The Power of Collaboration

Will Drury

Chief Executive

11th July 2024

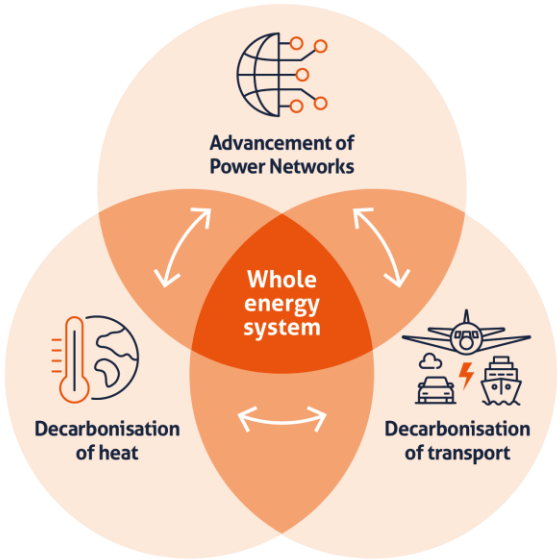
Our vision

To lead the acceleration of net-zero energy, heat and transport systems with world class innovation and facilities

Our mission

To deliver innovative whole systems engineering in collaboration with leading deep tech developers and operators across a global footprint.

PNDC – A Whole Systems Approach



Advancement of Power Networks

Decarbonisation of Heat

Decarbonisation of Transport

- System design
- Practical test & validation
- Security & resilience
- Multi-vector optimisation
- Equipment prognostics & diagnostics
- Communication and cyber security

A bit of history...

Collaboration

Noun – the situation of two or more people working together to create or achieve the same thing

1830, "act of working together, united labor" (especially in literature or scientific study), from French collaboration, noun of action from past-participle stem of Latin collaborare "work with," from assimilated form of com "with" (see com-) + laborare "to work").

Current Global Megatrends

Climate Change

Energy Transition

Rapid Urbanisation

Ageing Population

Current tech megatrends

- AI
- Quantum
- Semiconductors
- Security & trust
- Materials
- Circular Economy

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IT IS COMING FOR ~~YOU~~ US

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IT IS ONLY...

MILLION SECONDS AWAY

MILLION MINUTES

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THOUSAND HOURS

DAYS

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WEEKS

MONTHS

QUARTERS

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YEARS

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WHAT IS COMING FOR US?

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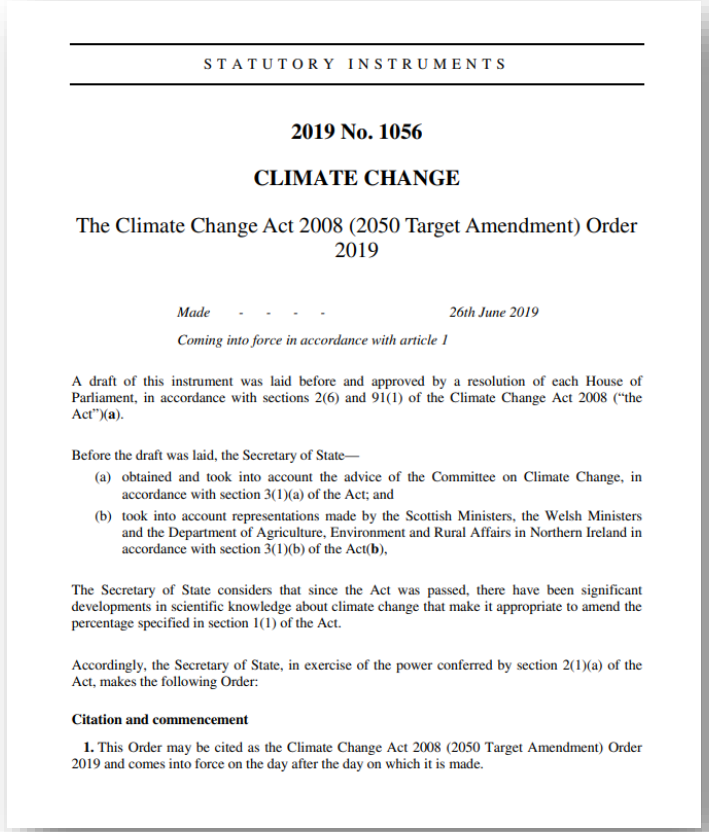
UK achieves Net Zero



STATUTORY INSTRUMENTS

2019 No. 1056

CLIMATE CHANGE

The Climate Change Act 2008 (2050 Target Amendment) Order 2019

Made - - - - 26th June 2019

Coming into force in accordance with article 1

A draft of this instrument was laid before and approved by a resolution of each House of Parliament, in accordance with sections 2(6) and 91(1) of the Climate Change Act 2008 ("the Act")(**a**).

Before the draft was laid, the Secretary of State—

(a) obtained and took into account the advice of the Committee on Climate Change, in accordance with section 3(1)(a) of the Act; and

(b) took into account representations made by the Scottish Ministers, the Welsh Ministers and the Department of Agriculture, Environment and Rural Affairs in Northern Ireland in accordance with section 3(1)(b) of the Act(**b**),

The Secretary of State considers that since the Act was passed, there have been significant developments in scientific knowledge about climate change that make it appropriate to amend the percentage specified in section 1(1) of the Act.

Accordingly, the Secretary of State, in exercise of the power conferred by section 2(1)(a) of the Act, makes the following Order:

Citation and commencement

1. This Order may be cited as the Climate Change Act 2008 (2050 Target Amendment) Order 2019 and comes into force on the day after the day on which it is made.

The UK's future is in our hands...

But we don’t live in bio-dome!

We need an interconnected global solution!

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WHAT CAN WE DO?

The energy transition is now!

We are reliant on multi-vector resilient energy systems

Growth hinges on a just energy transition

Distributed energy networks provide our opportunities

Capacity growth is needed with advanced monitoring

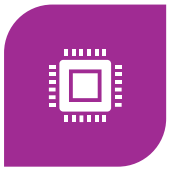
Technology trends are inextricably linked to energy

Fundamentals to Net Zero

GENERATION AND USE OF ELECTRICAL ENERGY

REDUCTION IN POWER LOSSES ARE KEY

ENERGY STORAGE WILL PLAY A SIGNIFICANT ROLE



INCREASE IN POWER ELECTRONICS

SECURITY IS PARAMOUNT

DATA IS CRITICAL TO OUR ELECTRICAL SYSTEMS

So, how is this relevant?

Our vehicles have higher energy demands with more complex energy networks

Vehicles are becoming huge processing platforms that convert energy on the go!

Integration of many converters with overarching controller adds to complexity

Safety is paramount so must cyber security be

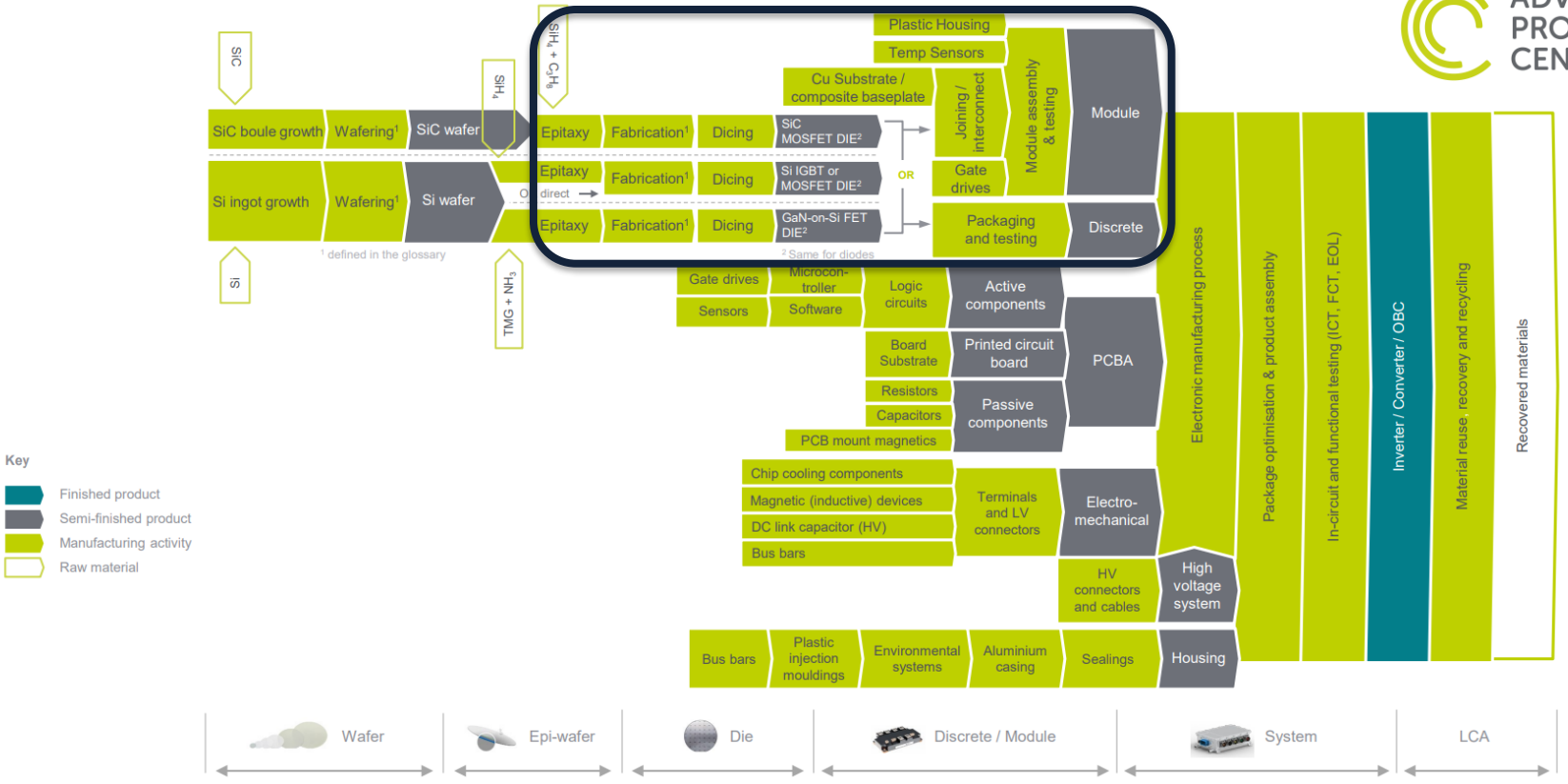
Traction drives, dc/dc converters, chargers, LED lights all need power control

Electric machines, for propulsion and energy recovery, are advanced needing high fidelity controllers

This is very akin to other sector's challenges!!!

No one company can do it all!

https://www.apcuk.co.uk/wp-content/uploads/2023/02/Power-Electronics-Value-Chain.pdf



Whilst the UK has strengths there are opportunities…

https://iuk.ktn-uk.org/wp-content/uploads/2024/04/DER-UK-Power-Semiconductors-Landscape-Report-April-2024.pdf

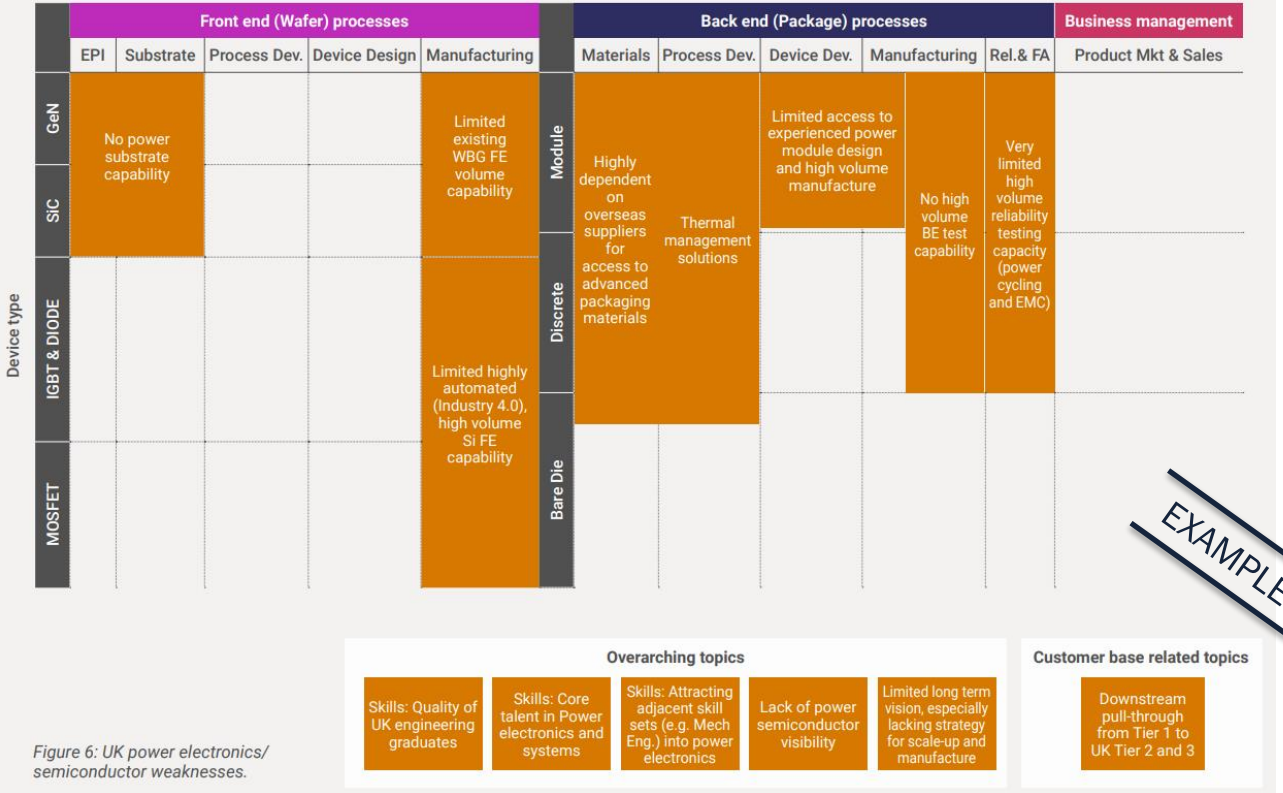


Figure 6: UK power electronics/ semiconductor weaknesses.

So ultimately why should we collaborate?

- We will be more innovative with wider views with much greater cognitive diversity
- We will deliver faster together with a greater resource pool and common goal
- Market access and penetration will be greater resulting in faster adoption across diverse sectors
- Critical mass will be achieved delivering greater global leadership
- We can grow skills, talent and complement capability

In summary…

- Collaboration is about working together for a common goal
  - We have one else we would not be here in this room today!
- Energy conversion capability from design to manufacture will underpin net zero
  - AESIN have been working on this since the MEP workstream was setup in c.2015
- Whole system solutions are critical and access to diverse sectors available through partnership
  - The components and sub-systems **must** be understood to maximise impact and effectiveness
- Electronics, and specifically power electronics are fundamental to efficient systems

- We have very limited time to stand up and be counted

The time is now, and the change makers are you!

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"Climate change represents the greatest challenge of the 21st Century and engineers must be at the front and centre of the energy transition"

Professor Sir Jim McDonald – 13 June 2024

University of Strathclyde Glasgow

TOGETHER WE CAN MAKE A DIFFERENCE

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