



Dieter Helm is the author of  
Burn Out: The endgame for fossil fuels

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TALKS

LECTURE FOUR

# THE NEW DIGITAL WORLD

PRESENTED BY

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# AGENDA

- The twentieth century assumptions turned on their heads
- Digitalisation of almost everything
- Robots and 3D printing
- AI
- Electric cars and transport
- Smart systems and smart households
- Decentralisation and renewable technologies

# THE TWENTIETH CENTURY ASSUMPTIONS TURNED ON THEIR HEADS

- Wholesale marginal costs

Zero marginal costs

- Passive demand

Active demand

- No storage

Storage and batteries

# DIGITALISATION OF ALMOST EVERYTHING

- What computers did to electricity
  - The possibilities of a poll and trading
- Digitalising manufacturing
- Digitalising services
- Digitalising transport
- Digitalising customer and creating competitive websites

Broadband fibre networks

**Everything digital is electric**

# ROBOTS AND 3D PRINTING

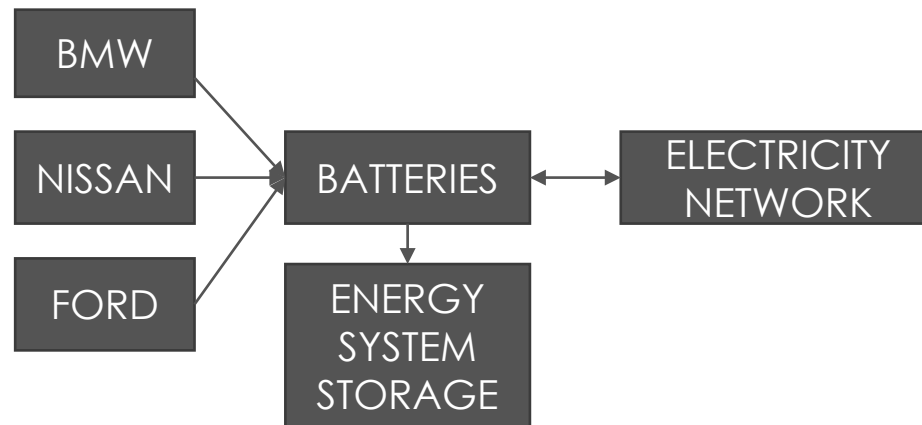
- **Robots revolutionise manufacturing**
  - Robotics takeover most manual functions
  - Agricultural equipment goes digital
  - All goods and services are the “things” of the internet
  - Tracking everything in real time
- **And 3D printing changes scale and location**
  - Everything can be customised
  - Labour costs less important
  - Manufacturing returns to home markets
  - Scale economics vastly reduced

# AI

- The combination of Big Data and Big Computer Power
- Most processors can be digitalised
- End of many labour based services
- GPS and location data coordinated
- Every system gets much more complicated
- Massive risk of cyber security

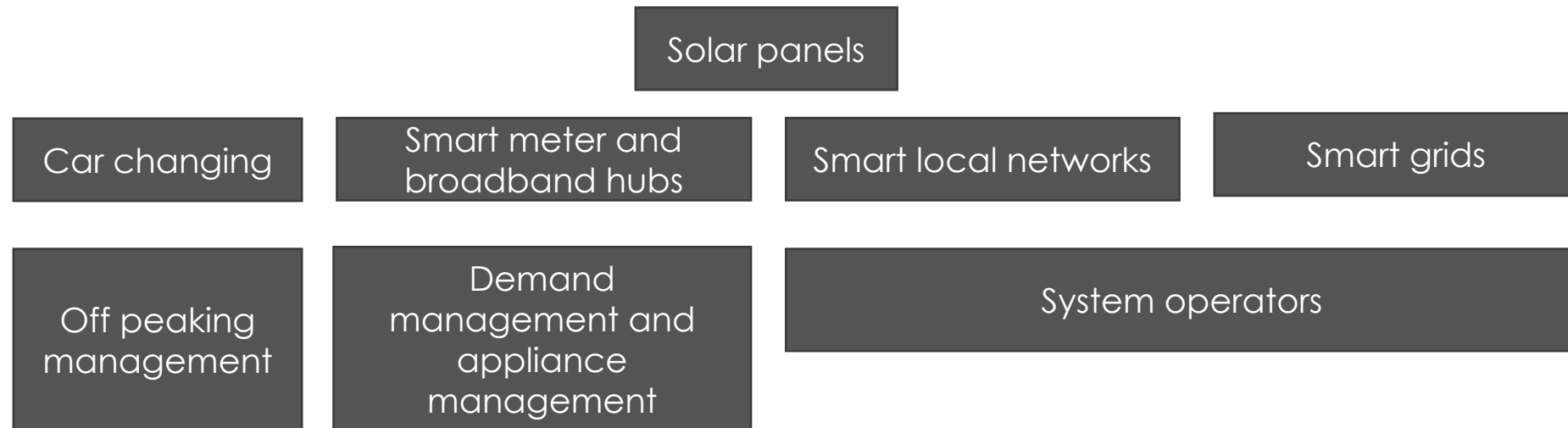
# ELECTRIC CARS AND TRANSPORT

- Cars = Robots and AI
- Transport is all about system management and system control
- Cars with batteries become part of the electricity industry



# SMART SYSTEMS AND SMART HOUSEHOLDS

- Smart grids and AI and big data
- Intermittency and decentralisation





# DECENTRALISED AND RENEWABLES TECHNOLOGIES

- The early stuff – windfarms and solar panels
- The light spectrum and solar
- Solar film and applications
- Small molecule nuclear?
- Tidal power?
- Floating large scale offshore wind?
- Geothermal?
- CCS?

# SUMMARY

- The old assumptions upon which vertically integrated structures build - turned on their heads
- New world is zero marginal cost and storage and active demand
- Everything is digitalising
- Everything digital is electric
- Manufacturing and services - electricity demands with change and growth
- New market (?)



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