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Birmingham Science City
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Science City Research Alliance:

Energy Efficiency & Demand

16th June 2010

Jonathan Seville
Dean of Engineering
University of Warwick

Jonathan Seville
Formerly Head of
Chemical Engineering
University of Birmingham

THE UNIVERSITY OF WARWICK

hefce HIGHER EDUCATION FUNDING COUNCIL FOR ENGLAND

UNIVERSITY OF BIRMINGHAM

Science City Research Alliance (SCRA)

- Major Investment in Research Infrastructure – AWM (and ERDF) - £57m to date
- £10m Investment in People – HEFCE
- Energy is a major strand:
  - Hydrogen (Kevin Kendall will talk about this)
  - Energy Efficiency
    - £9.5m capital; £1m revenue;

Project Purpose

- Development of energy efficient technologies and intellectual property
- Addressing industry needs through equipment and staff investment – concentration of excellence, synergies and sharing resources
- Knowledge transfer and jobs creation
- Create higher public profile of research themes, facilities, expertise available - especially to business
- Work with companies to form new collaborations
- Create region of excellence for energy efficiency products & processes

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Project Themes

1. Electricity, Efficiency of Energy Conversion and Power Distribution
2. Fuel Combustion for Transport, Heat and Power
3. Hybrid Electric Powertrain Technology
4. Sustainable Thermal Technology & Buildings

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Electricity, Efficiency of Energy Conversion and Power Distribution

- Devices for power generation & conversion applications
  Phil Mawby, UoW
- Development of smart power grid technology
  Xiao-Ping Zhang, UoB
- Renewable power generation and energy storage technologies
  Jihong Wang, UoB

CONVERTEAM
THE POWER CONVERSION COMPANY

Rugby!

CONVERTEAM

THE POWER CONVERSION COMPANY

Converteam ranks first independent supplier of wind converters…. It has so far powered converters to around 15GW of wind turbines globally.

Frost & Sullivan, November 2009

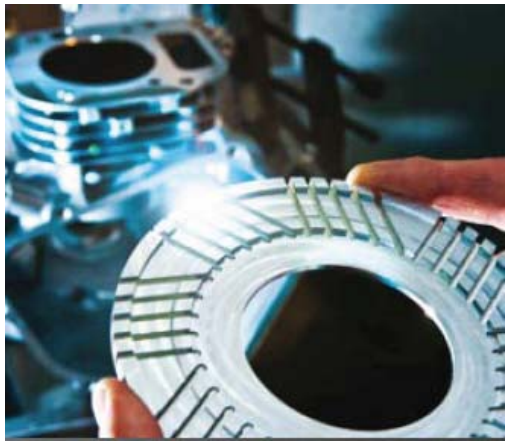
Fuel Combustion for Transport, Heat and Power

- Sustainable engine fuels research

  Miroslaw Wyszynski, UoB

- Fuel combustion optimisation with optical diagnostics

  Peter Bryanston-Cross, UoW



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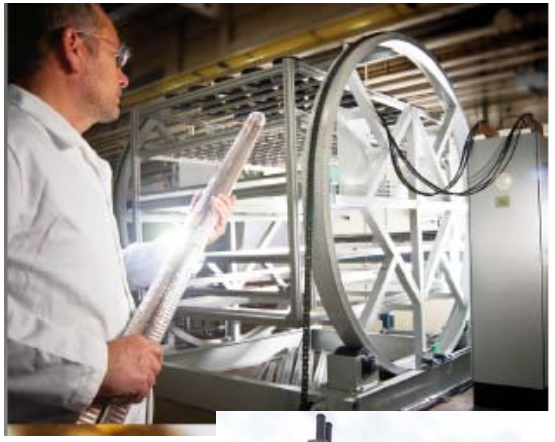
Sustainable Thermal Technology & Buildings

- Sustainable heating & cooling technologies

  Bob Critoph, UoW.
- Sustainable buildings

  Dr Mark Gaterell, UoB.



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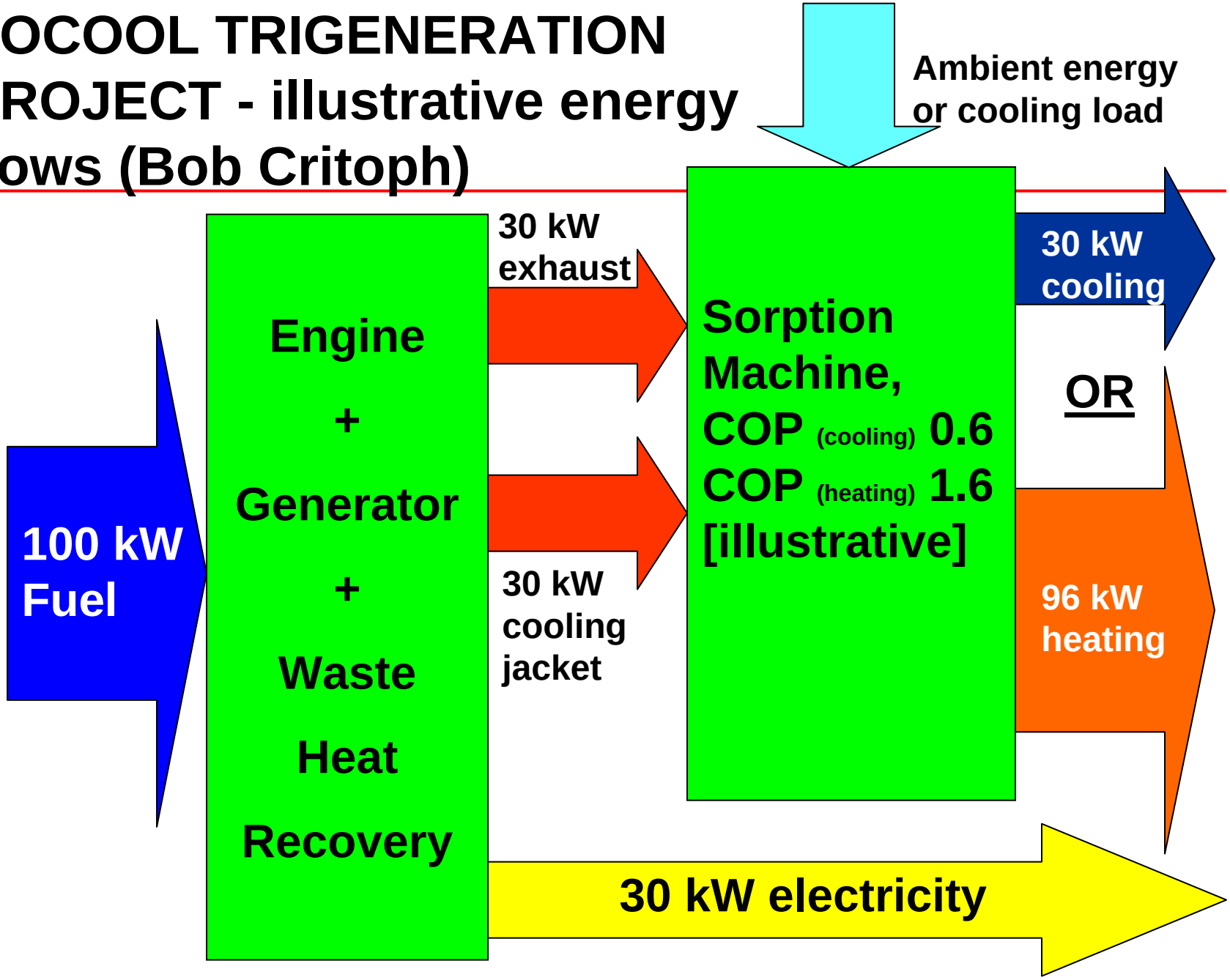
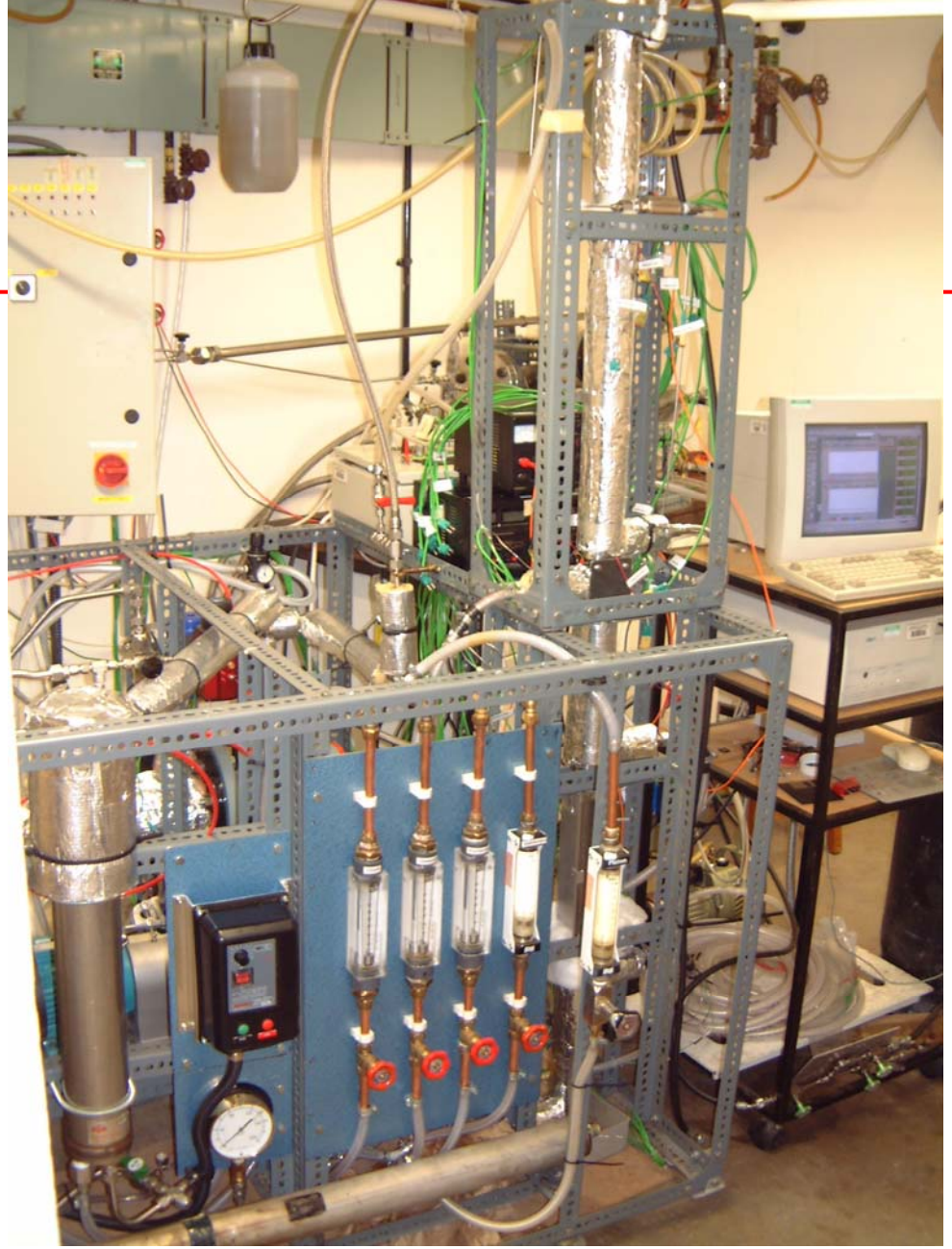
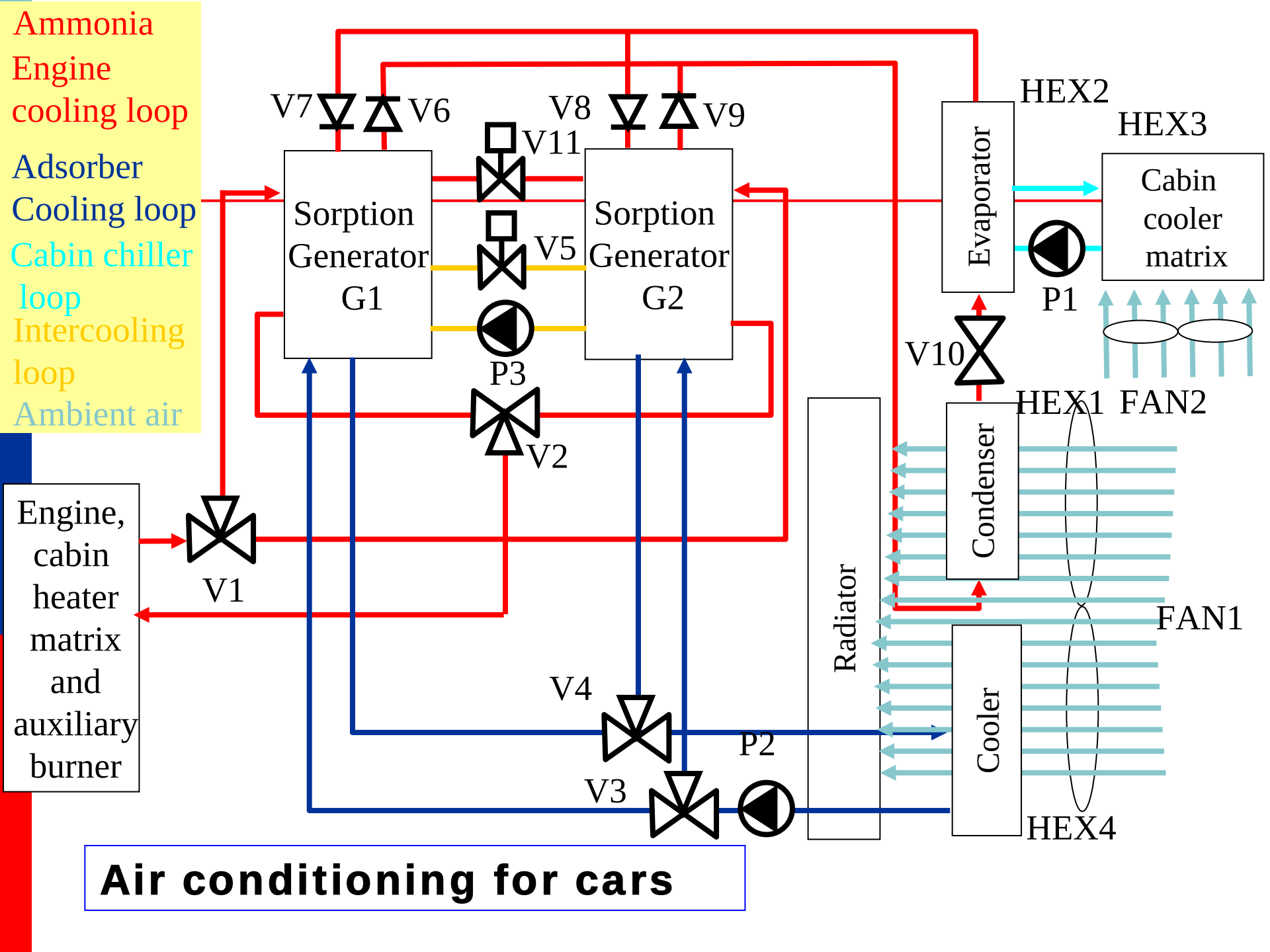
SOCOOL TRIGENERATION PROJECT - illustrative energy flows (Bob Critoph)

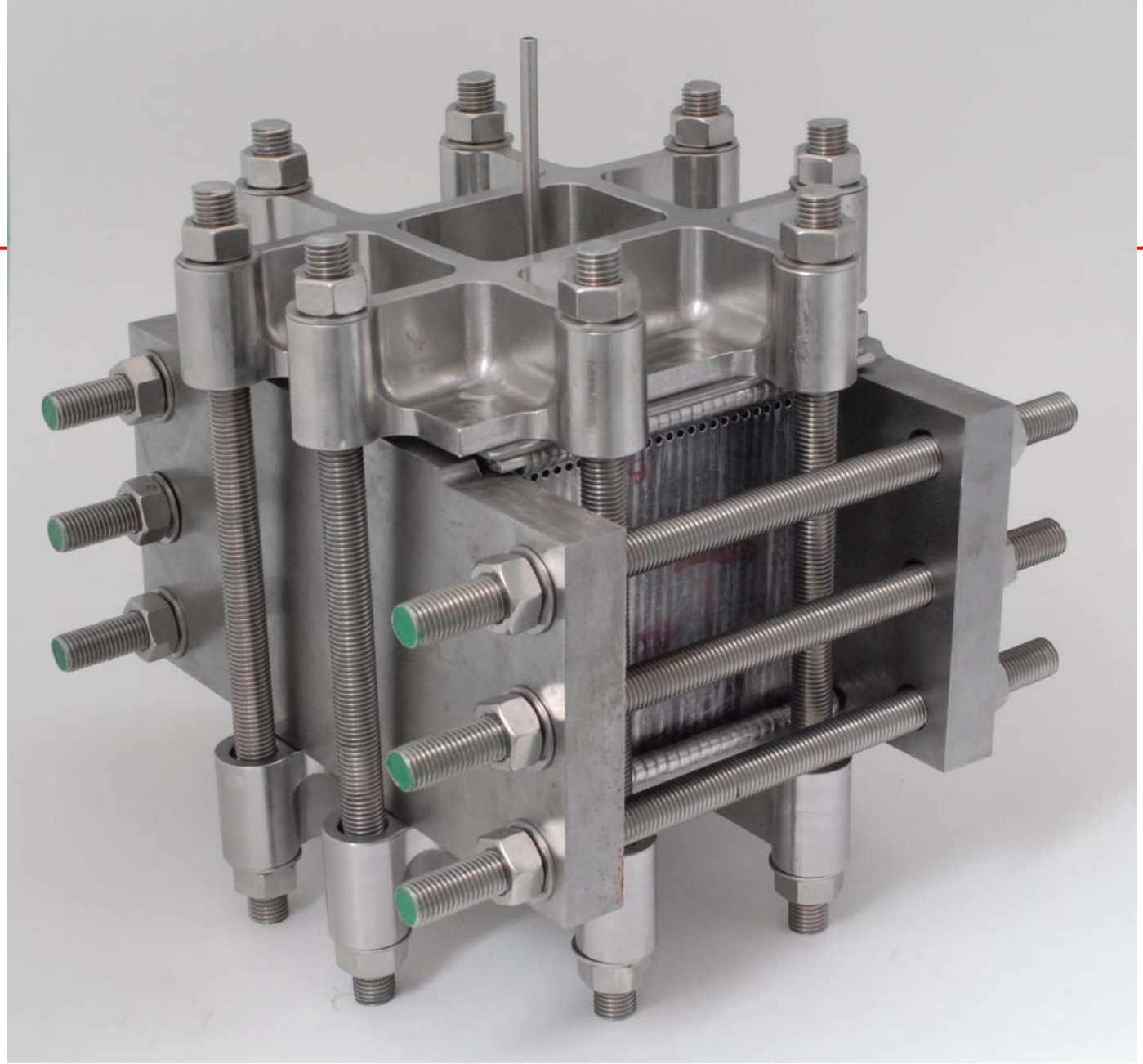


Single module under test



- **Thermal 5 kW SOCOOL prototype before delivery to Italy**
- ***Sorption Energy*** **spin-out**


Ammonia
Engine cooling loop
Adsorber Cooling loop
Cabin chiller loop
Intercooling loop
Ambient air
V7
V6
V8
V9
V11
V5
P3
V2
Sorption Generator G1
Sorption Generator G2
HEX2
HEX3
Evaporator
Cabin cooler matrix
P1
V10
HEX1
FAN2
Condenser
Radiator
FAN1
Cooler
HEX4
Engine, cabin heater matrix and auxiliary burner
V1
V4
P2
V3
Air conditioning for cars

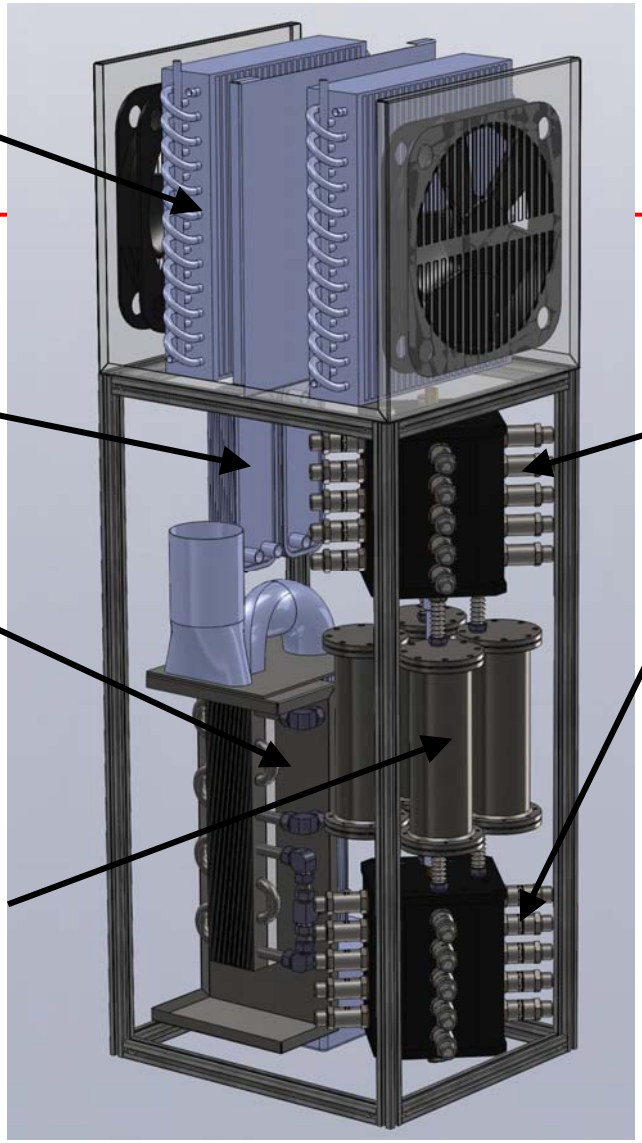


Consumer-Appealing Low Energy Technologies for Building Retrofitting ('CALEBRE')

With Nottingham & Loughborough Universities

- Funded by EPSRC (government) and E.ON to test next-generation technologies
- Test house is 3 bedroom semi-detached house built to 1930s specifications
- Testing to be carried out in the winter of 2011/2012
- First demonstration unit under construction for testing in environmental chamber this year

Baxi Group Ltd	Building Research Establishment	Care & Repair (England)
CIBSE	E A Technical Services Limited	Edward Cullinan Architects
Inbuilt Consulting	Magdalen Galley-Taylor	


Evaporator
Condenser
Burner at rear
Generators
Valves


1.5 m
0.5 m
0.4 m

Hybrid Electric Powertrain Technology

- **Vehicle Energy Facility (VEF) for sustainable automotive power applications**
  Paul Jennings, UoW
- **Energy Systems Integration Laboratory (ESIL) applications**
  Stuart Hillmansen / Clive Roberts, UoB

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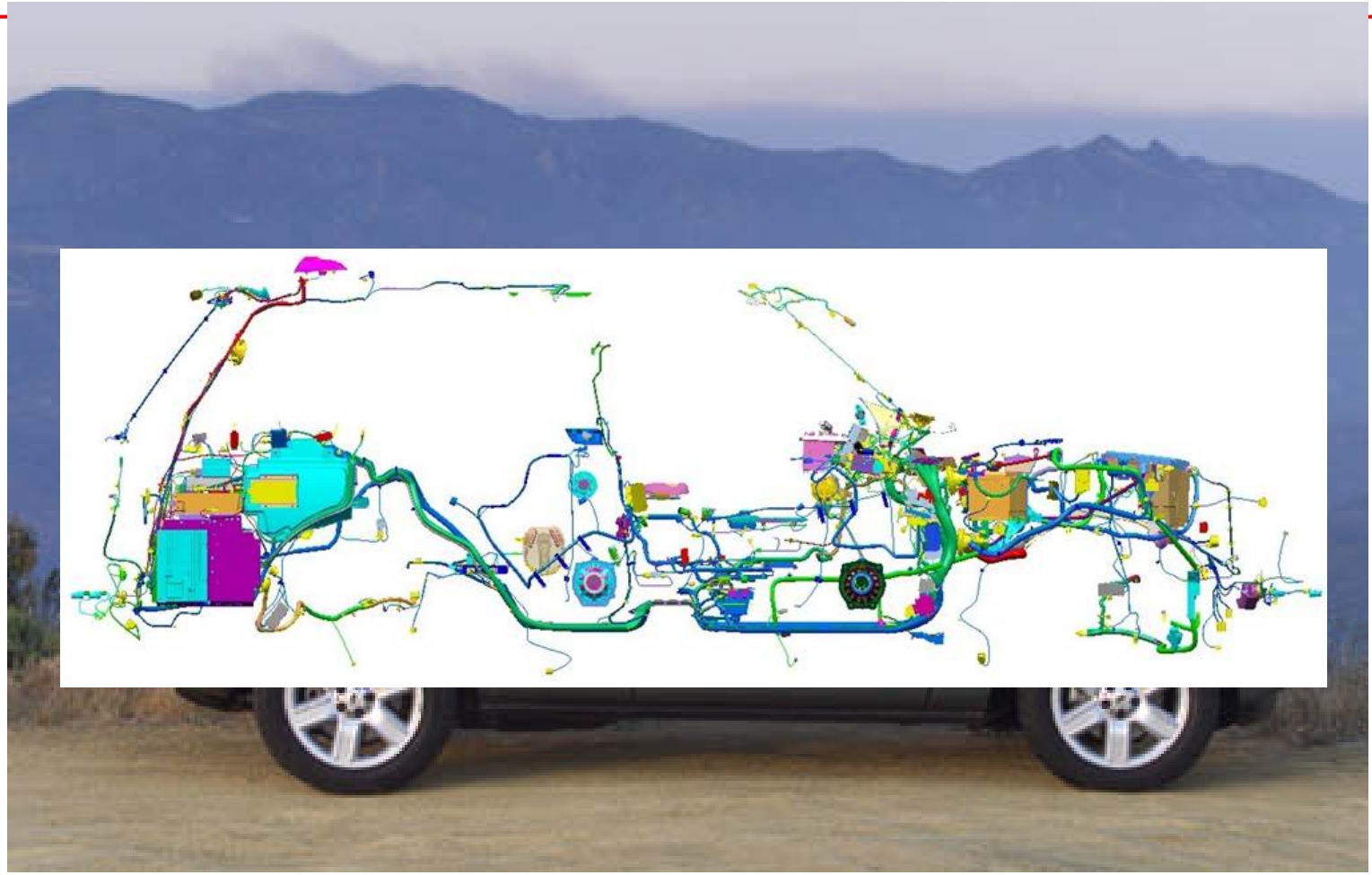
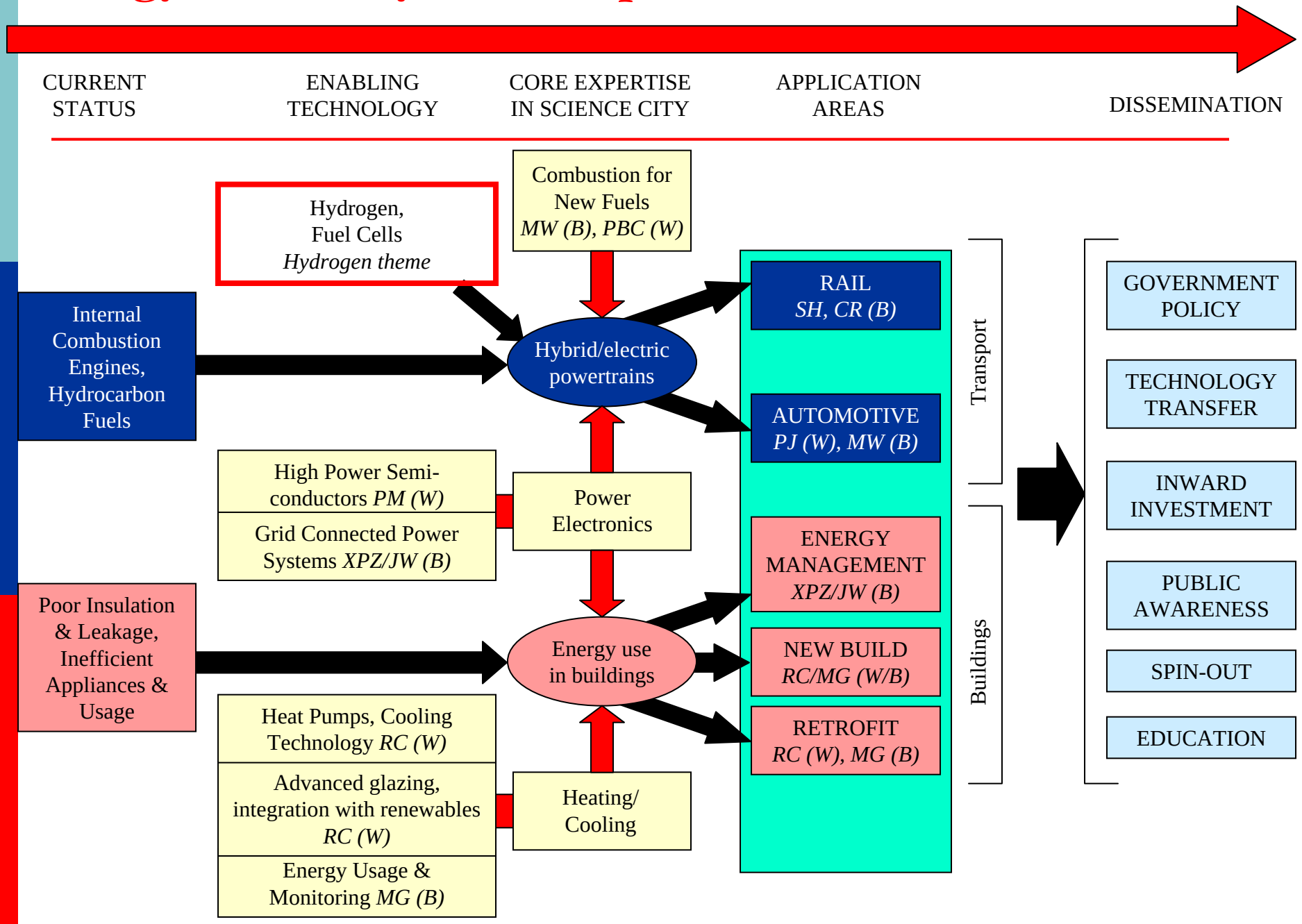
Automotive Electronics



Automotive Electronics

- University staff & students play an active role in developing new techniques

Energy Efficiency Roadmap



Output targets

- **50** Jobs Created
- **3** Businesses Created
- **50** Businesses Supported to Improve Performance
- **50** Businesses engaged in New Collaborations with the Knowledge Base
- **20** Graduates into Employment
- **225** People Assisted to Improve their Skills
- **£20** Million Levered Revenue
- **3** Patents/Licences
- **20** Workshops
- **205** Peer Reviewed Publications
- **120** Conference Presentations

Facilities are available for your use

- UoW and UoB research groups are 'guardians' of equipment/facilities
- The investment is mainly capital and therefore seed funding
- Key objective is to provide regional businesses with R&D support and strengthen regional academic expertise
- Considerable demonstrator and collaboration potential – as initiator or contributor
- Most equipment/facilities available from Easter 2010. Vehicle Energy Facility (UoW) from August 2010 and the Transients Engine Facility (UoB) from end 2010

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