CLASP Energy – Challenge Areas

A Focus Group of energy sector experts convened to define key technical energy challenge areas that will form the priorities for the funding call of the CLASP. The list is not exclusive and we would welcome any novel and innovative proposal that address other energy challenges.

Energy Storage
As renewables such as wind and solar are intermittent, storage is required to ensure that supply is always able to match fluctuating demand. The following issues should be considered:

- Characterisation and optimisation of fuels, devices and their life cycles including degradation (batteries / fuel cells / hydrogen).
- Optimisation of catalysed processes.
- Centralised and decentralised grid-scale storage methods to cope with short term (diurnal) and long term (seasonal) fluctuations in supply and demand.

Nuclear Energy
The UK is committed to uranium fuelled fission reactors for the foreseeable future. Projects that address issues in the following areas are welcomed:

- Plant life extension (e.g. radiation damage monitoring and mitigation).
- Decommissioning / decontamination.
  - Sensing (remote and in situ).
  - Handling (e.g. robotics).

Future Energy Grids
Electricity grids in the future will have to cope with a diverse range of power sources, monitored and managed on local, regional and national scales. The following challenges should be considered:

- Big data issues (e.g. real-time metering and feedback to customers).
- Modelling of fault conditions and cascade effects.
- Visualisation of complex networks for management.

Energy Materials

- Optimisation of manufacturing (e.g. thin film solar cells).
- Validation of rapid prototyping techniques (e.g. 3D printing).
- Bespoke manufacturing (e.g. precision machining).
- Advanced insulation materials and systems (e.g. for buildings without cavity walls).
- Overcoming materials degradation.
- High temperature materials (e.g. for increased thermal efficiency or advanced combustion technologies).
Sensing and Monitoring

- Monitoring of CCS sites.
- Satellite and other remote sensing.
- Measurement and prediction of incoming energy to wind and wave sites to avoid damage to plant.

Challenge areas that were not considered priorities for the 2013 CLASP Energy call, mainly due to their time to market, are listed below:

- Advanced nuclear fuel systems (e.g. thorium, fusion).
- Designing wind turbine blades.
- Biofuels (1st and 2nd generation).
- Solar systems based on crystalline silicon.

The 2013 Energy CLASP call complements the portfolio of work funded through the RCUK Energy Programme. The CLASP priority challenge areas were identified through consultation with experts including EPSRC and NERC to ensure increased impact from working together.

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