Future of Electricity Utilities Project

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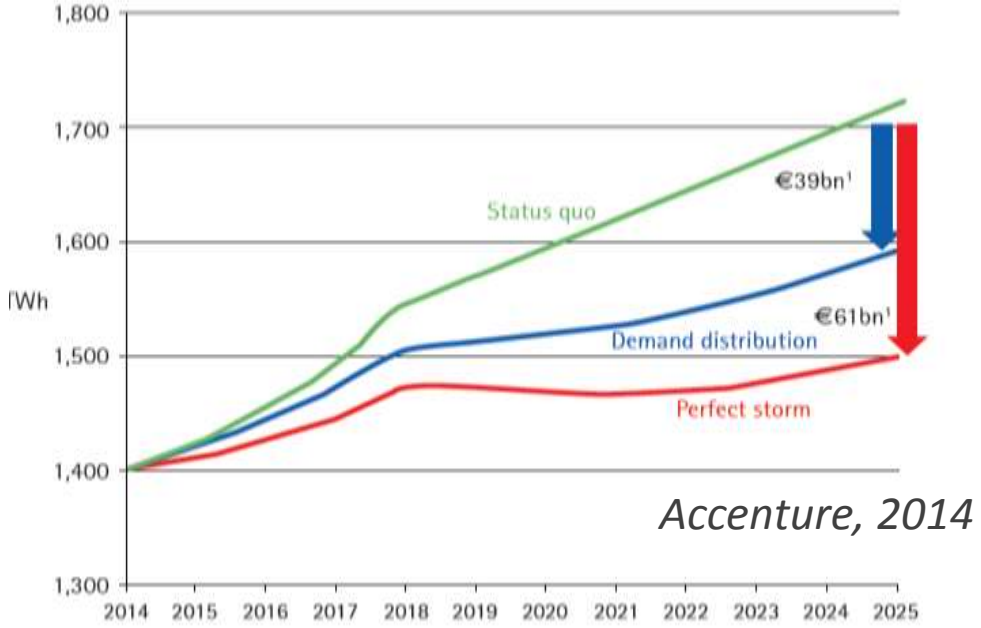
Vertically Integrated Business Model: Under Threat (1)?

- Whole Sale Market Changes;
- Impact of CfD;
- Political Risk;
- Increasing and diversifying competition; and
- Technical characteristics



Accenture, 2014

`30% plus share from distributed energy by 2030'

PWC, 2015

`Getting the Government out of the electricity market by 2025'

Amber Rudd, November 2015

Vertically Integrated Business Model: Under Threat (2)?

Increased Uncertainty:

(1) Reduced support for renewable energies;

(2) Cancelled the Carbon Capture and Storage competition; and

(3) Phase out of unabated coal generation by 2025.

Aims and Objectives

to assess the future operating environment of vertically integrated electricity companies and to assess any future role – if and in what form they might operate in the future UK electricity system.

The work will have the following objectives:

- Assess the operating environment of the UK future energy system;
- Assess the effect of the different scenarios on the business models;
- Assess the commercial and policy responses to systemic and corporate risks in the future electricity / energy sector;
- Assess affect on innovation and investment; and
- Finally, a suite of structural responses aimed at corporate, political, and financial audiences will define new roles and value propositions for electricity system participants.

Approach and Schedule

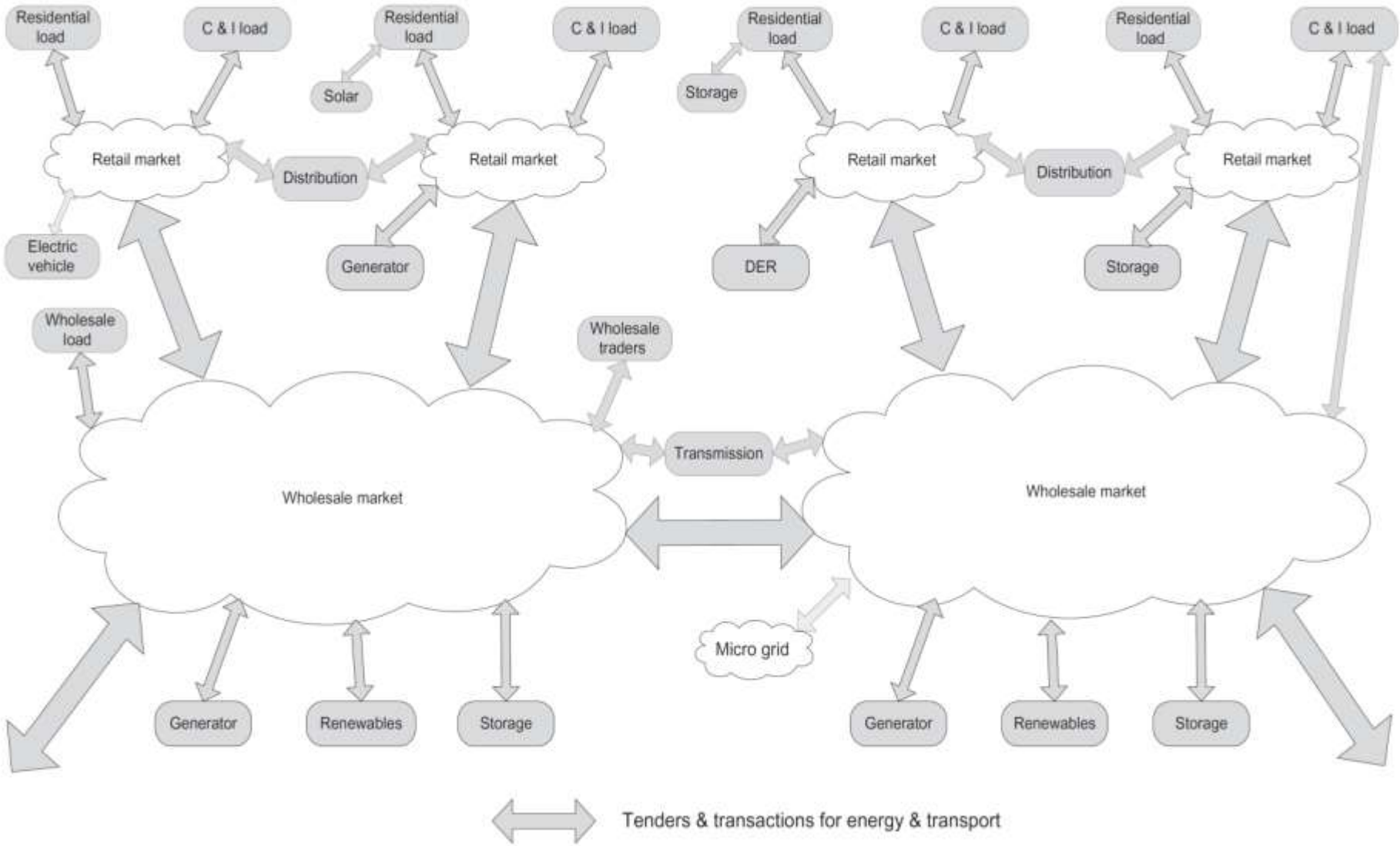
- **Phase 1: Scenario Generation.** Scenarios approach to navigate this landscape (15th June).
- **Phase 2: Scenario Response:** Phase 2 of this work will investigate the effect of the scenarios on the business models of different business model typologies. Three work packages:
  - **WP#1: Stress testing Scenarios.** Commercial and political implications of the scenarios developed in phase 1 (June to August).
  - **WP #2: Scoping utility adaptations.** Decision Theatres with key partners to map how the utilities business models can adapt to the scenarios developed in Phase 1 (Sept to Oct).
  - **WP #3: Structural responses.** Building on work Packages 1&2 - define structural responses and adaptive pathways across three stakeholder sectors (Oct).

Membership Interest

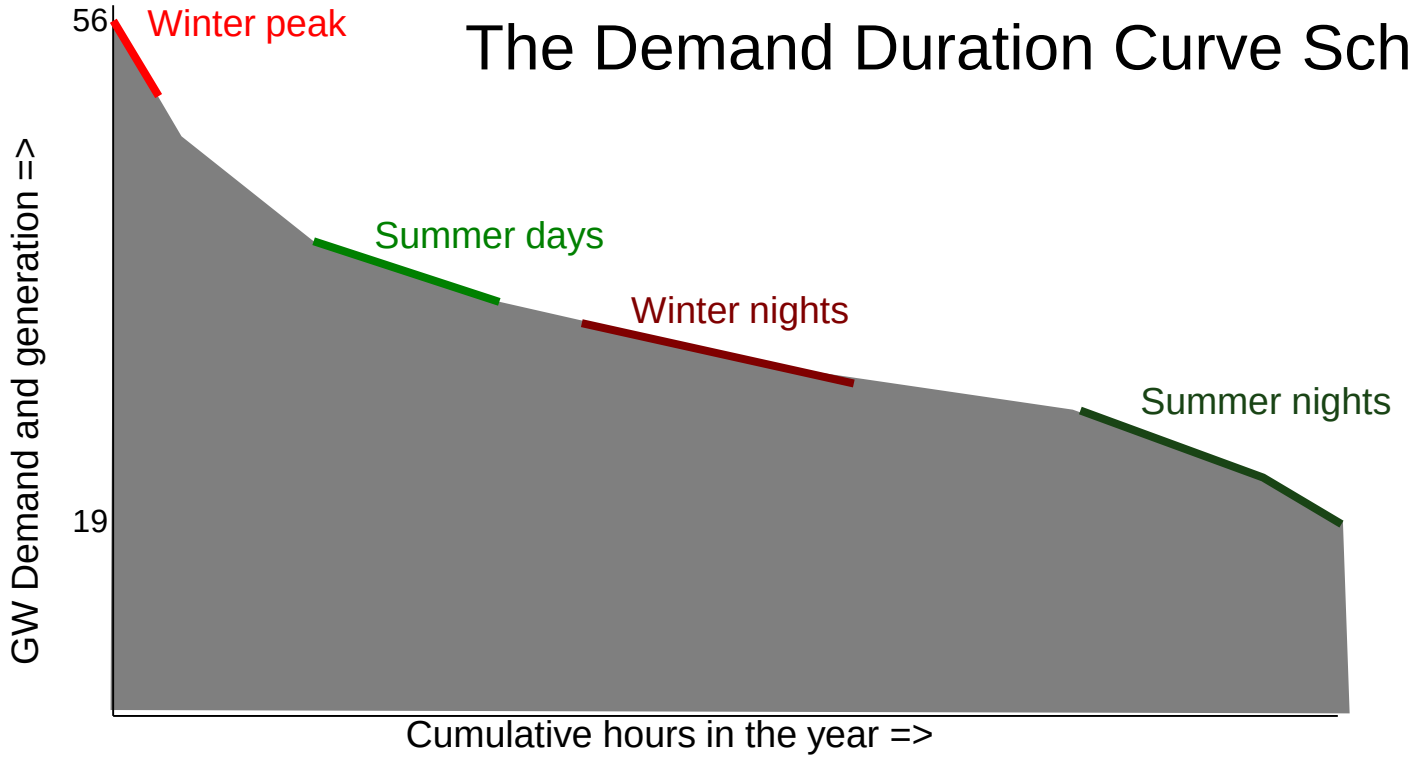
- **Enabling Team:** ATKINS (Geoff Darch & Jon Swan); Shell (John Russell); Stephen Hall (University of Leeds); and Chris Mazur (ICL).

- **Steering Group:** Bosch (Carl Arntzen), Stephen Hall (University of Leeds), Shell (John Russell), Atkins (Jon Swan), Drax (David Ball), Hitachi (TBC'd), Ofgem (Jeff Hardy), SSE (TBC'd), Welsh Government (Ron Loveland) and APSE Energy Collaborative (TBC'd).

Possible Future Electricity System: Trans-active Tariffs?



But the need for Base-load capacity is not negated - Illustration of High Renewable Scenario 1



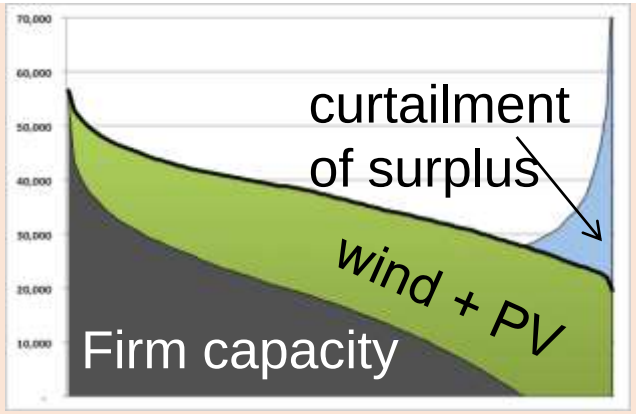
Reference: Andy Boston, January 2015

Need for Base-load capacity is not negated - Illustration of High Renewable Scenario 2

High Renewables Scenario

73 GW PV
73 GW Wind
67 GW firm backup
CO_2 = 158 g/kWh (if backup is all CCGT)

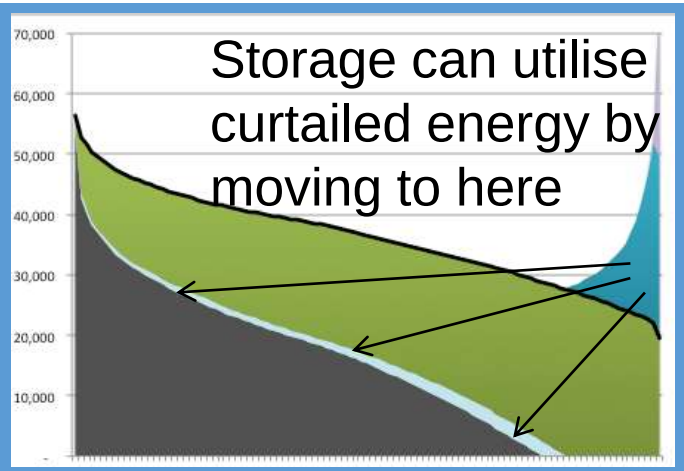
Irrespective of where they are added on the grid, weather dependent renewables create surpluses on windy/sunny days and leave some days with little generation



High Renewables With Storage

As before but
+ 30GW Storage or DSM or Flex I/C
CO_2 = 147 g/kWh

Storage, DSM or flexible interconnectors can help. But huge amounts are required (10 x current storage capacity is illustrated), and a large proportion of energy must still be delivered from firm sources



Reference: Andy Boston, January 2015