DS3 – RES' PERSPECTIVE

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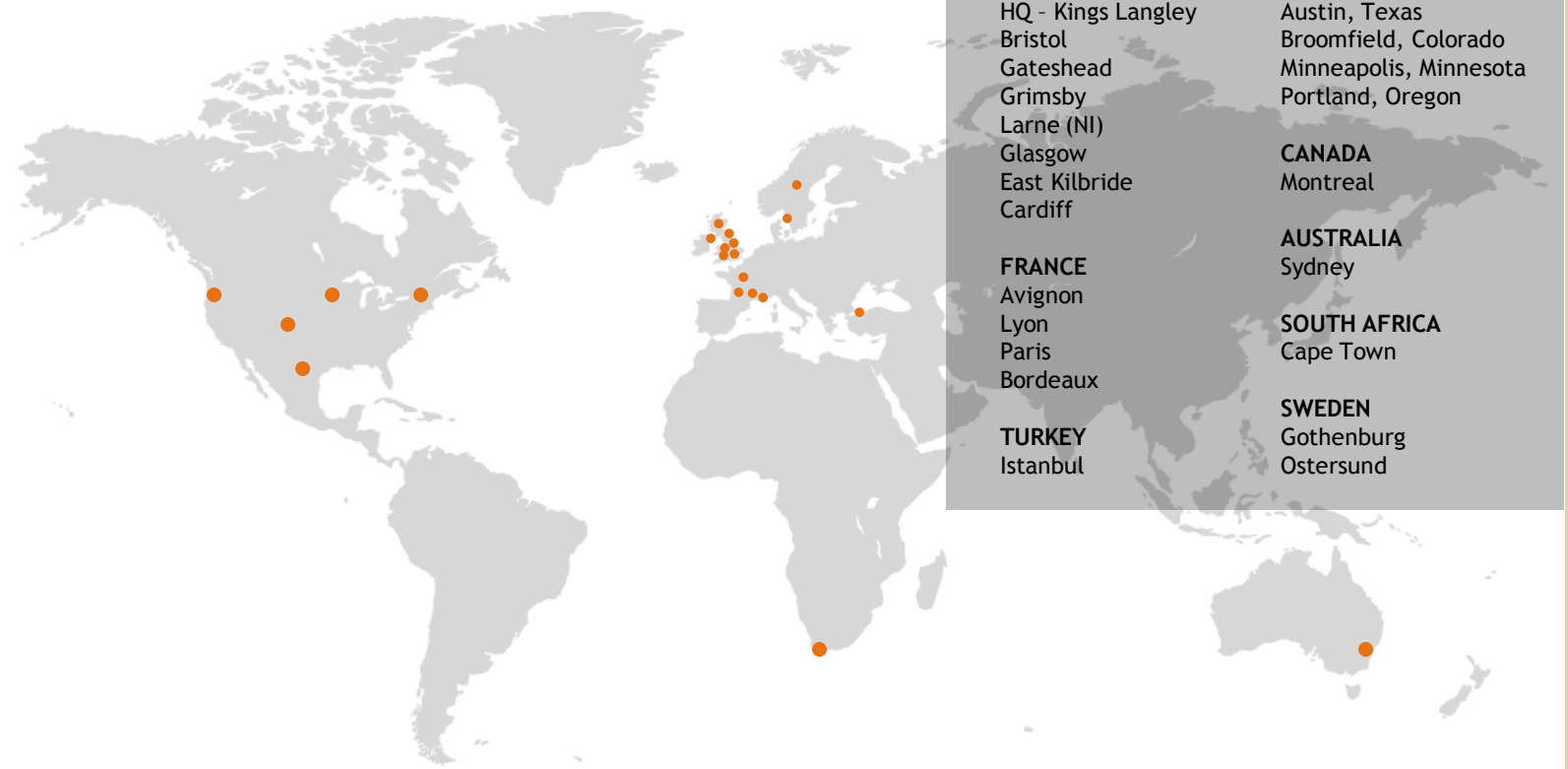
OVERVIEW OF THE RES GROUP

- One of the world's leading renewable energy project companies
- Over 30 years at the forefront of the wind energy industry
- Develops, constructs and operates large-scale Solar, Biomass, Wind, Wave, Tidal projects, and building-integrated renewables.
- Independent power producer



RES OFFICES WORLDWIDE



UK & IRELAND
HQ – Kings Langley
Bristol
Gateshead
Grimsby
Larne (NI)
Glasgow
East Kilbride
Cardiff

FRANCE
Avignon
Lyon
Paris
Bordeaux

TURKEY
Istanbul

USA
Austin, Texas
Broomfield, Colorado
Minneapolis, Minnesota
Portland, Oregon

CANADA
Montreal

AUSTRALIA
Sydney

SOUTH AFRICA
Cape Town

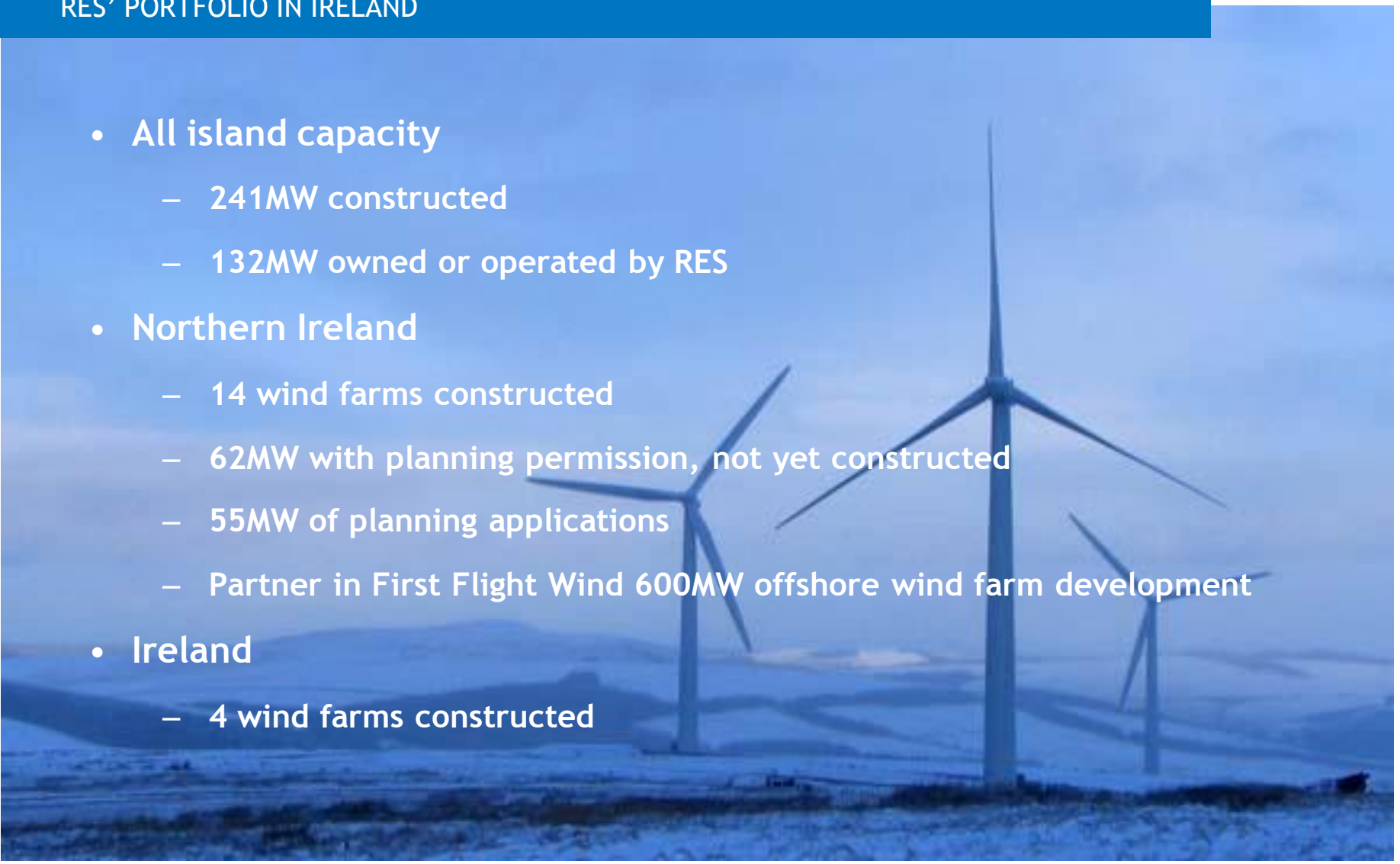
SWEDEN
Gothenburg
Ostersund

RES employs around 1000 staff in 22 offices across the world

RES GROUP PORTFOLIO TO DATE

- >6.9 GW wind energy capacity completed worldwide in over 100 projects
- RES portfolio would power the equivalent of 4 million homes
- Carbon savings through RES projects would take 5 million cars off the roads
- Several thousand MW in development or construction across 9 countries
- Offshore wind development in France, UK & Ireland, and N America
- Ownership interests in operating projects: 700+MW

RES' PORTFOLIO IN IRELAND



- All island capacity
  - 241MW constructed
  - 132MW owned or operated by RES
- Northern Ireland
  - 14 wind farms constructed
  - 62MW with planning permission, not yet constructed
  - 55MW of planning applications
  - Partner in First Flight Wind 600MW offshore wind farm development
- Ireland
  - 4 wind farms constructed

Pioneering Ireland

- Ireland pioneered grid code requirements for wind
- Highest wind penetration now
- One of the highest wind penetrations in future
- DS3 is tackling problems today which others will face tomorrow

THE PERFECT TRANSMISSION SYSTEM

From a wind farmer's point of view

- Adequate capacity to transport wind generation at all times
  - Free from constraints
  - Allows operation of a perfect market
  - Interconnected to neighbouring markets
- Facilitates connecting users
  - Accessible
  - reasonable and predictable costs for connection and use
  - reasonable program for new connections
- Stable
  - Free from disruption
  - Has access to and adequately remunerates all required ancillary / balancing services

RELATED GB ACTIVITY

- Frequency Response Technical Workgroup (Inertia)
- High Wind Speed Shutdown Workgroup
- Frequency Changes during Large Disturbances and their Impact on the Total System Workgroup (RoCoF)
- Electricity Market Reform (Capacity Mechanism)

FREQUENCY RESPONSE TECHNICAL WORKGROUP

http://www.nationalgrid.com/uk/Electricity/Codes/gridcode/workinggroups/freqrespTSG/

- Reported 15th November 2011 and concluded that
- New frequency response services would be required in response to
  - Increases in renewable generation, potentially exceeding minimum demand
  - Anticipated increase in largest loss of infeed from 1320MW to 1800MW
- Inertia will reduce and RoCOF will increase
- On loss of infeed, fast frequency response can be as effective as inertia in arresting the frequency nadir
- System frequency management with large penetration of asynchronous sources and can only be achieved if they provide the above services
- Wind turbine fast frequency response has some advantages over synthetic inertia
- Recommended further consideration of RoCoF challenges

HIGH WIND SPEED SHUTDOWN WORKGROUP

- Reporting soon
- Preliminary conclusions
  - No changes are required to GB Grid Code
  - Wind generators should provide the TSO with data after actual events using existing grid code provisions
    - OC7 Operational Liaison
    - OC10 Event Information Supply
  - National Grid to use above data to improve its modelling of HWSS risk
  - GB GCRP to review after 2 years

FREQUENCY CHANGES ... WORKGROUP

Reporting soon

- Studied projections of renewable energy, inertia and RoCoF
- Considered the risks of multiple embedded generator disconnections which would occur as system RoCoF increases beyond existing island protection trip settings
- Considered mitigation methods including
  - The costs of present actions to increase inertia and minimise loss of infeed risk
  - The costs of constraining on additional frequency responsive generators
  - the risks to DNOs and Users of desensitising RoCoF protection for generators >5MW
- Recommending that all new generators should withstand 1Hz/s
- Commissioned risk assessment study which shows acceptable risk for changing RoCoF protection settings on 5-50MW generators to 1Hz/s

ANCILLARY SERVICES

- National Grid has issued three rounds of requests for tenders to provide overnight
  - Voltage management (selected zones)
  - Inertia (all zones)

- National Grid's Balancing Services Standing Group (BSSG) and Commercial Balancing Services Group (CBSG) are considering a mandatory 5 second "Rapid Frequency Response" (RFR) requirement which may be required during periods of low demand and high asynchronous generation.
  - Various procurement options are being considered.
  - Primary response in GB is normally delivered in 10 seconds

THE FUTURE

- DS3 envisages a world where 2020 targets are met and asynchronous sources meet up to 75% of demand with “only” 5% of wind energy constrained
- Marginal price of the above 5% could attract novel users
- Post 2020 opportunities and methods for further increasing renewable energy
- Some developers looking to build wind capacity and export to GB without interconnection to the Irish system. Could this be a lost opportunity?


power for good