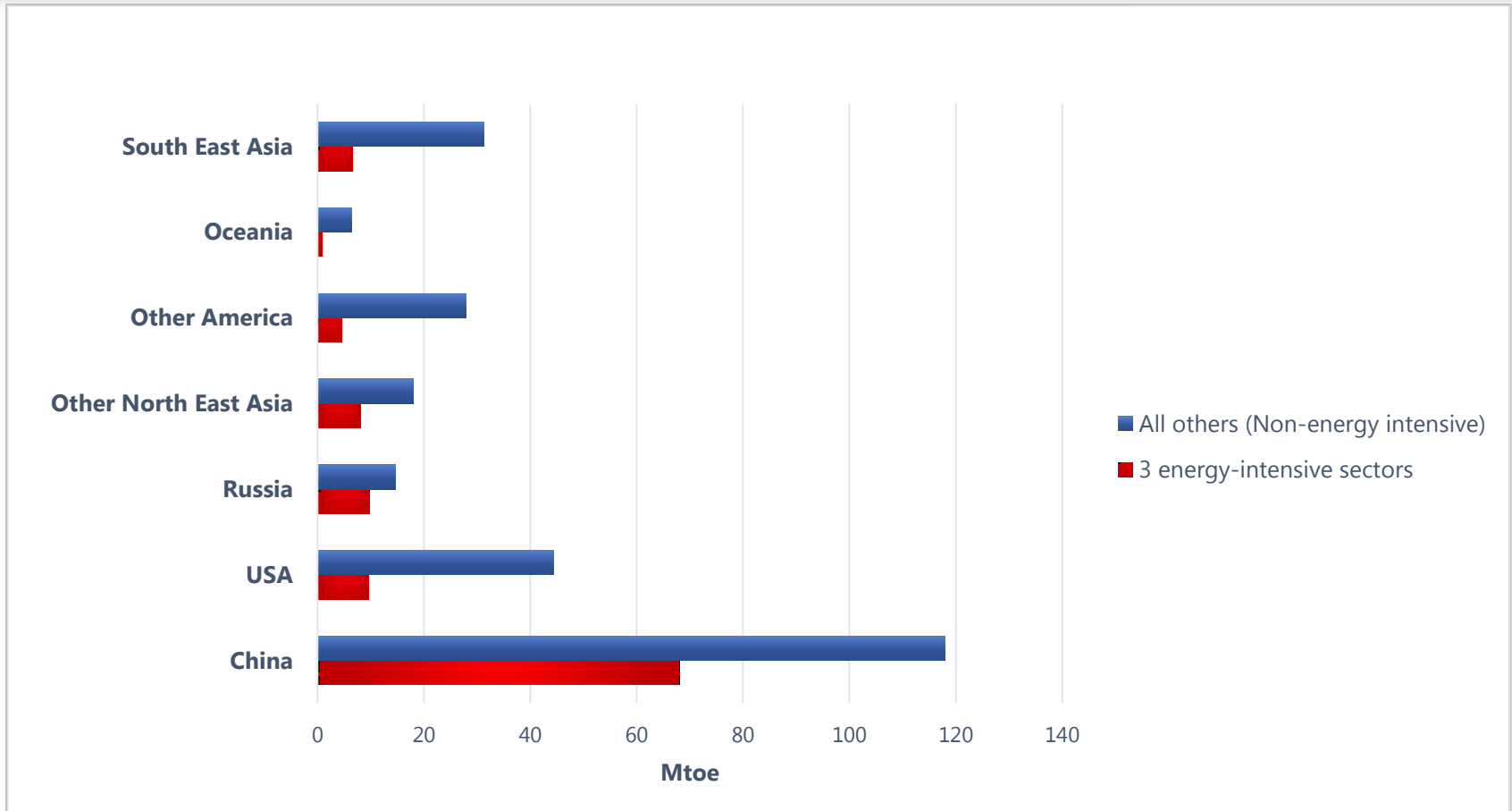
Industry Final Energy Demand: BAU vs Alternative



(Source: APERC Analysis)

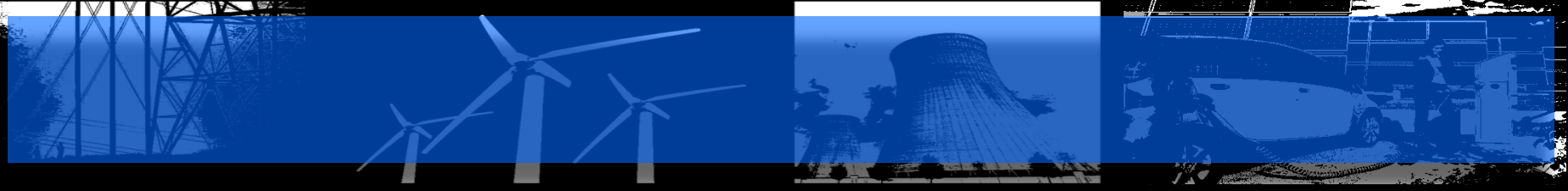
Industry energy demand is stabilized under the alternative scenario

Energy Saving in Industry Sector compared to BAU



(Source: APERC Analysis)

Other industrial sub-sectors offer largest potential for future energy savings



Alternative Demand: Transport

Alternative Scenario Overview - Transport

- Two scenarios of transport sector: Efficient vehicles and Efficient urban development.
- In the efficient vehicles scenario, the most important factor considered is the fuel efficiency of the fleet. Global Fuel Efficiency Initiative (GFEI) data was used as a reference to make efficiency gains assumptions as follows:

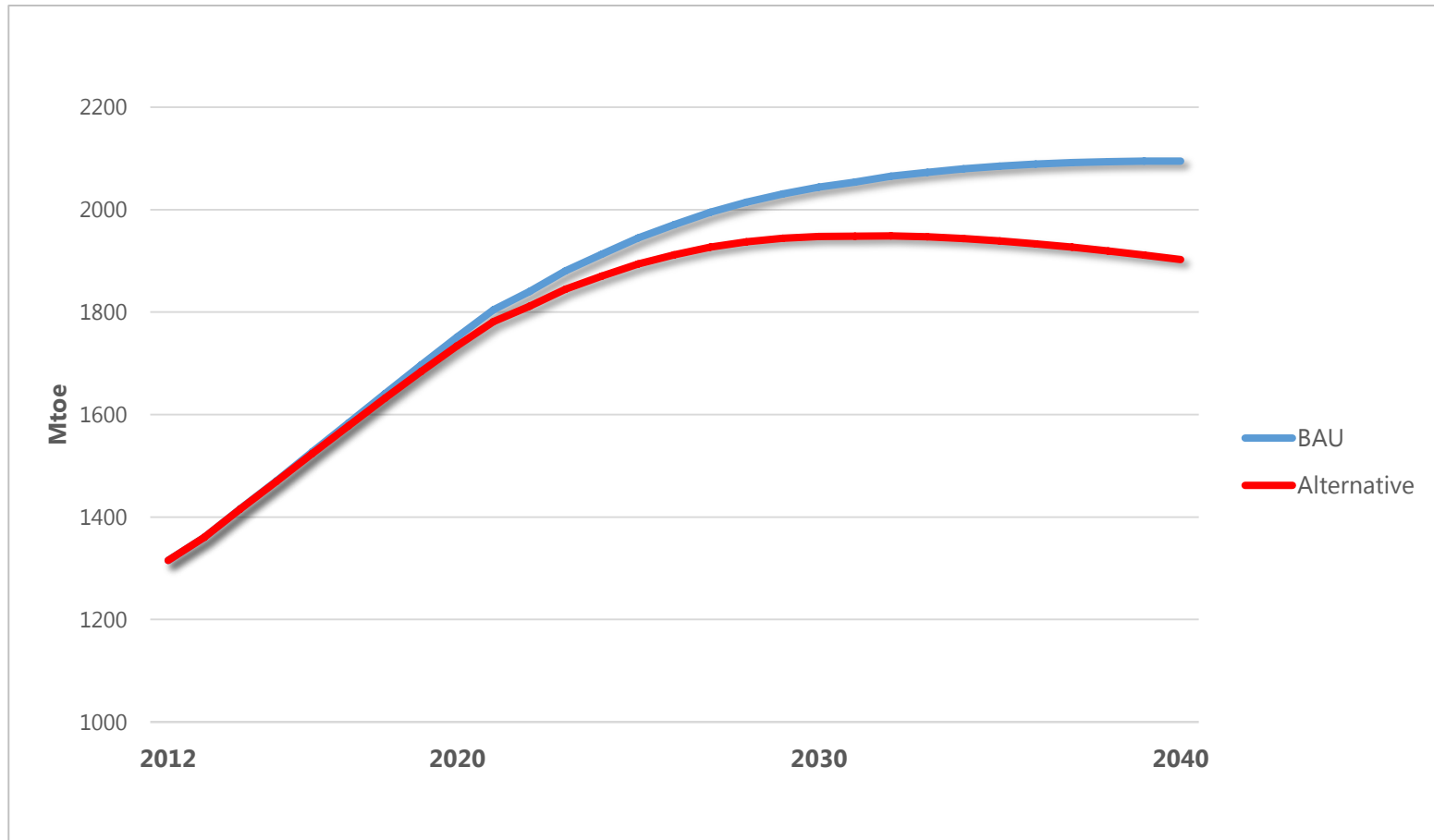
| Scenario | Group of economies | Fuel economy improvement (% per year) | |
|-------------|--------------------|---------------------------------------|-----------|
| | | 2012-2030 | 2030-2040 |
| BAU | A | 1.0% | 1.0% |
| | B | 2.0% | 1.0% |
| Alternative | A | 2.0% | 2.0% |
| | B | 2.7% | 2.0% |

Group A is economy where vehicle fuel economy labelling and standard policy has not been currently implemented, which include Brunei Darussalam, Indonesia, Malaysia, Mexico, PNG, Peru, Philippines, Russia, Thailand

Group B is economy where vehicle fuel economy labelling and standard policy has been currently implemented, which include Australia, Canada, Chile, China, Hong Kong, Japan, Korea, New Zealand, Singapore, US, Viet Nam, Chinese Taipei

- New technologies such as electric vehicles also play a role in future energy demand. The model provides estimates of penetration of these technologies and their impact.

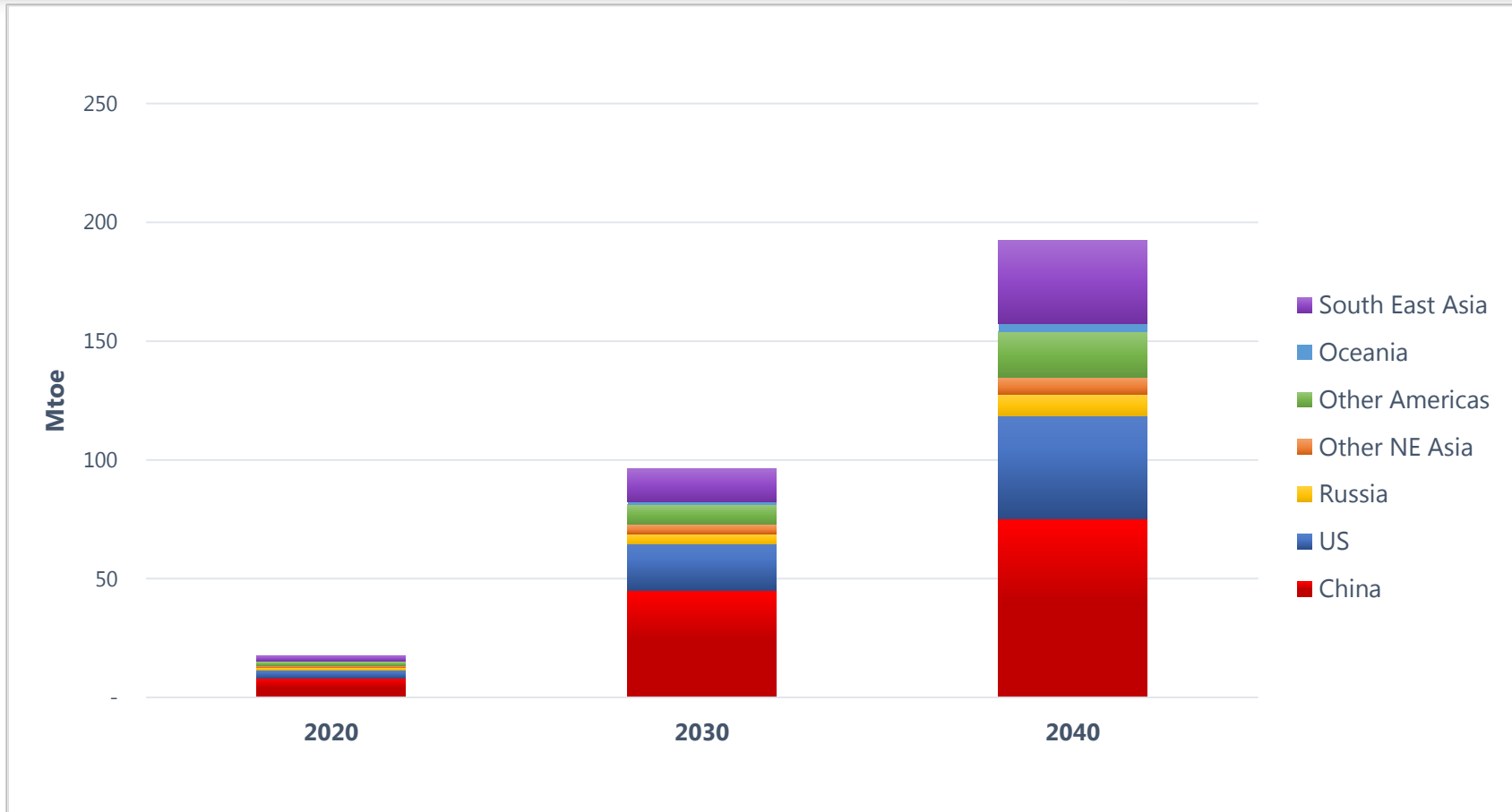
Road Transport Energy Demand: BAU vs Alternative



(Source: APERC Analysis)

Alternative transport energy demand peaks around 2030

Road Transport Energy Reduction Compared to BAU

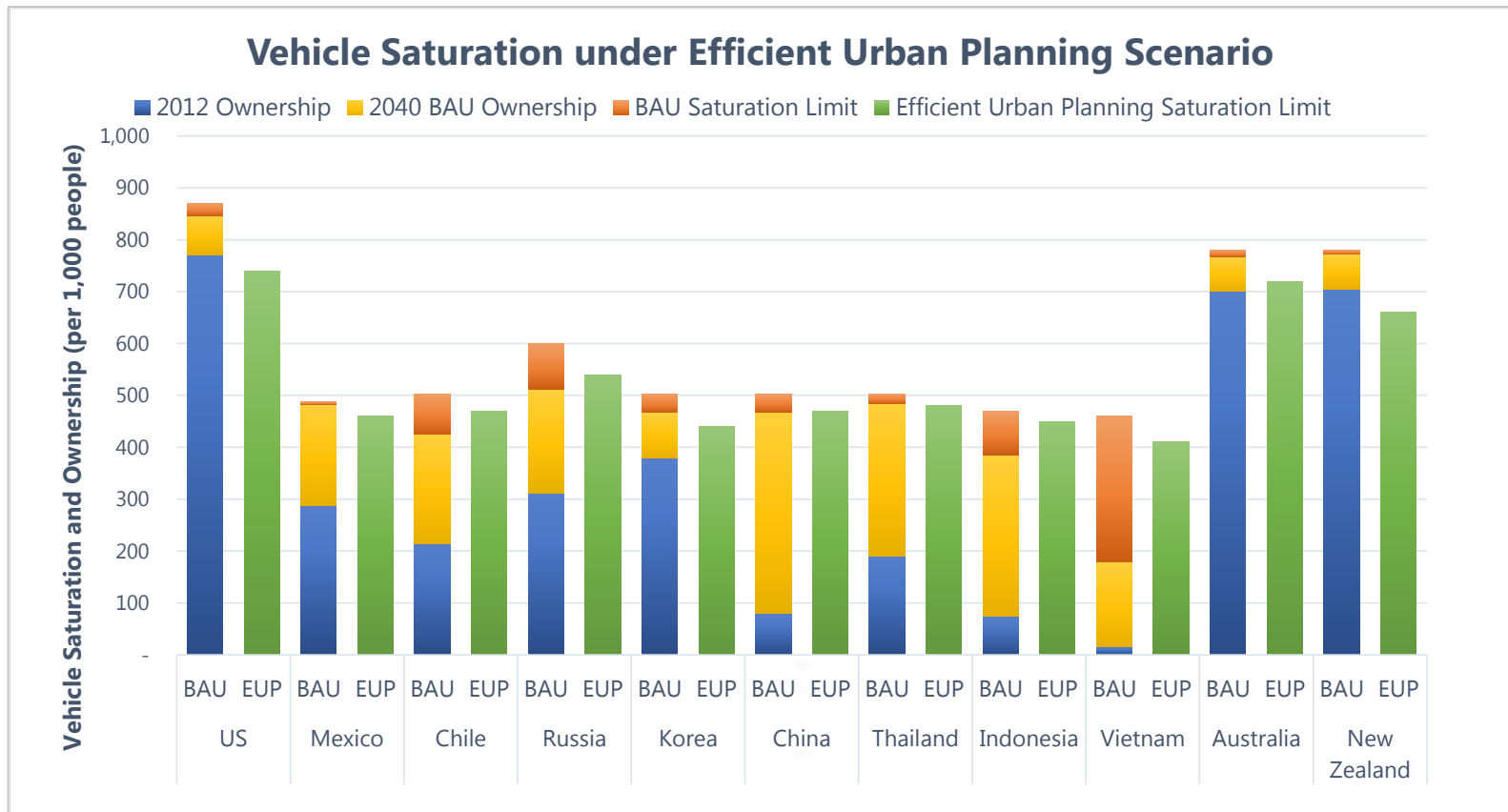


(Source: APERC Analysis)

Tightening fuel economy standards drives energy reduction in China, US and SEA which accounts for 80% of total reduction

Efficient Urban Planning Scenario

- Efficient urban planning scenario is under development. This scenario will maintain a constant level of urban density, instead of declining at 1.7% per year as the historical world average.





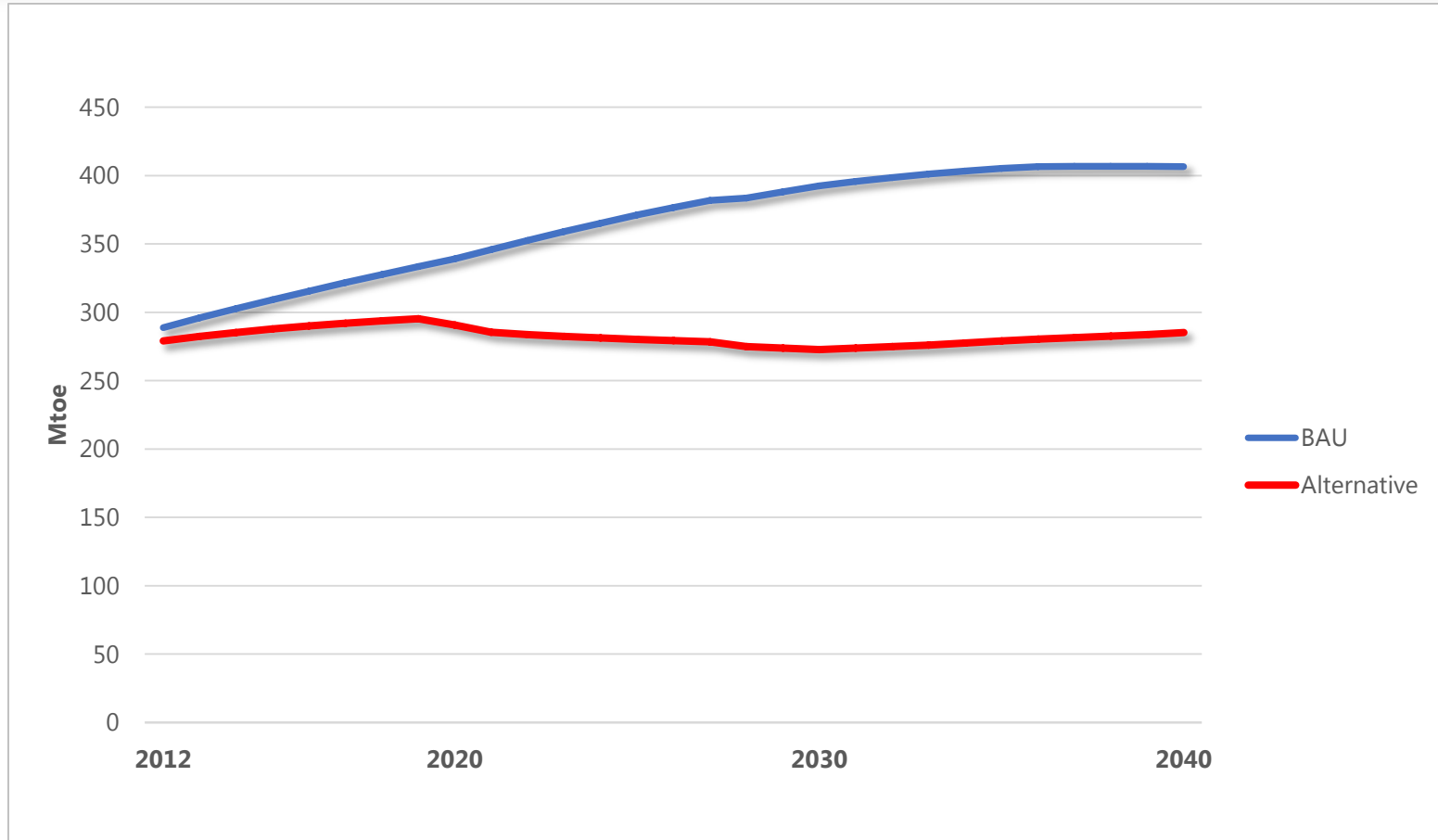
Alternative Demand: Residential and Commercial

Alternative Scenario Overview – Residential and Commercial

- The appliances included in the analysis are as follows:

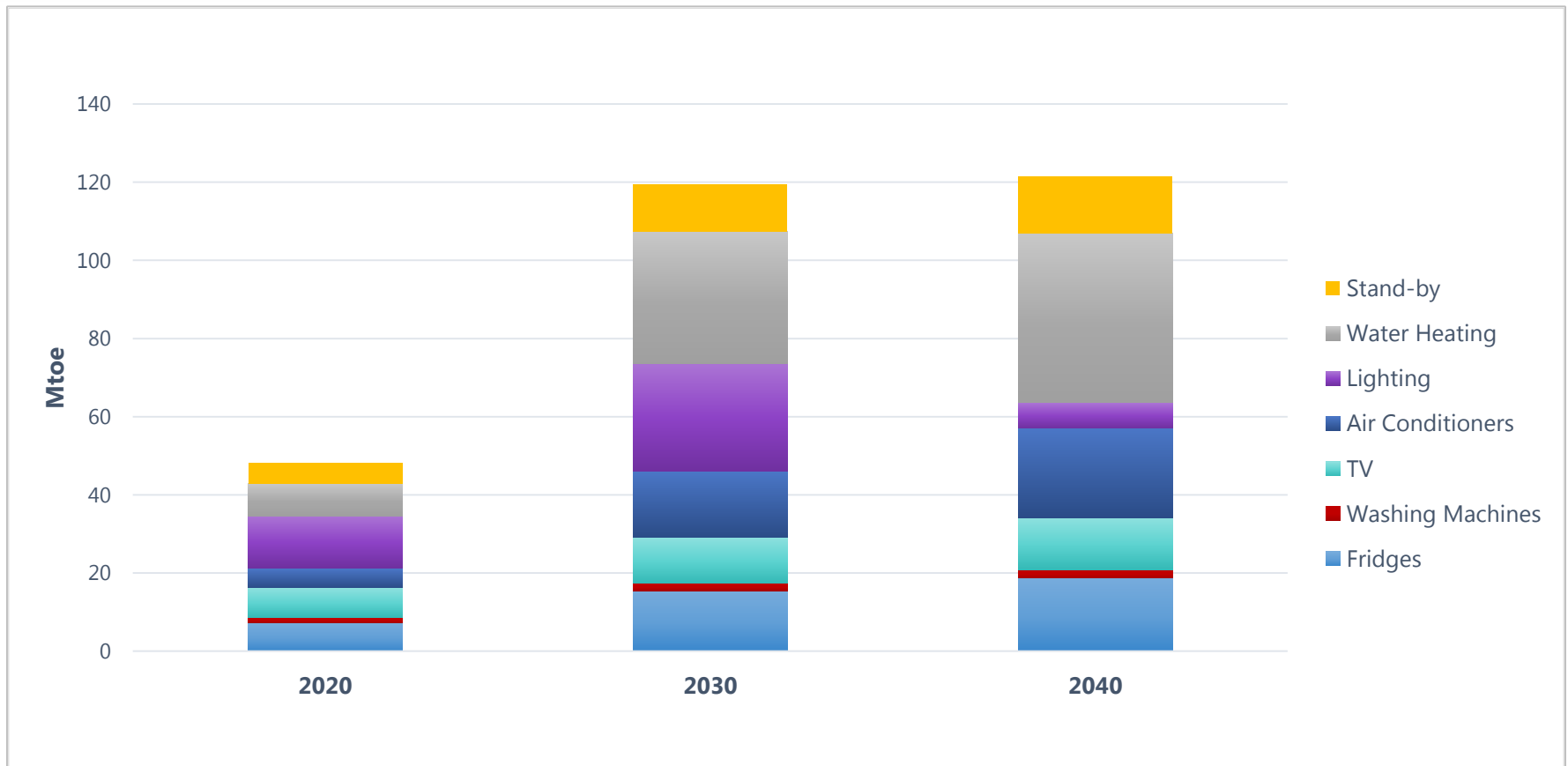
| Sector | Appliances and end uses | Range of efficiency |
|--------------------------------|--|--|
| Residential | Fridges Air Conditioners Water Heaters Lighting TV Washing Machines Stand-by | 644 – 216 kWh/y 2.55 – 5.81 EER 76% – 91% (HPWH - 2.5) 60W inc – 10W LED 261 – 102 kWh/year 194 – 6 kWh/y 5 – 3 – 1 W per device |
| Commercial – under development | Lighting Cooling Equipment Refrigeration | |

Energy Demand Of Residential Appliances: BAU vs Alternative



(Source: APERC Analysis)

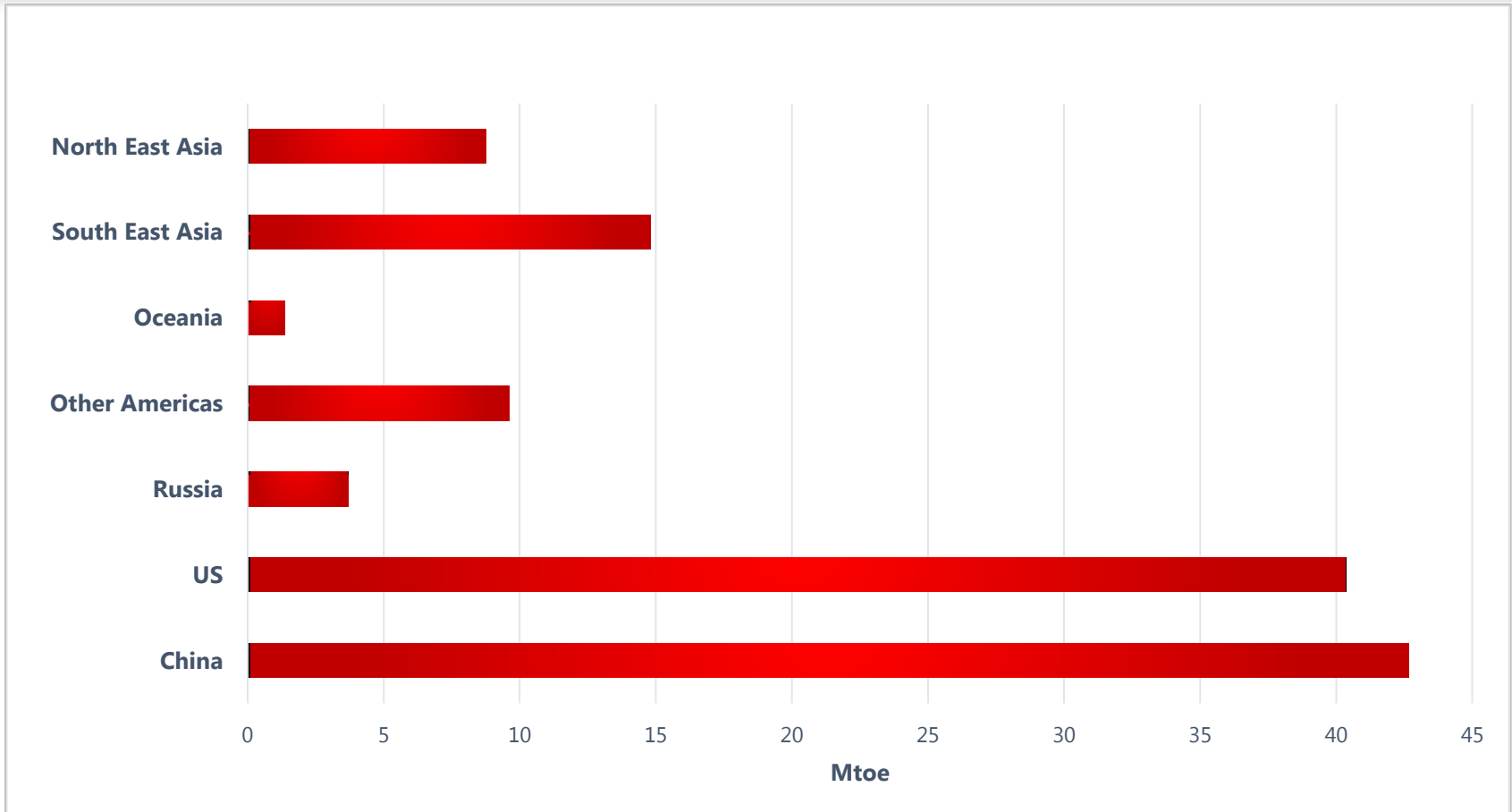
Energy Savings in Residential Appliances: BAU vs Alternative



(Source: APERC Analysis)

Water heating provides the largest saving potential of the selected appliances

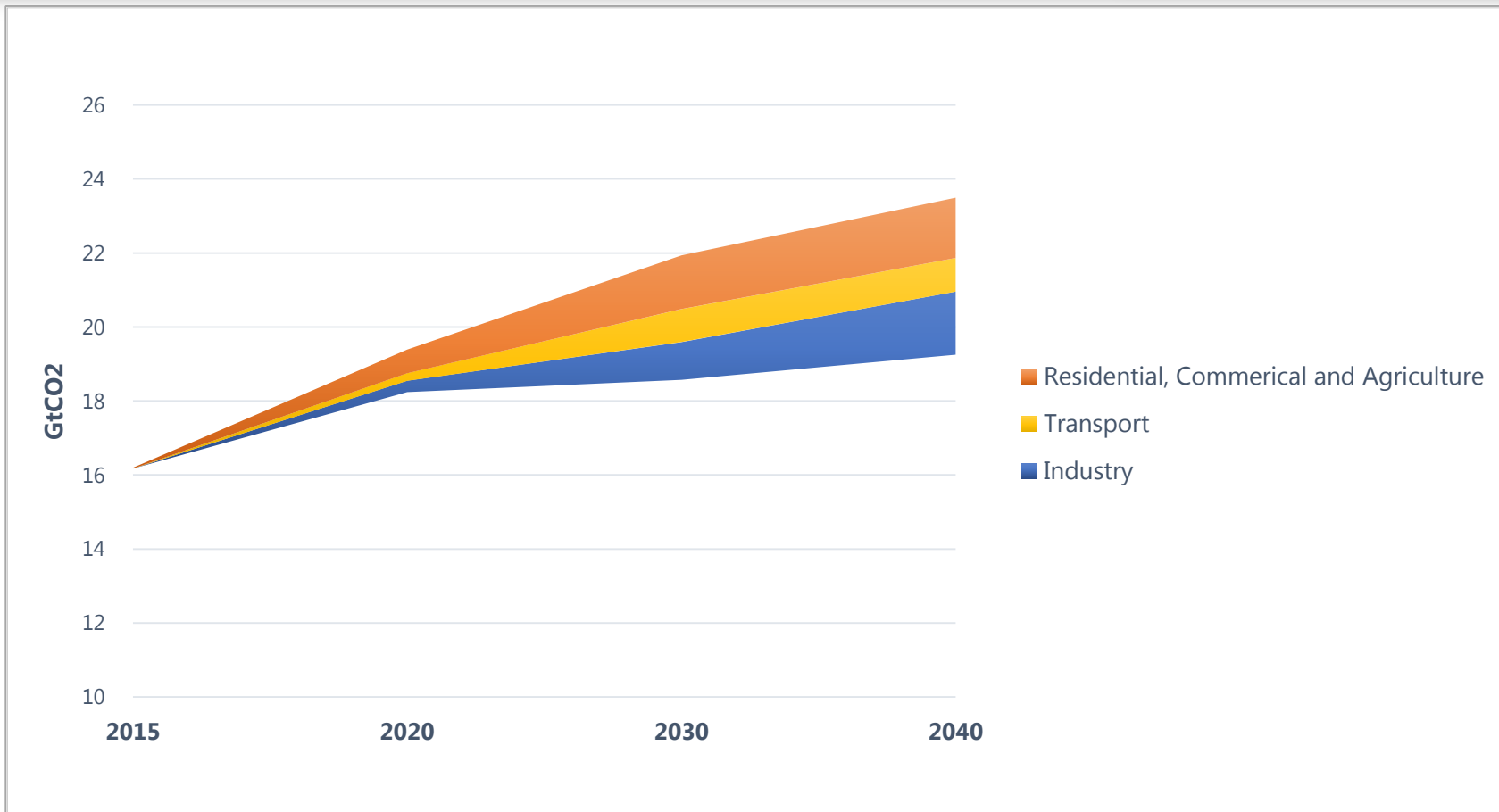
Residential Savings by Region in 2040



(Source: APERC Analysis)

China and the US represent the largest saving potential

CO₂ Emissions Reduction



(Source: APERC Analysis)

In Alternative Energy Demand, CO₂ emissions are 15% and 18% lower compared to BAU in 2030 and 2040. Lowest emissions of all alternative scenarios.

***We appreciate your review and
feedback on APERC's Outlook!***