



Smart Systems & Heat

ETI10 | TEN YEARS
OF INNOVATION
2007—2017

#ETI10



Welcome and Introduction

Programme Manager
Rebecca Sweeney



Agenda

2.00 pm Introduction and welcome

Rebecca Sweeney (ETI)

2.05 pm Programme overview

Rebecca Sweeney (ETI)

2.30 pm Consumer Insights

Matt Lipson (ESC)

2.40 pm HEMS

John Batterbee (ESC)

2.50 pm Local Area Energy Planning

Eleanor Knight (Welsh Govt)
Mike Jenkins (Bridgend LA)

3.05 pm Insights & Forward Look

Andrew Haslett (ETI)

3.30 pm Close



SSH Programme Overview

SSH Programme Manager
Rebecca Sweeney



Challenge of decarbonising heat

- The UK has a **massive challenge to decarbonise heat**
- Not about technology but about a **market failure**:
 - Energy retail does not reveal what **consumers value** from heat – their preferences
 - Components are **difficult to integrate** and **no services for integration** of domestic heat
 - Networks are **planned in silos** based on historic use not as part of a whole system
 - **Carbon cost** is not effectively internalised into heat systems
- The SSH programme is establishing an **innovation ecosystem** to support the sector
 - Retailers will be able to design **new retail services**
 - Industry will be able to **design better products** that are easier to integrate
 - Policy makers will be able to **develop new policy options** enabled by testing new retail services
 - Regulators will be able to **pre-empt future issues** with new services and decarbonisation



Smart Systems & Heat Programme

Realising Benefits

Industry having a route to deliver energy services that decarbonise heat in **local areas** that people and communities support and value

Establishing
a Shared
Ecosystem

Living Lab to help others test
new energy services

Planning evidence and dialogue
to make infrastructure decisions

Informing future energy
system architectures

100
home
living
lab


Department for
Business, Energy
& Industrial Strategy

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Phase 2

Establishing the
knowledge tools
and capability

30
home
field
trial

1
**Consumer
Solutions**

Software platform and
supporting design and
integration capabilities
to gather, process and
use data to help
service providers
**create and deliver
better domestic
energy services**

2

**Local Area
Strategies**

Local energy transition
planning capability,
building consensus
among stakeholders to
**make local
infrastructure
investment decisions
with confidence**

3

**Market, Business
and ICT Solutions**

System operations
design capability,
trading-off commercial,
information and
physical domains
across gas, heat and
power to **enable
effective multi-party
systems integration**

energy
technologies
institute

Phase 1

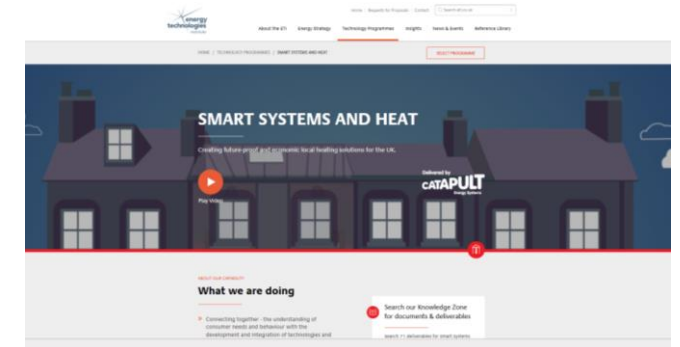
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Smart Systems & Heat Programme

The ETI has invested over
in projects in the
Smart Systems & Heat
programme

£37m



Consumer Behaviour Study



Enabling Component
Technologies



EnergyPath Networks



Planning Permission



EnergyPath Operations



Integrated Electric Heating
Project



Consumer Segmentation



Home Energy Management
System (HEMS)



Consumer Insights



Local Area Energy Strategic
Planning



Energy Path Economics



Buildings Retrofit



Value Management and Delivery

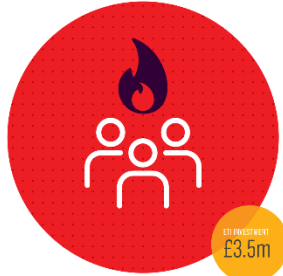


Data Management and
Systems Architecture

CONSUMER BEHAVIOUR STUDY

NOVEMBER 2012

This project was led by PRP Architects, experts in the built environment and provided insight into consumer requirements for heat and energy services



ETI INVESTMENT
£3.5m

ENABLING COMPONENT TECHNOLOGIES

FEBRUARY 2013

This project was delivered by a consortium of partners that included Hitachi Europe, EDF Energy, Element Energy, David Vincent & Associates and Imperial Consultants – to identify any gaps in the range of potential smart systems technologies



ETI INVESTMENT
£500k

ENERGY PATH NETWORKS

JANUARY 2014

Energy consultancy Baringa Partners designed and developed a software modelling tool for use in planning local area energy systems



ETI INVESTMENT
£1.1m

PLANNING PERMISSION

FEBRUARY 2014

This project reviewed the existing planning policies in the UK to plan for a future smart systems and heat market



ETI INVESTMENT
£140k

ENERGY PATH OPERATIONS

JANUARY 2015

DNV GL and a partnership of Hitachi & EDF have worked on developing the specification for an EnergyPath Operations software model to better understand the ICT and system solutions required to deliver new home heating solutions

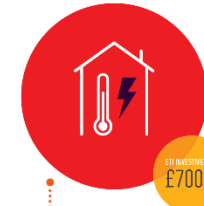


ETI INVESTMENT
£2.25m

INTEGRATED ELECTRIC HEATING PROJECT

MAY 2016

The Integrated Electric Heating Project provided a modelling tool to evaluate the opportunities and challenges for electric heating to meet UK household requirements. The tool will be used to create and evaluate upgrade pathways for a small number of housing archetypes informed by detailed information gathered from dwelling participating in the recent Home Energy Management System trial



ETI INVESTMENT
£700k

CONSUMER SEGMENTATION

FEBRUARY 2017

This project builds on the preliminary segmentation developed in the Consumer Response & Behaviour Project and the Consumer Insights Project to identify how consumers buy and use energy and upgrade their boilers



ETI INVESTMENT
£700k

2007

2012

2013

2014

2015

2016

2017



ETI INVESTMENT
£200k

DATA MANAGEMENT AND SYSTEMS ARCHITECTURE

FEBRUARY 2013

Hitachi Europe and energy & sustainability consultants DNV Kema each worked on a £100k contract to produce two different perspectives on the data system functionality and architecture for a smart energy system



ETI INVESTMENT
£600k

VALUE MANAGEMENT AND DELIVERY

FEBRUARY 2013

This £600k project was led by Frontier Economics, a leading economic consultancy and studied how value can be delivered across a smart energy value chain



ETI INVESTMENT
£541k

BUILDING RETROFIT

MAY 2014

This project retrofitted five types of domestic property, identified and prioritised in an earlier ETI project focused on thermal efficiency in UK housing



ETI INVESTMENT
£80k

ENERGY PATH ECONOMICS

FEBRUARY 2014

Management consultancy Europe Economics developed a modelling framework to evaluate the wider social and economic impacts of energy transitions in a local area



ETI INVESTMENT
£2.6m

LOCAL AREA ENERGY STRATEGIC PLANNING

DECEMBER 2014

The EnergyPath Networks tool will be demonstrated with three selected local authorities Newcastle, Bridgend and Greater Manchester Combined Authority resulting in an Area Strategy developed for all three

CONSUMER INSIGHTS

JUNE 2015

This project provided an understanding of consumer behaviour and proposed segmentations relating to the decisions they make on heating choices



ETI INVESTMENT
£140k



ETI INVESTMENT
£5m

HOME ENERGY MANAGEMENT SYSTEM (HEMS)

OCTOBER 2015

This project aims to accelerate the development of a consumer-orientated Home Energy Management System (HEMS) to give insight into consumer energy use, building and heating system performance providing a secure and flexible platform that will enable others to test and develop new energy services



SMART SYSTEMS AND HEAT

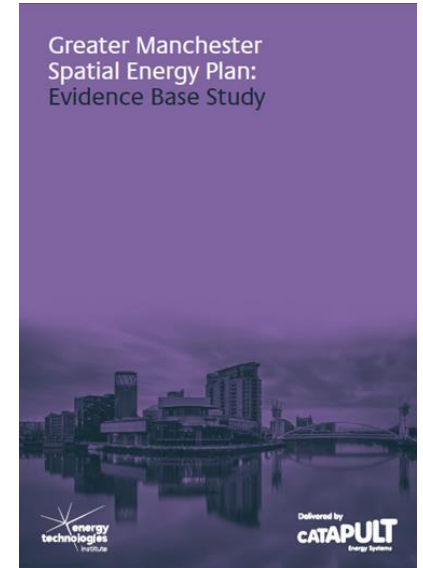
2007 – 2017 Programme Timeline

ETI10 TEN YEARS OF INNOVATION 2007 – 2017





- Software tool to design cost-effective local energy systems for the UK
- Designed in partnership with local authorities
- Demonstrating the capability to create future-proof and economic local heating solutions for the UK
- We are currently working with Newcastle City Council, Bridgend County Borough Council and Greater Manchester Combined Authority to support energy infrastructure planning using the EnergyPath Networks tools



£1.1M  Baringa



Consumer Behaviour Study

- Comprehensive behaviour study involving domestic consumers focusing on heat
- Sought to identify consumer requirements
- Examined consumers' responses to smart energy system proposals
- This project involved thousands of respondents providing insight into consumer requirements for heat and energy services, both now and in the future



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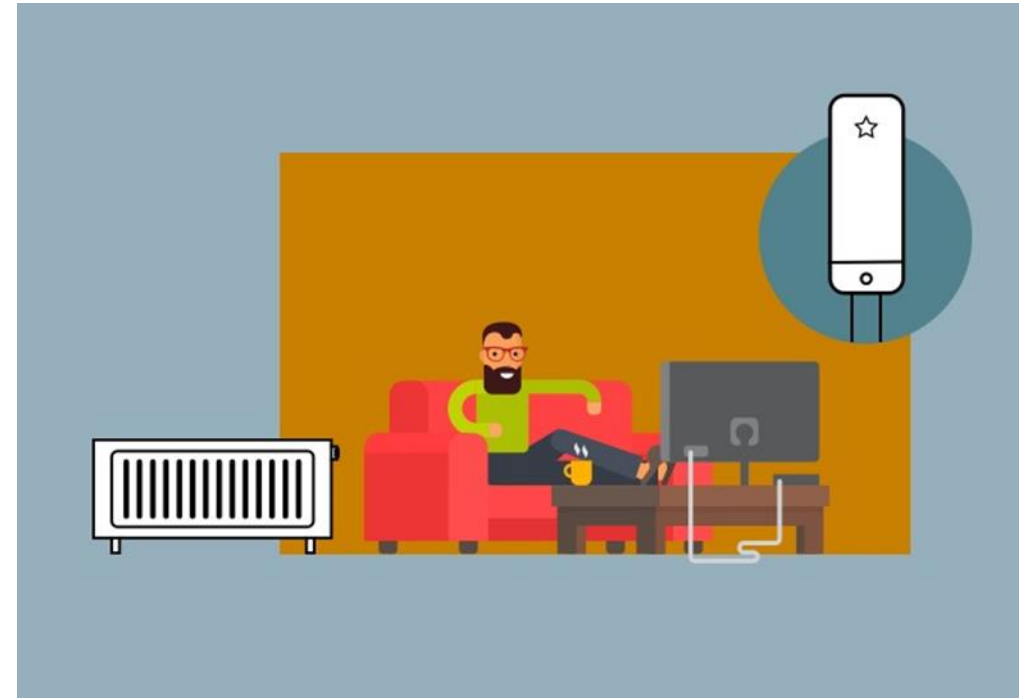
£3.5M





Consumer Segmentation

- Project to build upon previous consumer behaviour research
- This particular study is focusing on identifying how consumers buy and use energy as well as understanding consumers decision making processes when they seek to upgrade their heating systems



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£700k

CATAPULT
Energy Systems



Buildings Retrofit

- Project to practically test and develop novel approaches to domestic retrofit
- House types to be retrofitted were based on the findings of previous ETI research
- Investigated the cost, time and energy effectiveness of domestic retrofit activity across different house types



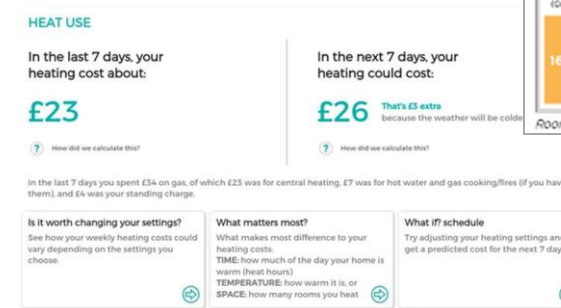
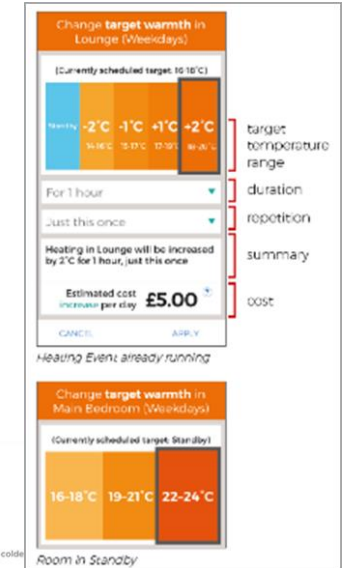
£541k





Home Energy Management System

- Developing a consumer-oriented Home Energy Management System to give insight into consumer energy use, building and heating system performance
- Provides a secure and flexible platform that will enable others to test and develop new energy services
- Testing in homes has completed and analysis underway
- Further work initiated by the ETI to investigate appliance disaggregation using data from additional homes



£5m



Knowledge Zone



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SMART SYSTEMS AND HEAT

Creating future-proof and economic local heating solutions for the UK.



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What we are doing

» Connecting together - the understanding of consumer needs and behaviour with the development and integration of technologies and



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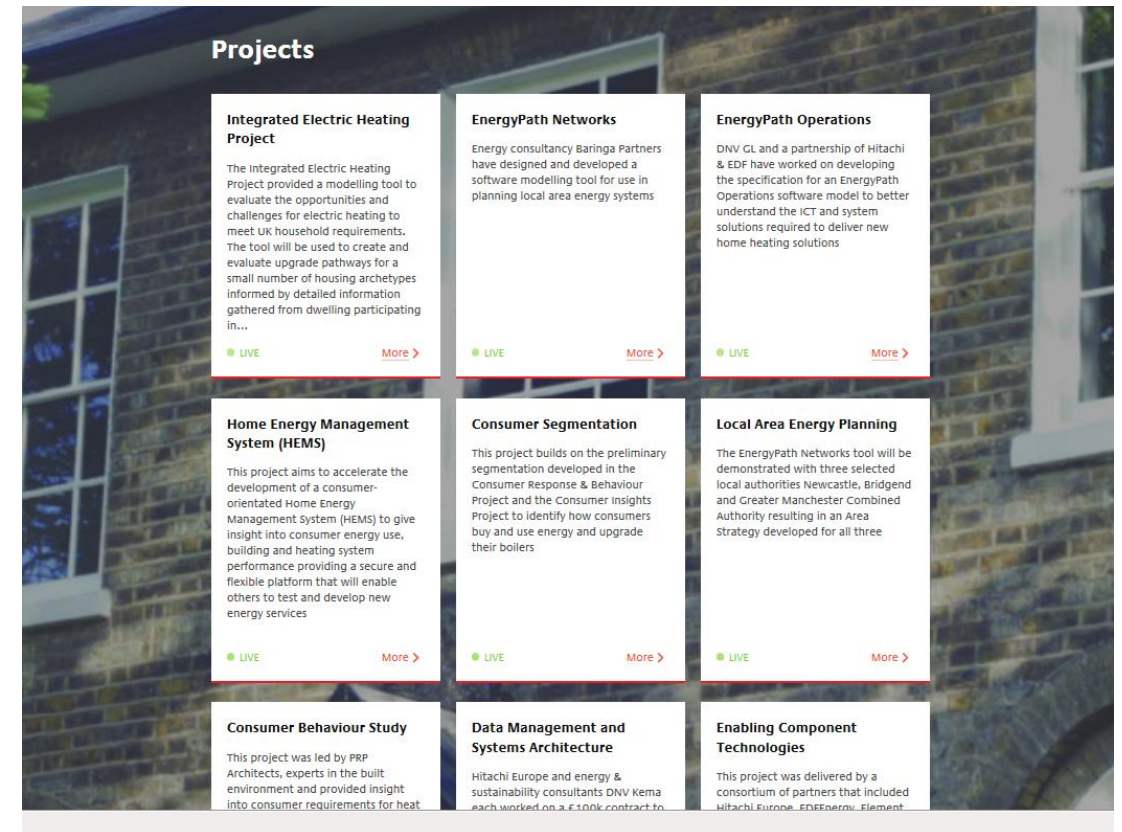
Knowledge Zone

Over the last 7 years the ETI has invested over **£37m** in projects in the *Smart Systems and Heat* programme



Reports and outputs from the projects are available on the ETI's website

<http://www.eti.co.uk/>



Projects

Integrated Electric Heating Project <p>The Integrated Electric Heating Project provided a modelling tool to evaluate the opportunities and challenges for electric heating to meet UK household requirements. The tool will be used to create and evaluate upgrade pathways for a small number of housing archetypes informed by detailed information gathered from dwelling participating in...</p> <p>LIVE More ></p>	EnergyPath Networks <p>Energy consultancy Baringa Partners have designed and developed a software modelling tool for use in planning local area energy systems</p> <p>LIVE More ></p>	EnergyPath Operations <p>DNV GL and a partnership of Hitachi & EDF have worked on developing the specification for an EnergyPath Operations software model to better understand the ICT and system solutions required to deliver new home heating solutions</p> <p>LIVE More ></p>
Home Energy Management System (HEMS) <p>This project aims to accelerate the development of a consumer-orientated Home Energy Management System (HEMS) to give insight into consumer energy use, building and heating system performance providing a secure and flexible platform that will enable others to test and develop new energy services</p> <p>LIVE More ></p>	Consumer Segmentation <p>This project builds on the preliminary segmentation developed in the Consumer Response & Behaviour Project and the Consumer Insights Project to identify how consumers buy and use energy and upgrade their boilers</p> <p>LIVE More ></p>	Local Area Energy Planning <p>The EnergyPath Networks tool will be demonstrated with three selected local authorities Newcastle, Bridgend and Greater Manchester Combined Authority resulting in an Area Strategy developed for all three</p> <p>LIVE More ></p>
Consumer Behaviour Study <p>This project was led by PRP Architects, experts in the built environment and provided insight into consumer requirements for heat</p> <p>LIVE More ></p>	Data Management and Systems Architecture <p>Hitachi Europe and energy & sustainability consultants DNV Kema each worked on a £100k contract to</p> <p>LIVE More ></p>	Enabling Component Technologies <p>This project was delivered by a consortium of partners that included Hitachi Europe, EDEnergy, Element</p> <p>LIVE More ></p>