

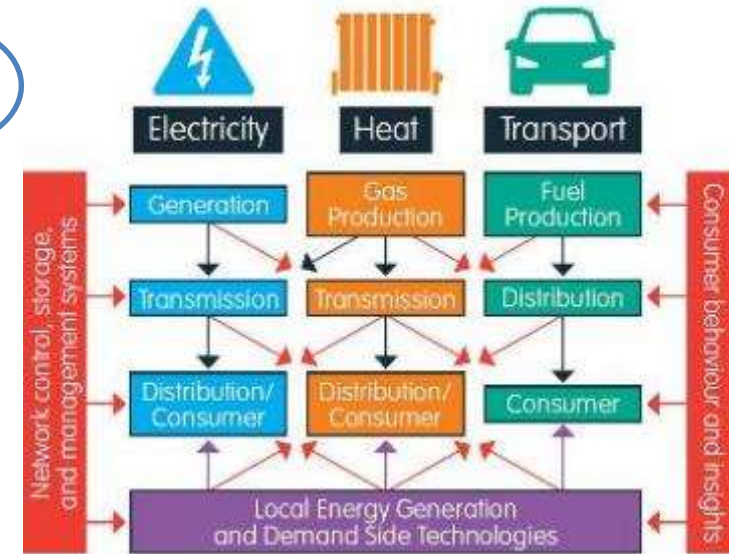
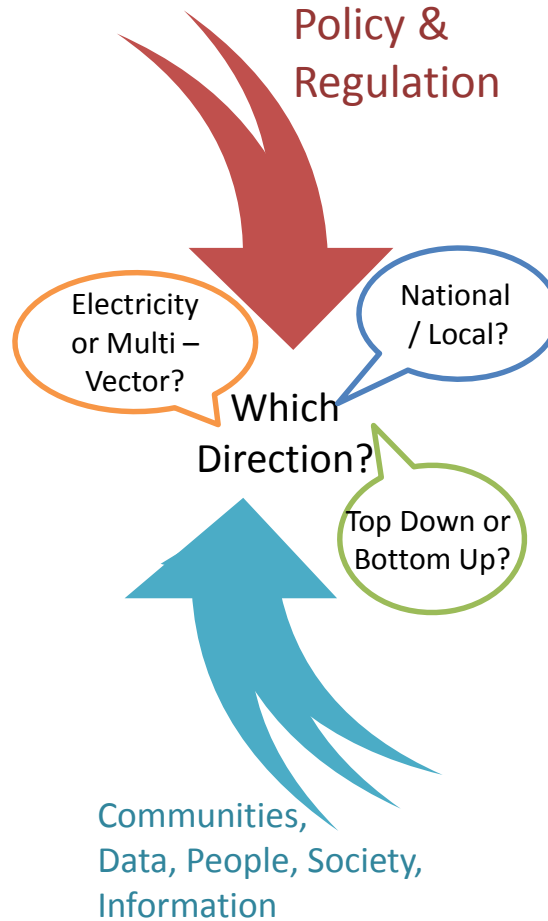
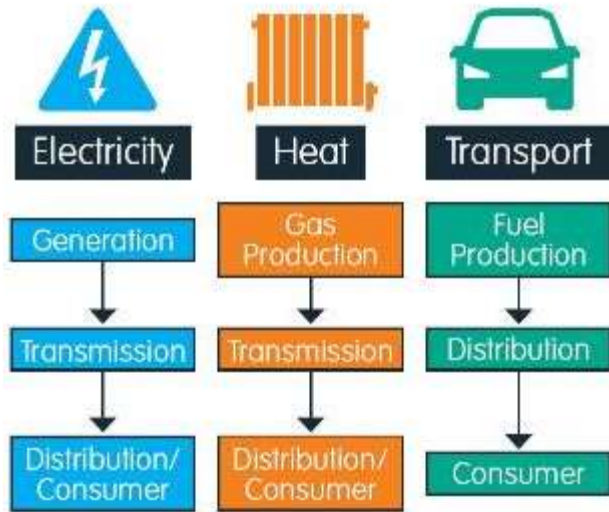
Energy Systems Catapult

“A clean, intelligent, energy system that works for people, communities and businesses”

Presentation to ERP

21st April 2016

Context



The status quo is:

- safe
- stressed
- cheap
- ageing

But, change is upon us:

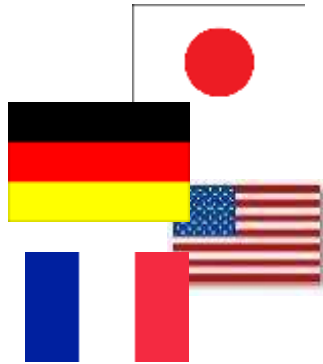
- climate change act
- society
- technology
- data + finance

And, the future could be:

- dynamic
- whole system
- distributed
- flexible
- secure

Opportunities...the world is gradually headed towards privatised, unbundled energy markets

US\$7tn
needed for
Global
Transmission &
Distribution alone



UK recognised
leader in
energy
innovation
investment

UK **sector structure** creates huge potential for **new businesses** that can enjoy material **export growth**

UK GDP
impact of
£8 – £35bn*

£12 - £27bn
of efficiency
savings*

Nationalised and centrally planned

Privatised, unbundled and effective market

Existing Supply Chain

Large supply chain multinationals, institutional investors, National Grid, local authority planning, regulation

New Markets

Peer-to-peer trading, new tariffs, arbitration, community energy, option pricing, demand side management

New Technology

IoT, Advanced control, Energy Storage, Heat pumps, EV charging, data & comms, University Spin-Outs

New Services

Distribution Service Operators, Energy Service Providers, gaming, building retrofit services and solutions

The sector is ripe for change but faces significant challenges

Catapult Response

- Short term, incremental market development
- Inadequate internalisation of transition costs
- High policy risk
- Lack of technology neutral, stable, adaptive regulatory framework



Whole System
Analysis

- Confused energy landscape
- Difficult to access information and partners
- Procurement barriers for SMEs
- Incentives promote incremental change
- Un-differentiated consumer offers



Accelerate
Commercialisation

- No multi-vector systems view of architecture requirements / standards
- Little investor confidence
- Under-developed supply chain
- Information asymmetry
- Split incentives



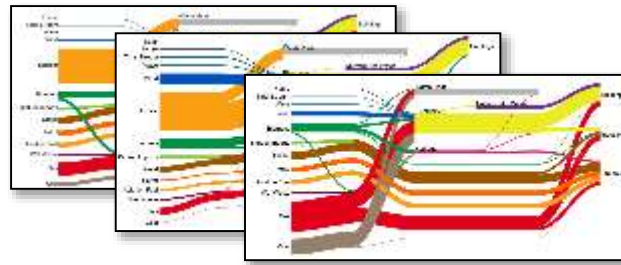
Test &
Demonstration
Platform

ESC will promote consensus on UK energy transition pathways and innovation priorities

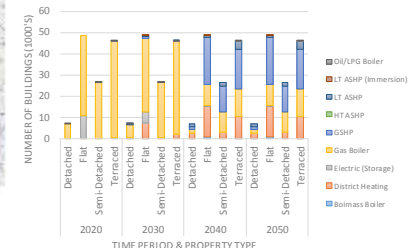


Today...

Reactive policy landscape creates **investor risk** | Complex, diverse scenarios create **indecision**
 Substantial research investment struggles to make impact



ESC will convene stakeholders and develop and apply **modelling and analytical capabilities** to help the UK make **strategic choices** in collaboration with industry, Gov't and academia



Transition Pathways are transforming automotive.
 The ESC will help do the same for energy.

The ESC will help stakeholders with objective analysis to make decisions

Innovation

Knowledge Exchange & Collaboration



User-accessible platform
(EKX - Energy Knowledge
Exchange)

Consumer Insights



Methodologies and tools
to allow end-user
requirements factored into
product development

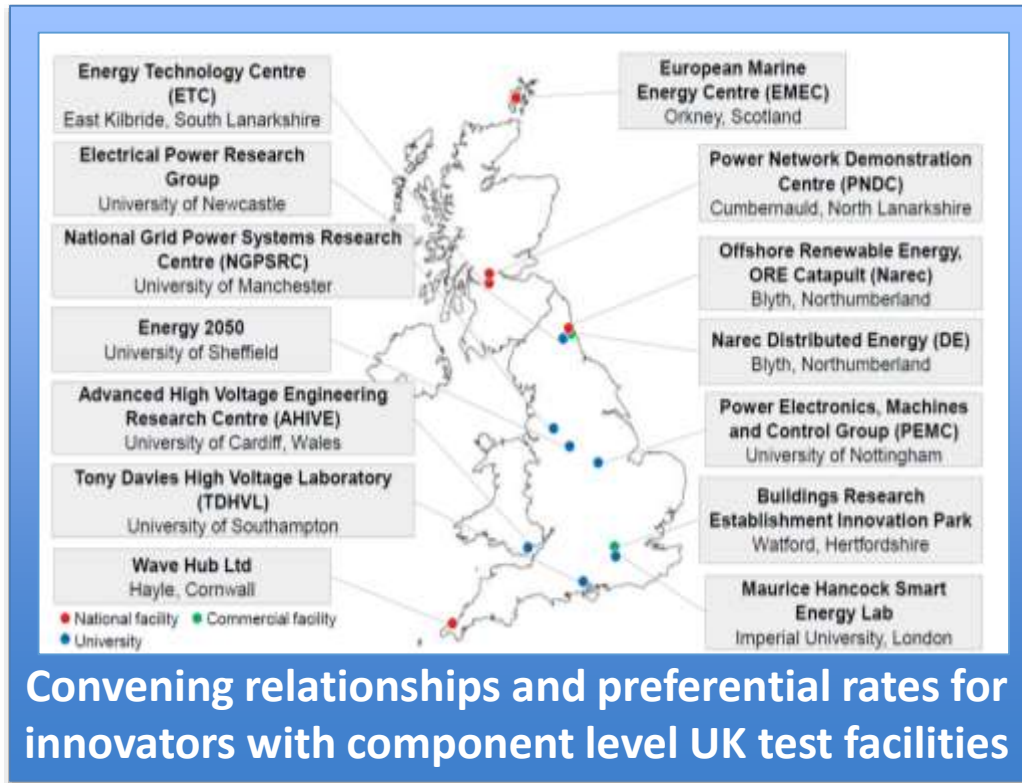
Targeted SME support



Insurance products,
procurement support, sub-
letting of test facility time

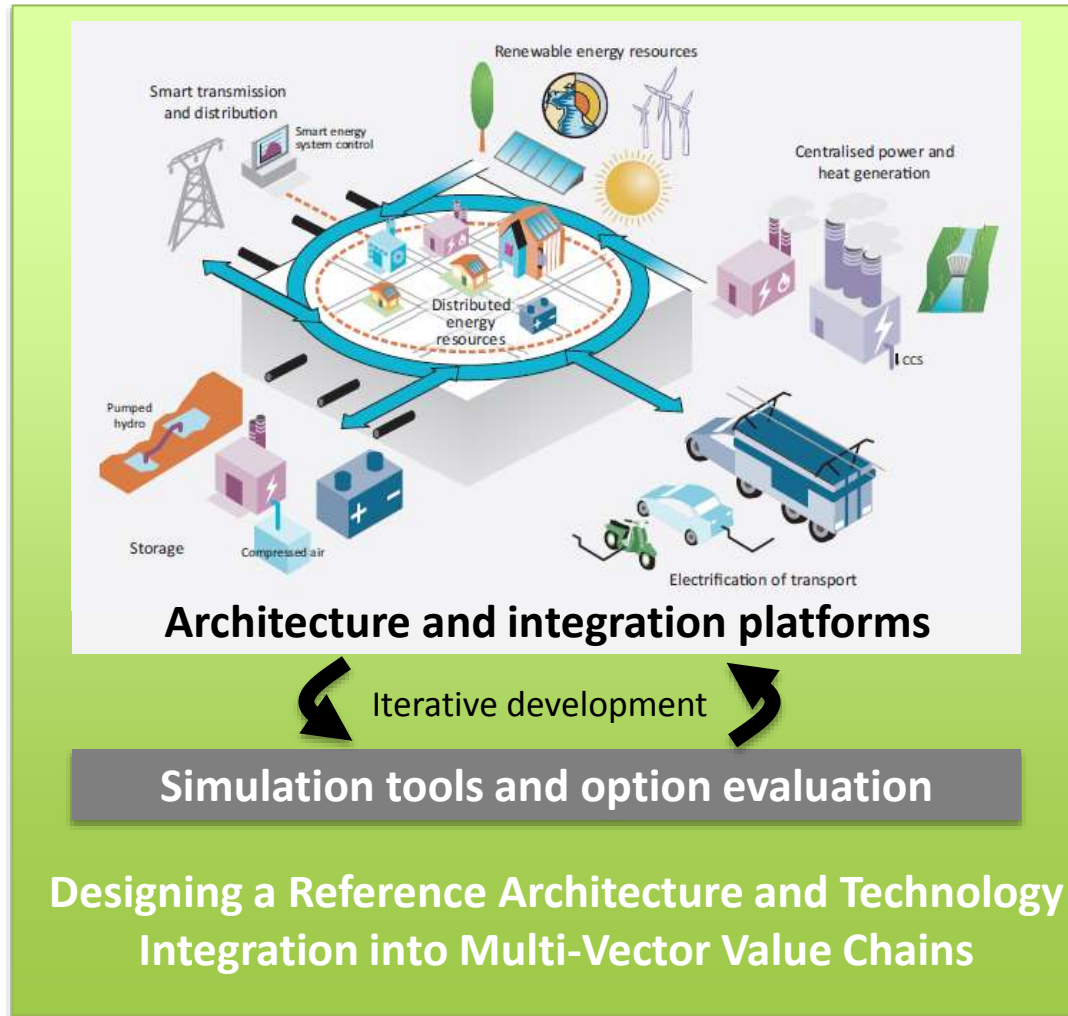
Demonstration

ESC will enable development & demonstration of innovations within a whole system



- Support Development
- Maximise SME influence in facilities development
- Broker alliances for multi-vector capabilities
- Preferential rates for SMEs for access to key facilities

ESC will enable development & demonstration of innovations within a whole system



- Enabling value capture from new business models
- Reduced risk for investors from 'blind alleyways'
- Reduced time to market

ESC will enable development & demonstration of innovations within a whole system

Helping commercial innovators to try out new services with real consumers



And new technologies throughout the energy system



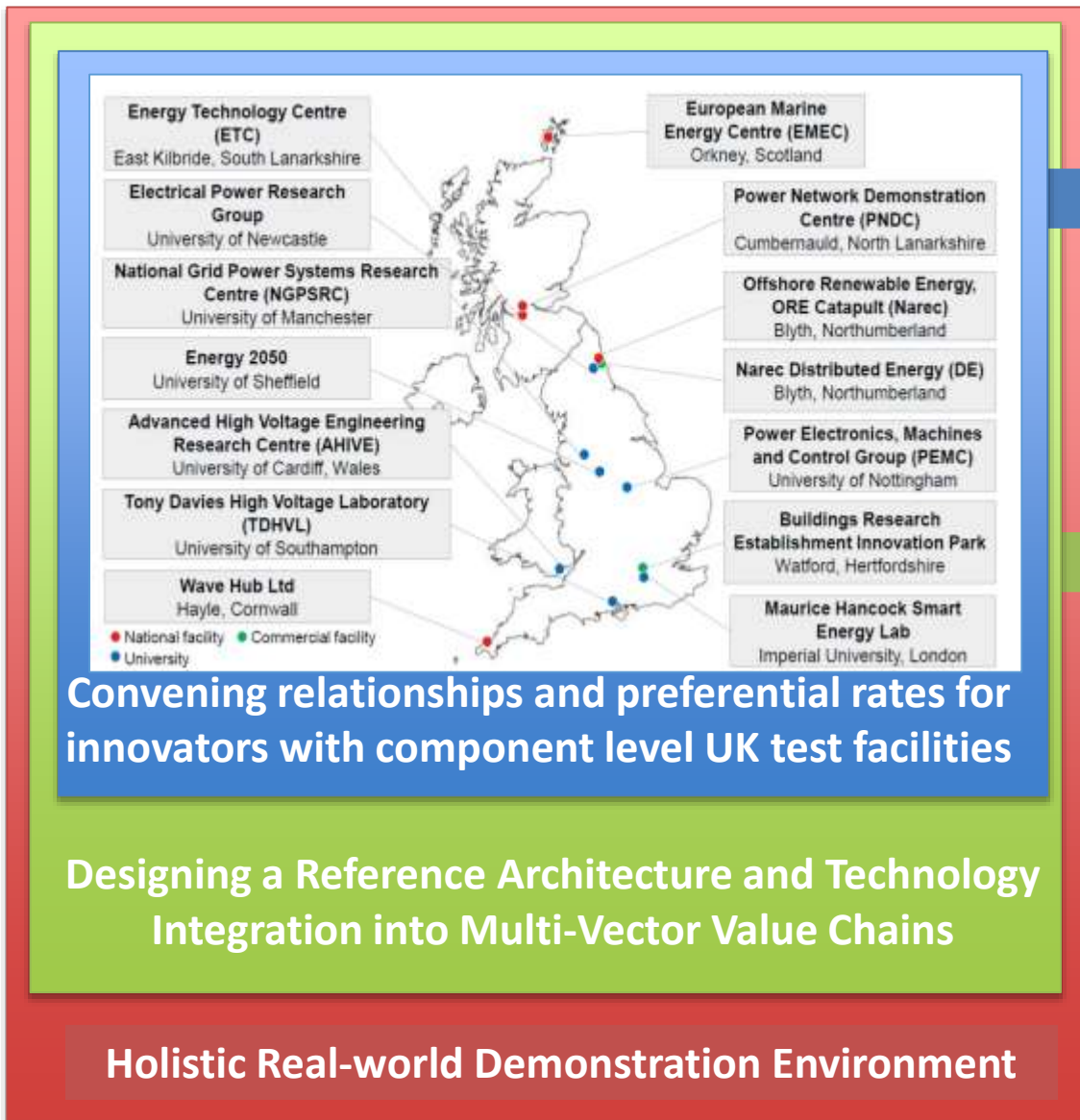
Building on Smart Systems and Heat Phase 2



Holistic Real-world Demonstration Environment

- Early market feedback
- Evidence based policy
- Realistic pricing of risk
- Consumer insights

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Outcomes: potential case studies

Short Term

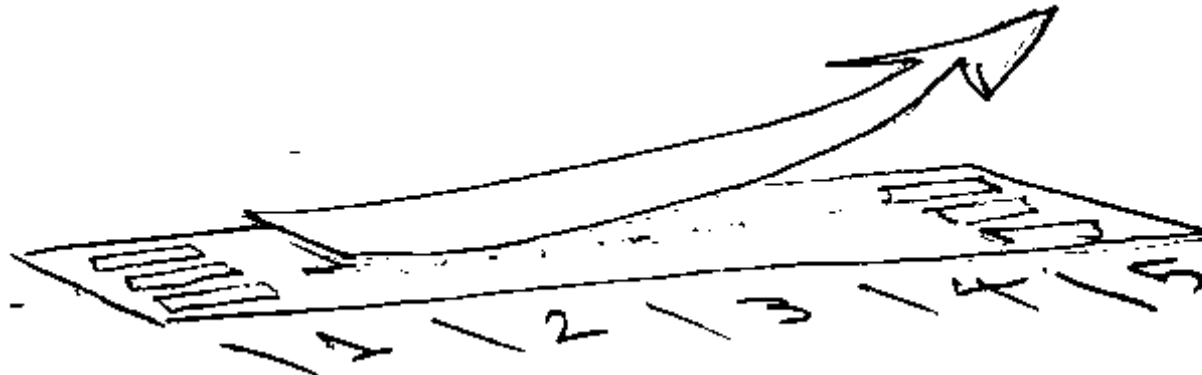
- Capability for local energy planning
- FPSA next phase
- SME collaboration platform
- Test facility access for SMEs
- Energy Knowledge Exchange

Medium Term

- Consolidated whole systems modelling capability: one stop shop
- EPN delivers Local Area Heat Strategies
- Heat networks displacing legacy systems
- Multi – Vector Systems Architecture developed

Long Term

- Consensus on innovation priorities
- SSH demo. Low carbon heat services delivered to '000s homes
- Multi Vector Architecture Model deployed; “Catapult kitemark” supports first new technology



Cannon House

- Connectedness, innovation & collaboration.



Progress so far...

SMEs

- Advising SMEs through Energy Innovation Centre (EIC) collaboration (c. 100 p.a.)
- Work procured directly e.g. E4tech, Encraft, Smarter Grid Solutions and exploring JV with SlowVoice
- Specific SME Engagement e.g.
 - 4ECO, M CATON, Caparra

Leverage of Core Funding

- 2 projects with DECC: £650k
- Future Power Systems Architecture (FPSA)
- SSH programme transferred to Catapult, phase 1 contract value: £20m
- Energy Knowledge Exchange (EKX) scoping in collaboration with Digital Catapult

Our 1st Year

Private Sector

- Working with finance institutions to explore alternative demonstrator funding mechanisms
- Proactive with EDF and Hitachi on the SSH Phase 2 scoping work
- New products/services e.g. EPN (Baringa) & HEMS (Camb. Conslt.) (>£5m committed)

Government and Academia

- Informing energy innovation budgets
- Government consultations, committees
- Collaborating with IET, DECC and academia to deliver FPSA
- Engaged with research councils and 15 Universities
- Local Authorities on scoping of SSH Phase 2 and Energy Path Networks

ESC Governance



ESC Board

Nick Winser (Chairman)

Non-Exec. Directors

Peter Bance

Robert Davis

Tani Nath

Neil Strachan

Robert Bryan

Executive Team

Philip New (CEO)

Marc Stone (CFO)

Paul Jordan (Business
Development)

Nick Smalles (External
Engagement Director)

Grant Bourhill (COO)

Chief Scientist (tbc)

TBC (Whole Systems
Analysis)

Eric Brown (Innovation
Management)

TBC (Demonstration
Environments)