Electricity Security Action Plan 2.0

Keisuke SADAMORI

Tokyo, Japan, 15 June 2018

IEA

What do we mean by electricity security?

- Electricity is an increasingly important part of the overall energy system
  - Globally, its share of total final consumption is increasing:
    - Doubled from 9% in 1973 to 19% in 2016
    - Expected to increase to **23% (NPS)** or **27% (SDS)** by 2040

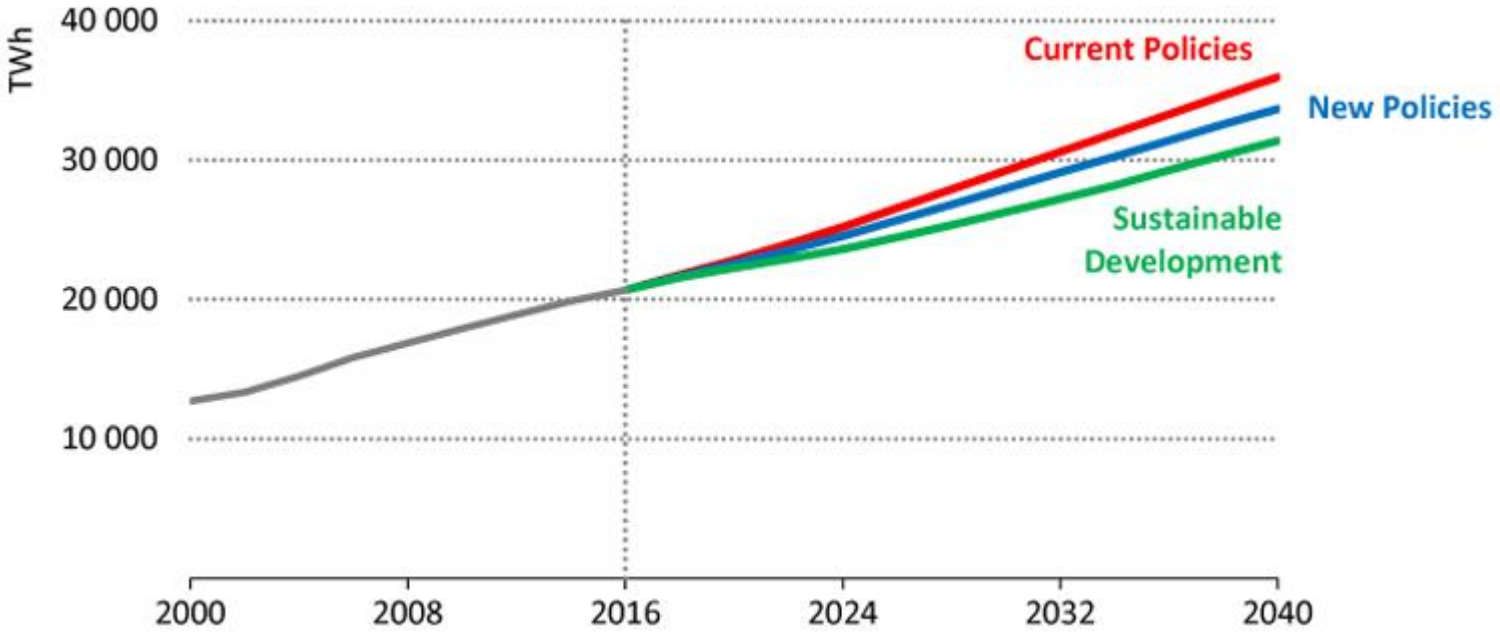
- Increased reliance on electricity means increasing focus on *electricity security*

- But, no single definition!
  - Resource adequacy:
    - Do we have enough capacity? Do we have the right (diverse) mix?
  - Resilience:
    - How well can we withstand system shocks (fuel disruptions, extreme weather events, cybersecurity, etc.)?

- Increasingly, these definitions are interlinked

Electricity demand: nowhere to go but up

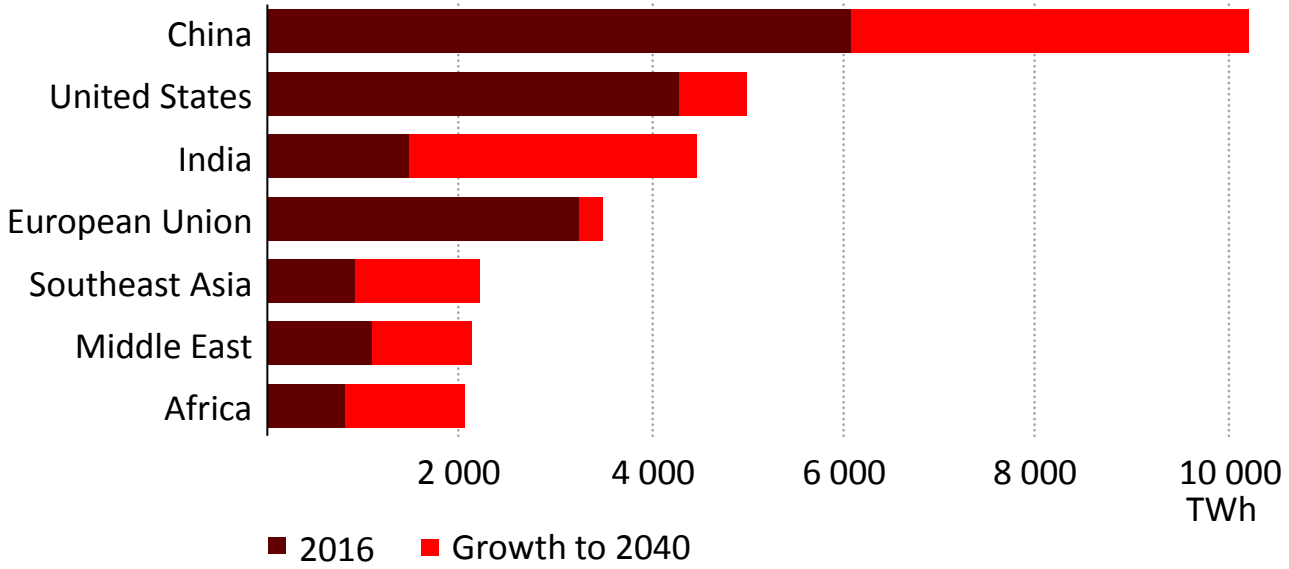
Evolution of electricity demand in the three WEO scenarios



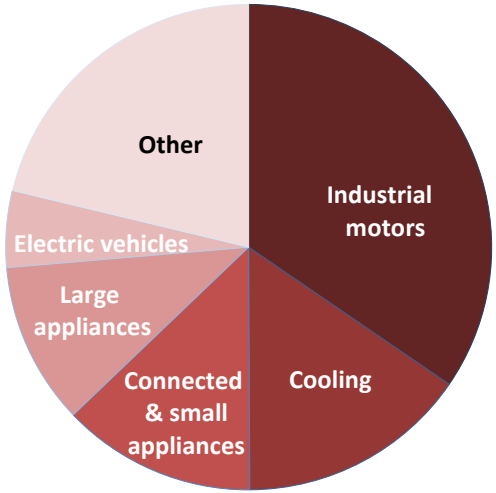
Electricity demand will increase in all scenarios.
Both efficiency improvements and more electrification happen in SDS.

The future is electrifying

Electricity generation by selected region

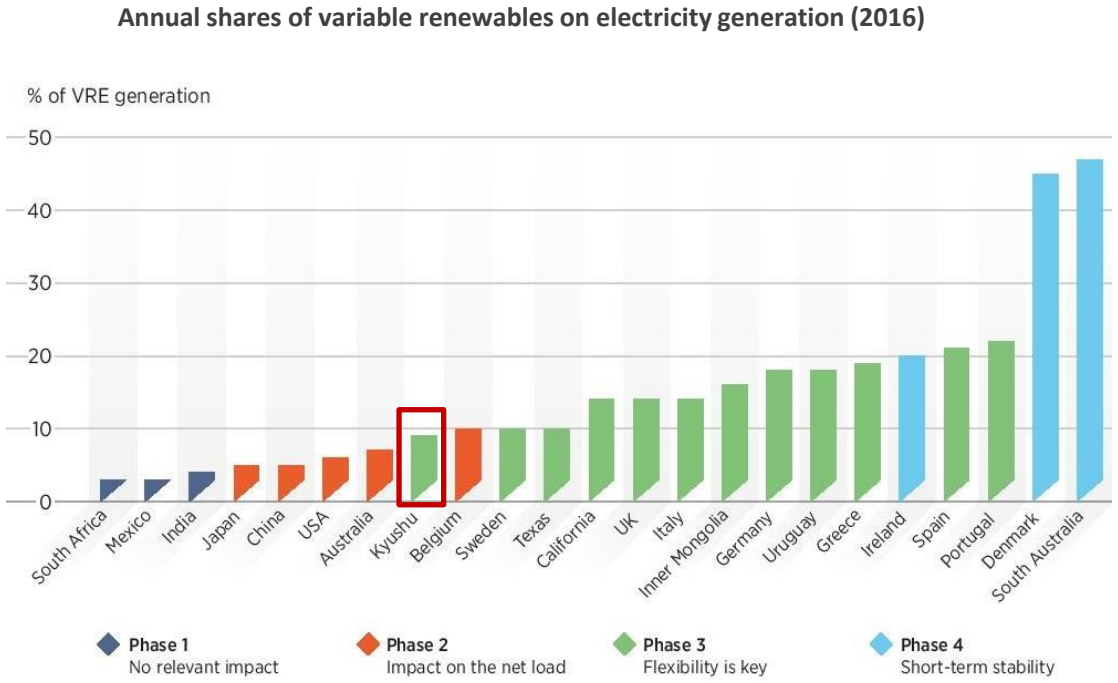


Sources of global electricity demand growth



India adds the equivalent of today's European Union to its electricity generation by 2040, while China adds the equivalent of today's United States

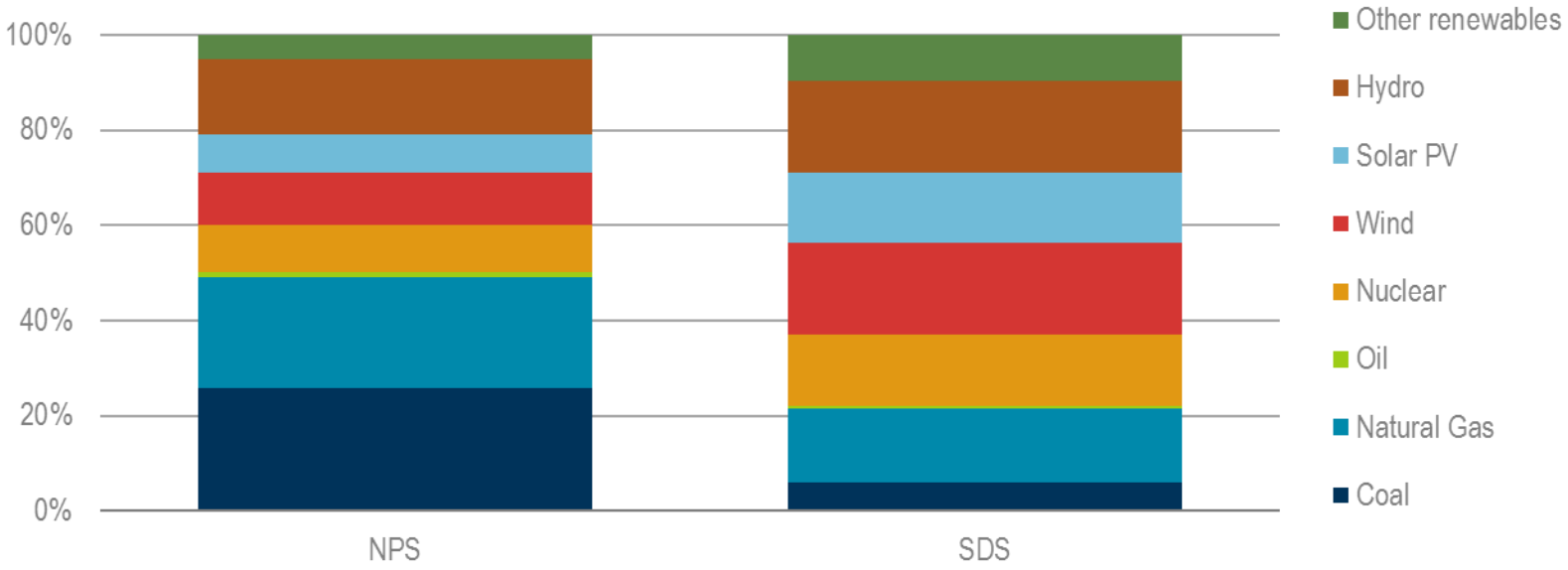
System integration of VRE: different phases



Challenges depend on wind and solar PV shares and country/region power system characteristics. Policies and measures should adapt accordingly.

What do we mean by power system transformation?

The global power mix in 2040 under the WEO NPS and SDS



Wind and solar will increase from 6% today to 20% in NPS and to 35% in SDS by 2040. Power systems must evolve accordingly.

From ESAP 1.0 to ESAP 2.0

ESAP 1.0

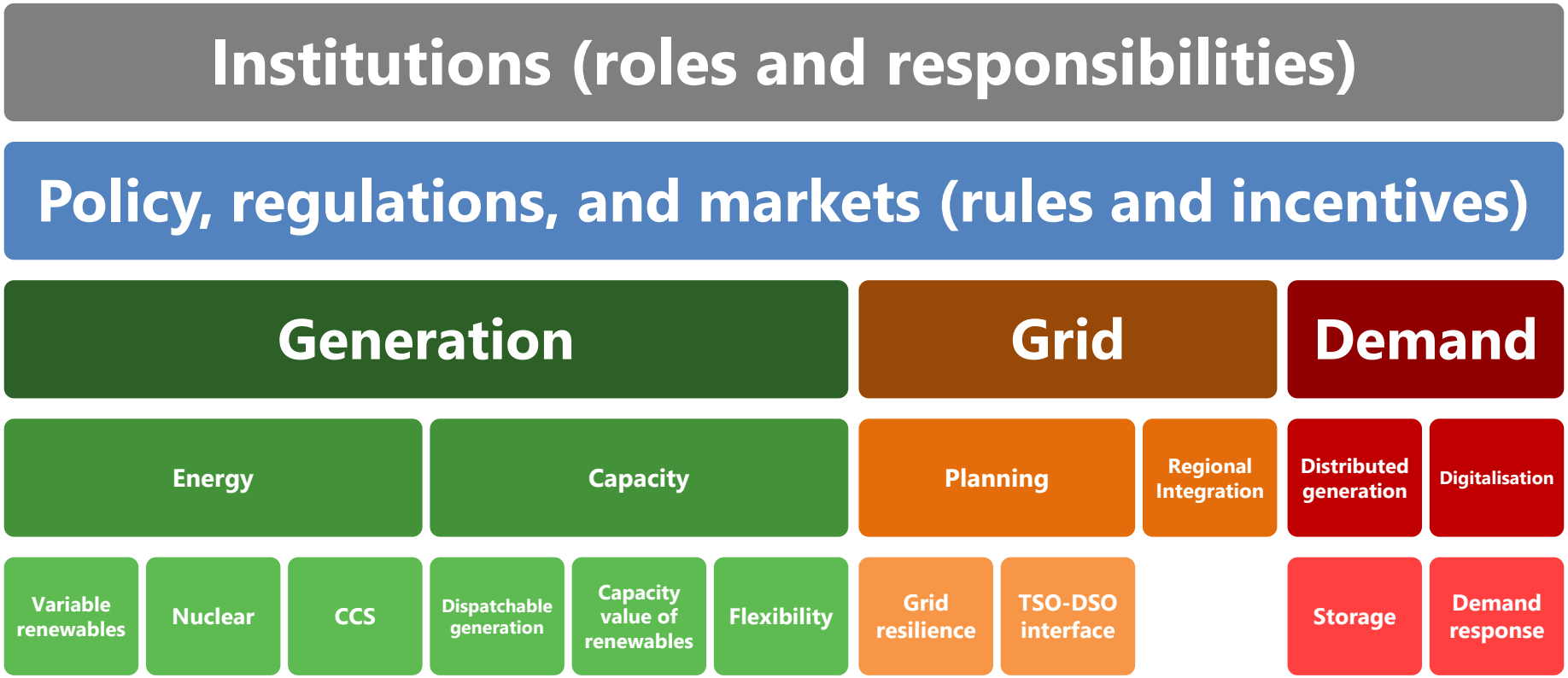
- IEA Ministerial 2011 called for work on **electricity security in a context of higher VRE shares in power systems**
- Key outputs since then include:
  - Creation of the Advisory Panel in 2015 (8 meetings and other related workshops);
  - Publication of several insights papers and **Re-powering Markets** the first IEA official publication on electricity market design
  - Country support: Thailand Electricity Security Assessment; contributed to Australia's Finkel review.

- Over 10 years of work on Grid Integration of Variable Renewables programme (GIVAR)
- Creation of the System Integration of Renewables (SIR) unit in June 2016

ESAP 2.0

- In 2017 the IEA's mandate on electricity security was re-affirmed and expanded
- ESAP 2.0 seeks to examine:
  - How to **maintain electricity security** in an environment of **rapidly expanding VRE** and, in some jurisdictions, **earlier than expected exits of existing capacity**
- Example policy intervention:
  - Australia's National Energy Guarantee seeks to explicitly link electricity security and power sector decarbonisation

Key elements of electricity security in a high-renewables world



www.iea.org

IEA