Global Energy Transition Prospects and the Role of Renewables
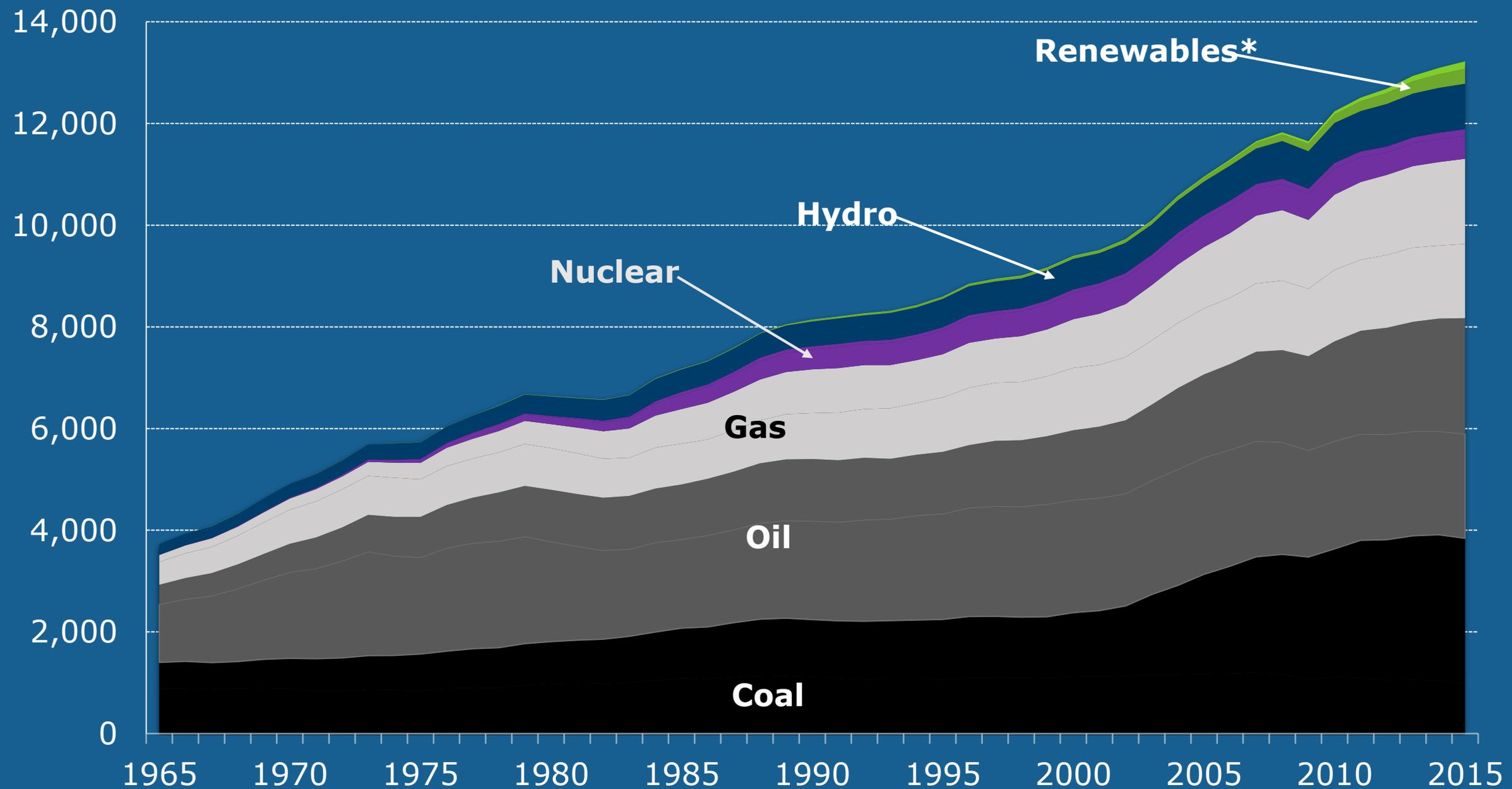
Paul Deane, James Glynn, Brian Ó Gallachóir.

Astana, Republic of Kazakhstan| 20th June 2017

Focus: What are the Opportunities and Challenges of renewable energy as part of the global energy transition

Global Energy Consumption 1965 to Today (Mtoe)

Renewables*

Hydro

Nuclear

Gas

Oil

Coal

What might the next 80 years look like for the Global Energy System?

Scenario-2 degree limit to Global Warming

GLOBAL ETSAP-TIAM model

- Linear programming bottom-up energy system model of IEA-ETSAP

- Integrated model of the entire energy system

- Prospective analysis on medium to long term horizon (2100)
  - Demand driven by exogenous energy service demands

- Partial and dynamic equilibrium

- Optimal technology selection

- Minimizes the total system cost

- Environmental constraints

- Local Air Pollution and

- Health external damages

- Price-elastic demands

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TIAM Regions
- AFR
- AUS
- CAN
- CHI
- CSA
- EEU
- FSU
- IND
- JPN
- MEA
- MEX
- ODA
- SKO
- USA
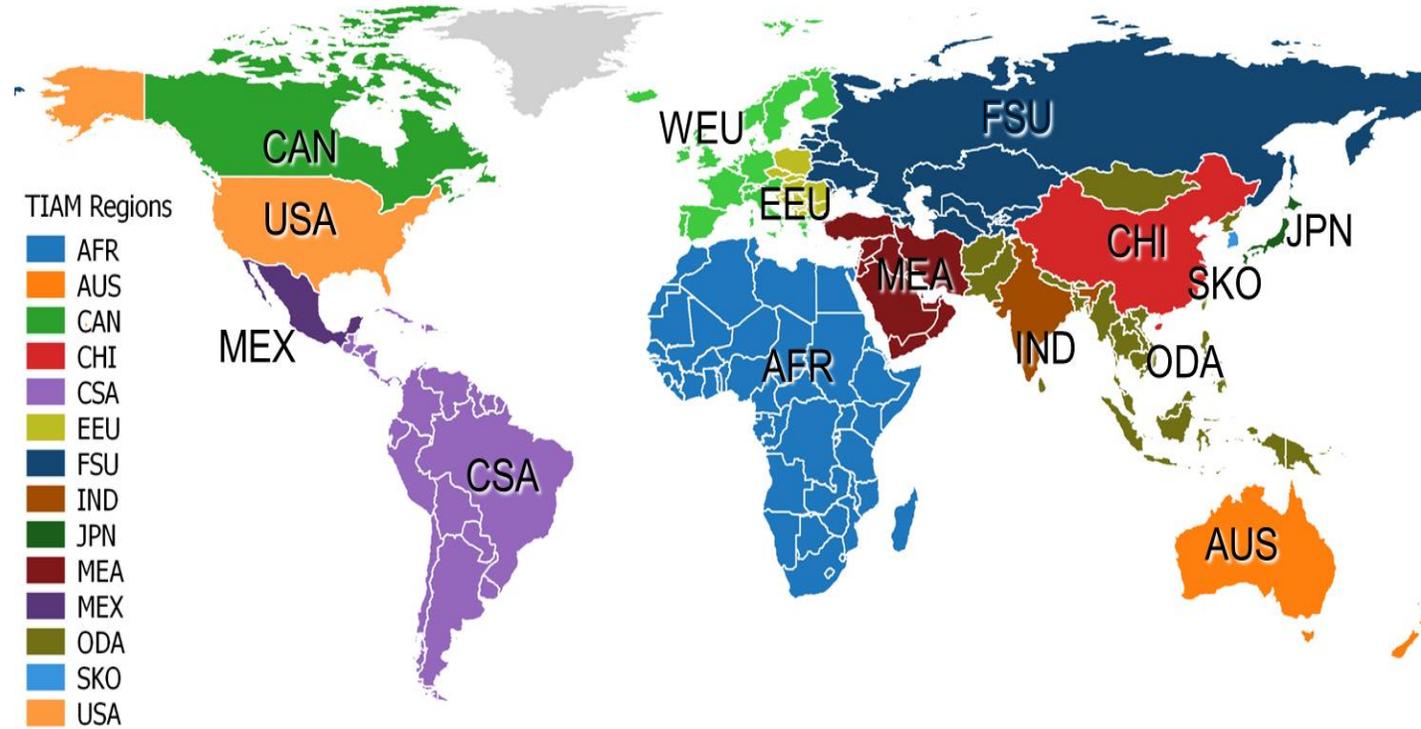
Possible CO2 Trajectory Gt(CO2) for 2 Degree Scenario
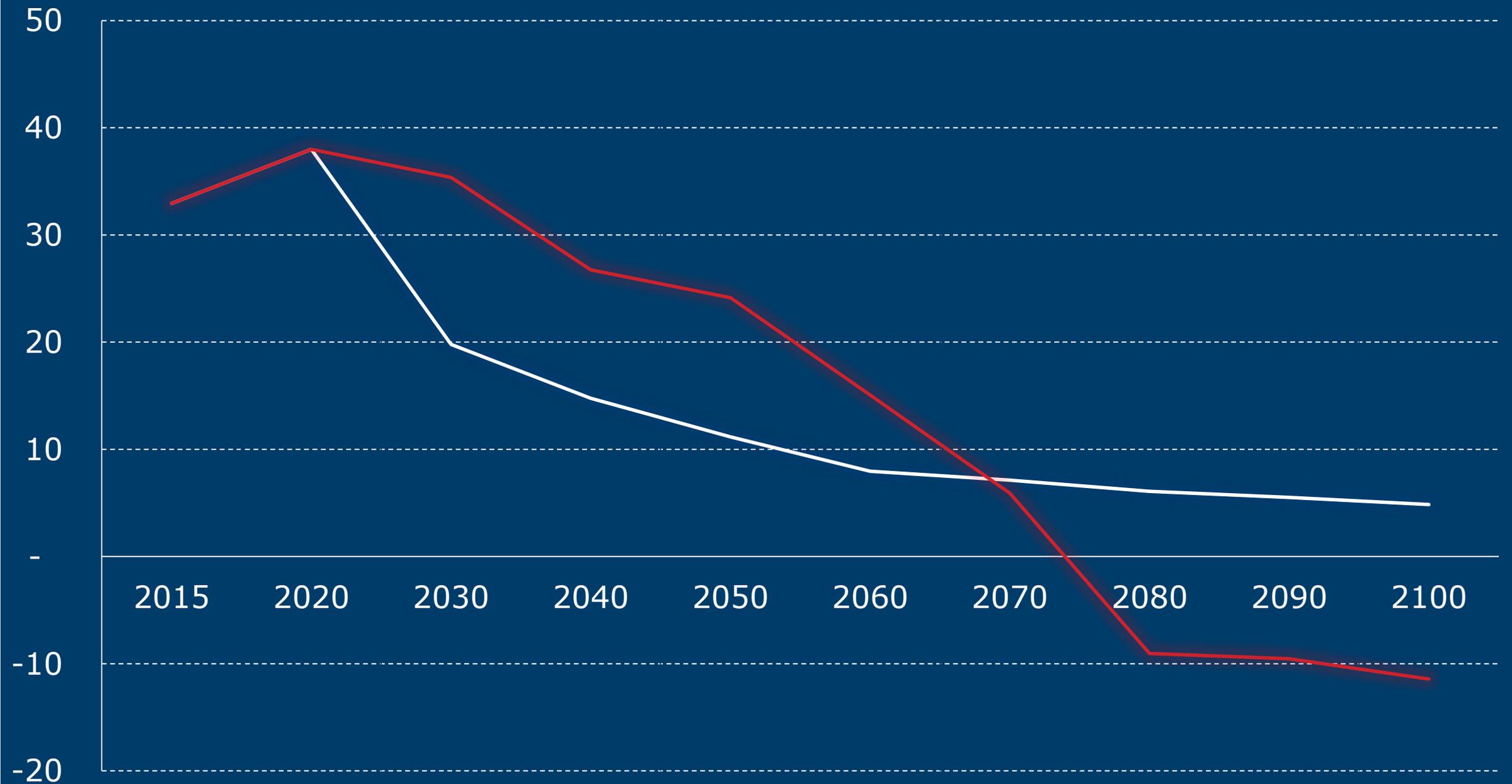
Global Energy Consumption Today to 2100 (Mtoe)

Coal ■ Oil ■ Gas ■ Nuclear Hydro ■ Bioenergy ■ Renewables

Coláiste na hOllscoile Corcaigh
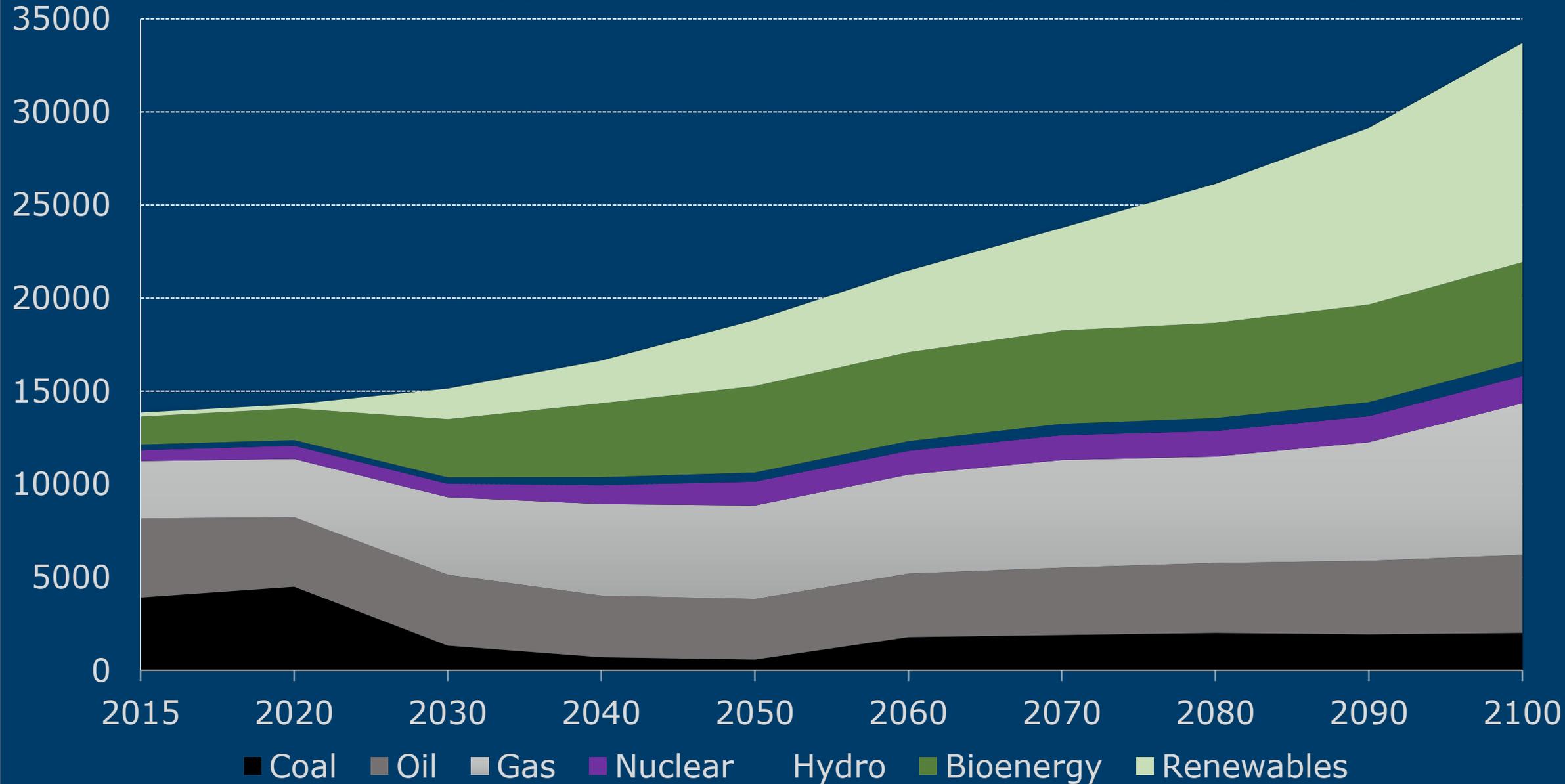
Renewable Levels (%) and Electrification within Global Energy System

Legend: - - All Renewables   - ● - Of which are V-RES   —○— Electrification
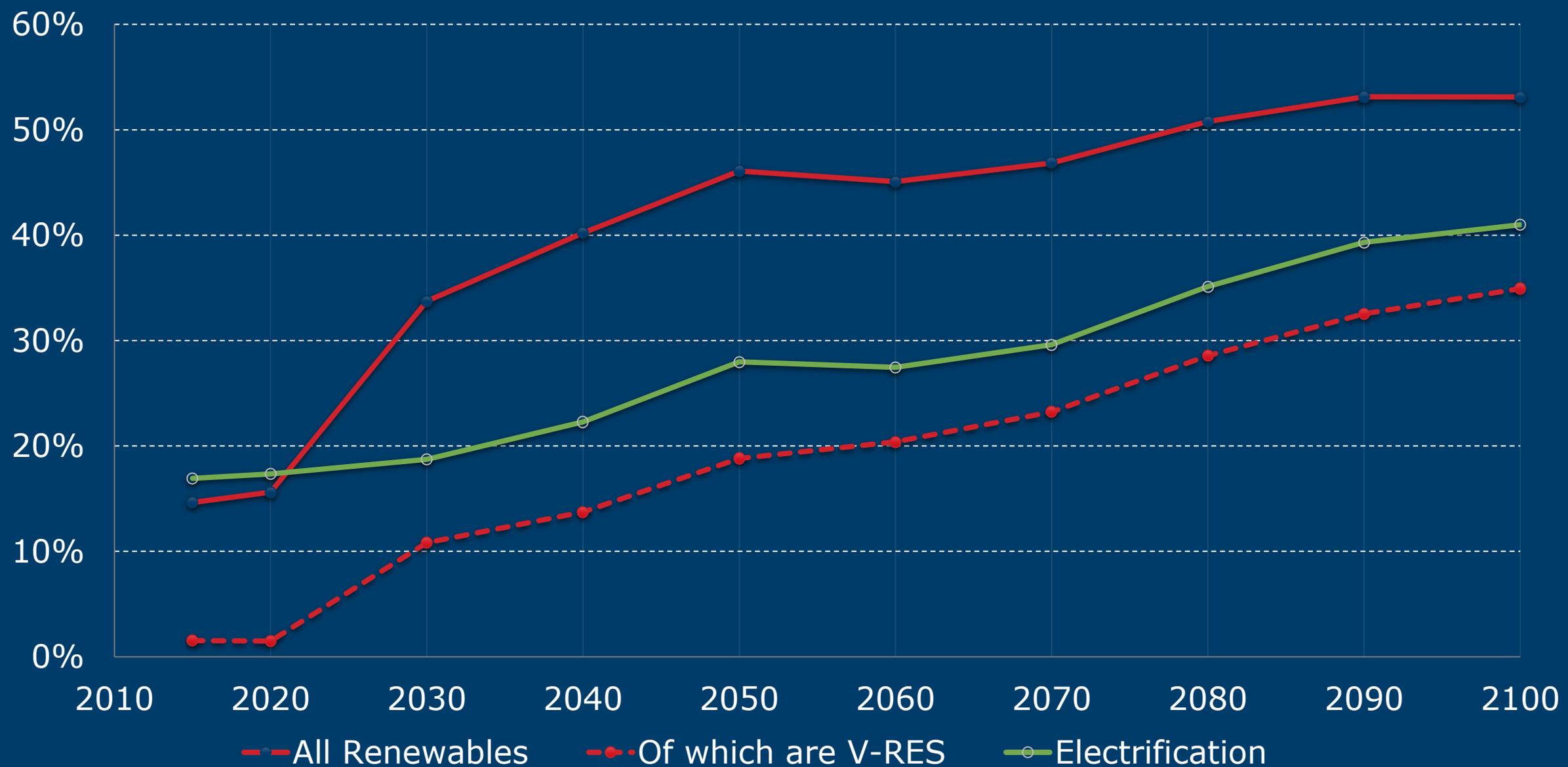
Installed Wind and Solar PV Capacity Today and 2050* (GW)

	Solar Wind	Solar Wind	Solar Wind	Solar Wind	Solar Wind	Solar Wind
	USA	FSU	China	Africa	Japan	India

2015   2050
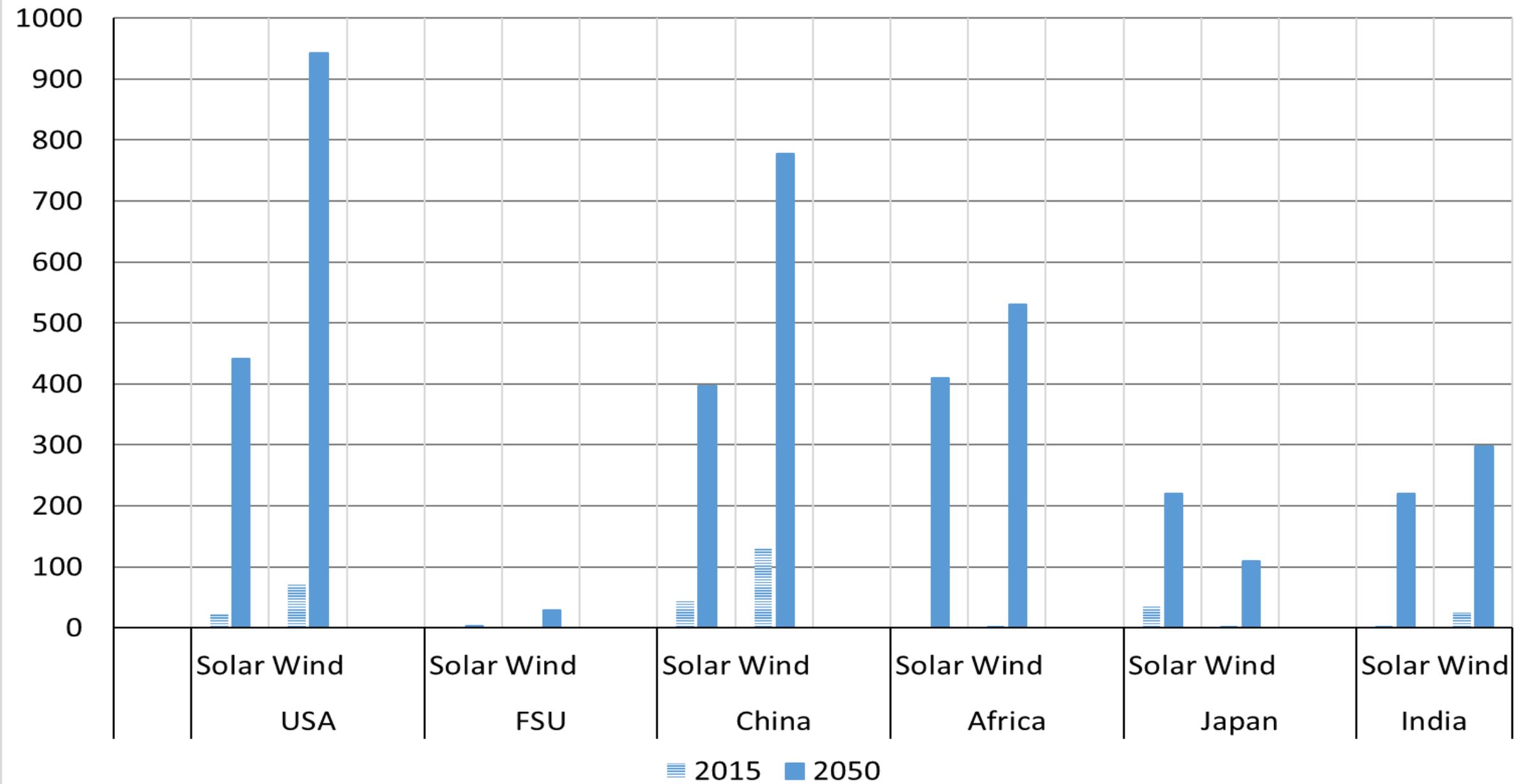
Opportunities:

Innovation is Required:
Innovation in new technologies is require but innovation in finance mechanisms is required

Bioenergy is key:
Large opportunities for rural development/employment in sustainable bioenergy

Low Carbon technologies and Renewables:
Increased deployment of wind power/solar is required when nuclear and CCS are not available.

Challenges:

Policy:
Stable clear policy signals are necessary for investments of scale.

Sustainability:
Sustainability Criteria for bioenergy must be robust. (learn from lessons in Europe)

Markets:
Electricity markets rules must facilitate and incentivise variable renewables.
(Importance of cross border flows and interconnectors)

Спасибо

Energy Policy and Modelling Group
www.ucc.ie/energypolicy

Sources of information

BP Statistical Review 2016
IRENA Global Renewables Database