

Looking Back – Moving Forward,  
in...

**OneGreenPlanet**



# OneGreenPlanet



- Introduction – Past, Present, Future...
- “Passive” Solar Properties
- Active Solar Property
- DTi/ETSU DFT2 Domestic Field Trial Phase 2
- (Black) Hydrogen Residential 24/7 Fuel Cell installation
- Renewable (Green) Hydrogen Fuelled & Powered Property
- *OneGreenPlanet* – Based at Elvingston Science Centre is...
- Developing portfolio of affordable housing, with:
- Integrated Renewable and Alternative Energy Systems
- Other *OneGreenPlanet* initiatives...

# Passive Solar c.1996



# Passive Solar



- Sun-space used by occupants as additional amenity space
- Whole-house ventilation exhausts wet rooms via heat exchanger re-circulates with fresh air
- Humidistat controlled ventilators from atrium sun-space to f/f rooms
- Formed part of DTi/ETSU DFT2 Domestic Field Trials Phase 2
- Large windows south small, to north
- Storm porch to north
- Air quality good – no condensation, residents healthier lifestyles
- Reduced heating requirements – resident feedback
- Additional sunspace cost c. 5.8% (1996)
- Won 1997 National Housing Award for Innovation in Social Housing
- Other variants have been developed

# Small Scale Domestic Field Trials

## DFT2



- Project is one of 23 in UK, and one of 4 in Scotland,
- delivering 36kW/p across 17 Properties
- Aims – to provide information on the buildability, operating performance, reliability & maintenance of building integrated PV (BIPV) systems
- 3 year project, with milestones:
- Design, Procurement, Installation and Commissioning Reports, followed with
- 4, 12 , 18 and 24 month Performance Reports, for On-Grid installations
- Retro-fit to 17 properties (16 x 2kWp + 1 x 4kWp) spread over three sites with different South-facing aspects
- Project provides 36kW/p of PVs
- FOR BRE REPORTS - see:  
*[www.bre.co.uk/filelibrary/rpts/pvdt/PVDFT\\_Final\\_Techn\\_Report.pdf](http://www.bre.co.uk/filelibrary/rpts/pvdt/PVDFT_Final_Techn_Report.pdf)*

# Active Solar



# Active Solar



- Developed 'passive' Sun Space into 'Intelligent' version
- Uses automatic blinds to raise temp in atrium of Solar Generator, increasing efficiency of internal Solar Water collector
- Winter/Summer ventilation system with Heat Recovery
- Hygrothermal Heat Storage within atrium
- Totally autonomous in operation
- Formed part of DFT2 with DTI/ETSU 4kW/p grid connected
- Also benefits from rainwater harvesting, breather wall, etc

# A Quick Detraction into the World of...



# Eyemouth boasts UK's first hydrogen powered home



# (Black) Hydrogen House



- ***European Consortium of Project Partners***
- ***The first live residential 24/7 installation in UK and Europe***
- ***Micro-CHP Beta PEM FUEL CELL working on Black hydrogen reformed from Natural Gas***
- ***On-Grid' connected - 1.5 kWe, 2.9 kWth***
- ***Thermal storage 1000 litres c. 18kWth)***
- ***Installed September 2005 6 months after first (inception) meeting with Baxi Innotech***
- ***12 months monitoring information bought by Carbon Trust***
- ***Confidentiality Agreement in place***
- ***Pilot extended with Carbon Trust by 6 months***
- ***Future generation PEM Fuel Cells in Germany...***

# The Hydrogen House ECO-5



# The Hydrogen House ECO-5



- host property utilises system built construction with bolt-ons

New OneGreenPlanet F1 (affordable housing)  
Hybrids will incorporate integrated renewable + other energy systems

# The ECO-5



- This House is designed to be self-sufficient for its energy needs – i.e. not utilising the electricity grid or the gas network.
- A 5.7 kW Sharp solar PV system, a 6 kW wind turbine, a solar water heating system and PEM Fuel Cell provide energy
- Electricity not used by home is stored in a large battery bank. When the batteries are full, green electricity is converted into hydrogen via a PEM Electrolyser producing c. 15 litres of hydrogen / minute
- Hydrogen stored underground as energy vector at c. 10 bar.
- Hydrogen Fuel Cell produces electricity to heat property.
- Excess heat from FC (thermal) is used to compliment thermal storage (1000 litres).
- Stored hydrogen can run the house for up to a month.
- Funded by Scottish Government under its Renewable Hydrogen and Fuel Cell Support Scheme.

# Future initiatives in OneGreenPlanet



- New portfolio of F1 Hybrid system built social housing with *integrated renewable and alternative energy systems*
- The complete solar roof
- Rainwater electricity generation - novel design to take advantage of Scottish rainfall for power generation
- Microbial (first generation) Fuel Cells producing 400 watts – fuel source waste/foul water
- Affordable PV's \$1/watt
- Micro-generation from resources (waste to power) readily available within built environment.
- AquaEnergy - development of combustion fuel from ordinary water for power-plants

# New portfolio of system built social housing “F1 Hybrids”



- A unique concept in development with OneGreenPlanet and Partners, with
- integrated renewable and alternative energy systems
  - Award winning “modular” factory based construction concept
  - “flexible but not tailor made”
  - standardized and cost effective
  - high technical standards/finishes
  - maximum emphasis on energy efficiency and “quality of living”
  - high customer satisfaction



# Thank You



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