Future Energy Trials

Agenda

- Electricity Generation
- Hydrogen (Automotive)

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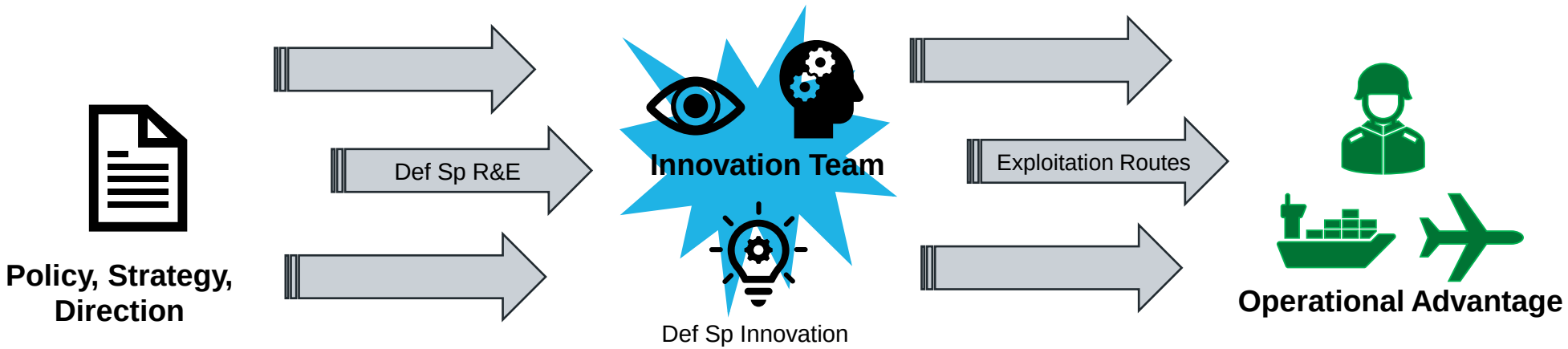
Introduction

- The Innovation Team was created in 2016 within Support Transformation to develop a pipeline of future transformation activities, however, it wasn't resourced until 2021.
- In 2023 the Innovation Team were moved to Support Operations to align with the Support Futures Research and Experimentation programme and provide a conduit between this and potential exploitation routes within the Defence Support Enterprise.
- To enable Defence Support to stay relevant, the innovation team **incubate innovation concepts to enable them to be exploited for Operational Advantage.**



Future Energy Trials - Hydrogen

Ministry of Defence

Defence Operational Energy Strategy

- Background “Future Energy”.
  - British Energy Security Strategy, MOD’s Climate Change and Sustainability Strategic Approach
  - Defence Operational Energy Strategy (DOES)
- Trial aims:
  - To support the Sustainable Road Transport Team, Phoenix 3 white fleet contract (Ph3) and the move to zero emissions at the tailpipe vehicles by Dec 2027.
  - Risk of MoD locations not having the infrastructure in 2027 to support the move away from hydrocarbon to battery.
  - Option to FLCs to support the roll out of Ph3.
  - To gain experience in the production, storage, transport, handling and operation of hydrogen as used in fuel cells.
  - Initially first site is RAF Leeming in Jul, but will add HMNB Devonport & Colchester, 20 Sqn RLC (Jul) car only.

Future Energy Trial - Hydrogen

Electricity Generation

- More electrical vehicles
- Test the alternative solutions to meet 100% zero emissions by Dec 27.

- 3 sites using a Geopura fuel cells
- To charge battery vehicles.
- Totally standalone units (field trial)

Hydrogen for motive use

- Some electrical vehicles will not replace existing capability...blue light, patrol cars.
- Hydrogen cars don't need recharge time = better availability.

- 1 to 3 sites using a hydrogen refueler.
- London site cars only and fuel cards
- Option for vans, Hilux and fork lift trucks

Future Energy Trial - Hydrogen

Key Activities
- Use/handling of H2
- Evaluation of options
- Milestone Reports
- Reliability
- Communication of trial
- Feasibility analysis
- Starting the alternative energy journey

Customer Relationship
- Engagement with FLC
- Showcase/seminars…RIAT 23, UK ex
- Use benefits
- Development of other tech…not just cars but also deployed power
- Monthly updates

Key Resources
- Sponsors
- Stations to support
- User expertise
- Regulation community (fire H&S, trade sponsors)…dive deeper than just a contractor providing a service

Customers
FLC
Strat Com
DE&S
DIO
DSTL

Mission Achievement
- Does it provide benefit to defence?
- VFM vs alternative?
- Hydrogen experience
- Do we need to tailor the product?
- What was not so good?
- Cost of solution

Value Proposition
- Opportunity to exploit tech
- To help deliver NZ
- Green power source…"replace a FEPS use"
- Springboard to introduce smaller power cells (modular)
- NATO partners experience

Future Energy Trial – Issues to Date

- Availability of Hydrogen
- Availability of equipment – Is it the right type?
- Cost
- Regulations & Experience

Future Energy Trial – Where next with hydrogen?

ISOs shown are 10ft. Could be mounted in a single 20ft ISO

- Solar panels provide electricity
- Electrolyser (10Kg/pd, ~30Kw per Kg). Only 1 rack, could add more to produce 20-40kg pd.
- Hydrogen Storage 60Kg, size was dictated by biggest single demand (38Kg bus).
- Hydrogen generator (100Kw)
- Issue point (Hydrogen FLT).

Future Energy Trial – Where next with hydrogen?

- Develop the infrastructure to provide competitively priced Hydrogen.
- First steps are to access Hydrogen, not a priority to get green initially.
- Volume Ammonia (from Middle East)
- Hydrogen is part of the Future Energy Mix hybrid model along with wind, solar, battery.

- How do we produce our own Hydrogen
  - Partnership?

Future Energy Trial – Conclusion

- Starting now…
- Working in the same space

The basics of EV charging

An electric car needs refueling, the same as any vehicle.

All you'll need to do is plug it in to an electricity source and leave it for a while. That's it.

It's just like charging your phone, in that each type of model will require a different kind of cable to make the connection. The cable will be supplied with your vehicle.

There will be a port on your car and another on the charging station, and your cable will need to plug in to both of them.

Strategic Command
Defence Support

GeoPura

Powered by clean hydrogen

Creating renewable energy

Using water electrolysis to produce green hydrogen

Stores renewable energy as a hydrogen-based fuel

Can transport hydrogen fuel where it is needed

HPUs use hydrogen fuel to produce zero-emission electricity

Zero-emission charging for zero-emission vehicles

Scan to access charging guide

Questions?