REMAP 2030: a roadmap to doubling the renewable share by 2030

(in the context of the SE4ALL Initiative)

Why the SE4ALL renewable target is challenging

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Content

- Why the SE4ALL renewable energy target is challenging
- IRENA analysis of the level of challenge

"*Sustainable Energy for All*" (SE4ALL)

The three objectives by 2030:

1. **Universal access to modern energy services (*phase-out energy poverty and inefficient use of traditional biomass*);**
2. **Doubling the energy efficiency growth rate;**
3. **Doubling the share of renewable energy (RE) in the global energy mix**

… meeting the 1st goal helps to achieve the 2nd one, but does not help achieve the 3rd one

How to measure the RE share in the energy mix

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- **RE share in TFEC (total final energy consumption)**

TFEC, secondary energy after conversion process, energy ready for final use (e.g. gasoline, electricity).

… Most RE is available in this form (electricity, solar heat, biofuels)

- **RE share in TPED (total primary energy demand)**

TPED, primary energy before conversion (e.g. oil, coal)

… If we measure the RE in TPED, we need to convert RE into primary energy equivalent using conventional efficiency (different methods are used)

Where we are today, where we want to go

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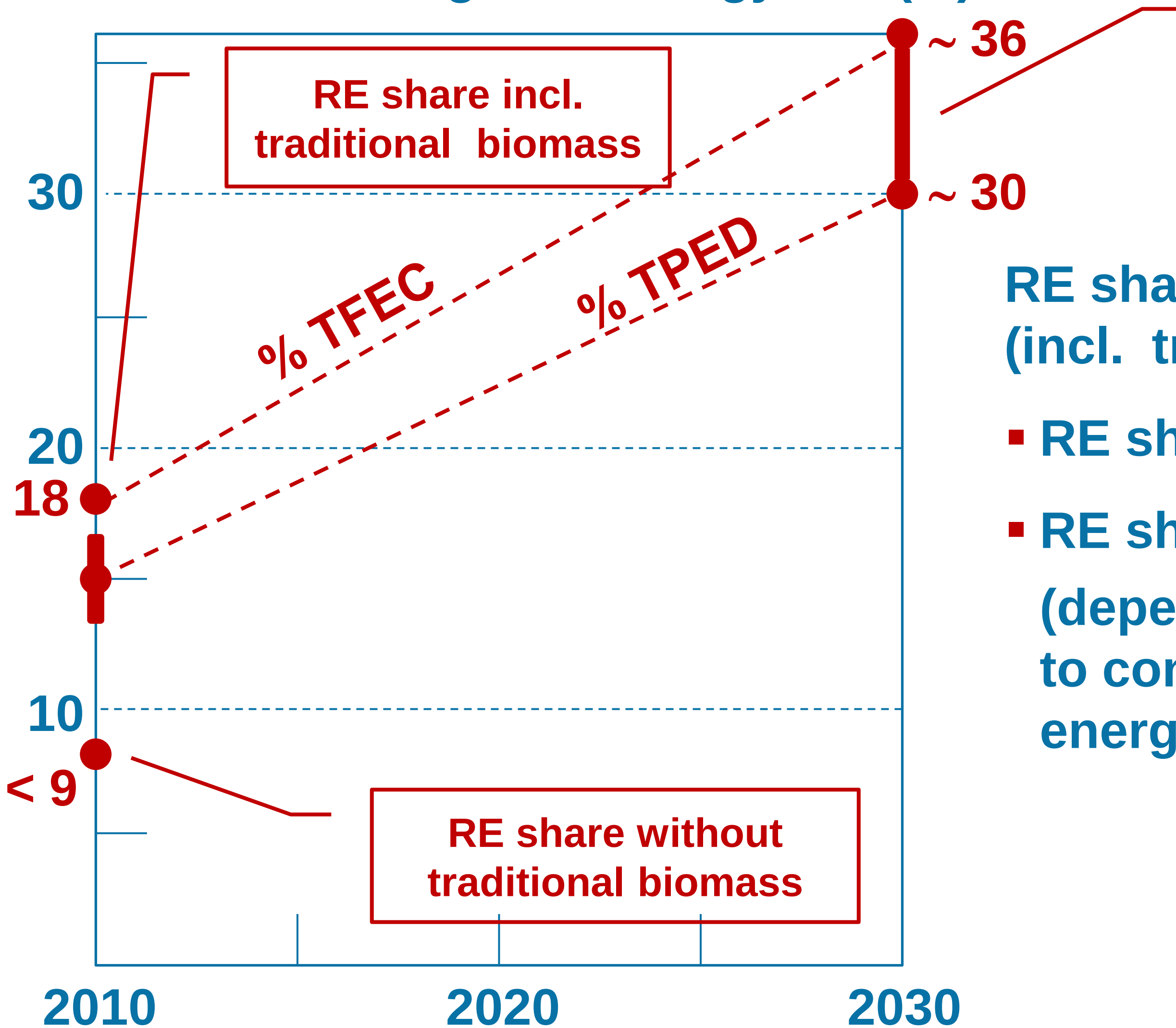
RE Share in the global energy mix (%)



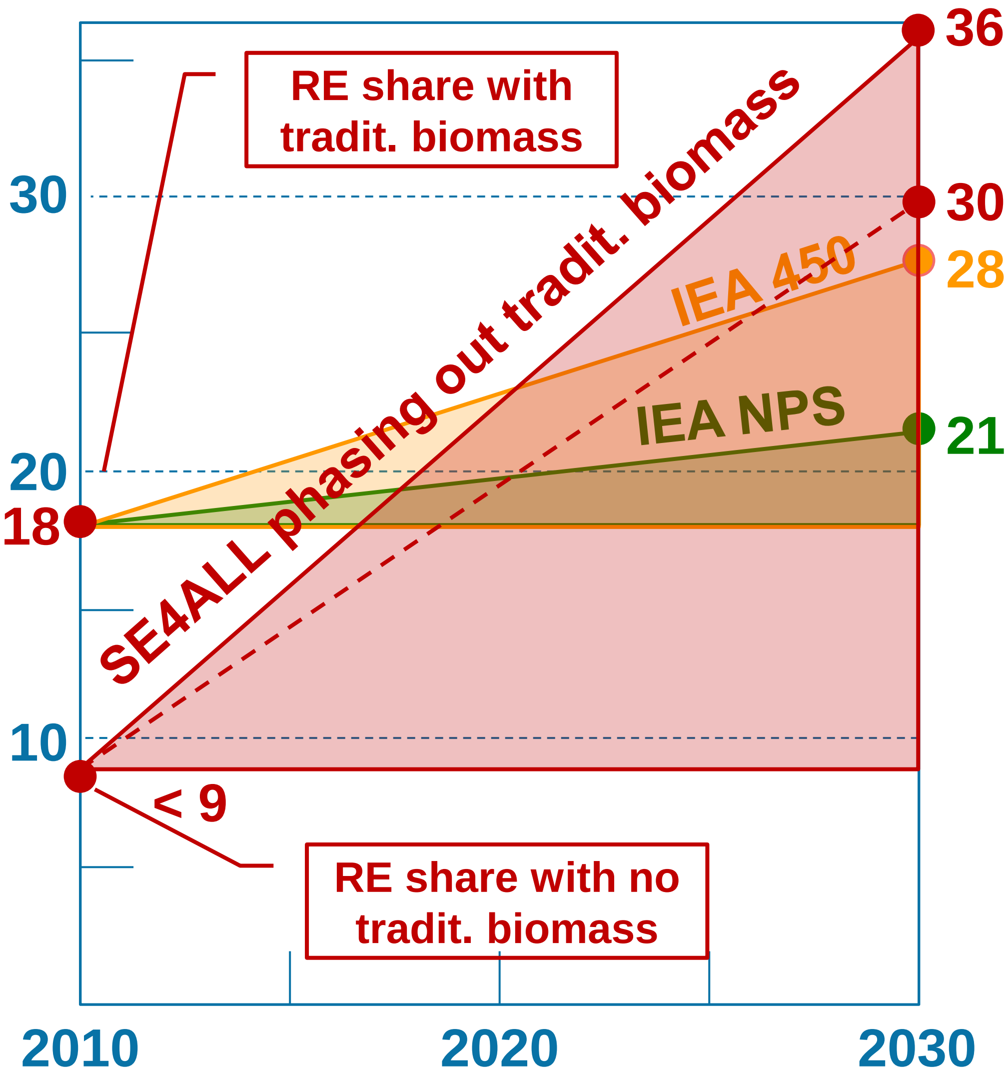
RE share in 2010 (incl. traditional biomass)

- **RE share in TFEC ≈ 18%**
- **RE share in TPED ≈ 13-17%**

  (depends on efficiency used to convert RE into primary energy equivalent)

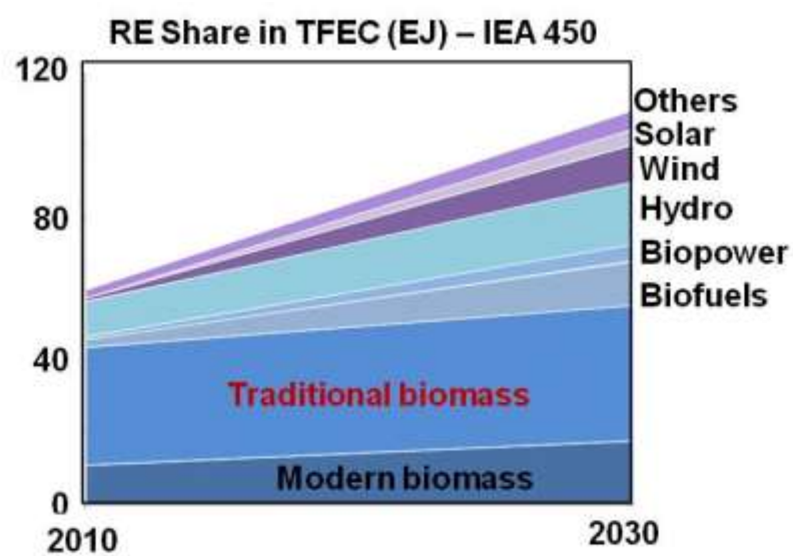
Why it is challenging

RE Share in TFEC (%)



IEA New Policy Scenario (IEA NPS) accounts for technologies and policies currently in place and planned

IEA 450 Scenario (IEA 450) includes additional efforts to keep the global warming within 2°C (450 ppm CO_2); relies significantly on CCS to reduce CO_2 emissions, and on continued use of traditional biomass



Assessing the level of challenge: IRENA Analysis

International Renewable Energy Agency

A three-step approach

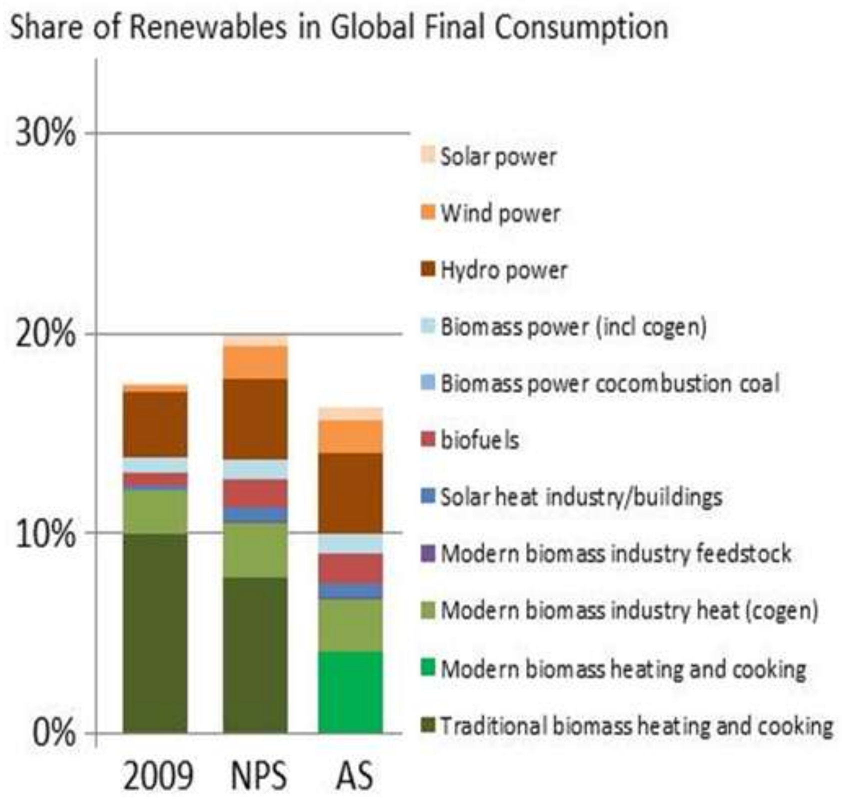
- Develop an *Access Scenario* (AS) building on IEA NPS and achieving universal access to modern energy by 2030;
  (→ analyse the AS impact on global RE share);
- Develop an *Access and Efficiency Scenario* (AES) building on AS and achieving both the universal access and double energy efficiency growth rate;
  (→ analyse AES impact on global RE share);
- Develop a *Renewables, Access and Efficiency Scenario* (RAES) building on AES, and using different combinations of renewable technology options to double the RE share by 2030;
  (→ analyse the implications)

Access Scenario (AS)

Assumption: ***AS builds on the IEA New Policy Scenario 2030 and assumes an additional deployment of modern RE to provide electricity access to 1.3 bn people and modern heating-cooking to 2.7 bn who have not.***

Key Findings

- **If only RE is used to replace traditional biomass ...**
- **the RE share declines from 19% (IEA NPS 2030) to 17% in AS 2030 (modern renewables are more efficient than traditional biomass);**
- **Achieving universal access will reduce the RE share in the energy mix due to the phase-out of traditional biomass**

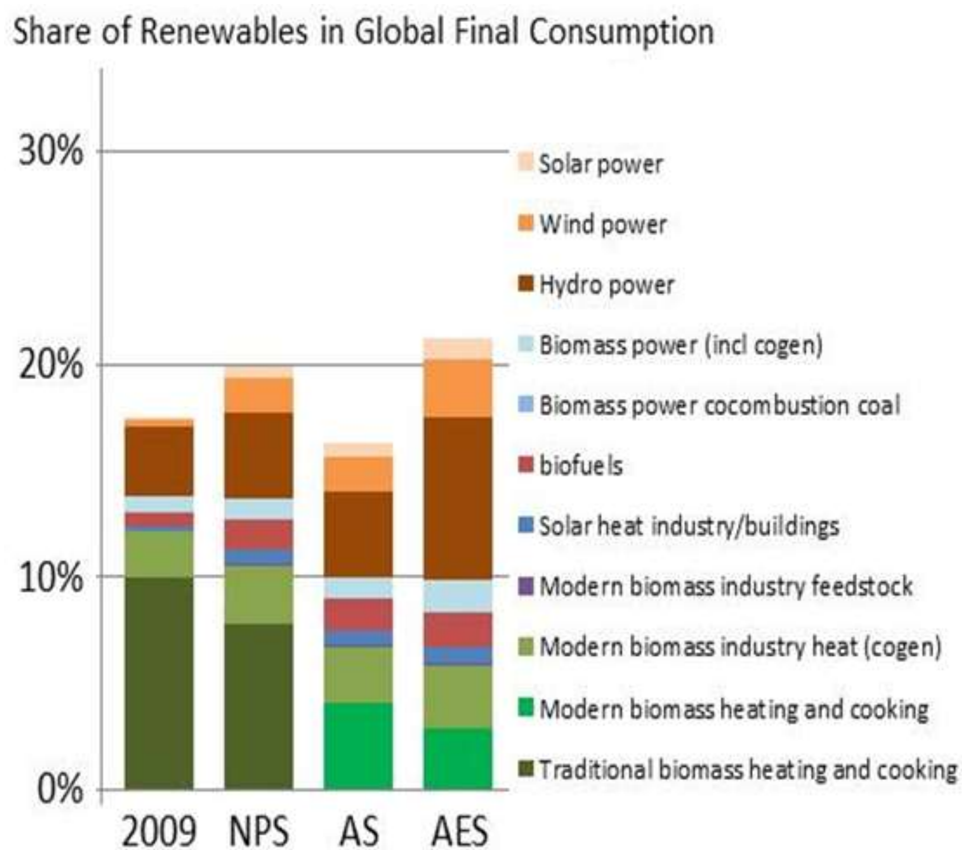


Access and Efficiency Scenario (AES)

Assumption: ***AES builds on AS and assumes increased renewable-based electrification* in end-use sectors (electric vehicles, heat pumps, etc.) to achieve the SE4ALL energy efficiency goal.***

Key findings

- **More electrification in end-use sectors can achieve the SE4ALL efficiency goal, and ...**
- **increases the RE share from 17% in AS 2030 to almost 23% in AES 2030;**
- **More energy efficiency policies are needed and ...**
- **an additional renewable power capacity of about 1815 GW is to be installed for this to happen**



(*) But no efficiency improvement in power generation and end-use technologies

Renewables, Access and Efficiency Scenario (RAES)

Assumption: ***RAES builds on AES and explores several technology options to double the RE share by 2030***

- **Displace up to an additional 4% of fossil-fuels in power generation by additional renewable power (up to 40GW hydro, 300-480GW wind, 200-250GW PV, 20-30GW CSP, 200-500GW biomass including co-firing, 11-18GW geothermal and 2-3GW ocean energy);**
- **Co-firing 10-20% of biomass in coal-fired power stations;**
- **Displace 5-20% fossil fuels feedstock in chemical industry with biomass feedstock (bio plastics);**
- **Displace an additional 5-7% of fossil fuel in transport by biofuels;**
- **Displace 5-10% fossil fuels for industrial heat by biomass;**
- **Displace 5-20% fossil fuels for industrial heat by solar;**
- **Displace 5-30% fossil fuels for buildings heating/cooling by solar**

Renewables, Access and Efficiency Scenario (RAES)

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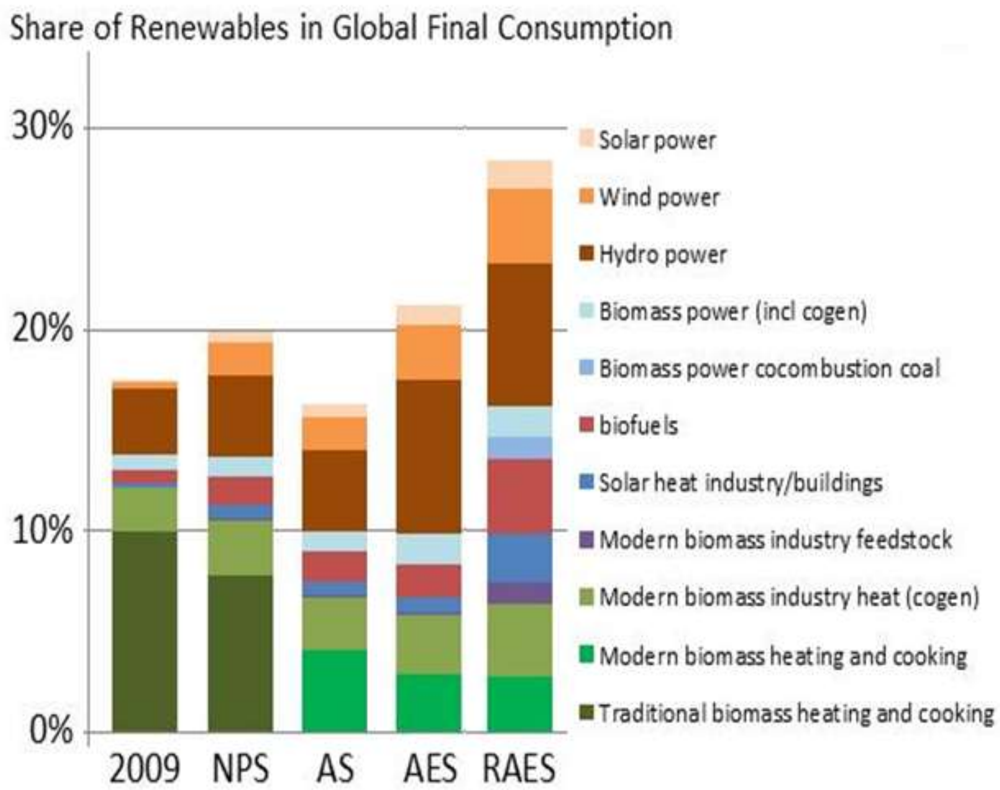
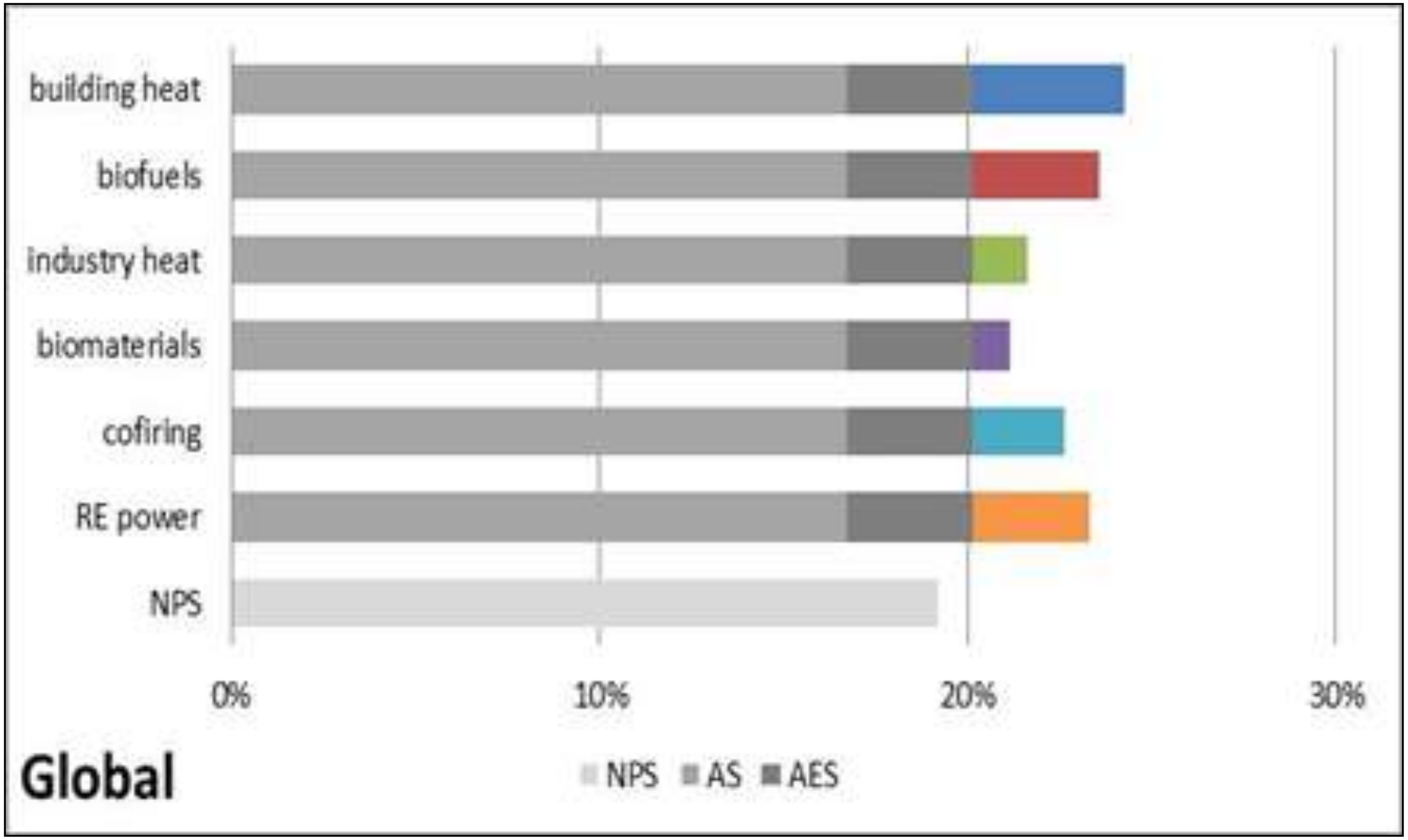
Key Findings from RAES

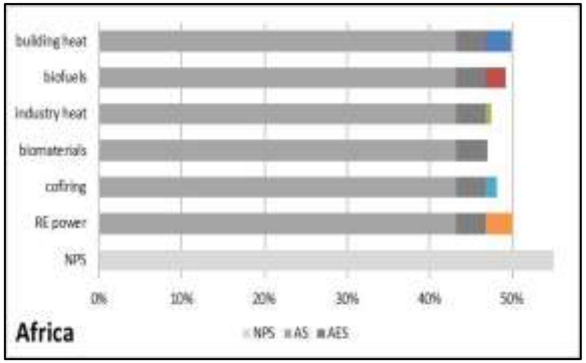
- More RE in power sector and in “ALL” end-use sectors is needed to double the RE share (action in a few sectors is not enough)
- If so, a 30% RE share can be marginally achieved if the RE share is measured in TFEC (or slightly exceeded if measured in TPED);
- Major contributions from RE in buildings, power generation, biofuels, and biomass co-firing
- Lower contributions from solar heat in industry and biomass feedstock in chemical industry

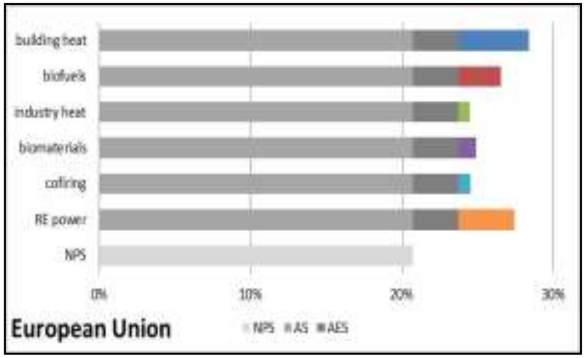


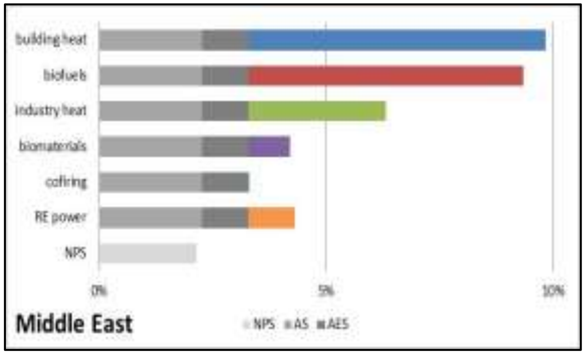
Role of Energy Sectors to doubling the RE share



Regional Differences







SE4ALL objectives and related policies may have different regional impacts, e.g.

- **universal access to modern energy reduces the RE share in Africa and has little impact in EU and ME;**
- **increased biomass co-firing has little impact in ME (little/no coal-fired capacity) while it may contribute the RE share in EU**

The global assumptions used in the IRENA analysis need to be specialised at regional level to capture the regional (and national) dimension of the challenge

Conclusions

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- Doubling the RE share by 2030 is technically feasible, but poses unprecedented challenges in terms of renewables deployment, if traditional biomass is to phase out in parallel;
- Required deployment of modern renewable technologies goes well beyond most ambitious energy scenarios to mitigate emissions and climate change;
- The regional and national dimension of the effort vary considerably across world regions and countries, depending on starting point, natural endowment, national policy;
- Crucial role for all energy sectors (power generation, transport, building, industry, but also electric grids, and energy in the cities (sectoral approach);
- Also crucial is to assess the economic implications (investment, impact on GDP, employment) of this important transformation of the energy system at regional and national level.

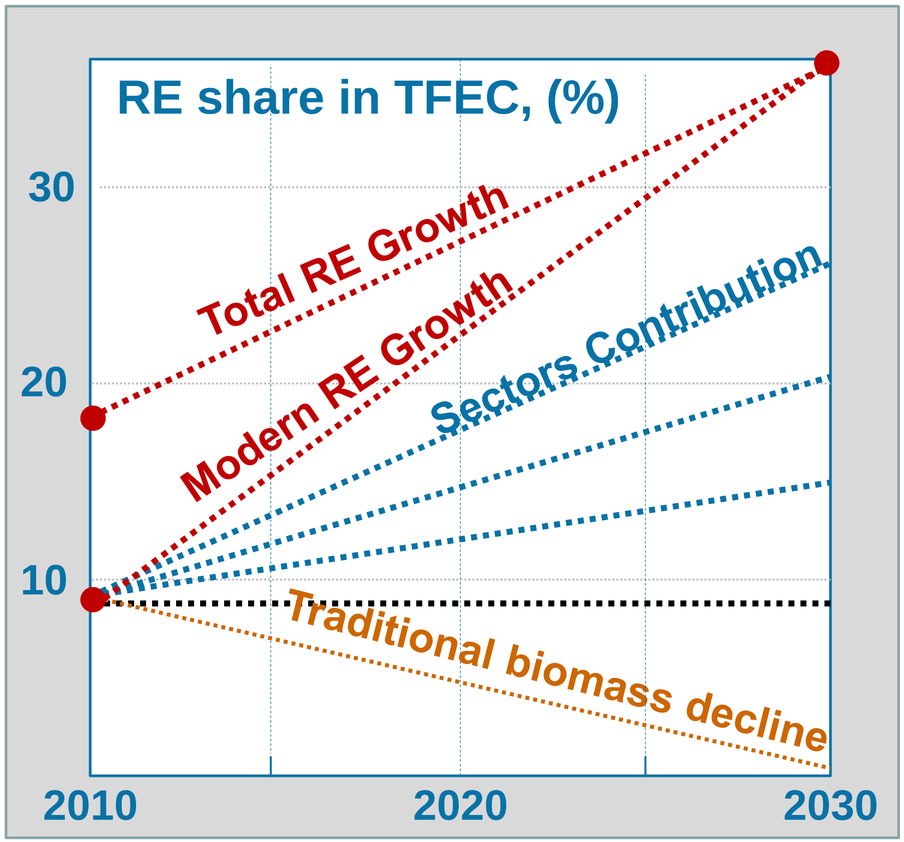
IRENA Global Renewable Roadmap (REMAP 2030)

IRENA International Renewable Energy Agency

Regional and National Roadmaps

IRENA Regional Scenarios

IRENA Sectoral Roadmaps



IRENA RE Technology Analysis

Economic Implications

Pathways and operational steps to double the RE share by 2030

Promote a new phase of RE deployment

Support Countries policy

support SE4ALL initiative