iiESI - Power Hub

A commercial Initiative to Utilise Decentralised Assets to Integrate Renewables

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Power Hub Technology
International B2B Sales
Our business is based on procuring, producing, distributing and trading in energy and related products in Northern Europe.

We have approximately 6,500 employees and generated DKK 73 billion (EUR 7.6 billion) in revenue in 2011.
With the increased penetration of renewables into the power systems more flexibility is required to stabilize the system. Should flexibility come from the conventional supply sources? or from flexible demand or decentralized generation?
A new value chain is emerging – bringing flexibility providers and flexibility utilizers together.
DONG Energy has developed the Power Hub Technology to capture the economical value of flexible assets.

Power Hub – enabling renewable energy integration

Apply forecast capabilities

Utilise inherent system flexibility

Connect different assets

Energy and reserves markets

Assets – Individual or aggregated

DONG Energy has developed the Power Hub Technology to capture the economical value of flexible assets.
Real time connection of physical assets and markets

High performance, scalable and reliable information flow and data management is vital.

User Requirements

Basic Asset Data

Basic Financial Data

Prognosis

Cross Market Optimisation

Market Bids

Market Contracts

Schedules & activation

Measurements
Customer Case: Lem Kær Wind Farm & Energy Storage

Demonstration site for Power Hub
- Providing all ancillary services from a wind farm and energy storage
Customer Case: Novo Nordisk

Demonstration site for Power Hub
- Utilizing excess generation capacity for balancing purposes
Customer Case: Faroe Islands

Demonstration site for Power Hub
- Providing sub second frequency demand response and distributed energy resource reserves to an isolated energy system
The Schneider-Electric / DONG Energy partnership builds on the Power Hub platform

A 3-level architecture for system optimisation

1. Data operation & automation of field devices
2. Real-time operation & control
3. Optimisation of supply & demand

Distributed energy optimisation
- Economic dispatching (business & flexibility regulations)
- Baseload calculation
- Reserve optimisation
- Load shedding matrix
- Asset technical & commercial availability
- Unit commitments
- Mobilisation & performance evaluation

Supply side operation
- Automatic generation control
- Generation forecasts
- Alarm & event management
- Advanced performance & availability calculation
- Monitoring and KPI calculation

Demand side operation
- Fast frequency demand response
- Fast load shedding
- Short and near-term load forecasts

Field devices
- Substations
- Feeders

Generation assets
- Solar panels
- Wind turbines
- Storage facilities
- Micro turbines
- Gensets & marine diesel
- Combined heat & power

Meteorological measurement devices
- Production forecasts
- Unique model
- Extreme weather functionality

Weather data operation

Distribution network operation
- Network model & operation
- Topology analyzer
- Load flow
- State estimation

Schneider Electric

Schneider Electric / DONG Energy partnership builds on the Power Hub platform

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Schneider Electric
Conclusions!
Power Hub shows it can be done, but strong barriers to commercialisation prevail

Complexity rules in the real world
- Building the operational platform and business process integration is not trivial
- Varying DER regulation capabilities and control technology impacts mobilisation
- Poor communication and data management

Standardisation and Smart Grid enabling
- Necessary modifications to DER control technology often ruins the business case
- Of the shelf Smart Grid enabled/compliant units could accelerate smart grid roll out
- Real time connectivity is paramount

DER owners awareness of capabilities and potential
- Flexibility, ancillary services and reserves markets are not commonly known topics
- Linking flexibility to business processes rather than technology is paramount

Market reforms and regulatory changes
- Restructuring markets in terms of bid size, duration and gate closure
- TSO approval of a VPP as a single unit instead of approval of every unit in portfolio
- Unbundling of supplier and balance responsible party
Questions/Answers
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