



# Northern Isles New Energy Solutions: Rebuilding an energy system

Reinout Wissenburg

# About SSE

SSE's strategy is to deliver sustained real growth in the dividend payable to shareholders through the efficient operation of, and investment in, a balanced range of economically-regulated and market-based energy-related businesses.

This balance means SSE has a strong and diverse group of energy assets and businesses from which to secure the revenue to support future dividend growth.

## 1-3 Wholesale

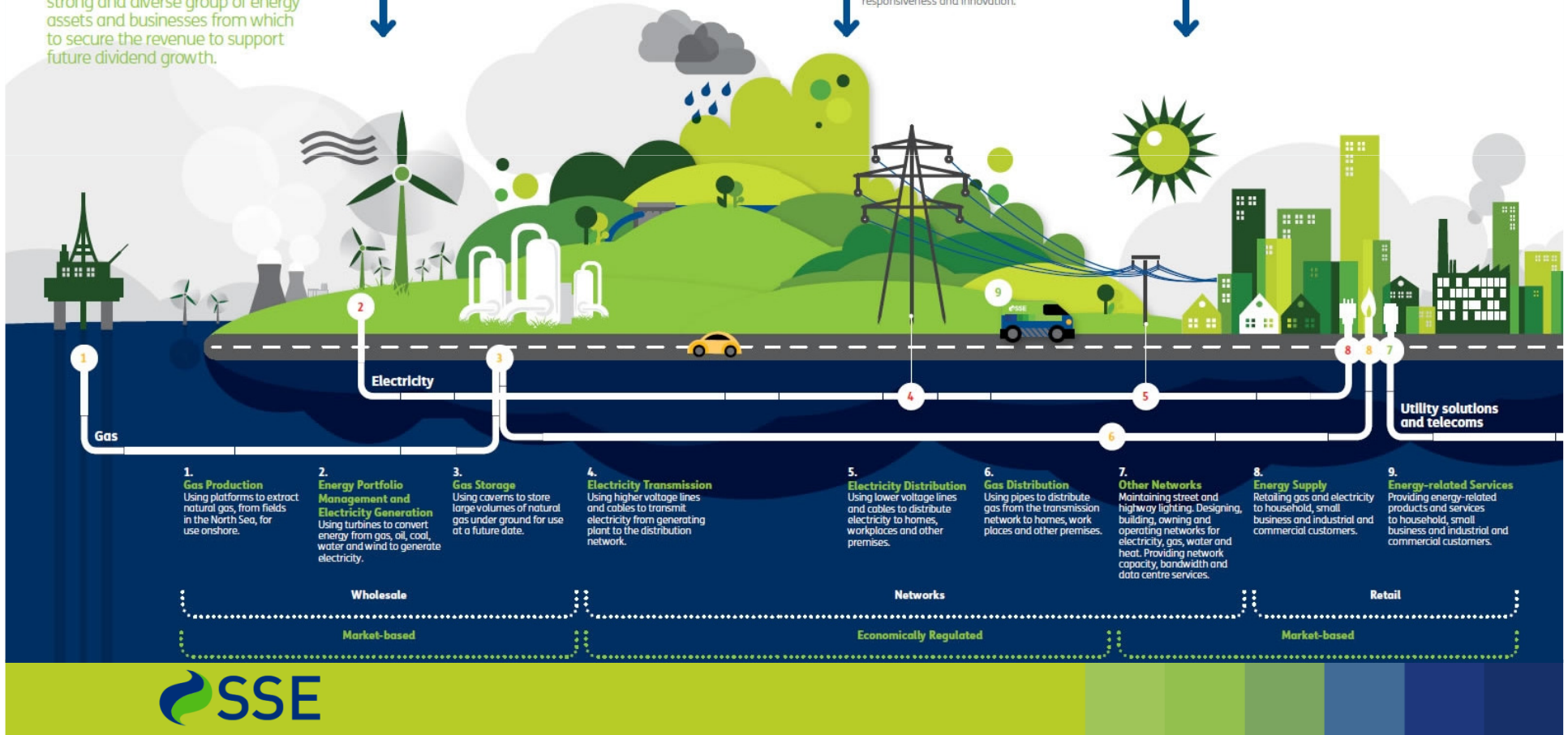
To secure energy for its customers, SSE is involved in energy portfolio management, electricity generation, gas production and gas storage. Amongst other things, it is the leading generator of electricity from renewable sources across the UK and Ireland. Its Wholesale businesses priorities are competitiveness, sustainability and flexibility.

## 4-7 Networks

SSE has an ownership interest in economically-regulated network businesses in electricity transmission and electricity and gas distribution and has other networks businesses in market-based areas such as lighting services, utility solutions and telecoms. In operating and investing in these businesses, SSE's Networks priorities are efficiency, responsiveness and innovation.

## 8-9 Retail

Through its brands SSE, Southern Electric, SWALEC, Scottish Hydro, Atlantic and Airtricity, SSE supplies electricity and gas in markets in Great Britain and Ireland and also provides other energy-related services such as mechanical and electrical contracting. Its Retail priorities are fair prices, simple products and excellent service.



# Shetlands' challenge



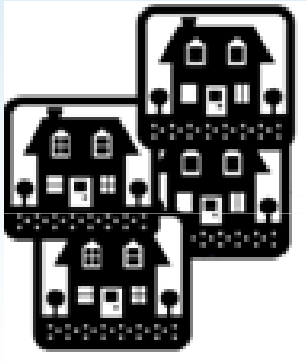
## Build a hybrid energy system

- 240 km off-coast
- 22,000 people, 12,500 connections
- Supreme wind resource
- 7% renewable electricity
- Unconnected electricity system
- Old oil-fired power station 67MW
- BP-owned gas fired unit 22MW
- Privately owned 3.7MW windfarm
- Peak of 48MW, in summer 11MW

**How to provide the energy people need in a reliable and sustainable way?**

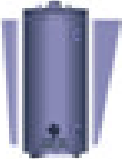
# Northern Isles New Energy Solutions

Thermal storage



Reduce the peak by 20 MW

Battery



Forecast and communication system



Modular power plant



# NINES: Lessons learned

## From R&D to replacement project

- Peak shaving: from 20 to 11 MW = 37 MW peak
- Thermal storage: slow installment, lower reduction
  - Waste incinerator – 250 homes
  - Quantum/Smart Electric Thermal Storage – 750
  - e.g. 1000 houses at 15 KW = 15 MW => 4 MW
- Battery: 1MW-6MWhr sodium-sulphur battery
  - Safety at Lerwick
  - Lead acid 1 MW-3MWhr battery (peak duration: 20 minutes)
  - Life time from 15 to 5 years
- Power station: modular design
  - One turbine less = 40 million pounds over 40 years lifetime
- More renewables

# Conclusion



## Complex

- Lower expectations
- If it works at Shetland, it works everywhere
- NINES allows more penetration of wind energy at Shetlands
- Delayed modular increase of power station capacity
- Tariffs needed to reward ancillary services

# THANK YOU

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