



Power, storage and human factors in cyber security... *Considering Energy Resilience*

Panel: Energy system futures, innovation and threats
10th Cleanpower Smart Grids 2019, 1-2 July Cambridge, UK
www.cir-strategy.com/events

2nd July 2019

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V1.0

QINETIQ

Power, storage, and human factors in cyber security...

We face a wave of promising electrically powered technology

... relied upon by millions

... essential in critical settings

- Will the electrical revolution be sabotaged by underdeveloped power connectivity and resilience?
- It's the system of systems that matters



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5

5 fundamental mobile phone technologies including Touch Screen and Liquid Crystal Displays (LCD) developed by QinetiQ experts

40

40 organisations, including the Royal Navy involved in 6 weeks of operations during the Unmanned Warrior Exercise

50+

including 50+ unmanned vehicles operating in the air, land and sea



12

IN STRICT CONFIDENCE

12 Empire Test Pilot School students have become astronauts including Major Tim Peake



85+

locations worldwide

1,300+

patents (including 300+ pending)

We are QinetiQ

£783m

FY2017 revenue

6,000+

people with unique science and engineering expertise

16

Our Ocean Basin in Gosport, UK contains enough water to fill 16 Olympic swimming pools

3secs



Every 3 seconds a Boeing aircraft takes off or lands that has been tested in QinetiQ's low speed Wind Tunnel

1,850km

1,850km of the TANAP pipeline will be protected by OptaSense®

QINETIQ

RESEARCH,
EXPERIMENTATION
& INNOVATION



IN STRICT CONFIDENCE
TEST
& EVALUATION



IN STRICT CONFIDENCE

TRAINING
& REHEARSAL



QINETIQ

RESEARCH, EXPERIMENTATION & INNOVATION

INNOVATION INTEGRATOR • RESEARCH, DEVELOPMENT & EXPLOITATION
• DISRUPTIVE BUSINESS SOLUTIONS



[Case study](#)

Robotics & Autonomous Systems

Power Sources, Energy Storage & Distribution

Cyber & Electromagnetic Technologies

Secure Communications & Navigation

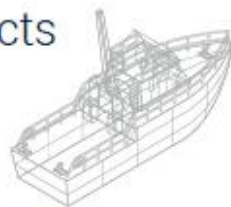
Artificial Intelligence, Analytics & Advanced Computing

Novel Systems, Weapons & Effects

Sensing, Processing & Data Fusion

Advanced Materials & Manufacturing

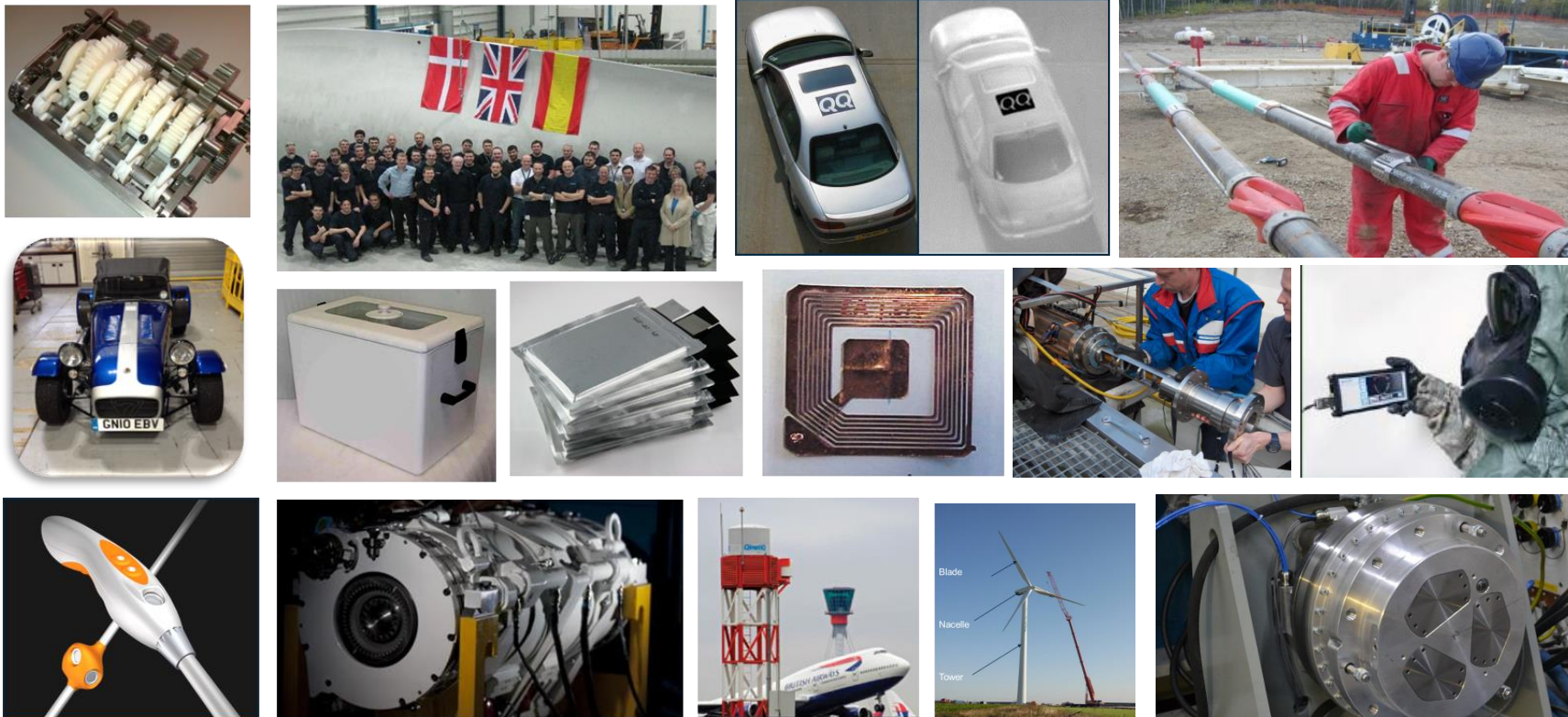
Human Protection and Performance



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Power Source innovation

Incubator hub – develop low TRL technologies and take through to exploitation in the market place
 Example: **E-X-Drive** improves fuel efficiency and reliability, significant power within the vehicle and new freedom in design



Energy innovation case study

- Power source management for future Forward Operating Bases (FOBs)
- Why power sources?



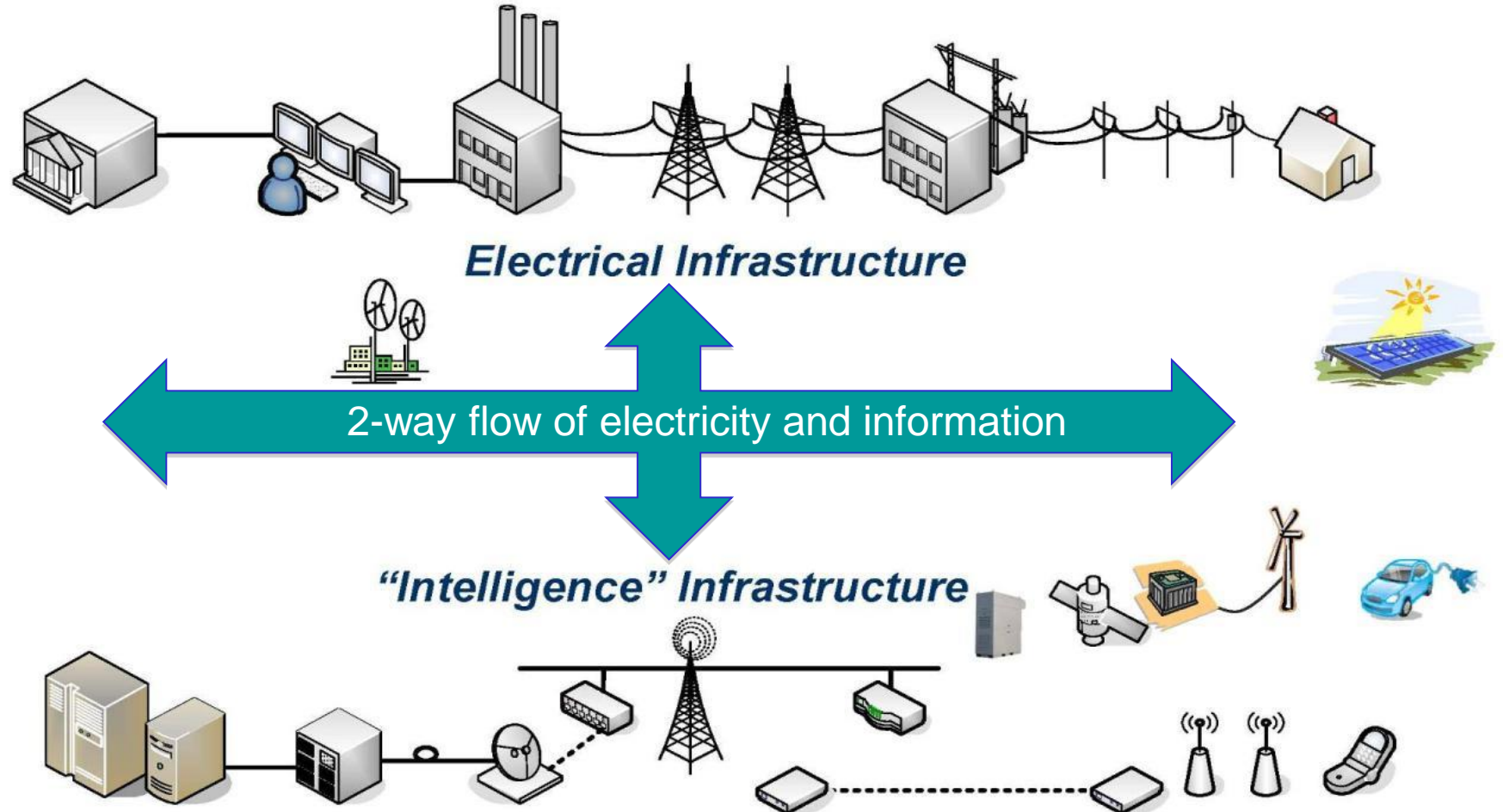
- Critical enabler
- Costly and heavy; risks in logistics and safety
- Scope for advancements – electrochemistry, logistics & applications
- Investment for future technology and environmental sustainability

- Why future FOBs?



- Relevant environment
- Microcosm of wider potential
- Advancements widely applicable (transport hub, refugee camp)

Smart Grid Organisation: The 'Energy Internet'

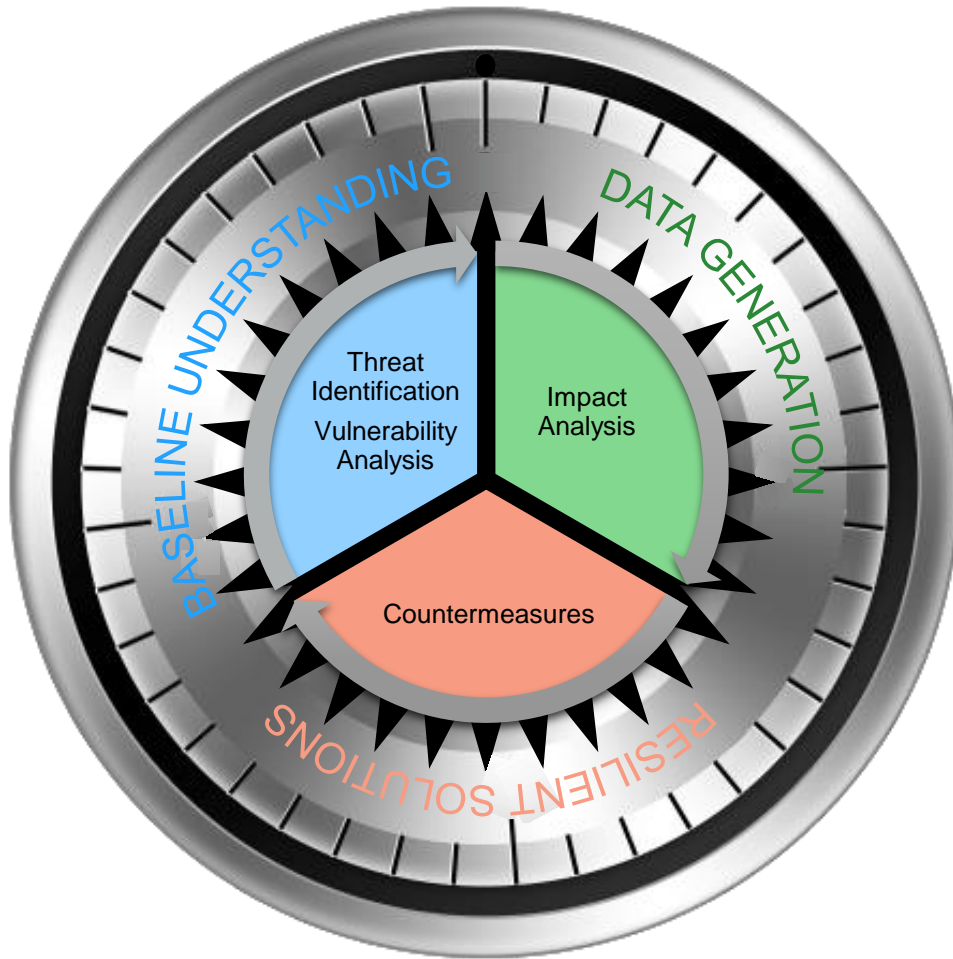


courtesy of EPRI

Your greatest asset and your strongest defence



Unlocking Resilience



- What are the real threats we are dealing with?
- How vulnerable is our infrastructure?
- What will happen if we are attacked?
- What do we need to do to protect ourselves and recover quickly?



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