



Llywodraeth Cynulliad Cymru  
Welsh Assembly Government

# Photonics in Wales: A perspective at 5 months into the CSA job

**John E Harries,  
Chief Scientific Adviser for Wales,  
and  
Professor of Earth Observation,  
Imperial College,  
London**





# 1. Introduction

- Science and technology in the broadest sense is important to Wales of the future: Rhodri Morgan, as 1<sup>st</sup> Minister, argued that Wales' future lies in a “**knowledge economy**”, **relying on “scientific, technological and engineering know-how”**. Our present 1<sup>st</sup> Minister, Carwyn Jones, announced the appointment of a CSA last February, saying:
- “**The Chief Scientific Adviser’s role will be to provide scientific advice to the First Minister and the Welsh Assembly Government, to promote science, technology, engineering and mathematics and the role of science within the wider knowledge economy.**”
- In this talk I will set out some of my thinking on how we might go forward, after 5 months in the job, and how this relates to Photonics. During that time, new initiatives and plans have abounded: for example, the Economic Renewal Plan, the R&D review, and, just last week, the Climate Change Strategy.



## 2. Activities and Findings

Some general observations:

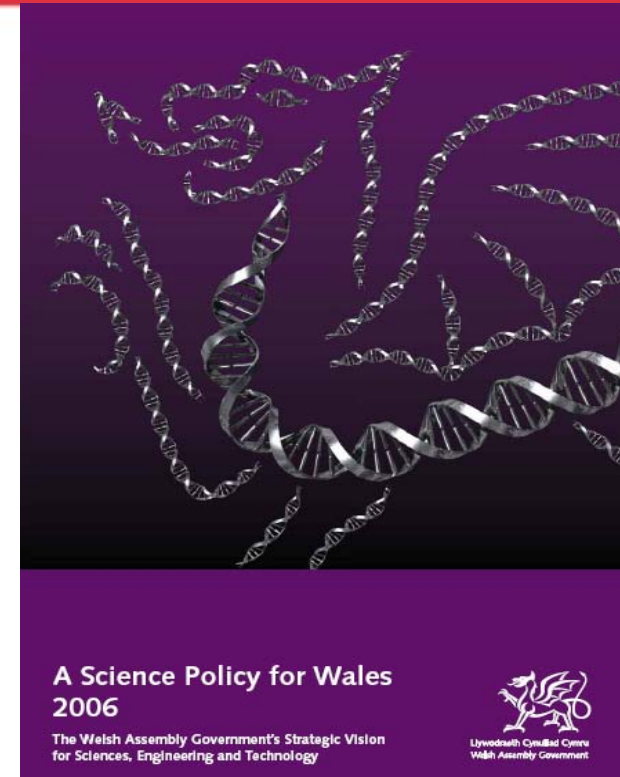
- Lots of meetings, talking, reading, consulting, with people in government, industry, universities, the 3<sup>rd</sup> sector, schools.
- A lot of enthusiasm, a lot of clever ideas and initiatives, a lot of excellent research.(but not everything can claim to be “world class”);
- Sometimes a little hard to see the overall pattern and plan: too many, too small?
- Need an overarching, agreed strategy;
- Also, must do a better job of monitoring performance, reviewing, project managing

## 2. Activities



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- Two of my more urgent activities at present are:
  - ❖ Set up the Science Advisory Council for Wales;
  - ❖ Produce a revision and up-date of the Science Policy 2006 document
    - Membership of SACW key to preparing the new policy;
    - Input requested from HEFCW and other stakeholders.



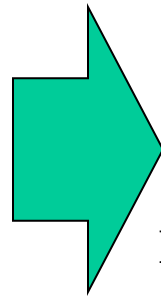
### 3. Recent Reviews have defined priorities for Wales



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*New policy of economic renewal focuses us on 6 key business sectors:*

- **ICT;**
- **Energy and environment;**
- **Advanced engineering and manufacturing;**
- **Creative industries;**
- **Life sciences;**
- **Financial and professional services.**



*Reviews have identified 4 R&D Priority Areas:*

#### **Digital Economy:**

Secure mobile and wireless communications;  
Creative industries (animation and games media);

#### **Low Carbon Economy:**

Sustainable building technology;  
Renewable electricity innovations (including marine sciences);  
Low carbon vehicles;  
Climate change, adaptation and mitigation;

#### **Health and bio-sciences:**

Translational science in aging and well-being (neurosciences, medical engineering, informatics and e-health, imaging);  
Plant bio-sciences, negative carbon;

#### **Advanced engineering and manufacturing.**

Advanced materials (composites, micro- and nano-technology); Autonomous systems.

### 3. Priorities for Wales



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Emission, transmission, amplification, detection and modulation of QM photons of light: recognising wave and particle character of light

Photonics

Photonics is a potentially very important area within this approach, which may generate a flow of technologies and applications from one sector to another

### 3. Priorities for Wales



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Photonics is strong in Wales, as we are hearing in the other presentations:

- Welsh Opto-electronics Forum;
- Optic Technium;
- KTN;
- Universities (in alphabetical order!): Aberystwyth, Bangor, Cardiff, Glyndwr, Swansea;
- Older companies (Sharp, ex Plikington), newer companies (Translucent, Grounded, G24, Pure Wafer, and a lot more...).

### 3. Priorities for Wales



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How will this whole sector figure in Wales of the future?

It is very well placed now, and touches many buttons,

BUT, I throw **a challenge** out to you:

To provide me with a clear case for Photonics taking a leading position in our science and technology base on which we build greater prosperity and expertise.

This meeting is a very good step in providing that case.

Along with other sectors, you are invited to organise yourselves into a team that can convincingly explain why, against the ERP and R&D reviews, photonics offers world class science and technology to take a key role in the new Science Policy





## 4. Issues: the challenges and opportunities in R&D in Wales, and the role of Chief Scientific Adviser



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- What is the situation?
  - RAE results in Wales need to improve;
  - EPSRC Doctoral Training Centres (8 initial proposals; 0 successes);
  - R&D investment by industry not high enough;
  - Success rates in RCs, EU low
- Let's have evidence-based debates.
- Need to be clearer about just what we are doing: does it fit an agreed strategy, or is it piece-meal?
- Label “world class” has to be deserved, not mere semantics;
- BUT, we should be more positive about our successes: not everything, by a long way, is gloomy!

## 4. Issues: the challenges and opportunities in R&D in Wales, and the role of Chief Scientific Adviser



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- Possible ways to raise standards of R&D in STEM in Wales?
  - Are we going for fundamental “blue skies” research, or applied research; the whole spectrum, or not??
  - Attract new stars?
  - Focus on strengths (and consequently not on weaker areas)?
  - Collaborate with best inside and especially outside Wales;
  - Use the National Science Foundation to good effect: not just to ‘top-up’ existing activities

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- Focus on strong alliances within, and without Wales?
  - Merge Departments?
  - Strengthen selected Departments with Stars, extra funding? ( BUT  $\equiv$  Stop other activities elsewhere);
  - Identify winning subjects;
  - Sponsor joint industry-HEI institutes?
  - Regional focus ( eg Medicine/Bio; Environment; Optics).

## 4. Issues: the challenges and opportunities in R&D in Wales, and the role of Chief Scientific Adviser



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- Industrial R&D:
  - Lower than elsewhere in UK?
  - Construct joint HEFCW/WAG – Industry schemes?
  - Examples:
    - Techniums;
    - Anchor companies;
    - Research Foundation.
  - Attract in new high-tech companies.

## 5. Summary: the way forward



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- Many existing initiatives in Wales: need to *clarify and record* our current status, by regular best practices: review, consultation and reporting;
- Be prepared to *focus* our limited resources and efforts in carefully selected areas;
- *Link* world-class, **excellent science** with **innovation** and **enterprise**, aimed at economic renewal; we need excellence in all 3 aspects: **THIS DOES NOT GROW ON TREES!**
- *Recognise* strength of natural clusters of HEIs, industry, NGOs, and government, and mixtures of the four sectors; encourage *collaboration* and links in Wales, the UK, and Europe;
- Work to bring new *resources* into Wales from UK, Europe and beyond, to expand the knowledge economy, with particular focus on driving new commercial enterprises.
- Organise a sound and responsive *CSA advisory structure* that will ensure availability of high quality scientific evidence to First Minister and Cabinet:
- Implement modern techniques and good working practices; exploit links with other CSAs and GCSA;
- Raise the *profile* of science and engineering, and increase public confidence in S&E within Wales; encourage STEM careers with young people: develop the **HoSEP** function;
- Views of HEFCW on priorities?



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