

EPSRC THERMOELECTRIC NETWORK

Bob Freer, University of Manchester

Thermoelectric Network

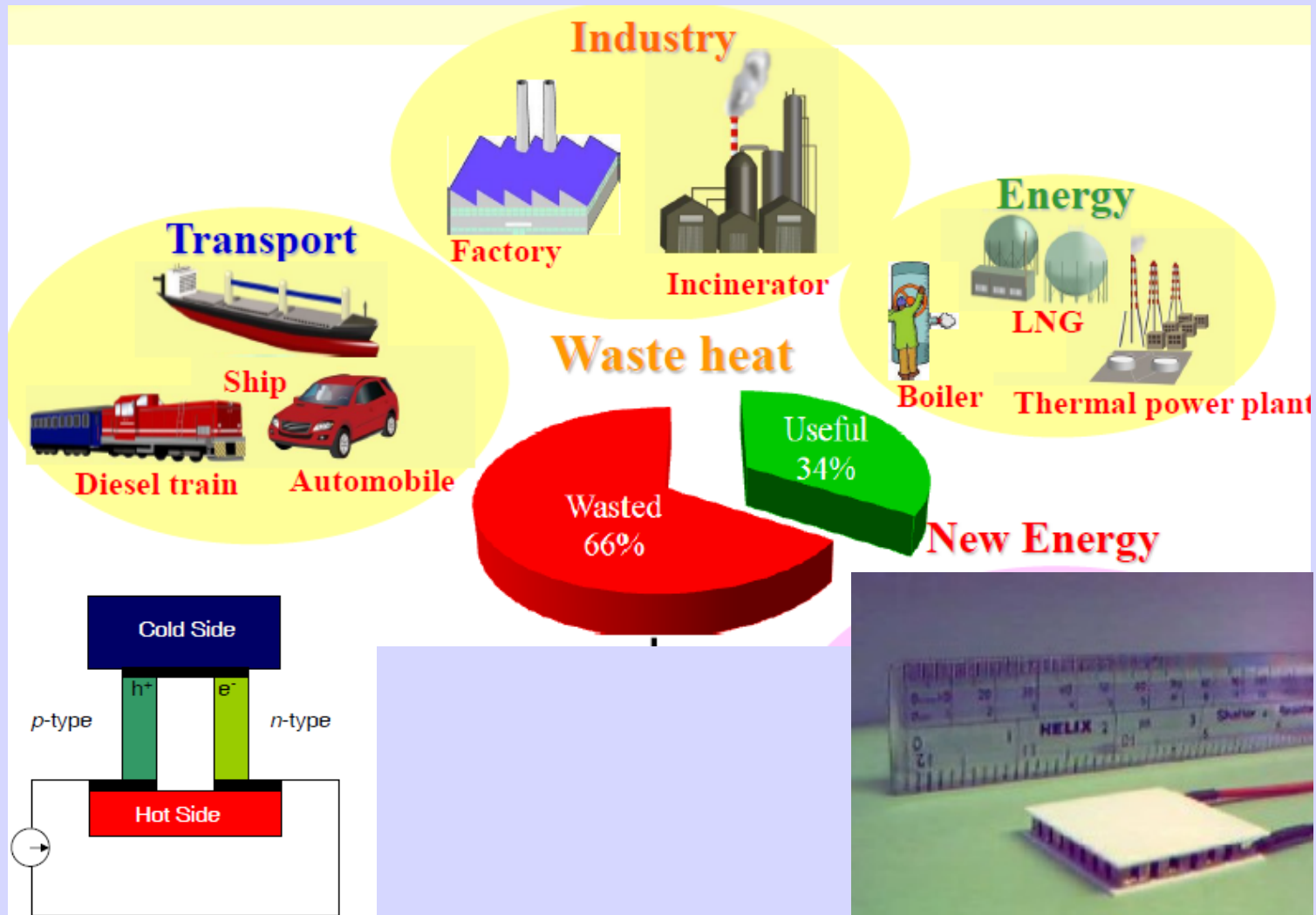
- **EPSRC – 15 January 2014 (for 3 years)**
- **TEMPEST –**
- **ThermoElectric Materials, Physics, Electronics & Systems**
- **Bob Freer – Manchester**
- **Anthony Powell - Reading**

Founding Network Committee

- Bob Freer – Manchester
- Anthony Powell, Reading
- Andy Knox, Glasgow
- Doug Paul, Glasgow
- Mike Reece, Queen Mary, London
- Kevin Simpson, European Thermodynamics Ltd
- Richard Stobart, Loughborough

THERMOELECTRIC NETWORK

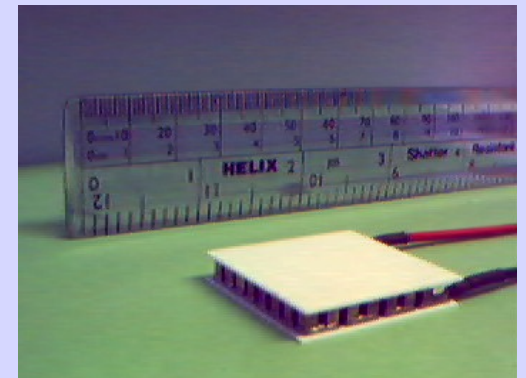
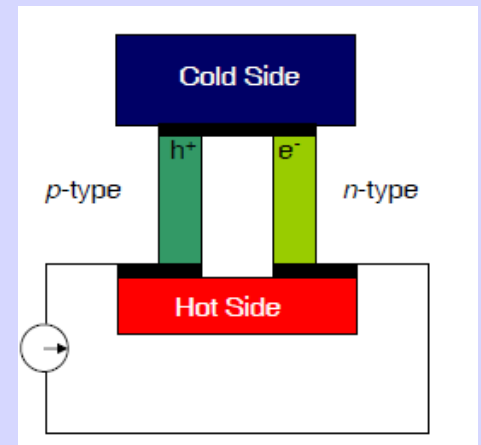
Energy from Waste Heat



THERMOELECTRIC NETWORK

Scientific and Technological Challenges

- Materials Stability and Integrity
- Device Fabrication
- Performance
- Cost
- Theoretical Understanding
- System Integration



Network Plans

- Web Page
- Newsletter
- Programme of Workshops and Training Events
- Researcher exchanges (facilities etc)
- Scientific Programme
- Technical Programme

Web Page

- Programme of meetings/workshops
- Facilities/expertise database
- Directory of members – sign up
- On-line resources (data, design information, presentations...)
- **Energy Harvesting Network Web Page**

First Workshop – 26 February 2014

- **State-of-the-Art**
- **Challenges for the community**

Workshop - 26 February

Anthony Powell, Reading, **Traditional and Novel Thermoelectric Materials**

Emmanuel Guilmeau, CRISMAT Caen, **Recent Advances in TiS₂ based Thermoelectrics**

Ryoji Funahashi, AIST, Japan, **Exploiting Oxide Thermoelectrics**

Cedric Rouaud, Ricardo, **Thermoelectrics for Automotive Applications**

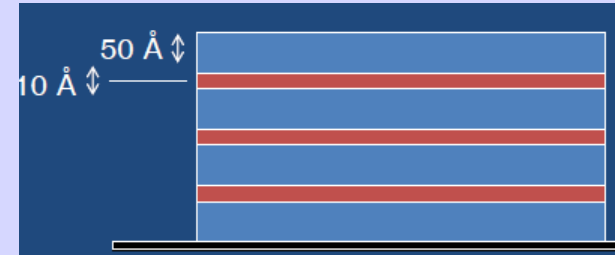
Kevin Simpson, European Thermoelectrics Ltd, **Development of Thermoelectric Modules**

Andrew Knox, Glasgow, **Practical Considerations in the Design of Thermoelectric Systems**

Plans for Network

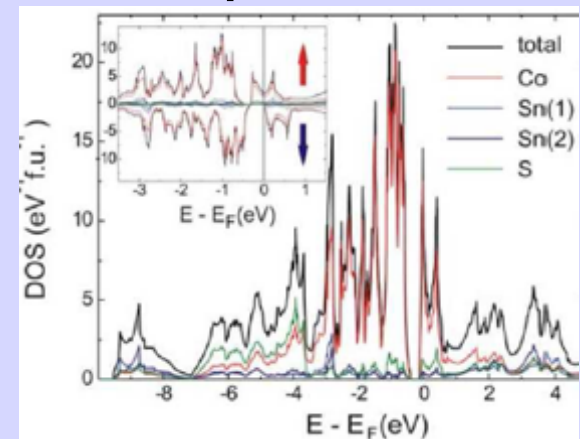
Scientific Programme (1)

Development of new and enhanced nanostructured TE materials



Understanding the factors controlling TE performance in low dimensional structures

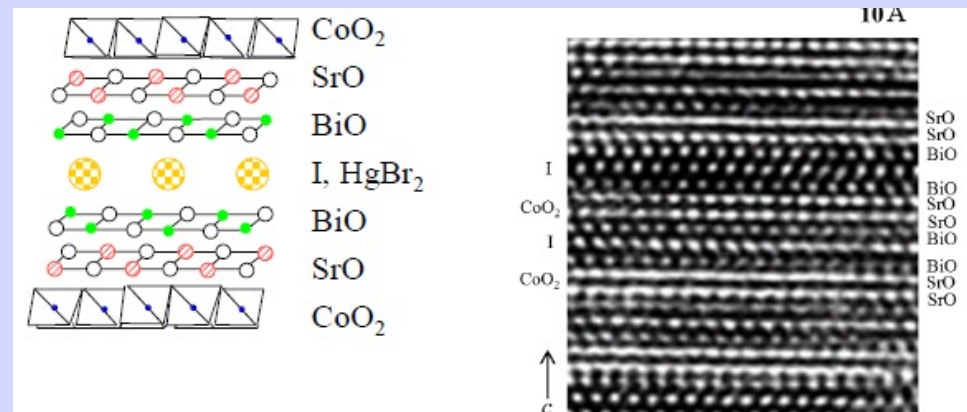
Modelling of materials by DFT techniques to understand thermal and electrical transport phenomena in TEs



Scientific Programme (2)

Device physics and modelling of thermoelectric junctions and interfaces

Microstructural investigations of TE materials and devices at the grain and atomic level



Accurate methods to measure TE properties across different length/temperature ranges

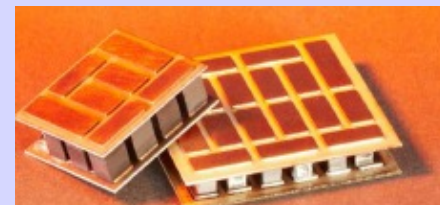
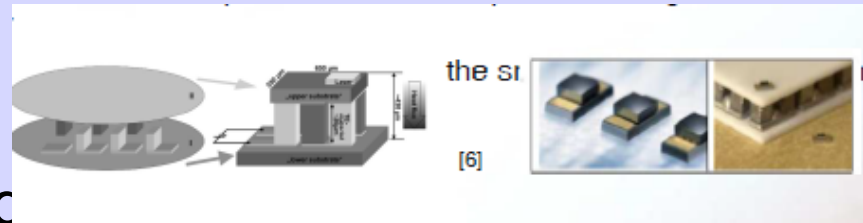
Technical Programme (1)

Defining TE performance required for specific application sectors

Defining commercial engineering constraints that limit market exploitation

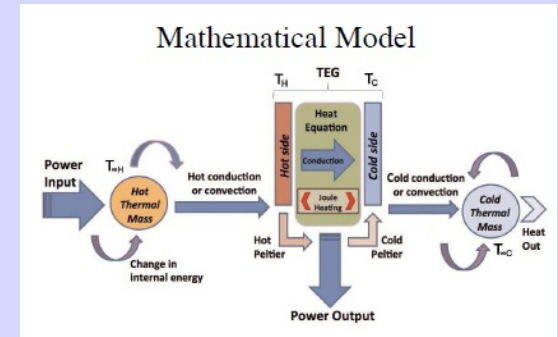
Improving module design, construction and manufacture

Overcoming packaging performance



Technical Programme (2)

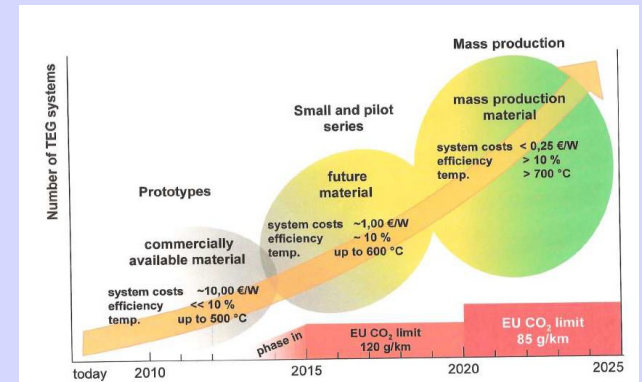
Modelling and prediction of performance device and system level



Developing accompanying electronics for TE systems; standardised testing of modules

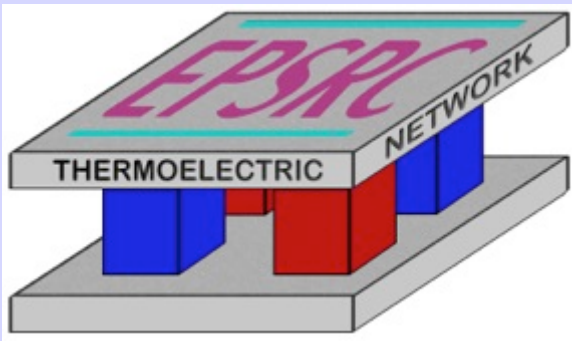


Developing a Roadmaps
Establish inter-laboratory measurement comparisons of system performance

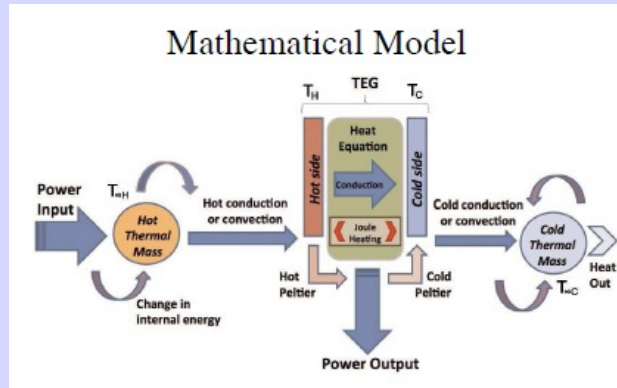
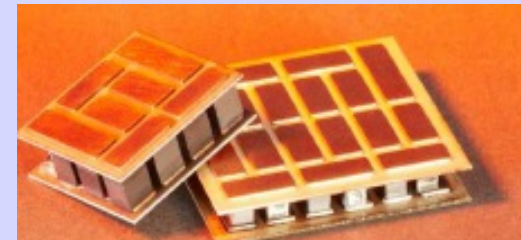
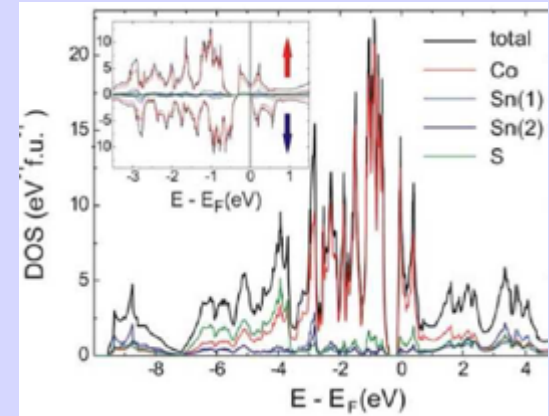
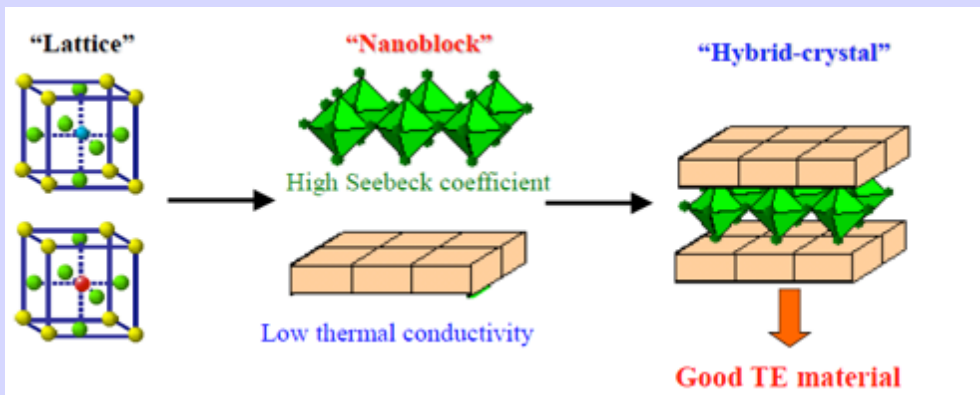


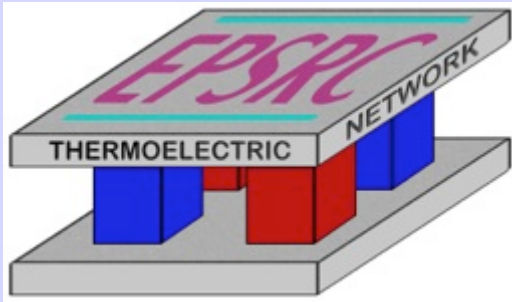
September 2014

- One day Network Training Event
- One day Network Conference
 - Two keynote presentations
 - 8 contributed oral presentations
 - Poster presentations
 - Invited speakers from overseas



Thermoelectric Network





Thermoelectric Network

- New members welcome
- Web page planned - starting April
- Bob Freer
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