



E4tech

Newsletter

Introduction

Welcome to E4tech's second newsletter and to an update on our activities over the past 12 months. We have included brief highlights of our work, in addition to other news that we hope will be of interest. If you would like more information on any of these projects or areas, or simply want to say hello or organise to meet up for a drink and a chat, please do get in touch.



About us

Putting down roots

By David Hart

Both E4tech London and E4tech Lausanne remain in their central locations, though the London office is expanding as we continue to grow. The Victoria location is proving convenient for us and clients alike, and we look forward to another year with our partner organisations. In Lausanne we are well settled and close to both town centre and train station, making contacts convenient. If you'd like to come and see us in either location you'd be more than welcome.



Biofuels

Brazil – UK - Africa Partnership on Bioethanol

by Claire Chudziak and Ausilio Bauen

The UK Government held presidency over the G8 summit in 2005 and, in the resulting Gleneagles communiqué, outlined an agreement between G8 countries to tackle the priority issues of climate change and African development.

There has been increasing global interest in expanding the production of biofuels in order to reduce carbon emissions from transport. In Brazil, bioethanol from sugarcane is in widespread use; when produced with appropriate technologies, it is a competitive and low carbon fuel. Southern Africa was identified as a potential region in which conditions may be suitable for competitively growing sugarcane for bioethanol production, and where the production of bioethanol could also contribute to other social and economic goals.

Following on from Gleneagles, the UK Government's Office of Science and Innovation commissioned E4tech to investigate the scope for a partnership between the UK, Brazil and African countries to stimulate the production of bioethanol in Africa. As part of the project, E4tech team members visited South Africa and Brazil to meet with industry, government, NGO and academic representatives to discuss the viability and sustainability of expanding sugarcane for ethanol production.

Our study showed that there is potential for expanding sugarcane growth in Africa. In southern Africa alone, using a relatively conservative increase in sugarcane production, E4tech estimated that enough bioethanol could be produced to replace 30% of the gasoline required by the projected southern African fleet of 17million gasoline cars by 2020, without competing with land dedicated to food production.

E4tech also identified priority issues that should be addressed by a partnership. The UK government is now leading the international discussions for its implementation.





Hydrogen and fuel cells

A remote possibility for hydrogen

by Adam Chase

The Highlands and Islands of Scotland are home to some of the remotest communities and harshest climates in the UK. They are also home to some of the best renewable energy resources in Europe. Despite this, local consumers currently pay high prices for energy, which is almost entirely imported fossil-derived fuel.

Highlands and Islands Enterprise (HIE) was established to foster sustainable economic and community development across this region. HIE has been approached by several technology and project developers who have pointed to the potential of hydrogen as an alternative means to exploit local renewable resources. Earlier this year, HIE commissioned E4tech, together with Element Energy and Shetland-based Partnership for Unst Renewable Energy (PURE) to investigate opportunities for the region to meet its objectives through hydrogen and fuel cells.

Together with our partners we led workshops across the region which informed and interested around 130 people in hydrogen, and resulted in over 80 hydrogen-related ideas. E4tech and its partners looked for common themes among the ideas that were formulated during the workshops, and developed a 'toolkit' that would enable users to develop potential hydrogen projects and carry out techno-economic assessments of them. For example, a project evaluation software tool to give an indication of the scale of hydrogen generating plant required to meet a given demand, and the costs associated with the hydrogen supply and end-use equipment.

The region currently has one wind-hydrogen project which currently provides power to an off-grid industrial estate and for small scale road transport. We hope that our work will soon lead to other projects, showing that 'remote' does not necessarily mean far-off when it comes to hydrogen.

Building Physics and Software

The "Systemnachweis Minergie- ECO[®]" project

by Flavio Foradini

The **Minergie-ECO[®]** label has recently been established in Switzerland, as a result of co-operation between two organisations, Minergie and eco-bau. The objective of this new label is to promote buildings that not only have very low energy consumption but also guarantee a healthy and comfortable interior and a limited impact on the environment.

MINERGIE	MINERGIE-ECO	
Comfort <ul style="list-style-type: none"> • High thermal comfort • Solar protection • Systematic air renewal 	Health (constr. materials) <ul style="list-style-type: none"> • Optimal diurnal lighting conditions • Low sound emissions • Low pollutant loads 	Light Noise Ambiant air
Good energy efficiency <ul style="list-style-type: none"> • 25% lower overall energy consumption and • At least 50% lower fossil fuel consumption than the average state of the art equivalent 	Ecology of construction <ul style="list-style-type: none"> • Good material availability • Low impact on the environment, in both manufacture and processing • Simple deconstruction, reclamation and disposal 	Resources Construct-ion Deconstruc-tion

These objectives are achieved by carefully choosing construction materials that have negligible associated pollutants. The added value of this label over the current Minergie[®] label is illustrated in the table on the left.

Having created this new label, a development project is now underway to simplify its implementation, interpretation and attribution. One of the objectives of the project is to develop an integrated information tool that will allow the user to evaluate the energy needs, level of comfort and environmental impact of the whole building.

It will be possible to use this tool either during construction or renovation. Several DLL (dynamic link library) components are currently being developed and E4tech is responsible for those components relating to energy calculations and comfort levels.

E4tech will use Lesosai (www.lesosai.com) as the test software for their implementation. The components will then be made freely available to different software developers.

It is crucial that users can easily input the information required to obtain the label. Therefore, integrating all the calculation methods into a single piece of software which is both user-friendly and has been officially approved, will improve the ease with which the Minergie-Eco label can be obtained, and will accelerate its deployment.



2050 Swiss energy R&D policy vision

Contributing to the identification of promising technologies

by Meinrad Buerer

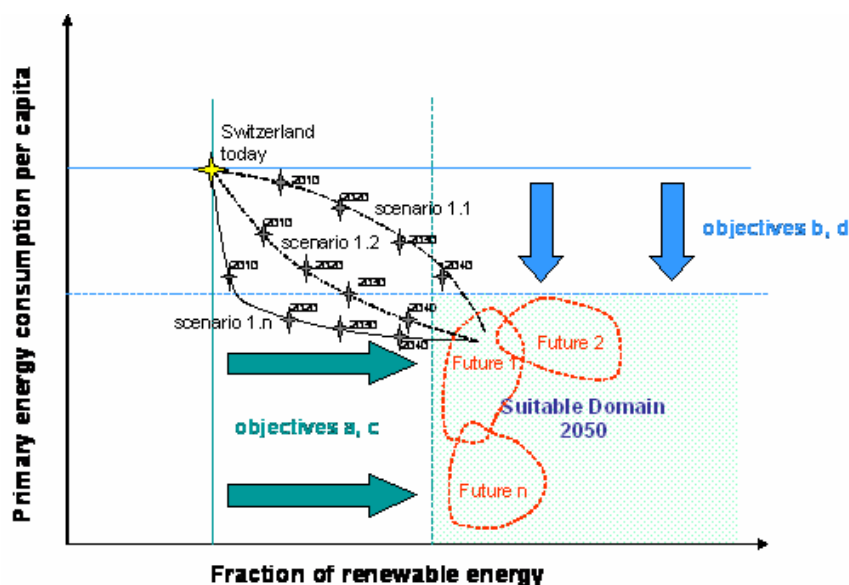
Energy R&D is an essential component in the design of an energy policy that aims at providing a sustainable, secure and economical energy supply. The Swiss Federal Energy Research Commission (CORE) provides recommendations and guidelines for R&D in the field of energy, in order to ultimately converge towards a society of 2,000 watts per capita and of 1 tonne of CO₂ average annual emissions per capita.

In this context, the CORE asked E4tech, together with the Centre for Energy Policy and Economics in Zurich, to contribute to the identification of promising technologies required to meet four quantitative targets formulated by CORE's 'Roadmap Working Group' for the 2050 time horizon, which are believed to be necessary for the achievement of a sustainable energy supply in Switzerland:

1. no use of fossil fuels for heating requirements in the building sector
2. a reduction by half of the energy consumption in the building sector
3. an increase of the share of biomass in the energy supply while using its full ecological potential
4. a reduction of the vehicle fleet's average fossil fuel consumption down to 3 litres per 100 km

For this purpose a study has been conducted which reviews existing literature on road mapping of medium-term energy supply, defines different possible 'Futures' for the Swiss energy supply and demand by 2050 on a qualitative basis and on a first order quantitative basis, and investigates existing R&D competences in the public and private sectors.

Setting priorities in public R&D funding for medium-term energy supply involves a considerable risk of failure: decision makers face a great deal of uncertainty related to the way numerous relevant boundary conditions may evolve in the future. In a debate often shaped by divergent opinions and various conflicts of interest, there is a need for a more transparent and structured analytical framework. A methodology based on the notion of 'Futures' has been developed and applied in order to remain as objective as possible by reducing the number of degrees of freedom in the process of identifying promising technologies to be supported by public R&D. Scenarios investigated are illustrative and must by no means be interpreted as projections. Other Futures could be considered, and many other scenarios could indeed be envisioned for a same 'Future'.



Results from this analysis indicate that complying with those four targets by 2050 would lead to a renewable fraction in the primary energy supply ranging from 46 to 61%, and an annual primary energy consumption per capita ranging from 3.5 to 4.2 kW year per year and per capita. In order to reach those targets, primary energy consumption per capita must be reduced by 20 to 30% and the renewable sources fraction increased by 2.5 to 3.5 times, compared with the situation in 2001. The CO₂ emission rates resulting from the four 'Futures' investigated range from 2.4 to 4.1 tons of CO₂ per capita and per year. This is a reduction of 40 to 65% compared with the situation in 2001.

The final report, entitled 'A contribution to the identification of promising technologies for the 2050 Swiss energy R&D policy vision', can be downloaded from the official website of the Swiss Federal Office of Energy or from E4tech's website.