



Economic Opportunities of the Energy Transition

Dolf Gielen

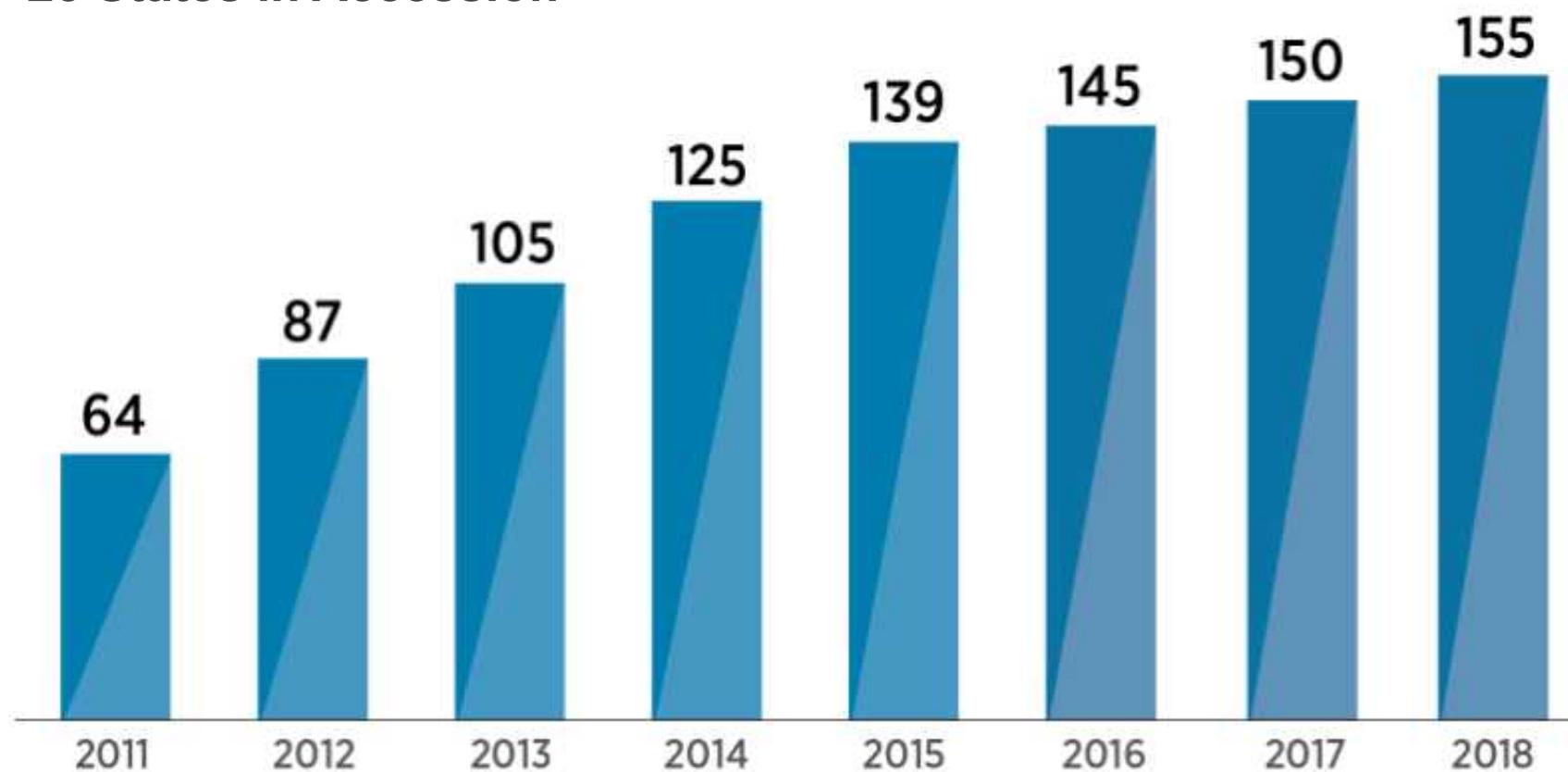
Director, Innovation and Technology
MoFA Advisory Panel, 5 March, Tokyo



Global Membership – an indicator for widespread recognition for renewables

155 Members

25 States in Accession



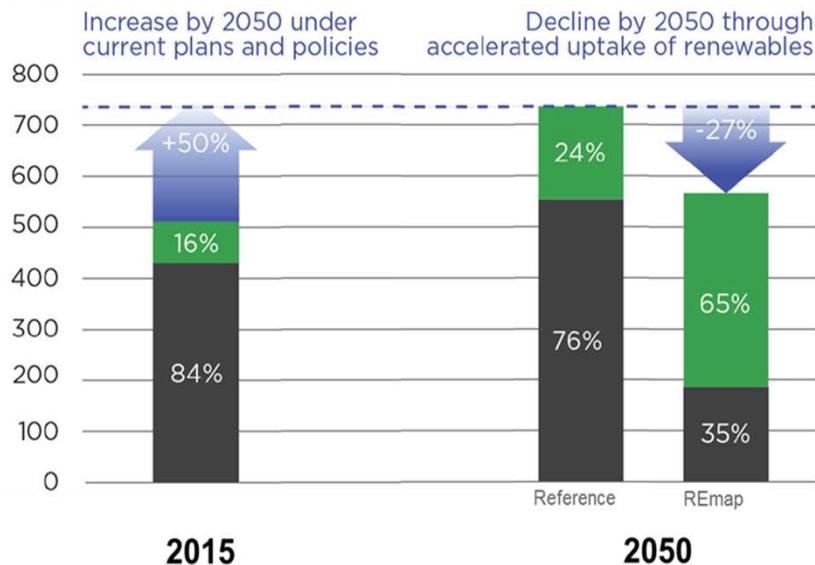
Energy transition is needed, based on RE

+ EE

A consequence of the global climate agreement



Total primary energy supply (EJ/yr)



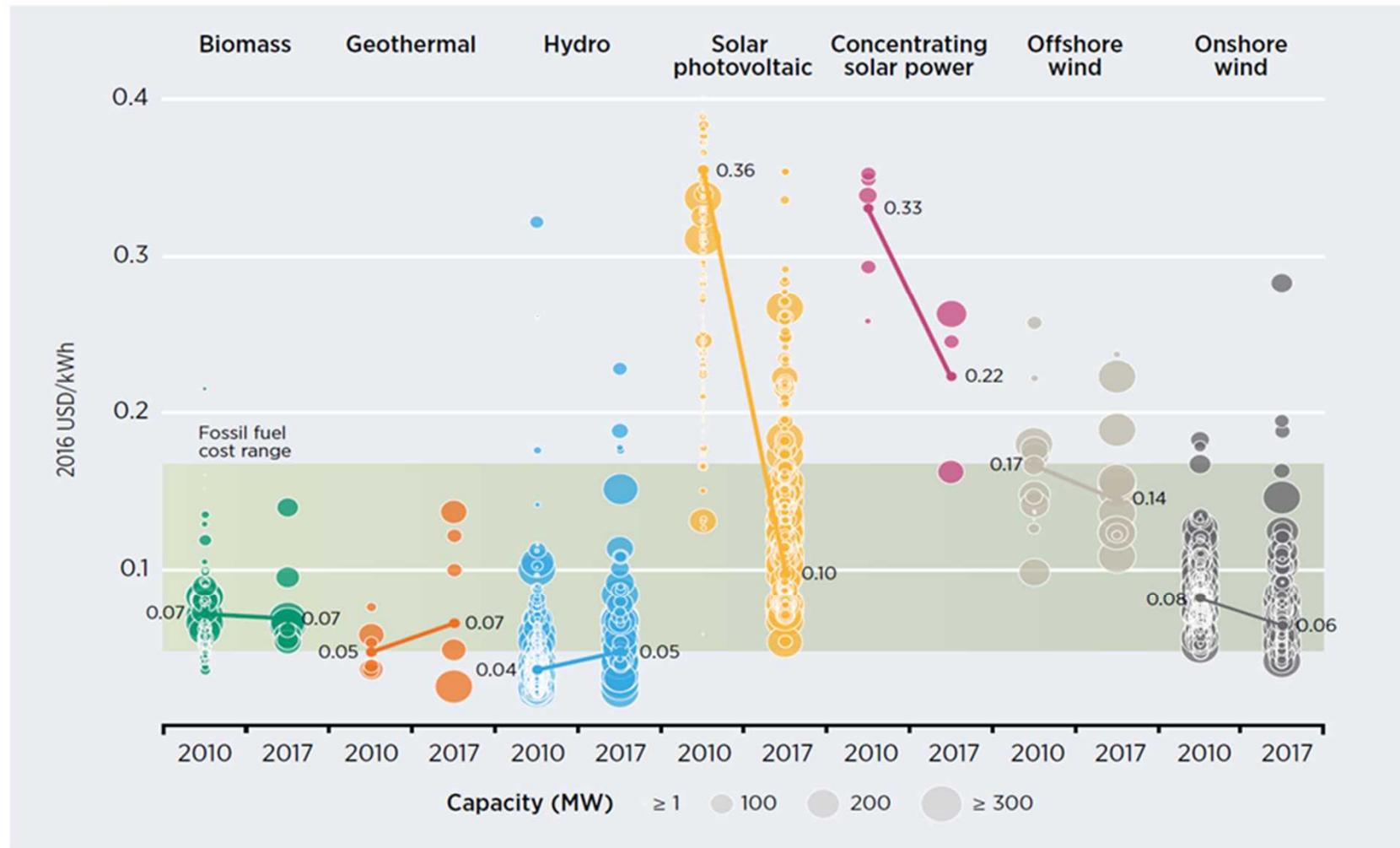
Source: IRENA, 2017

A combination of very high energy efficiency and rapid growth of renewables

- Renewable energy would make up two-thirds of the energy mix by 2050 in REmap case, up from just one-quarter in Reference Case
- This requires an increase in the renewables' share of 1.4% per year, a seven-fold acceleration
- TPES would stay around today's level the result of both energy efficiency and RE power/electrification
- GDP nearly triples while energy use is flat – intensity improvement 2.6%/yr – a doubling
- IRENA and IEA agree on the main findings³

Cost trends – energy transition is affordable

Renewables



Source: IRENA Renewable Cost Database.

Renewables account for more than half of global power generation capacity additions since 2012

Energy transition has attractive economic consequences

Economics of Energy Transition

1 Boosts global GDP



- **0.8%** higher in 2050 compared to current plans and policies
- **USD 19 trillion** in cumulative economic gains, 2015-2050

2 Improves welfare



- **Health, environmental** and **climate** benefits that GDP fails to capture
- Saving up to **six times** more than the additional costs of decarbonisation

3 Creates jobs



- **Total 26 million** employed in renewables by 2050 from 9.8 million today
- Job creation exceeds fossil fuel job losses when combined with energy efficiency job gains

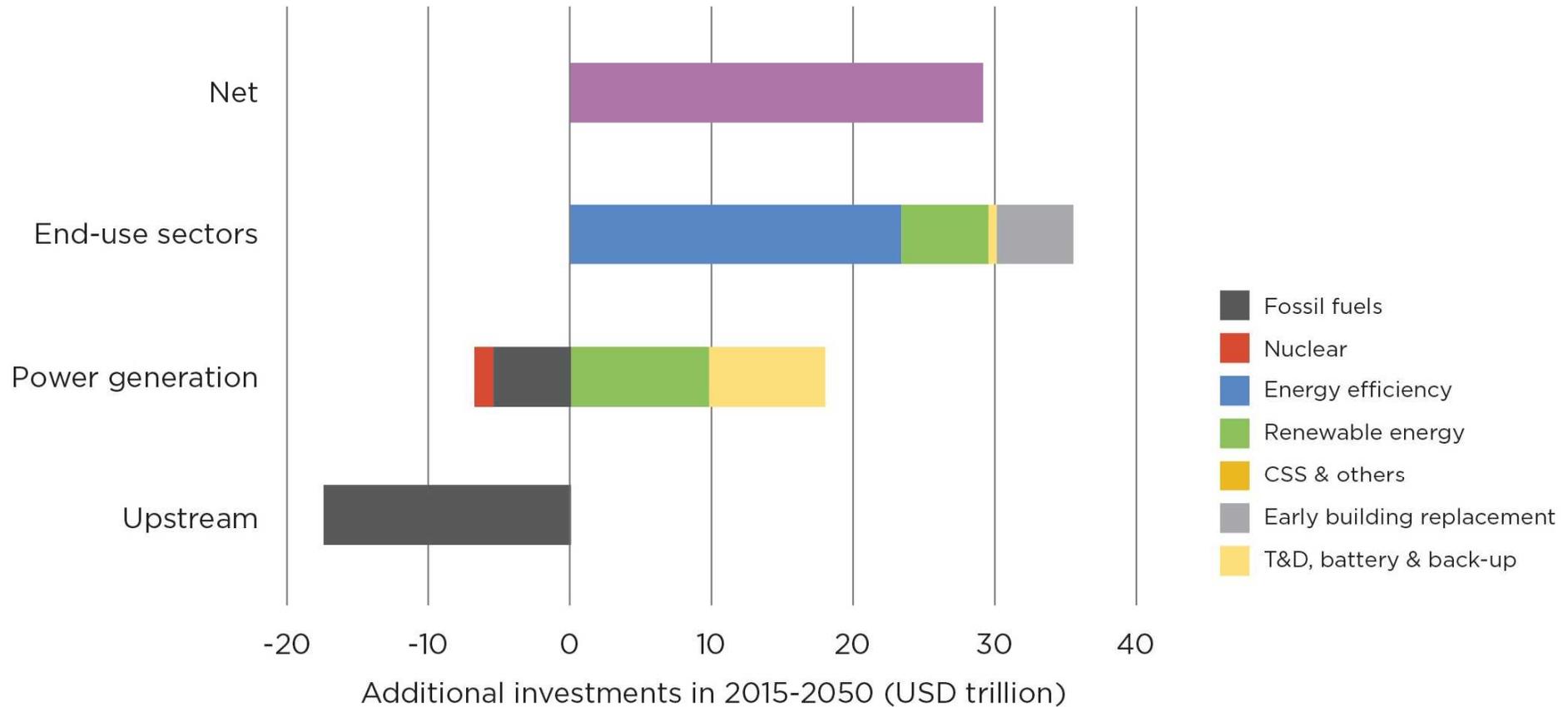
But to achieve these aims, the world needs **more investment** in low-carbon technologies



- **3X** more investment in renewable energy
- Net incremental investment of **USD 830 billion** more per year compared to current plans and policies

To learn more, see [Perspectives on the Energy Transition](#)

A USD 29 trillion incremental investment opportunity in REmap compared to the Reference Case, 2015-2050



- Meeting the 2° C target requires investing an additional USD 29 trillion between 2015 and 2050 compared to what current plans and policies foresee.

The energy transition presents an economic opportunity

- Regional and rural development (joint Japan-IRENA workshop 18 January, Abu Dhabi)
- Energy Transition Coalition – to be launched during 3rd Suzhou International Forum on Energy Transition, October/November 2018. Supported by IRENA
- New industrial activities and service industries
 - Equipment manufacturing (batteries, EV, heat pumps etc)
 - Electricity trade and power system services
 - Innovation opportunities: advanced biofuels, hydrogen etc
 - Energy services (ISO 50 001 etc)
 - Digitalization of the energy system, big data etc
 - New commodities may emerge eg Lithium
- The industry structure will change - a global risk of USD 10-20 trln stranded assets under business-as-usual

Innovation Landscape



How to scale-up the transformation of the power sector to a close to zero-carbon one by 2050?

- Innovation in business models, regulation, market design, enabling infrastructure, operational practices

Innovation Week Bonn 5-7 September

Innovation Landscape report in preparation

The energy transition will have geopolitical consequences

- Global Commission on the Geopolitics of Energy transformation , supported by IRENA.
- Reduced climate change will reduce the risk of mass migration.
- Welfare gains for society could also come from increased energy access, helping to generate sustainable livelihoods and better quality of life in rural areas.
- Reduced trade of fossil fuels.
- More interconnectors for electricity trade.
- Today's energy importers will likely benefit from a more local and decentralized energy infrastructure.
- Energy transition is a global trend that is driven by innovation and policy, gradually moving from power sector to end use sectors.
- It requires a rethink what is energy policy (SDGs).



Thank you!



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