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Accounting Primary Production from Renewables

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Energy Statistics and Training Office
Asia Pacific Energy Research Centre



**Asia-Pacific
Economic Cooperation**

Disclaimer

- The presentation is not the official position of APEC EWG and APERC/ESTO but mostly the opinion of the presenter
- The presenter is not an expert on renewable energy, physics and chemistry
- The presenter's backgrounds are mathematics and economics
- The presenter's work in the energy field is mainly on energy statistics and energy demand-supply modeling

Outline

- Background: SE4All and APEC RE Doubling Goal
- Methodologies in calculating primary production of renewable energy
- Efficiencies of RE Technologies
- Issues on current methodology
- Suggestions

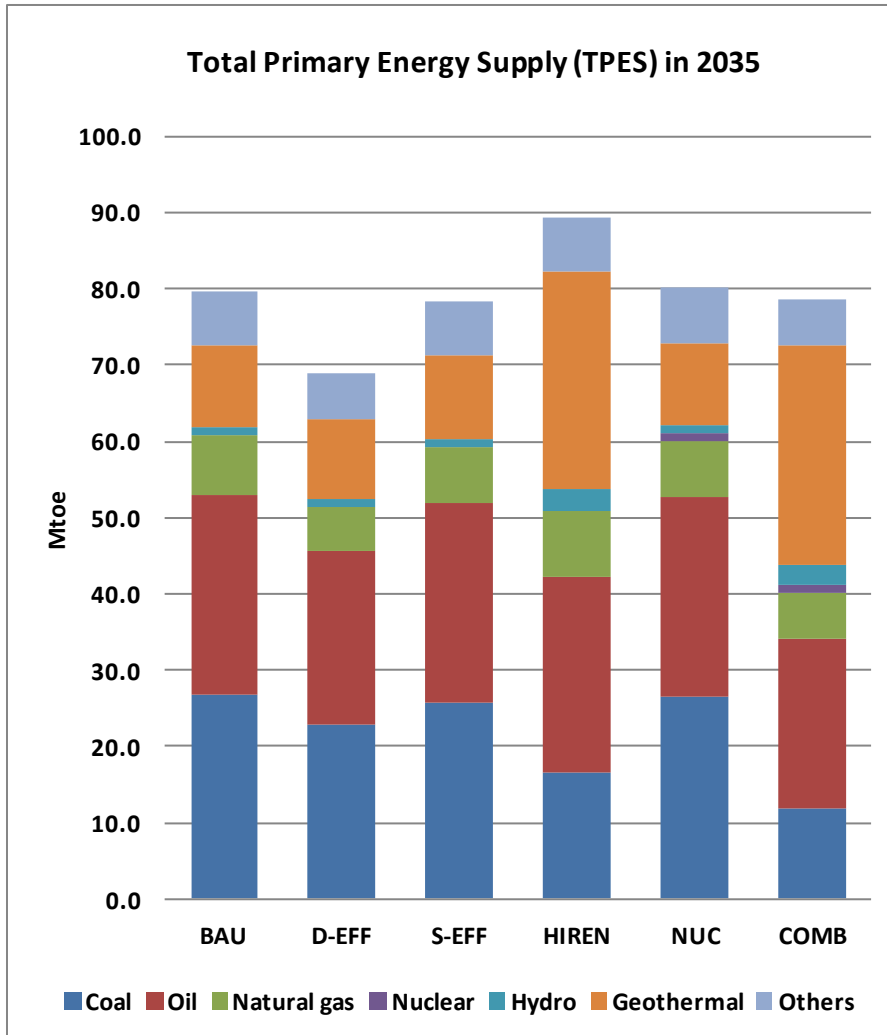
Background: SE4All and APEC Energy Goals

- SE4All
 - Ensuring universal access to modern energy services
 - Doubling the global rate of improvement in energy efficiency; and
 - Doubling the share of renewable energy in the global energy mix by 2030
- APEC Energy Goals
 - Reduce APEC-wide energy intensity (EI) by 45% by 2035 from 2005 level
 - Double the share of renewables in the APEC energy mix, including in power generation, from 2010 levels by 2030
 - These goals somehow pose some issues on how primary production from RE should be accounted

Calculating Primary Energy Equivalent of RE

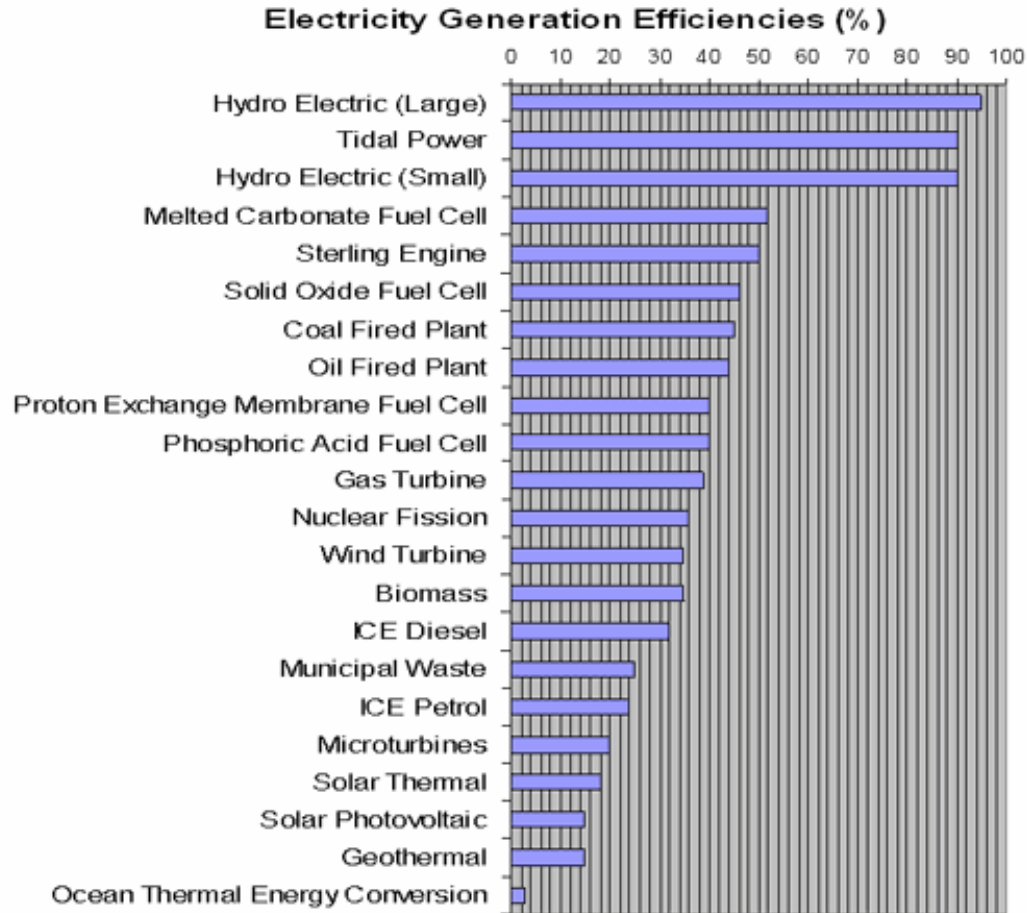
- Hydro, solar PV and wind electricity output = primary energy equivalent
 - Why? Electricity output is considered as the primary energy from these sources
 - Why not hydropower, sunlight and wind energy?
- Geothermal: electricity output * 10 = primary energy equivalent (for many countries)
 - Why? The efficiency of conventional geothermal turbines is around 10%
 - The primary energy is not the electricity output but the geothermal heat/steam input
- Why are the primary energies derived differently?

Impact of Current Methodology in Energy Outlook



1. BAU: Reference scenario
2. D-EFF: more efficient demand
3. S-EFF: more efficient power supply
4. HIREN: higher renewable for electricity and road transport
5. NUC: higher nuclear share
6. COMB: Combination of scenarios 2-5
7. Scenario 6 has higher TPES compared to scenario 2 due to lower efficiency assumptions used for nuclear power (33%) and geothermal energy (10%)

Theoretical Conversion Efficiencies of Various Technologies



Source - Eurelectric

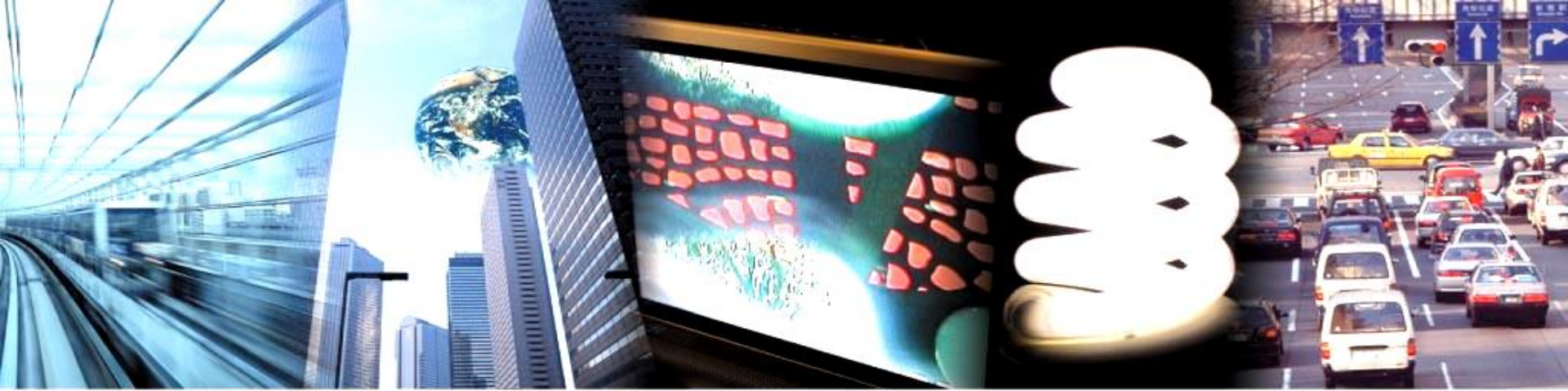
Note: Just for illustration to aid discussion. Not confirmed to be accurate.

Complaints from APEC Member Economies

- Share of hydro, solar and wind to total primary energy is understated
- Hydro, solar and wind cannot contribute much to increasing self-sufficiency targets (costly technologies but little contribution)
- Very low geothermal conversion factor result in higher energy intensity although higher RE production
- Never an issue as each country/economy can have their own methodology
- However, as there are global and regional targets/goals, all energy balances should apply the same methodologies to avoid confusion

Suggestions

- InterEnerStat should start discussion on the most appropriate methodologies in calculating primary energy equivalent of RE sources
- We have harmonised definitions of products and flows, shouldn't harmonised energy balance methodologies follow?



Thank you for your attention

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