ESB Engineer Challenge 2015
Smart Connected Community

29th Oct 2015

The Challenge

- **Develop a design proposal for the Hollyfield site that is energy, resource and waste efficient, uses smart technology and has a chic feel reflecting the following:**
  - An innovative refurbishment and internal fit out of the existing Phase 1 properties;
  - Phase 2 will include a community hub facility which enhances the community and its environmental impact
  - Phase 2 homes to be of leading edge standard – list the main features and possible appearance
  - Identify how the community itself can optimise energy and waste management through internal collaboration and in collaboration with other communities. How would this work?
- **The design must be innovative and technically feasible.**
- **You can propose any technology available on the Web even those in prototype – make sure to reference your sources**
- **You have 3.5 hours to research, design, package and prepare a presentation**
- **Presentations must be handed over at 13:00 sharp**

The Team's Role

Your role:

You are the ESB design team who will pull together a re-design concept of the Hollyfield site. The design concept will be pitched to a panel of assessors from ESB, EPA and Teagas. The aim is to gain agreement from the panel to proceed to the next stage of the project: the preparation of a full detailed design.

Success or Failure:

It is critical that the pitch goes well and the panel are impressed. If it raises serious issues this will most likely delay the project which could adversely impact the EU Commission's promise of funding for the pilot project. The funding has an expiration date for drawdown within the next two months.

If the pitch is successful you will be part of the detailed design and build team. You may even get a chance to live at the re-purposed estate and join the wider MEWSIC initiative……

Background Smart Connected Community

The Project:

The EPA, Teagasc - Johnstown Castle and ESB are collaborating on a H2020 project to investigate the viability of a smart-connected community. This community will act as a living lab to aid energy and waste management research. It aims to be an exemplar of best practice for energy and waste management at a local level.

Project Objective:

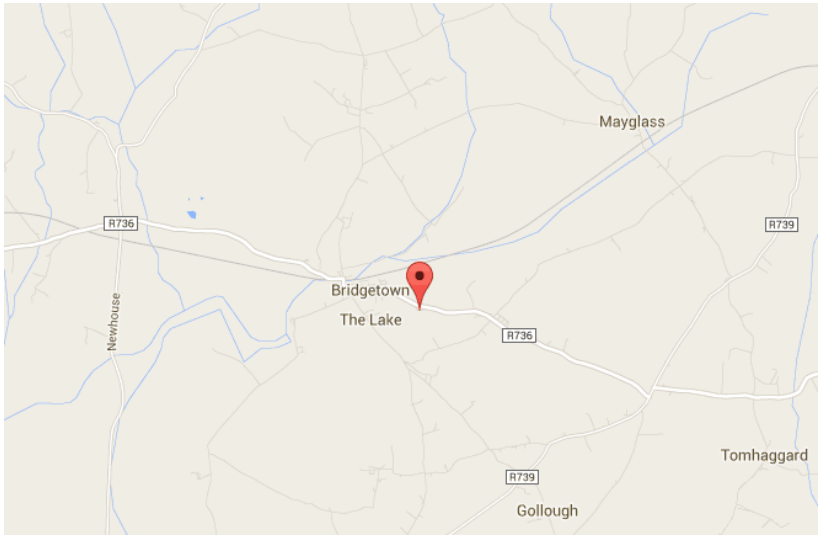
The objective of the H2020 project (MEWSIC – Managing Energy & Waste in Smart Interconnected Communities) is to optimally manage energy and waste across the Hollyfield site in a holistic manner so as to minimise impacts of that community on the local or wider environment. The research will provide critical data and a design template to support future smart community planning and management.

Work so far:

Outline planning permission has been received for an extra 10 homes and a community hub. The first phase will provide accommodation for a 23 strong team of researchers on the Horizon 2020 Project.

A team has been selected from a number of research centres across Europe. The team will work at the site and at the Johnstown Castle research facility.

Location & Site Overview



Units briefly comprse:

1 3 bed detached bungalow 1363sq.ft.
2 3 bed two storey detached 1320sq.ft.
3 4 bed two storey detached 1471sq.ft.
4 4 bed two storey detached 1471sq.ft.
5 3 bed two storey detached 1320sq.ft.
6 3 bed two storey detached 1320sq.ft.
7 3 bed detached bungalow... 1363sq.ft.

https://www.google.ie/maps/place/Bramble+Park,+Bridgetown,+Co.+Wexford/@52.2284682,-6.5421499,15z/data=!4m2!3m1!1s0x48681e315a2428b9:0x29a810455696c745

Phase 2 planning permission allows further 10 houses and a community hub up to 10,000 sq. ft

Phase 1 homes have not been completed. Assume they have no electrical, water , waste or communications systems installed. Buildings are weather proofed and in good condition structurally

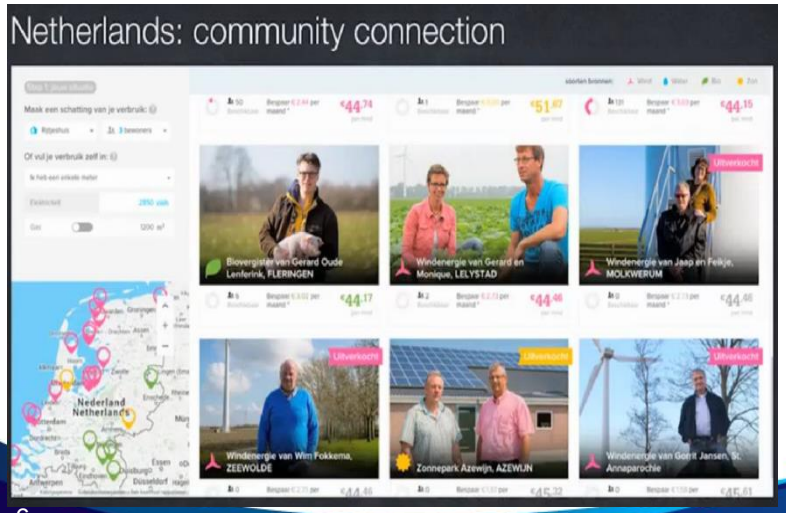
Energy & Waste Management Guidance

Re-Design the existing 7 Phase 1 Properties & Estate Complex:

- To accommodate 23 researchers who will live there once it has been refurbished. They will carry out their research activities, on a team basis, at both the Johnstown Castle and on the Hollyfield site itself;
- Properties to be fitted out with latest: energy saving technology, monitoring and control systems; entertainment and communications;
- Smart sensors to be deployed on site to record / measure, control and manage energy, waste and other services;

Design Phase 2 of the Estate:

- Planning permission has been received for the integrated development of a community hub and a further 10 homes, to be designed to maximise lifetime energy production and minimise lifetime energy use;

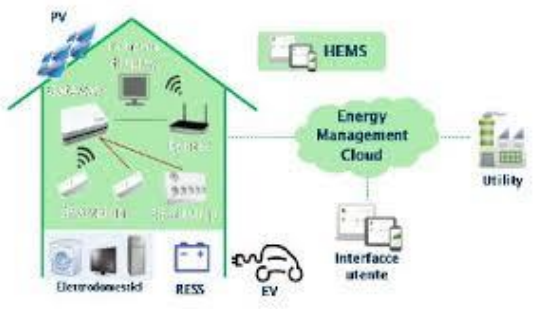


Energy & Waste Tips:

- We recommend a community energy & waste management approach is utilised for the entire Hollyfield site;
- A number of private inter-community and intra-community prosumer initiatives are being trialled in UK and Netherlands;
- Check out http://rescoop.eu/
- How can this approach or an alternative better design be utilised at Hollyfield? Keep in mind the option of trading or collaborating with other similar communities

General Guides & Constraints

We don't just want you to Google and find this…



…and or this either…

Changing Business Characteristics

A disruptive business transformation ahead

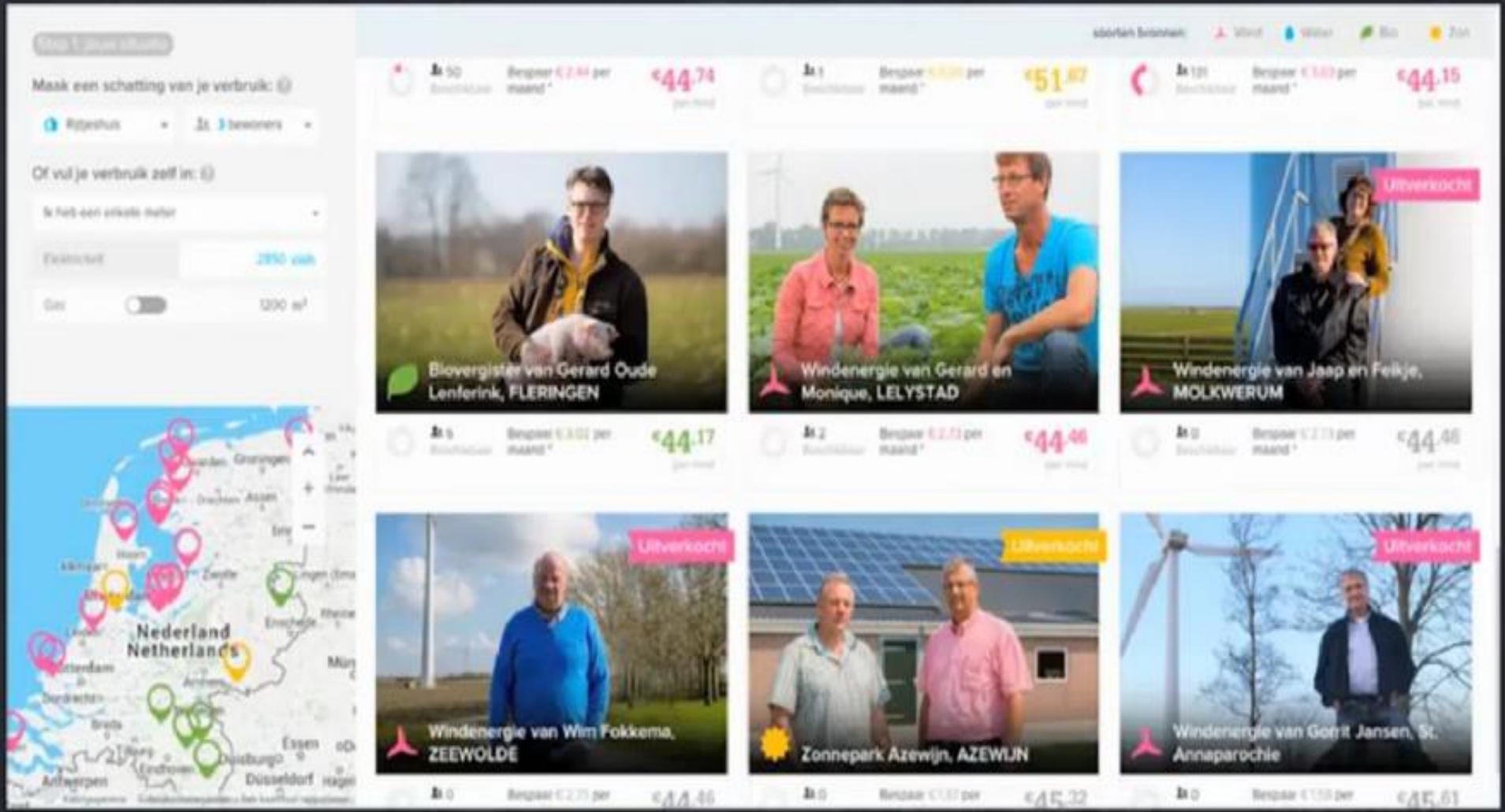
	Today		Tomorrow
Energy flow	Unidirectional	➡	Bidirectional
Grid	Few to Many, hierarchical	➡	Many to many, mazed
Parties	Consumers, Producers Suppliers, Markets, DSO & TSO	➡	Consumers, Producers, Prosumers, Broker, Markets DSO & TSO
Role of customer	Energy Consumption	➡	Consumption, Production, Storage
Portfolio E-supplier	Energy Supply, Trade Customer care & Billing	➡	Risk management, Balancing, Settlement, Trade, Customer Care & Billing, Asset management, Advisory
End user Price	Fixed , fuel based	➡	Volatile, weather based
Risk at	Supplier	➡	Prosumer, Broker
Margin based on	Revenue- Energy costs-internal costs	➡	Balancing/Risk management, Transaction based margin
Forecasting	Relevant for supplier	➡	Relevant for Prosumer & Broker

- A "quick google" will present a list of the latest renewable technologies that support the growing prosumer sector – this should be minimum baseline;
- ***Packaging the right mix to make the best impact will be key***
- You need to think beyond the obvious – think how the Internet of Things will allow the leading technologies to interoperate. How can energy and waste management be improved on a community wide basis to manage environmental impact and costs?
- We want to see some innovative thinking on the whole community concept:
  - Integrated building and community design – must function effectively as both a residential and living-lab environment;
  - Energy and waste management design for overall site;
  - Management of overall services for the whole site;
  - Minimising inter-community consumer costs and maximising potential prosumer revenues;

Prosumer Energy Initiatives

Energy for generations

Netherlands: community connection



Can it all be done at a reasonable cost?

Energy for generations

Construction …

Community Design

Transport…

power… heat… waste…

water…

connectivity… entertainment…

Scoring Criteria and Presentation

Scoring will be based on the following criteria:

- **Technical feasibility**
- **Solution Research**
- **Innovation**
- **Teamwork**
- **Design and delivery of the a presentation for clients**

Presentation is 10 minutes and must involve at least two members of the team

Questions will be 15 minutes and will cover all aspects of your pitch and the spec. All members of the team will be questioned

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Energy for generations

Questions