

Report on the ETI Committee's Visit to the EU

25TH MAY 2010

1 Waldemar Kütt, European Commission Cabinet of Commissioner for Research, Innovation and Science

Mr Kütt initially talked of two key priorities for the Research, Innovation and Science Directorate. The first is to emphasise the importance of Innovation across the EU and thereby assist in the process of efficiently bringing research into the market place through coordination and free movement of risk capital. This focus on innovation will also allow the directorate to link with the EU's broader Flagship Initiatives which focus on innovation as a key mechanism for moving the EU out of the current economic situation.

The second priority is the European Research Area (ERA) which aims to increase competition for excellence through the circulation of researchers within the EU and opening the "old men's club" which exists in some Member States as established networks for research contracts become open to wider competition. It is hoped that this will facilitate deeper and more efficient cross border networks. The ERA should also allow less duplication of research to take place within the EU as well as increasing competition.¹ Subsequently the ERA may become an effective locus for governments and industry to cooperate and make determinations on the direction of future research and innovation agendas.

The Framework Programme 7 (FP7) is the EU's third largest funding mechanism (behind CAP and the Structural Funds) with a budget in excess of €50 billion up to 2014. FP7 utilises various instruments from individual research grants to public/private partnerships to attain aims determined either through top-down policy objectives or bottom-up industry generated priorities. Most money at the moment goes into collaborative research (approximately 60%). Mobility grants are also available for infrastructure support (research infrastructure rather than physical infrastructure) and support for SMEs with little to no internal capacity for research.

Available FP7 Support

There are currently Web-based tools such as:

- **CORDIS** (http://cordis.europa.eu/home_en.html) – General information on the general policy objectives of FP7 (and FP8 in future) and the results/outputs of the programmes are all contained within the CORDIS site;
- **Participant Portal** (<http://ec.europa.eu/research/participants/portal/appmanager/participants/portal>) - The calls for research under all FP7 programmes are posted on this central site. It also guides potential researchers to necessary forms and documents. Negotiation between potential collaborative partners; the monitoring of proposals; and the management of projects throughout their lifecycle will be hosted on through this portal in future.
- **Europa** (<http://europa.eu/>) – the central Commission site.

¹ The significance of duplication was highlighted later in the meeting when innovation in the renewable sector was discussed. France, Germany, Italy and the EU are all separately developing electronic cars. They are uncoordinated programmes which aim to meet the same standards with total investment of approximately €2 billion. Coordination, it is suggested, would enable the technologies to be shared, the costs to be reduced and the product to be completed sooner.

It is hoped that the websites will assist both harmonisation and simplification of FP7 by reducing overlap of information and functions.

The FP7 Work Programme is published annually in July (on the Participant Portal) with details of the content and dates of the calls for research applications which will be issued over the following year. It is hoped this gives potential candidates foresight as to what is coming up, allows them to proceed in application planning well in advance and enhances their capacity to fulfil the considerable bureaucratic requirements for application.

Support Organisations

Effective use of FP7 mechanisms can be achieved through coordination with the current support organisations. For example there are currently **National Contact Points** (NCPs) who are, in some cases, supported by the Commission. Mr Kütt suggested NCPs can be effective conduits for indentifying key approaching themes which coalesce with national strategic priorities as they often gain advance notice of calls coming up in the following year². NCPs therefore are also critical to matching calls with either SMEs, universities or other institutions that may have the capacity, experience or interest in pursuing it. There is a huge onus therefore on NCPs being very proactive in this role.

UK NCPs work on specific thematic areas including Transport; Environment; and Law and Finance. There are also Regional NCPs. **The NCP for Northern Ireland is Dr Joanne Coyle of Invest NI.**³

European Enterprise Network is a specialised network within the Commission which is focused on industry and SME innovation support. It seeks to assist small business to make the most of the European Marketplace by assisting in:

- The development of businesses for new markets
- Sourcing or licensing new technologies
- Accessing EU finance and EU funding⁴

Mr Kütt emphasised that there was no one route to effective participation within FP7 but pointed to the Netherlands as an example of a country who operated well. They demonstrate a clear and well worked out relationship with NCPs. They engage proactively and directly with SMEs regarding upcoming calls and are very focused in identifying strengths within various sectors. These analyses allow for better targeting of resources and a coordinated approach to targeting calls.

Mr Kütt also pointed to the Germans who give grants to companies to enable them to submit a proposal to the EU in response to Calls which can vary between €5,000 - €10,000.

Mr Kütt also discussed a potential role for government as a coordinator to enable research participants to link with parties which have been successful within the programme and

² The calls are posted to the public in July of each year on the Participant Portal but contact points receive them in advance

³ A full list of UK NCPs and their contact details are available through:
http://cordis.europa.eu/fetch?CALLER=FP7NCP&PASSVAR%3ATITLE=FP7+NCP&QM_CCY_D=GB|UK&QM_EN_FNC_D=&QZ_WEBSRCH=&USR_SORT=EN_ORG_A+CHAR+ASC

⁴ European Commission, European Enterprise Network,
http://www.enterprise-europe-network.ec.europa.eu/index_en.htm

therefore facilitate idea exchange between those with experience of negotiating the application processes etc and subsequently build broader expertise.

Critically, FP7 no longer places a requirement on applicants having an element of cross border collaboration as the achievement of the ERA as an overarching framework negates the need to emphasise borders at all.

SME Participation

There is an emphasis on SME participation within FP7. The European Commission has set a target that 15% of all contributions within the Cooperation programme should go to SMEs. These targets are being missed however, with only 12.6% being achieved as of June 2009.⁵ The next set of calls, published in July, should be more SME oriented with, for example, environment specific funding which focuses on eco-innovations with a specific and set-aside budget.⁶

Mr Kütt also highlighted the potential for greater collaboration between SMEs and universities as SMEs, who are on the frontline within the marketplace, define the problems at the outset and then the universities attempt to solve it. In harnessing this there can be greater mutual benefit.

Cooperation Energy Theme

The calls made under this theme are largely focused upon implementing the strategic energy technology plan (SET plan) with a focus on renewable energy.⁷

Mr Kütt advised that FP7 calls within area are dominated by renewable energy. European Technology Platforms encourage industry and other stakeholders to contribute towards strategic research agendas – i.e. to identify what should be done at the EU level over the next 10-12 years. Large industry networks within these platforms and the conclusions are subsequently selected and internalised within the work programme.

Framework Programme 8 (FP8)

So far, Mr Kütt suggested research investment had not been subject to the same cuts as other areas, and FP7 budgets are scheduled to increase year on year until the programme ends in 2014. In parallel negotiations beginning for the replacement programme, FP8, which would most likely need to prioritise specific objectives, probably linked to the EU 2020 agenda, given broader economic constraints.

⁵ European Commission, 'Third Progress Report on SMEs in the R&D Framework Programme 7' June 2009 http://ec.europa.eu/research/sme-techweb/pdf/fp7_full_report.pdf

⁶ Mr Kütt warned this is very highly oversubscribed, therefore the calls are very restrictively drawn and defined.

⁷ The SET plan aims to help achieve European objectives regarding energy technologies and face up to the challenges of the Energy sector:

In the short term, by increasing research to reduce costs and improve performance of existing technologies, and by encouraging the commercial implementation of these technologies. Activities at this level should in particular involve second-generation biofuels, capture, transport and storage of carbon, integration of renewable energy sources into the electricity network and energy efficiency in construction, transport and industry;

In the longer term by supporting development of a new generation of low carbon technologies. The activities to be carried out should focus, among other things, on the competitiveness of new technologies relating to renewable energies, energy storage, sustainability of fission energy, fusion energy, and the development of Trans-European Energy networks.

Mr Kütt suggested that Framework Programme 8 would be more specifically linked to the EU's grand challenges and would seek smart sustainable solutions to support objectives linked to renewable energy, water and climate change. It would also aim to support Innovation more whilst providing mobility grants and further risk-sharing finance mechanisms for high risk prospects with a view to increasing the diversity of participants.

2 Pre-Meeting on Energy

This meeting sought to emphasise the significance of the new Agency for the Cooperation of Energy Regulators (ACER) to NI Energy interests and their representation at the supranational level. NI is currently unique within the EU as it alone presides over a cross border energy market which has the potential to be sold as an idea across Europe. At the moment it is proposed that 'only one representative per Member States from the national authority may be admitted to the Board of Regulators.'⁸ Subsequently, OFGEM will represent the whole UK within ACER as the sole **National** Regulatory Authority.

The prospect of OFGEM representation was described as problematic in two ways. First, as this is a devolved matter in NI, OFGEM doesn't represent NI interests. Thus we will be reliant upon OFGEM's goodwill for representation in decisions and votes. Secondly, because NIAUR has limited resources to follow this pan-national regulator it will face a substantial logistical and informational challenge in attempting to persuade OFGEM to pursue its interests.

However, the wording of the regulation precludes NIAUR taking a full role within the board and a vote as it is merely a regulatory authority, and to give it a place would create an uncomfortable precedent for other sub-national authorities throughout the EU. However, NI is unique in presiding over a cross border market and there is potential to argue for permanent observer status. This would allow NIAUR to be copied into all ACER papers and documents; and receive invitations to all ACER meetings therefore keeping pace with the work undertaken therein

The cross border market includes significant innovations such as the committee structure with representatives from the UK, Republic of Ireland and an independent from Spain. This decision-making structure has arguably been instrumental in attracting new participants and new wholesalers and retailers to the market. This not only provides an example to other sub-national regulators, but incentivises other movements towards trans-national networks if an increased role within ACER results.

However, the Chair of OFGEM, Lord Mogg, is also the Chair of ACER's Board of Regulators and has not been receptive to this idea.

3 Philip Lowe, Director-General; Energy – European Commission

NIAUR Representation on ACER

The issues related to the pre-meeting were raised with Mr Lowe, but he reminded the Committee that while the Commission had "a certain degree of input", the regulator issue is primarily regarded as a UK issue. However he agreed that NIAUR was a unique example which was potentially transferrable to the EU and cross border markets would be a major challenge for the Commission within this cycle. As such, he agreed to put 'some degree' of

⁸ Official Journal of the European Union, August 2009 Regulation (EC) No. 710/2009 Establishing an Agency for the Cooperation of Energy Regulators

pressure and 'some degree' of support for what is being suggested in terms of NIAUR representation on ACER.

Renewable Energy

Mr Lowe talked more generally about the Commission's attitude towards Climate Change moving forward, arguing that the EU's targets were agreed irrespective of the failure to gain a global agreement. An attendant goal to reaching the 20% renewable energy target was progressing reasonably well, especially among those Member States which identified a competitive interest in developing renewable industries and seek to eventually export. Germany, Denmark and Spain were mentioned in particular, while other nations were perceived as more user oriented.

Much of this development was reliant upon investment in: a. new capacities; and b. Research and Development. While these were intensive funding streams in the short terms it was theorised that costs would eventually come down and consequently feed-in tariffs, for which there are no plans to harmonise across the EU, would likely be phased out, perhaps in line with the market. Subsidies were however imperative in Mr Lowe's view until such time as these cost differentials were minimised. Furthermore, overall certainty was central to the broader project of encouraging renewable energy as otherwise, as in Spain, over investment by government could become an object of public criticism and the whole renewable energy sector politicised.

Furthermore, the Commission was concerned that the need to reach a balance between different forms and sources of renewable energy was recognised as central to this project. Mr Lowe highlighted the potential for a broader European network would allow for increased efficiency by linking renewable generation across various Member States and thereby make it easier to balance the mixture of coal, gas and renewables utilised across the EU.

However, Mr Lowe also suggested that longer term solutions were being sidelined for short term exigencies in the contemporary context. It was therefore essential that a new equilibrium was found between the imperatives of climate change and what we can afford to do now. Industrial considerations are becoming more pressing, as evidenced by the recent decision by Corsican authorities to replace one old oil fired power station with yet another one. Mr Lowe suggested on the contrary that local decisions should fall on renewable due to broader concerns regarding security of supply.

The Action Plan for Energy

This will cover the Commission's agenda regarding renewable energy for the next ten years. It will aim to outline a package on infrastructure development. One pressing issue which this raises is how to build and finance the infrastructure capacity for grids given the lack of motivation among suppliers to do so. This is particularly challenging at the moment where markets are risk averse coupled with a culture of competition which seeks to modulate tariff limits to limit the capacity for companies to pass costs onto the consumer.

The DG for Energy is seeking to facilitate broader market and grid access on a pan European level across frontiers. **Super grids**, which are essentially wider transmission networks, may be one route of achieving this. The most potential lies with the North Sea Baltic area, but this concept only makes sense if the regional parts work to the incremental benefit of the whole and expands on the sum of its parts. Regional initiatives and Private consortia with some national funding are all encouraged.

There is a debate taking place in Germany currently as to whether off shore wind plants should be connected to large population and industrial centres, but the process isn't

progressing far as it has, so far, failed to catch the public's imagination. There is a clear need to demonstrate in this case how much investment tangibly benefits local communities as otherwise they come to represent impositions.

Mr Lowe implied the Directorate will be bringing a package for grid development as the question of creating the conditions for people to invest in updating grids remains. This may be a single funding source which focuses solely on subsidising grid development across Europe and can be used to leverage further capital investment.

4 Luc Hendrickx – European Association of Craft, Small and Medium Sized Enterprises (UEAPME)

Small and Medium Sized Enterprises are gaining a higher profile within EU decision-making since the Small Business Act for Europe (SBA) which was endorsed in 2008. The SBA reflects the Commission's political will to recognise the central role of SMEs in the economy and for the first time puts into place a comprehensive SME policy framework for the EU and its Member States. It runs on the principle of "think small first"⁹ so that legislation starts from the needs of SMEs, who account for 99% of businesses within the EU and 75% of employment. The SBA also seeks to simplify the administrative burdens placed upon SMEs by proposing that:

- Business registration should take no more than one week and costs should be reduced.
- Businesses should be able to report data "once and for all" to public administration.
- Companies should only be expected to provide statistics "once in three years" where appropriate.

The provisions within the SBA are non-binding, and are aspirational at this stage.

Renewable Energy and SMEs

In terms of the Renewable Energy question, Mr Hendrickx talked of SMEs as being central in the ongoing process of developing renewable policy and delivering the results on the ground through two ways. First, SMEs may not develop the new technologies, but they will be relied upon to use and sell them as once they are researched and developed, SMEs are an essential conduit for bringing them into the market.

Furthermore, through further progression of Corporate Social Responsibility in terms of the need to persuade SMEs of the benefits of ideal models such as waste reduction, particularly in terms of the profitability potential for implementing such changes.

The Role and Objectives of UEAPME

UEAPME is a recognised European Social Partner which means that they must be included within Commission consultation processes to defend the interests of SMEs. As a horizontal organisation, UEAPME's main route of influence is in the initial drafting process of Commission Communications which means they must aim to shape the initial direction of a proposal or, Mr Hendrickx argues, it's too late. As such UEAPME has actively sought to build

⁹ European Commission "Putting Small Businesses First: Europe is good for SMEs, SMEs are good for Europe." 2008 Edition.
http://ec.europa.eu/enterprise/newsroom/cf/document.cfm?action=display&doc_id=3428&userservice_id=1&request.id=0

relationships with EU partners and Commission staff to improve SMEs interests which counter those of the large and powerful companies.

Mr Hendrickx talked of member organisations within UEAPME as being both representatives of the SME organisations at national level and also involved in social dialogue within Member States.

The decision by the UK Federation of Private Business (FPB) to leave UAEPME was also subject to discussion. Mr Hendrickx referred to a divergence in strategy between the national and transnational bodies as FPB UK sought to include direct consultation with individual SMEs which UEAPME felt would lead to unnecessary and undemocratic as individual SMEs would inevitably defend their own particular interests which would not be representative of the vast number of interests which SMEs had across the EU. UEAPME has to try and determine collective agendas which represent a plurality of interests so that the collective trumps the individual. The UK organisation would not tolerate this and subsequently left.

The Committee inquired further as to the services and benefits which UEAPME could offer an organisation, such as the NI Federation of Small Businesses, which sought to become a member. Mr Hendrickx suggested that there would not be a problem in principle with the NI FSB becoming a member of UAEPME but not a full member. UAEPME will:

- Give advice and try to involve organisations in EU decision-making;
- Try to take all sides into account in decision papers and reach compromise;
- Sectoral organisations exist – for example the transport forum;
- Offer information on consultations; and
- Provide access to the Commission on specific issues.

The fee varies, depending upon the number of organisations a body represents.

5 Meeting with the Northern Ireland Executive Office and Invest NI

Present: Noel Griffin, NI Executive Office;
Damien Nicell, Business Development Director, Invest NI;
Farha Brahmi, EU R&D Liaison Service, Invest NI.

5.1 Noel Griffin

Mr Griffin discussed with the Committee the general functions of the Executive office in Brussels including its three core objectives:

1. Support NI engagement with the EU including the wider remit to support the Assembly;
2. Ensure NI engagement in policy making in the EU institutions;
3. Raise the profile of NI.

The broader context meant that the Office was, strictly speaking, part of the UK Permanent Representation. This means that representatives from the Office can attend meetings of the Permanent Representative and Council meetings. The Office also can operate semi-autonomously, but can't publicly disagree or lobby against the official Member State position. There is also an ongoing relationship with the Irish representation which assists in giving steers on how policy may progress.

The Executive Office core priorities focus on building upon the Barosso Task Force Report, which despite top-level delays, still provides levels of access to key Commission players. Linked to this process is the need to push NI Departments to come to clear policy agendas which develop beyond exploratory policies and move towards demonstrating clear added values.

The Office also attempts to attend as many meetings and develop as many informal linkages so to be able to pass as much specialised information, which is more in depth than that available online, back to NI.

5.2 Damien Nicell

Mr Nicell discussed his role as within Invest NI as trying to cultivate relationships with regions and countries where there is a potential complimentary fit with NI. He also promotes NI as a near shore platform to Ireland and the United States which is both cost effective and a high quality area. Competencies and innovation are key factors in encouraging foreign direct investment, and it is Mr Nicell's role to try and cultivate key decision-makers within global companies to get involved. Mr Nicell was asked how he coordinates with the other Invest NI offices in Europe. He responded that there was a Germany office specialising in Research and Development, but otherwise Invest NI's other representation on the Continent was him.

5.3 Farha Brahmi

The role of the R&D Liaison Officer is to boost NI R&D collaborative services, mainly through FP7. The current targets aim to draw down €50 million to NI from the programme by 2013. Within the first 3 years of this 7 year programme, €22 million had been drawn down. Ms Brahmi talked about strategic SME involvement in NI as SMEs here tend to be more reactive and plan short term through near to market research. Conversely, FP7 places significant bureaucratic burdens on applicants and has prohibitive procedural timescales with 6 months for a decision on success and then up to a further year for confirmation on the value of the award. Subsequently, NI SMEs find it difficult to dedicate resources to application planning or isolating appropriate partners when the outcome is potential so far removed from their current context. Thus simplification of the mechanisms is an ongoing issue which many feel will be addressed again in FP8.

As, Invest NI's Liaison Officer, Ms Brahmi undertakes networking to spread the word through formal and informal meetings with representatives from other regions to establish synergies and establish existing complementarities. These have been established in areas such as Bremen, Catalonia and Brittany across varying sectors which means that, if a relevant call in these areas, Invest NI will be in a position potentially link NI interests with partners in mainland Europe. In comparing the opportunities for networks in Europe however, Ms Brahmi pointed out the difference between the Republic of Ireland and Northern Ireland in these dealings as, the former as a fully fledged Member State, has different contact points and access to informal links than NI as a region which has to always go through Whitehall does.

Ms Brahmi suggested that NI does face a particular structural challenge as it only has two universities who can apply for funding under FP7. University dominance is due to the logistical challenges and the permanence of the infrastructure therein. It was furthermore suggested that the dominance of Universities in drawing down funding in NI (see Figure 1) is a pattern which is replicated across all EU Member States. However, information presented by Chris North of the Department of Business, Innovation and Skills earlier this year

suggests that the UK is in fact an outlier in this regard based upon EU statistics. (See Figure 2)

Figure 1: Funding received by NI participants through FP7 as of 1 November 2009:¹⁰

Organisation	FP7 Funding Secured	No. of Participants
Companies	€2,346,386	11
Universities	€13,002,483	42
“Other” organisations*	€1,152,458	8
Total	€16,501,327	51

Figure 2: Sectoral Comparison of successful funding applications¹¹

% Participation by Type	Secondary & Higher Education (%)	Private & Commercial (%)	Research Organisations (excl Education) (%)	Public Bodies (%)	Other (%)
UK	60.8	22.5	11.3	3.8	1.6
Germany	34.0	32.7	28.9	3.3	1.2
France	17.1	33.6	42.1	4.6	2.6
Average	38.5	26.5	25.8	6.5	2.7

General

Discussions progressed further into the role of Ministers in Brussels and the Committee was informed that the Minister for The Department of Agriculture and Rural Development has been the only Minister, so far, to attend a Council meeting. Ministers do have a high profile and their presence would open doors. It was suggested further that the opportunities offered by the Barroso Action plan will be limited in time, and that they perhaps should be utilised while the Commission is willing to be receptive.

The Committee asked whether those it was felt that the work of the Office faced a danger of being totally process driven rather than outcome focused and it was agreed that outcomes were difficult to benchmark given the nature of the way politics is undertaken through informal meetings and open ended networking in Brussels.

¹⁰ Department of Enterprise, Trade and Investment, Request from Northern Ireland Assembly Research and Library Services on Funding Received From the Framework Programme 7. Received March 2010

¹¹North, C., Deputy Head of the International Science and Innovation Unit, Department of Business, Innovation and Skills, Presentation to ‘Engaging Business on FP8: Capturing UK business views on the 8th European Framework Programme for Research and Technological Development’ January 2010.
http://www.raeng.org.uk/international/activities/pdf/FP8/Chris_North_presentation.pdf

Stats taken from European Commission, FP7 grant agreements and participants database, released 1 November 2009

6 Meeting with Dr. Mühlen, Blue Tower Plant, Herten, Germany

Background to Renewables in Germany

Dr. Mühlen began the session by discussing the Renewable Energy sector as it stood within Germany at the moment.

Germany is seen as a forerunner in **wind energy**, especially in the North where the energy generated is more than 100% of their requirements in part due to the excess capacity installed there. Dr. Mühlen discussed the problem of off shore wind turbines, which are popular among German politicians, but are difficult to upload into grids without significant amounts of energy being lost in the delivery process. Also, there is a further problem in gaining big investors to undertake the work.

Photo-voltaic (PV) energy is a considerable contributor to Germany's overall renewable energy generation as there are lots of tiny plants across the country. Previously it was German policy to offer substantial subsidies and when the programme began in 2000, it offered index-linked payments of 51 euro cents for every KWh of electricity produced by solar PV. These were guaranteed for 20 years. This is similar to the UK's initial subsidy, of 41p. The solar subsidy was massively greater than the payments for other forms of renewable technology. The guaranteed rate has now been dropped, but PV is, in Dr. Mühlen's opinion, still the most economical and workable option.¹² Conversely, Dr. Mühlen felt that Solar Thermal energy plants had limited potential within Germany, as it would in Northern Ireland due to climate restrictions are attendant economics as these plants tend to be much more industrial in scale than PV.

Biomass & Biogas is one of the most differentiated areas within the Renewable sector in Germany. There are currently 4,500 across Germany and all the larger farmers within Germany own plants which generate green methane for electricity. This market is quite saturated within Germany which, because of further land restrictions and associated costs, therefore larger plants are thought to be impractical at the moment.

The Blue Tower Project

The Blue Tower project in Germany is a pilot 'Waste to Energy' gasification system which handles the disposal of multi-feedstock such as municipal solid waste and sewage sludge with capacity to produce only 1-2 megawatts. The Blue Tower was described as differing from other waste to energy plants in allowing more diverse materials to be used to produce energy. It also attempts to internalise all the energy outputs to achieve very high energy efficiencies.

The Blue Tower differs from traditional wood combustion and gasification processes as the essential factor of all combustion processes is that the combustible is completely oxidized, that means burned and that a lot of heat, as much as possible, is extracted from the flue gas for example in a steam boiler. The heat may either be used directly as heat or indirectly for the electric power production. The flue gas would then be given off to the atmosphere through a chimney after thorough cleaning. Two points may be made concerning combustion:

¹² Alternative positions regarding PV feed-in tariffs and their extension to wind power are articulated in a Report by the Ruhr University entitled 'Economic Impacts from the Promotion of Renewable Energy Technologies: The German Experience' – November 2009
http://repec.rwi-essen.de/files/REP_09_156.pdf

- If only heat is needed, then combustion would be used rather than gasification to convert the biomass.
- Certain type of biomass would not burn properly. These may be still gasified.

The product of this gasification process is a combustible gas which is much more useful than a hot flue gas. This high quality gas is produced in the Blue Tower where steam is used as gasifying agent instead of air or oxygen. The gas, as the Blue Tower's primary output, consists of:¹³

- 50% hydrogen;
- 25% carbon dioxide;
- 20% carbon monoxide; and
- 5% methane.

The Blue Tower product gas has a calorific value (energy value) of 12 - 13 MJ/Nm³ and can be used in conventional gas motors, boilers, turbines etc. to generate electricity. There are mainly four applications of the product gas:

- In a "classic" way as fuel gas for motors, boilers, etc.
- As fuel gas in a gas engine or in a fuel cell for electric power production with high efficiency.
- For hydrogen production.
- As a raw material for synthesis gases.

The by-product Hydrogen can then be used both as a fuel itself (once the technology catches up in for example hydrogen run cars) and also sold on to chemical companies. This is a potential option to assist in the profitability of the Plant once installed, but there are constraints such as transport limitations and legal restrictions on Hydrogen pressures which can be moved around.

The Blue Tower is not the only steam gasifier on the market. However Dr. Mühlen argued the following qualities make it unique:

- It works under atmospheric pressure. There are no big pressure vessels with hot gases inside.
- It is robust and not at all selective with respect to the input material. E.g. fine particles, a big problem for the most air blown gasifiers, can be handled without problems.
- It is efficient and safe: Steam gasification is an endothermic process. Nothing needs to ignite or burn out. The gasification process would run only when heat is provided by the heat carrier.

As it can run on all types and mixtures of biomass this means materials such as leaves, sticks, animal waste (including offal, bones and fur), timber products, used oil, varnish mud and even rubber can be utilised. This allows flexibility on the market, it allows the plant to adapt to shortages and minimises the impact the operation has on local economic markets.

Compared to traditional fuels, the product of the Blue Tower is comparable to a very young coal which is less fixed and stable in its chemistry. Therefore if the biomass is heated within the gasifier it undergoes changes through the thermal destruction of molecules.

Secondary Outputs include:

¹³ These ratios are approximations and can vary depending on input material

- Power
- Flue gases (Blue Tower emissions are cleaner / less than a cars emissions)
- Dust
- Ash (used in fertilizer & construction industry)
- Heat for conversion of further energy
- Heat for producing hot water
- Heat for cooling / cooling water

The biomass which is left over as a solid residue of the process can apparently be disposed of lucratively. The residue can be used as a fertilizer or for phosphate recovery. In single cases even ammonia recovery might be attractive preferably in the form of ammonium salts in a cost effective way.

Dr. Mühlen further discussed the practical challenges the plant faced given German regulations on waste disposal and needs to balance the economic interests. The Committee sought to relate how such a plant would operate within the Northern Irish context given different approaches and financial implications regarding the disposal of waste and the implications which local regulations might have to the profitability of such a plant.

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7 Meeting in Soutlz Geothermal Plant with Xavier Goerke (Chargé d'exploitation)

The plant in Soutlz is the result of 22 years of research and has been a collaborative project between French and German industry, the public sector and various scientific partners. The project remains a largely German and French venture but the European Union is also involved.

The Project Objectives:

- Produce energy and heat within Western Europe
- Utilise unconventional geothermal reservoirs through deep seated fractured granite.
- Examine whether geothermal energy is a long or short term resource and to what extent the underground is cooled through the process of injecting water.

Challenges

- High salinity of the land
- Ensure that the project is as environmentally friendly as possible, in terms of noise and sight as well as structurally.

This project was not without precedence as Paris currently has in excess of 30 geothermal plants to supply district heating and is now used within the German Parliament, the Bundestag also.

Soutlz was initially chosen due to the major vertical fractures which had developed over time. Prospective oil drilling had shown that there was a non-conventional heat distribution also, for example the temperature increased at 50 °C at 500m. Over the course of the research the bore holes have progressively become deeper as researchers sought to reach a depth where water could reach 160-5 °C which would be sufficient, given the technology of the 1990s to generate electricity. The drilling was able to stop at 5,000m where temperatures of 200 °C were attained. In depth research, made possible due to deviating drilling lines, showed that heat distribution was differentiated across depths so whereas the heat could increase by say 20 °C between 1200-1300m, it might increase by 50 °C across 100m at another depth and this was linked to the number of cracks within the underground. These cracks occurred naturally.

The electricity produced from this process can be up to 2.5 MW with a net production of 1.5MW, but this is a small research oriented plant. Others such as those in Basle and Landau are larger and run by private companies. Electricity is not distributed onto the net at the moment as the French feed in tariff is paid on net production at a rate of 12c/KW. This is compared to a German system which pays on all produced electricity at 24c/KW. The French government will increase the rate to 20c/KW, and when these preferential rates come into operation, it will start production in full. The water which is raised around 164°C is used to heat isobutane which subsequently evaporates and helps in the process of creating electricity. New technologies allow for electricity to be produced at 80°C, but at very low efficiency ratios.

However, problems have been raised during development by increased levels of seismic activity related to the geothermal activity taking place. As water was injected at high

pressure the rocks underground have moved and subsequently set in different places and in 2003 this caused an earthquake locally reaching up to 2.9 on the Richter scale. Alternative technologies were pursued which would localise the earthquakes underground so that seismic activity, which can't be resisted, but its externalities on the ground were limited. The solution was identified in the decision to inject a mixture of acids which would naturally become water as it proceeded through the cracks. Similar seismic activity has been reported from similar projects in Landau In August and September 2009, Northern California and Basel, all of which are commercial plants owned by private companies. The Landau site was closed pending inspections and has recently reopened for trial testing but denied a direct correlation between the methods used and the seismic activity.¹⁴

Costs

Costs increase exponentially the deeper that you go and it becomes very difficult to offset those costs. They increase as granite is very heavy and the massive cost and time implications caused by the changing of tools, and attendant difficulties of dealing with problems which occur in very inaccessible places.

The key factors in determining whether there is potential for geothermal energy to be used within a given area are:

- The temperatures which can be attained at which depths – this has cost and efficiency implications. A seismic survey can determine this.
- The level and pressure of water flow. Mr Goerke recommended a level of 120 litres per second. This is significant as it limits the amount of heat which is lost in the transportation back to the surface.

Mr Goerke suggested that it will take 80years for the Soultz project to claw back its costs; but at the same time as a research oriented project, this is not a priority as money was intended at the outset to be an incidental concern. This system, known as Enhanced Geothermal System, was suggested to be much better and more realistic than the alternative hot dry rocks method.

The committee asked about the risks of natural radioactivity, linked to radon. Mr Goerke suggested that all radioactive particles were collected and analysed and hadn't so far posed a major risk. He also suggested that if natural radioactivity is a pressing issue in NI its impact in a geothermal plant could be minimised through proper ventilation.

¹⁴ BINE Information Service, 2007 Geothermal Electricity Generation in Landau
http://www.bine.info/fileadmin/content/Publikationen/Englische_Infos/projekt_1407_engl_internetx.pdf