Technology Strategy Board

Driving Innovation

Technology Strategy Board

Who we are, how we work and what we deliver

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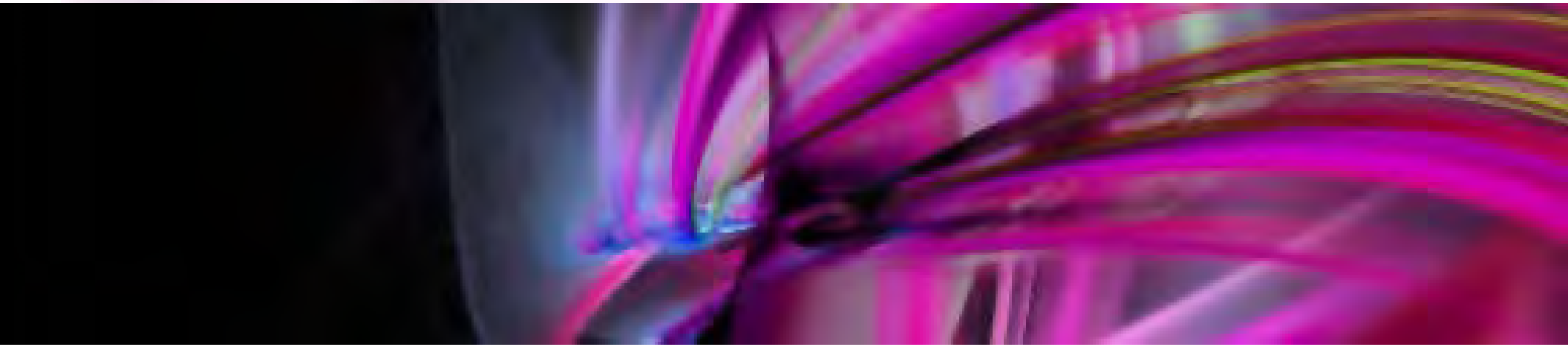
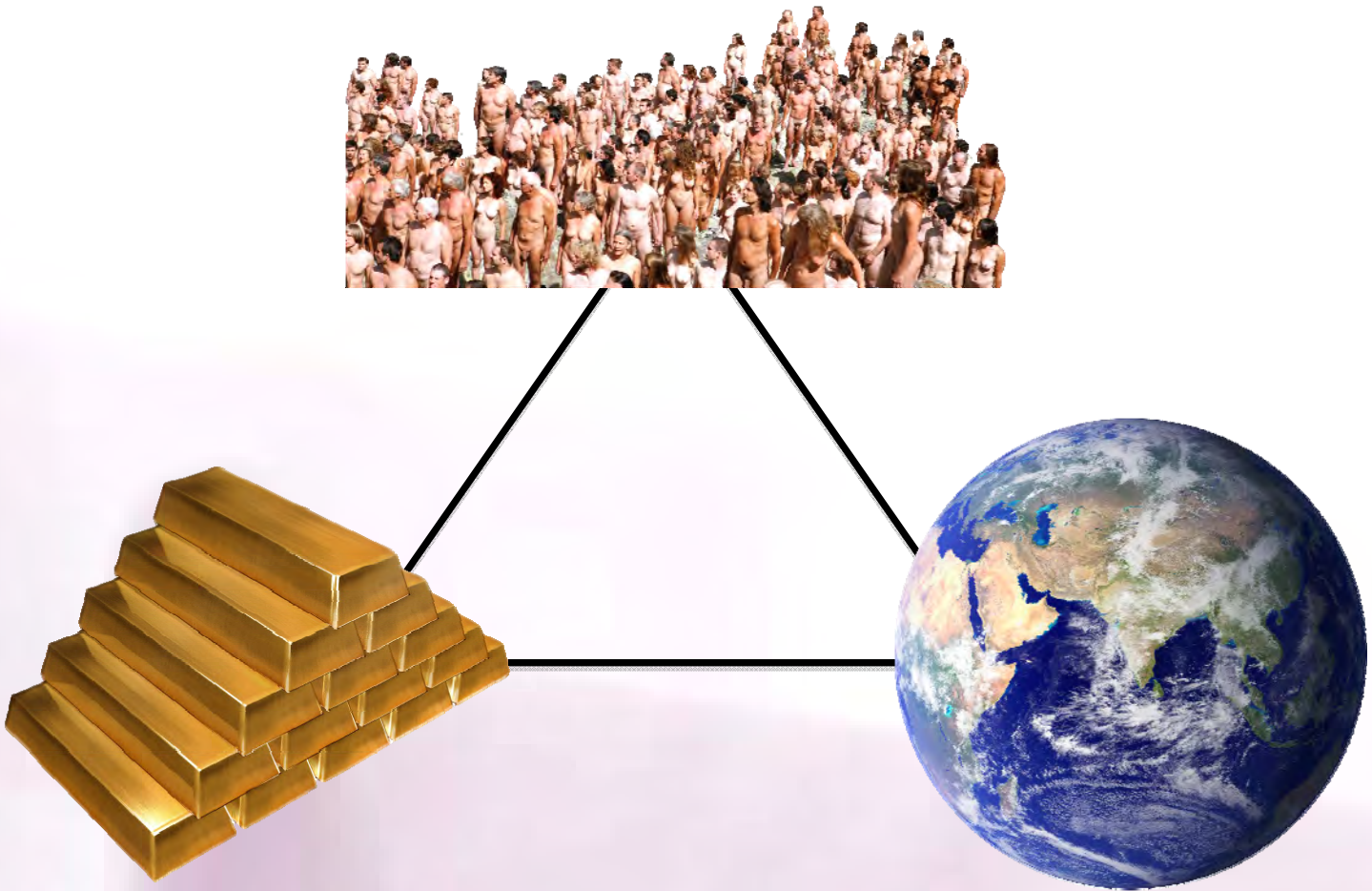
Head of Development
9th July 2009

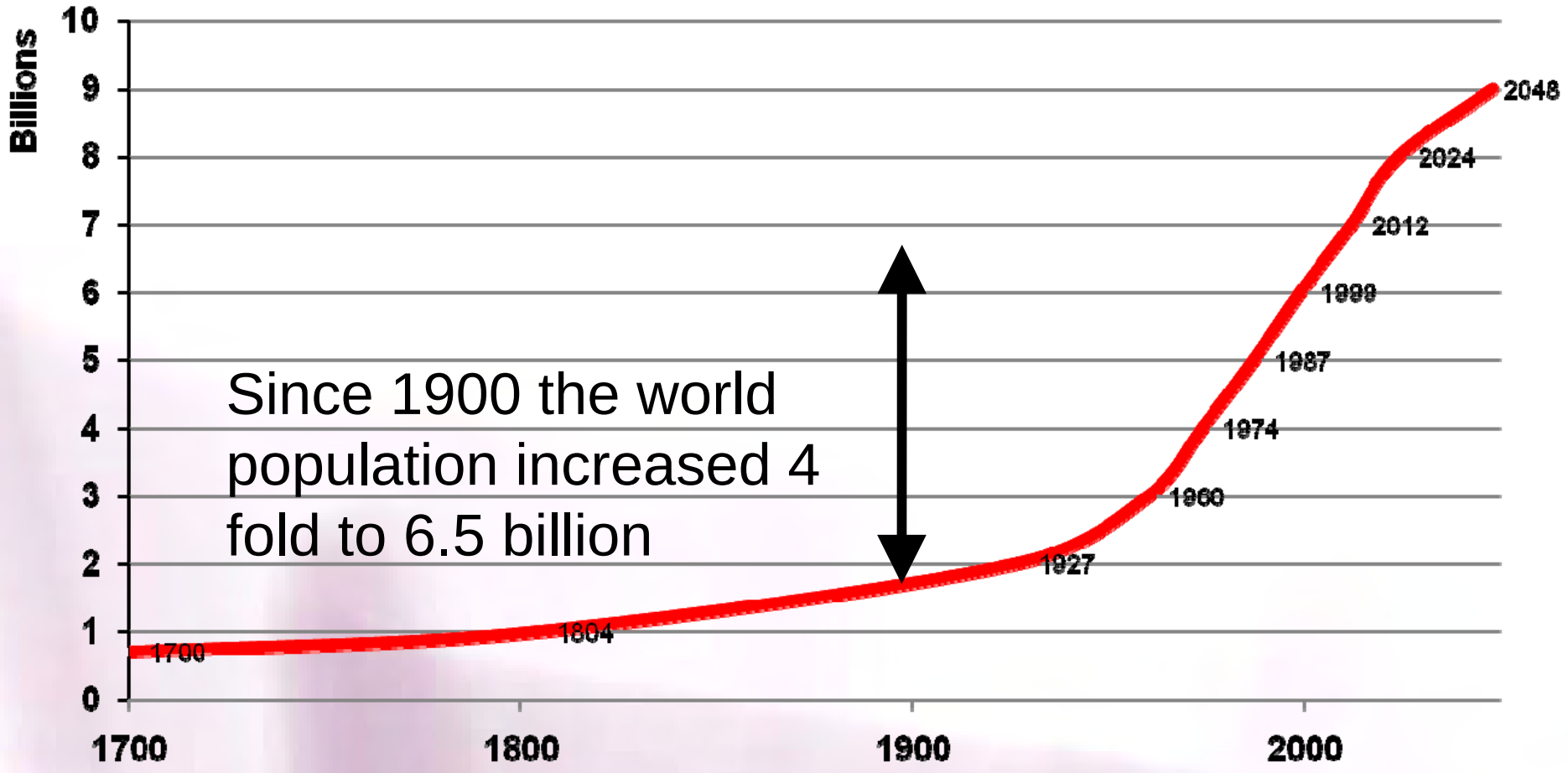


What does the future hold?

It’s a balance



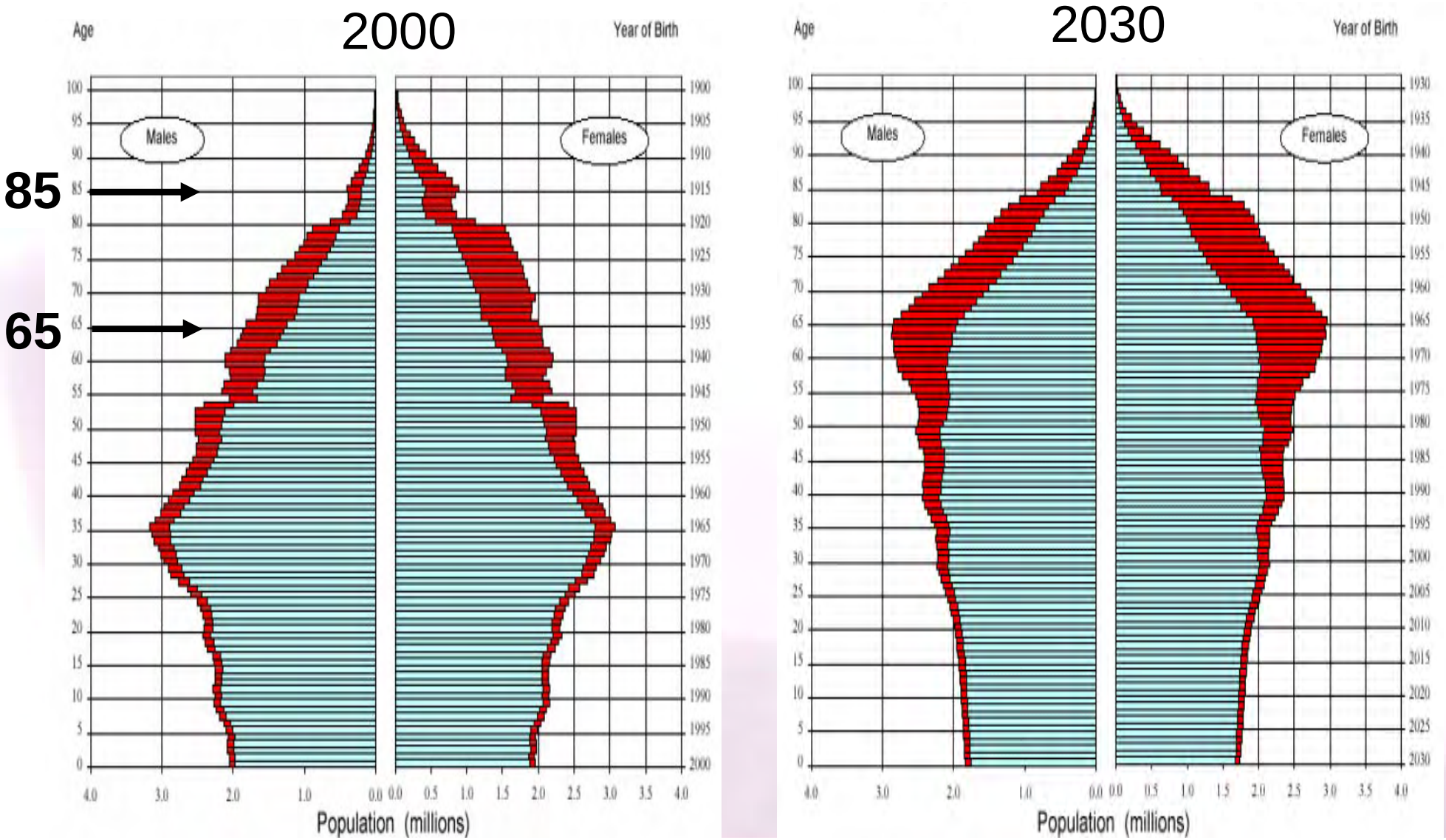
It starts with people …



…and the things we do…

- In the same time -
  - Our water use increased 9 fold
  - Our energy use increased 16 fold
  - And our industrial production grew 40 fold
- We all have to live somewhere
- And we all want to travel
  - There were very few cars in 1900…
  - ..and no planes!

…and we grow old…



Our lives will change

- There will be more of us – and more of us will be older
- We will need food and water to live
- We will need to be looked after more
- We will need housing to live in
- We will need to work to pay for things
- We will need things to buy
- We will need to travel to work – and will want to travel
- And we are running out of natural resources

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How will the UK fare?

Who are the Technology Strategy Board?

- We are a national body set up to invest in business innovation
- We work across business, universities and government
  - ..and anyone else who can help
- We come from business (and the public sector)
  - 90 people with >1000 years of business experience
- We are responsible for investing £1bn over the next 3 years

What we do

- We help build business capability in underpinning areas
- We help companies respond to market opportunities
- We work with Government as they address societal challenges, and help businesses benefit
- We build networks within communities where knowledge about needs and capabilities can be exchanged

We support the full range of business

- We help **strengthen** the global competitive position of our leading businesses
- We identify and **grow** sectors and businesses with the capacity to become the best in the world
- We **nurture** the businesses that can succeed in the growth sectors of tomorrow

And we make choices

- We don’t pick winners, we pick sectors where UK businesses can thrive and support innovative companies in them
- We consider the size of the markets, the capability of the UK to address them and the timing
- And the difference our support would make

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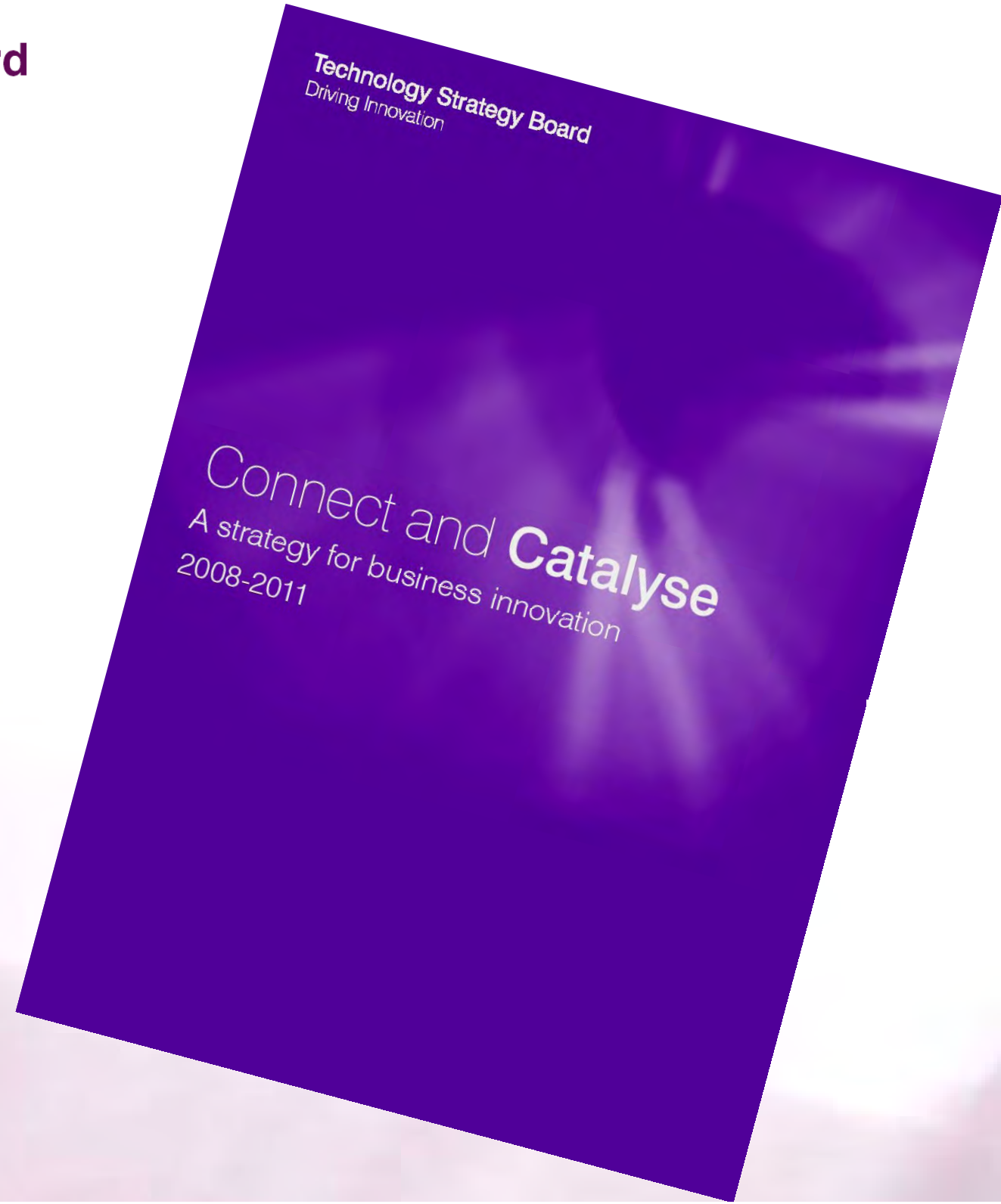
How we deliver



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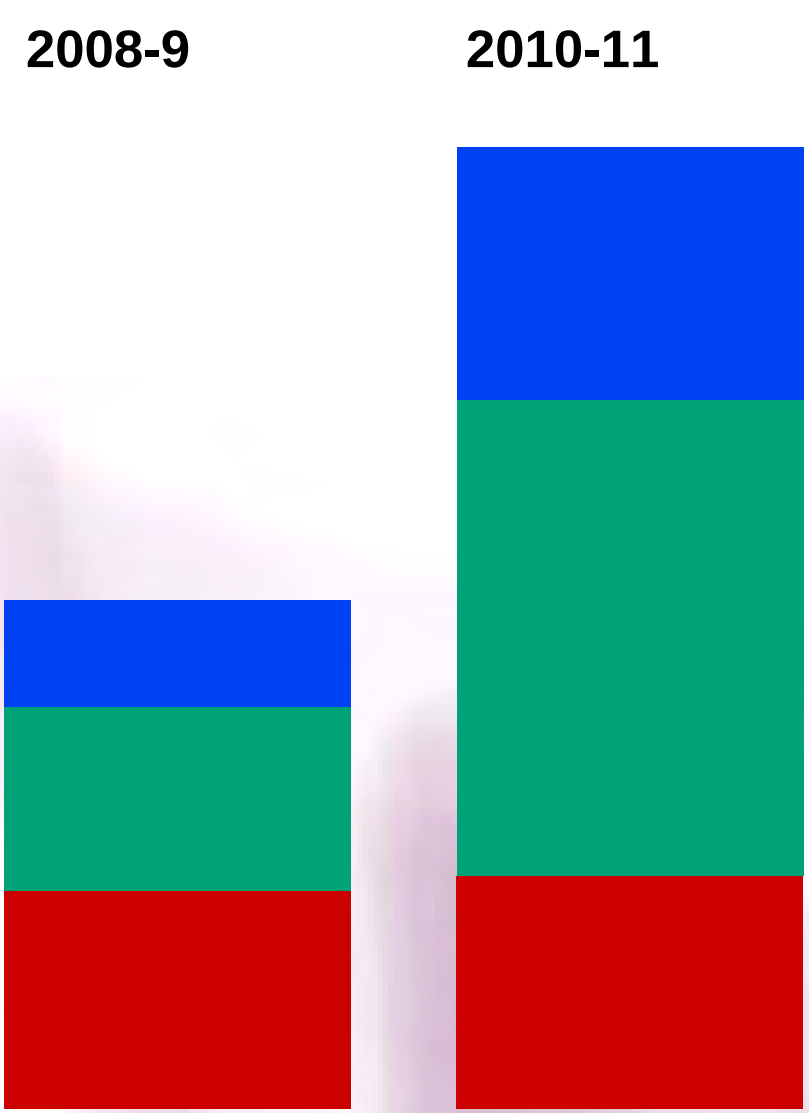
£1 billion investment over 3 years



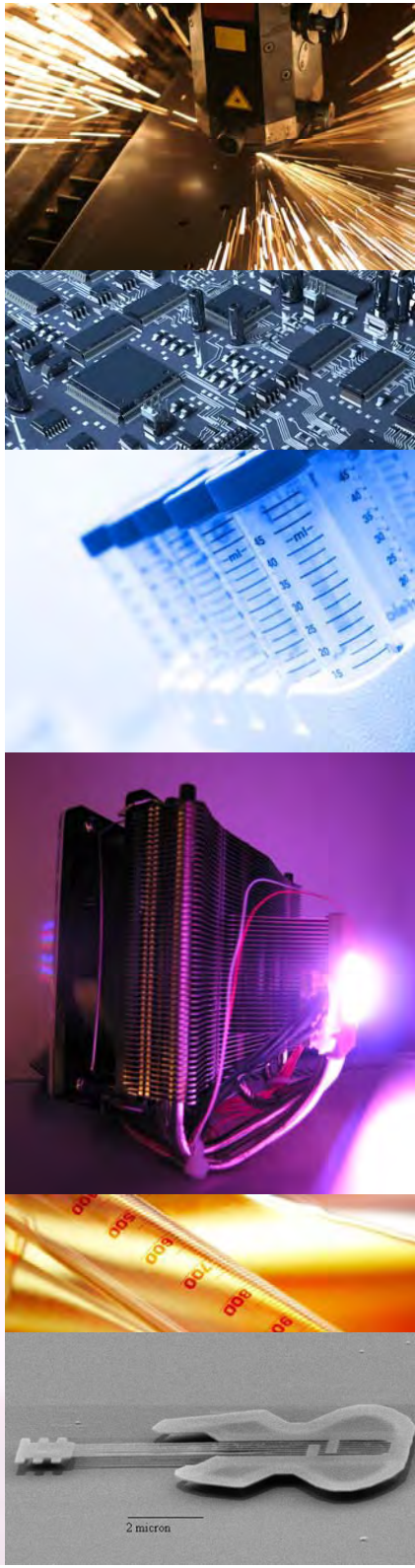
The innovation climate

Challenge-led innovation

Technology-inspired innovation

Technology-inspired innovation

- We help build business capability in underpinning areas
  - Advanced materials,
  - Bioscience,
  - Electronics, photonics and electrical systems,
  - Information and communication technologies,
  - High value manufacturing
  - Nanotechnology



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Challenge-led innovation

- We help companies respond to market opportunities
  - Energy generation and supply
  - Environmental sustainability
  - Built environment
  - Creative industries
  - High value services
  - Medicines and healthcare
  - Transport

Innovation Platforms

- We work with Government as they address societal challenges, and help businesses benefit
  - Intelligent Transport Systems and Services
  - Network Security
  - Low Carbon Vehicles
  - Assisted Living
  - Low Impact Buildings
  - Detection and Identification of Infectious Agents







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What's next in Innovation Platforms?

- Immersive Education
- Sustainable Agri-Food Supply Chain
- 'Water'
- 'Waste'
- Stratified Medicine
- Sustainable Aviation
- ……?






Delivery mechanisms

- Consortium R&D Investment
  - “normal” 2-stage
  - “fast track” 1-stage
  - feasibility first stage
  - 2-stage with consortium building workshop
  - sandpit first stage
- SBRI – R&D contracts

The Innovation Climate

- We build networks within communities where knowledge about needs and capabilities can be exchanged
  - Knowledge Transfer Networks (KTNs)
- We use the stories of projects we support to inspire others
- We support the exchange of knowledge at the individual level
  - Knowledge Transfer Partnerships (KTPs)

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Integrated Products Manufacturing

Bioscience for Business

Aerospace and Defence

Chemistry Innovation

UK Displays & Lighting

Sensors & Instrumentation

Resource Efficiency

Cyber Security

bioProcessUK

Electronics

Materials

Food Processing

Photonics

Healthcare Technologies

Nanotechnology

Industrial Mathematics

Modern Built Environment

Digital Communications

Intelligent Transport Systems

Grid Computing Now!

Location & Timing

Environmental

Creative Industries

Low Carbon & Fuel Cell Technologies

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We don’t do this on our own

EPSRC
Pioneering research and skills

Chemistry Innovation
Knowledge Transfer Network

SCI
where science meets business

BBSRC
bioscience for the future

RSC | Advancing the Chemical Sciences

YORKSHIRE FORWARD

Knowledge Transfer Partnerships

IChemE
heart of the process

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Some examples of what we do

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Sustainable transport fuel

- **Green Biologics Ltd**
- Green Biologics Ltd is developing Butafuel TM, a sustainable transport fuel based on Butanol.
- Micro-organisms are used to convert waste plant material into the next generation biofuel, through high temperature fermentation and enzyme processes which are faster, more efficient and cheaper than conventional processes.
- *Co-funded by the Technology Strategy Board*
- *Project partners:* ***Green Biologics Ltd****; EKB Technology Ltd*

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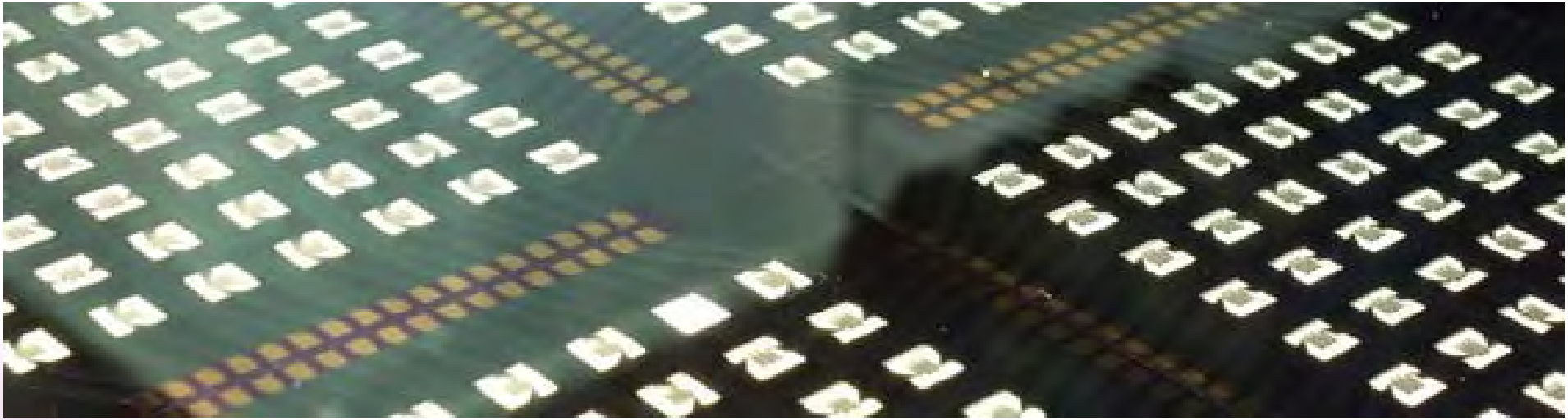
Better hydrogen storage



- **Ilika Technologies Ltd**
- Ilika Technologies Ltd. Is searching for new materials which will enable hydrogen to be stored in solid state metal hydrides.
- The image shows arrays of micro-heaters, each only a few millimetres across, which heat small samples of metal hydrides in order to measure their hydrogen storage capacity.
- *Co-funded by the Technology Strategy Board*
- *Project partners:* ***Ilika Technologies Ltd;*** *Rutherford Appleton Laboratory; University of Oxford; Johnson Matthey plc*

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Hydrogen fuelled sports car

- The Morgan LIFECar is a fuel cell hybrid sports car concept which was launched at the Geneva Show in March 2008.
- The car is powered by a hydrogen fuel cell sized to meet the constant load requirement of cruising (about 20% of peak power) and as a result delivers significant weight and cost reductions over other designs. The QinetiQ fuel cell operates at 45% efficiency and produces 22Kw of electricity, with only heat and water as by-products.
- Electricity is directed to 4 electric motor/generators, each connected directly to a driving wheel. These motors are highly efficient - 92-94% across their operating range - and also have inbuilt re-generative braking, recapturing the kinetic energy for when acceleration is required (and reducing energy consumption still further). Whilst regenerative braking is not a new concept, current applications offer around 10% energy reuse; in the LIFECar up to 50% can be re-employed. Energy storage and delivery is via a bank of ultra-capacitors rather than batteries.
- The car has been engineered to deliver energy consumption equivalent to 150 mpg on petrol with a top speed potential of 80-85 mph, a 0-62 time of under 7 seconds and a 250 mile range.
- This project advances current knowledge of the integration of advanced hybrid fuel cell components, while demonstrating that a zero emission vehicle can also be fun to drive.
- *Co-funded by the Technology Strategy Board*
- *Project partners:* ***Morgan Motor Company;*** *BOC; Oscar; Qinetiq; Cranfield University and the University of Oxford*

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Non platinum fuel cell catalysts

- ACAL Energy is developing a low cost fuel cell system for auxiliary power, micro-CHP, and automotive applications.
- Fuel cells are set to provide clean, low carbon power of the future, however to date they are far too expensive, and do not meet the performance needs of their customers. ACAL Energy's FlowCath© technology makes a massive step change to address the root cause behind these issues. This project will deliver and scale up improved platinum free catalysts to use in ACAL Energy's 1kW auxiliary power system, which will be significantly cheaper and more reliable than current fuel cells systems.
- www.acalenergy.co.uk
- *Co-funded by the Technology Strategy Board*
- *Project partners:* ***ACAL Energy Ltd****, Thomas Swan & Co Ltd, University of Newcastle and University of Liverpool*
- **A featured company/project at the Building the Britain of the Future expo hosted by DIUS in January 2009.**

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Better drug production

- **Better drug production - Ingenza Ltd**
- This project aims to find faster, better and cheaper routes to new drugs.
- Ingenza and Novacta Biosystems are aiming to find faster, better and cheaper routes to new drugs by developing new biocatalytic processes to prepare optically pure beta amino acids and chiral amines, which are required by the pharmaceutical industry worldwide.
- In this project, the aminotransferase biocatalysts are isolated from microbial sources, adapted, by directed evolution, to improve their activity towards industrially important target compounds and then applied in scalable bioprocesses.
- Other potential benefits are that new chemicals may be produced more efficiently and that new enzymes could be isolated and modified for use in industrial processes.
- www.ingenza.com
- *Co-funded by Technology Strategy Board*
- *Project partners:* ***Ingenza Ltd*** *and Novacta Biosystems*

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Detecting toxins and disease

- In this project Stratophase led on developing optical microchip sensors used to detect toxins, viruses and bacteria - making the laboratory portable. The native sensors monitor the optical properties of liquids at multiple wavelengths, allowing multipoint real-time ‘concentration tracking'.
- When functionalised the sensors chips become highly sensitive and selective biochemical detectors, capable of detecting all classes of biological target. It is the small scale and robust nature of this novel sensing technology which makes it ideal for applications in bio-threat detection and point-of-care diagnostics.
- www.stratophase.com
- *Co-funded by the Technology Strategy Board*
- *Project partners: **Stratophase**, University of Southampton, Smart Fibres and Davin Optronics.*

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Smart system displays

- The ENDSENSE project aimed to enhance the readability of visual displays using smart thin film coating materials and techniques. Difficult conditions such as brilliant sunlight hamper the viewability of aircraft cockpit displays for example. The project evaluated electrochromic and transflective films in combination with tuned LED backlights for implementation in future display products. It has led to a further co-funded project ENDVIEW which is aiming to do this.
- *Co-funded by the Technology Strategy Board*
- *Project partners:* ***GE Aviation Systems - Newmarket (formerly Micro Circuit Engineering)****, universities of Greenwich and Abertay, and Thin Film Solutions.*

… innovation opportunities for chemists?

- Innovation Platforms
  - Low Carbon Vehicles
  - Low Impact Buildings
  - Detection & Identification of Infectious Agents
  - ... Sustainable Agri-Food ? (under development)
- Application Areas
  - Energy Generation and Supply
  - Resource Efficiency
  - Medicines & Healthcare (incl. Regenerative Medicine)

… innovation opportunities for chemists?

- Technology Areas
  - Plastic Electronics
  - Advanced Materials
  - Nanotechnology
  - High Value Manufacturing esp. Process Industries

… nearly everywhere!

Conclusion

- Technology Strategy Board national body for technology innovation
- Strongly focused on helping businesses

  ... working across the UK infrastructure
- £1bn investment over 3 years in:

  Technology-inspired / Challenge-led / Innovation Climate
- Chemistry has a key part to play in addressing UK challenge
- Chemistry Innovation KTN primary point of contact

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http://www.innovateuk.org