

P2G LEAP (NGGD) – 2015 NIC ISP Questions

1. Under criterion (a), please provide some quantification for how the project would deliver benefits that outweigh the costs.

We have answered this by reference to the long-term future benefits that we expect to be unlocked by successful demonstration of the technology.

Power-to-gas has the potential to provide significant benefits to UK gas customers.

Direct Consumer Benefits: Renewable gas from P2G could enable gas customers to reduce their greenhouse gas emissions without the need for any additional investment. For a typical customer in a 3 bedroom semi-detached house, for instance, the avoided cost of upgrading appliances compared with, for example, an equivalent air-source heat pump would amount to at least £4,000. Averaging across different scenarios, spilled renewables (i.e. potential renewable electricity for which there is no instantaneous use) could increase from 5 TWh_{el} in 2030 to 63 TWh_{el} in 2050, which (at a 60% power-to-gas conversion efficiency) translates to 3 TWh_{th} and 38 TWh_{th} of renewable gas respectively. If 38 TWh_{th} of renewable gas were available for supplying 2.4m properties which would therefore not have to make these upgrades, £9.5bn could be saved by gas consumers. This would be in addition to the annual value of the 38TWh/a of renewable gas from electricity that would otherwise effectively be worthless. This would amount to around £650m per year (£50m per year in 2030, based on 3 TWh) if valued conservatively at the current commodity price of natural gas of around 50 p/therm (1.7p/kWh).

Energy System Benefits: Wider energy system benefits become apparent when considering how renewable gas from P2G could be used to reduce the overall cost to reaching the UK's climate change targets, which cascade back to gas customers. Redpoint has estimated that 100 TWh of substitute natural gas generated through biomass-based technology would generate savings of £1.4bn p.a. in 2030 and £8.3bn p.a. in 2050. These savings stem from avoided costs for incremental reinforcement of electricity networks, heat networks or additional low carbon generation, and therefore equally translate to substitute gas produced by the P2G route. In addition, P2G would avoid or reduce the potential need to decommission part of the entire gas distribution network, a substantial cost largely ignored in most economic analyses.

Project Funding Benefits: By complementing the NIC funding with funding from Horizon 2020, the contribution from UK gas customers can be geared by a factor of 3. We believe this represents very good value for money for UK gas customers.