



**STRONSAY DEVELOPMENT  
TRUST**

**‘HARVESTING THE WIND’**

**-Our Vision for a Clean Energy Future-**

Stronsay is the seventh largest island in the Orkney archipelago, located off of the north-east coast of Scotland. It's a modest 3275 hectares (about 12.6 square miles) of excellent farmland with a surprisingly long and varied coastline, accentuated by three large, pristine beaches.



Stronsay is home to a thriving community of about 375 people who for centuries have adapted to the changing world and are willing to help lead the way with Orkney's important role in alternative energy production.

The Stronsay Development Trust is a community-based organisation formed in August 2004. The Trust is charged with promoting the sustainability of our fragile community by gathering ideas from the residents, identifying projects, and turning these into fully-realised community assets. Like many small island populations, Stronsay has seen issues such as high energy costs, changing economic priorities, and substandard services lead to depopulation, especially amongst young people. The Trust is actively engaged in improving the quality of life and providing greater opportunities for all members of the community.

The importance of renewable energy production has been identified since the earliest days of the Trust, and considerable attention has been focused towards choosing the best of the many available options. Community-ownership of wind turbines has been explored by several similar organisations in other areas and in many cases has provided tangible benefits through island employment and the selling of electricity to the national grid. In addition, the generation of energy from alternative sources can result in the payment of Renewable Obligation Certificates (ROCs).

The winds blowing over the Atlantic Ocean and the North Sea surrounding Orkney are among the most powerful, and unrelenting, in the world. This resource is being exploited with great success both on Stronsay (a privately-owned farm of 3 turbines has been operational since 2002) and on several neighbouring islands. The benefits to the residents of Stronsay from the privately-owned turbines are far below those achieved through community-ownership. Furthermore, the cables from our island do not have the capacity for further connections to the national grid. After carefully weighing our various options the Stronsay Development Trust has an ambitious plan:

**We intend to be the first community in the UK to make the full transition from a fossil-fuel dependant economy to a clean-air, hydrogen-based economy, generated by non-grid connected, community-owned wind-turbines.**

**We want to serve as a 'living laboratory' for the world to observe and learn from our experience.**

### **How is Hydrogen produced?**

-Electricity (in this case, produced by wind-turbines) can be used to separate water into positively charged hydrogen and negatively charged oxygen – a process known as electrolysis.

### **Why Hydrogen?**

-There is increasing evidence that we are in the grip of climate change caused by man made carbon dioxide pollution.

-Hydrogen gas can be used as an alternative wherever carbon-based, fossil-fuels have been traditionally used, i.e. driving the car, heating the home, switching on the light, powering farm equipment, etc.

-Unlike fossil-fuels, which produce environmentally-damaging greenhouse gases, the by-product of hydrogen combustion is pure water. Furthermore, using wind energy to produce the hydrogen is also non-polluting.

-A high proportion of the island's expenditure goes out of the island when buying in energy as fuel, By making our fuel, this money will now be stay within the community.

### **What will the Hydrogen be used for?**

-As mentioned above, all standard uses of fossil-fuel engines and home heating can be converted or replaced by non-polluting hydrogen models.

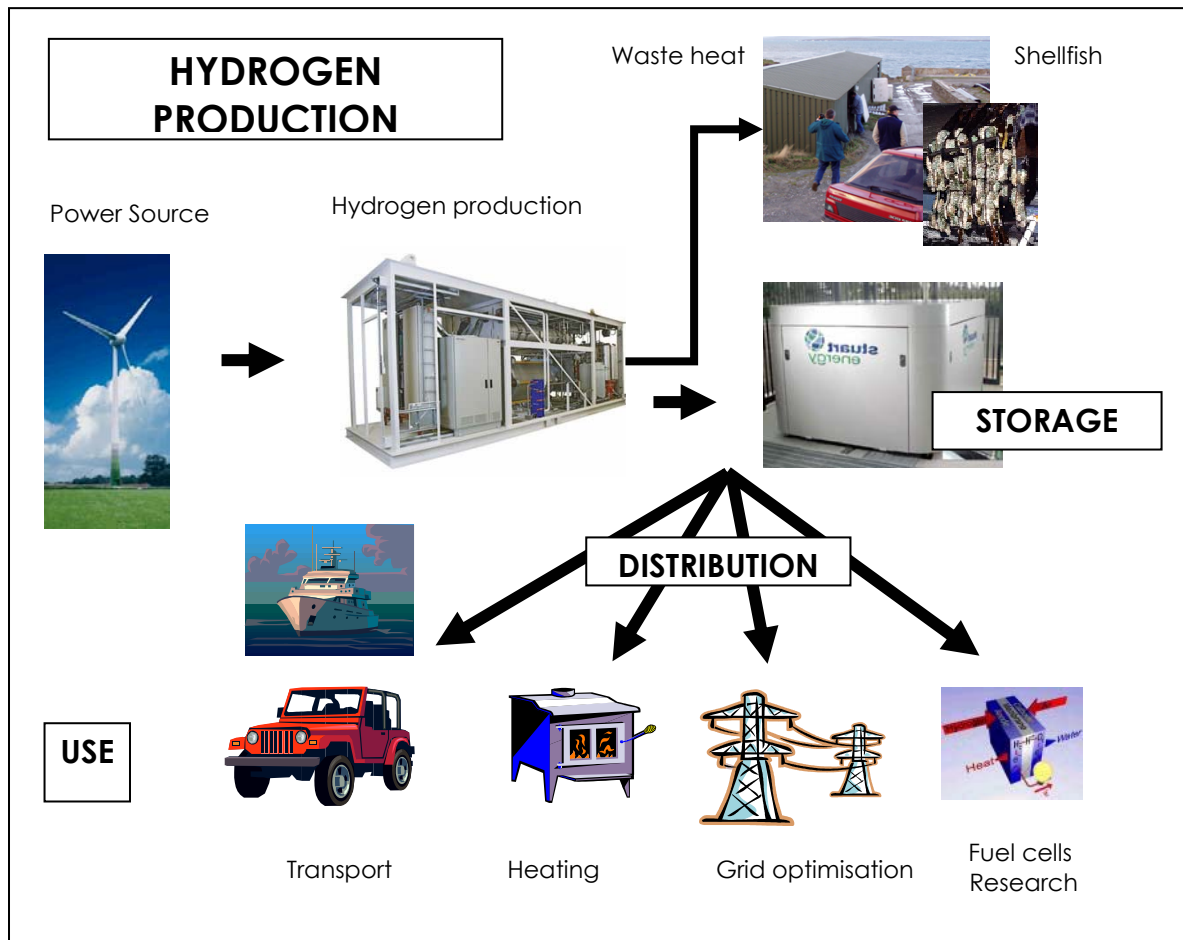
-Once hydrogen has been produced it can be stored for later use. Typical wind-turbines (dedicated to generating electricity) have very little storage capacity.

- Running a 25m survey vessel for eco-tourism, seal, whale, bird watching. This will help us apply the lessons learned to the development of a hydrogen ferries that can be refuelled with Isles generated hydrogen.

-Stored hydrogen can also be reconverted to electricity to support the national grid when there is a shortage of electricity.

-Hydrogen can also be used to power fuel-cells. Fuel cells are themselves an alternative to typical combustion engines.

-Other uses may include: various aquaculture from the warm water by-product of electrolysis and the export of hydrogenated chemicals such as ammonia.



### Why Stronsay?

-Since achieving the status of ‘Initiative at the Edge’, the Stronsay Development Trust and the residents of the island have worked hard to improve the sustainability of our home. We believe that the transformation to a hydrogen-based economy has a greater chance of success here than in a larger, centralised market. Not only is the scale of production and distribution more manageable but the smaller population will allow for an easier transition as we move from one phase to another and face technical and social barriers.

-While there a number of hydrogen initiatives taking place in other parts of the world - notably Iceland, these are mainly focussed on high technology fuel cell applications. Stronsay is the first to look at a more holistic combination of both high and low tech hydrogen applications and demonstrate how they can be applied within a community.

-Stromsay is one of the most severely fuel-impovertished areas in the UK. High transport costs, housing inadequacies, and the northern weather, combine to threaten the most vulnerable members of the community.

-An island is the world in miniature. With our living laboratory of 375 souls, it is very easy to monitor the challenges and benefits of moving to the hydrogen economy from technical, social and economic viewpoints. We seek to work with industry, small businesses and academia to apply our experience back into the wider world.

### **Future Stages**

After the installation of the wind-turbines and electrolyser, hydrogen production can begin. The first uses would be towards conversion of vehicles (automobiles and agricultural equipment, ecotourism with the hydrogen boat, grid support and home-heating.. Development of the distribution infrastructure would allow access to all residents.

The hydrogen plant would also be available for research and development of our additional ideas (i.e. fuel cells, hydrogen storage, aquaculture, and chemical production) and would serve as an important resource for universities or other research-orientated institutions.

The knowledge and skills gained by these projects would create substantial employment opportunities for residents of Stromsay as consultants serving to share our experiences with the wider world. The lessons learned here could be extrapolated, not only to larger developed regions, but to isolated communities in the third world without grid infrastructure.

For further information and contact details please visit the Stromsay Development Trust on the web at:

**[orkneycommunities.co.uk/SDT](http://orkneycommunities.co.uk/SDT)**

The Stromsay Development Trust is supported in its activities by Orkney Enterprise, Orkney Islands Council, Communities Scotland, the Crofters Commission, and Orkney Community Planning Partnership.

