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Market Trends and Projections to 2018
Methodology and Scope

- Analysis of drivers and challenges for RE deployment at country level
  - Regulatory framework, power demand, competition with other fuels, grid integration, etc.

- Bottom-up global RE power capacity and generation forecast, with case studies on key markets:
  - USA, Canada, Chile, Mexico
  - Japan, Korea, Australia
  - Denmark, France, Germany, Ireland, Italy, Spain, Turkey, UK
  - China, Brazil, India, Thailand, Morocco, South Africa

- Global biofuels production by country
- Regional breakdown RE for heat
Despite Challenges, strong Renewable Drivers in 2012

- Total renewable capacity and generation grew strongly in 2012 (+8%)
  - Strength partly due to China hydropower
  - Global non-hydro capacity grew by 21% year-on-year
  - Onshore wind and solar PV capacity grew faster than expected

Still, some emerging challenges
- Global investment fell (-12%)
- Policy uncertainty in some key countries
- Grid integration issues emerging
- Biofuels production growth stalled
Positive outlook for renewable electricity

Renewable electricity projected to scale up by 40% from 2012 to 2018
Renewable power spreading out everywhere

Total Renewable Annual Capacity Additions, by region (GW)

Emerging markets more than compensate for slowing growth and volatility in markets such as Europe and the US
### Improving competitiveness

- **Most dynamic technologies** – onshore wind and solar PV – increasingly competitive in a number of markets

- **But market framework matters**
  - Deployment with little support occurring in some areas with rising energy needs, good resources, and predictable long-term revenues

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**Global levelised costs of power generation ranges (USD per MWh)**

Note: costs reflect differences in resource, local conditions, and the choice of sub-technology.
Growth accelerating for the whole RE power mix

- Hydro remains the largest increasing single renewable technology
- But for the first time additional generation from all non-hydro sources exceeds that from hydro
Global RE capacity additions led by wind

- Onshore outlook more optimistic than in *MRMR 2012*
- Policy uncertainties make additions volatile in some areas
- Offshore wind outlook more pessimistic than *MRMR 2012*, with financing and integration challenges

Total wind (onshore + offshore) annual capacity additions by region (GW)
Solar PV growing out of Europe

Strong growth seen in China, Africa, Middle East, and Latin America
But other technologies lagging behind

- Potential of offshore power remains high, but technical, financial and grid connection issues pose challenges
- Storage adds value to CSP, but deployment hampered by relatively high costs
Renewables expected to grow almost like fossil fuels in America, and more than total demand in Europe
Renewables to reach 15% of US power generation

Drivers
- state-level mandates
- very good renewable resources
- ample grid capacity for integration
- attractiveness of small-scale solar PV; financial innovation

Challenges
- uncertainty over federal tax credits
- some competition with gas
- scale-up of less-mature technologies

US renewable power generation 2006-18

- Hydro
- Solar CSP
- Bioenergy
- Geothermal
- Wind onshore
- Solar PV
- Geothermal
- Ocean
- Wind offshore

% share of RE
% non-hydro
China accounts for 40% of global growth

Drivers
- strong gov’t backing with FYPs and expected quota system
- eased rules for grid connection and announced small-scale incentives
- ample low-cost finance
- robust manufacturing

Challenges
- lack of market pricing framework and priority dispatch in general
- Integration of variable renewables
- supply chain bottlenecks, lack of deployment for offshore wind, CSP

China renewable power generation 2006-18

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<th>Year</th>
<th>Hydro</th>
<th>Bioenergy</th>
<th>Wind onshore</th>
<th>Solar PV</th>
<th>Solar CSP</th>
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Renewables and natural gas

- Gas generation to crowd out renewables? Or vice-versa?
  - Renewables and gas can both grow strongly...

- **Globally:** coal-to-gas switching can lead to large reductions in CO₂ emissions, but gas is not enough to meet 2DS

- **USA:** some competition, but strong RE drivers even with low power prices; RE enhances diversification, gas helps balance variable RE; large scope for coal replacement

- **Europe:** slow demand growth, high gas prices, overcapacity in some markets; RE crowding out gas; still, gas provides important balancing for rising variable RE

- **Asia:** portfolio of low-carbon solutions needed to meet rapid demand growth; high LNG prices make RE attractive
Policy uncertainty is the number one risk

Spain solar PV + CSP annual additions (GW)

- Deep financial incentive cuts and cap for solar PV
- Assumed moratorium on new projects under Special Regime from Jan 2012 onwards

US onshore wind annual additions (GW)

- Uncertainty over PTC renewal at end-2012
- Assumed expiration of PTC at end-2013
- Expiration of federal PTC

Abrupt, retroactive policy changes
Stop & go policies
Main messages to policy makers

- Many renewables no longer require high economic incentives

- But they do need long-term policies that continue to provide a predictable and reliable market and regulatory framework compatible with societal goals
For further insights and analysis...

- The Medium-Term Renewable Energy Market Report 2013 can be purchased online at:
  
  www.iea.org

- Thank you for your attention!