Objective and scope

- With the increasing role of a portfolio of maturing renewable technologies in the power mix...
- The IEA is publishing its first medium-term report focused on renewable energy
  - Bottom-up, global renewable forecast of renewable electricity capacity and generation over the next 5 years
  - Detailed analysis of 12 OECD countries + China, India, Brazil (~80% of world renewable electricity)
- For 2012 edition, focus on 8 technologies in power sector with some analysis on solar thermal heating
- Completes slate of IEA MT forecasts: oil, gas, coal
- Methodology consistent with other MT reports
Analytical framework – Japan example

- Generation and capacity forecast based on:
  - Power demand
  - Power sector structure
  - Grid and system integration
  - Economic attractiveness
  - Financing
  - Policy framework robustness

- Identify drivers and challenges for renewable deployment
Key trends

- As the portfolio of renewable technologies matures, global renewable power generation is forecast to increase 40% over 2011-17.

- This projected growth represents an acceleration versus the previous period.

- Renewable deployment is projected to spread out geographically, with increased activity in emerging markets.
  - New deployment opportunities are spurring economies of scale in some renewable technologies, creating a virtuous cycle of improved global competition and cost reductions.
Growth in renewable power is forecast to accelerate

- Hydropower remains the main renewable power source (+3.1% p.a.)
- Non-hydro renewable sources grow at double-digit annual percentage rates (+14.3% p.a.)
Growth is led by non-OECD countries

- Non-OECD accounts for two-thirds of the overall growth
  - China, Brazil, India lead; others grow significantly as well
- OECD growth still largely driven by Europe but Americas and Asia-Oceania make significant contributions
Non-hydro technology deployment spreads out

- Number of countries with cumulative capacity larger than 100MW (can cover consumption of 100k households) increases significantly
- Growth areas include Asia, Africa, Latin America and the Middle East
Annual growth patterns for non-hydro technologies vary significantly

- China becomes deployment leader
- OECD Europe deployment growth slows
- OECD Americas growth reflects US policy uncertainties
Generation additions over 2011-17 differ across regions and technology portfolios

OECD Americas (+179 TWh)

OECD Asia-Oceania (+77 TWh)

OECD Europe (+365 TWh)

Non-OECD (+1,220 TWh)
China accounts for 40% of global renewable generation growth

**Drivers:**
- Growing energy needs
- Diversification
- Government targets
- Ample low-cost finance
- Robust manufacturing

**Challenges:**
- Pricing framework
- Priority dispatch
- Grid upgrades
- Prohibitive licensing for small-scale systems
Japan grows strongly under uncertain nuclear situation and new feed-in tariff policy

**Drivers:**
- Uncertainties about nuclear restart
- New feed-in tariffs
- Good match of solar PV for shaving peak load

**Challenges:**
- Power system fragmentation
- Relatively high capital costs of renewable energy
- Location of wind and geothermal resources far from demand centres
State mandates drive the US picture but uncertainties persist over some federal policies

**Drivers:**
- State level RPSs
- Federal incentives levels
- Ample grid capacity
- Innovative financing

**Challenges:**
- Duration and certainty of federal incentives
- Competition with natural gas
- Cost and availability of tax equity finance
In Italy weakening economy and rising financing costs weigh upon deployment

**Drivers:**
- Policy commitment to renewable deployment
- Increase of targets
- Improved renewable competitiveness in good resource areas

**Challenges:**
- Policy costs for solar PV
- Overcapacity of power system
- Cost and availability of finance
- Grid upgrades
Investment in renewable electricity

- Annual investment topped USD 250 billion in 2011
  - Most recent quarterly data suggest some slowing

- Economic and credit risks weigh on medium-term picture
  - European bank project finance and utility finance more strained

- Other sources/structures of finance play increasing role
  - Development banks
  - New institutional and non-traditional corporate investors
  - Smaller scale financial innovation for small distributed capacity

- Ultimately, cost and availability of financing to depend most on prevailing policy and technology environments