Energy Policy Dialogues in the Baltic Sea Region

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Energy Policy Dialogues in the Baltic Sea Region

Do we face a failed debate on energy policy in the Baltic Sea region?

Riga: Nuclear – Energy - out?

Tallinn: Bio – Energies - in?

Editors

Elmar Römpczyk & Ahto Oja

Riga-Tallinn

2008

Content

Introduction

To find a comprehensive answer to such a controversial question, the Friedrich Ebert Foundation in the Baltic States initiated the first of a series of Energy Policy Dialogues in autumn 2006. In cooperation with the Latvian "green NGOs" (Latvian Green Movement and Latvian WWF in cooperation with the Riga Graduate School of Law) we invited government representatives, policy advisors, researchers, private business, EU representatives and NGOs to a two-day conference under the heading of *Energy security beyond Ignalina – Baltic Sea Region*. Right from the start we reached out to the Scandinavian countries as well as to other Baltic rim countries like Poland and Germany. We also welcomed participants from the Czech Republic, from Hungary and even from Ukraine. The venue for each dialogue moves to another host country and the topics change for each event. While the first dialogue picked up the burning and controversial question of whether to continue with nuclear energy under safety, cost-efficiency and sustainability criteria, the second dialogue in Tallinn focused on bio-energies and the various planning and implementation lessons learnt from the same range of Baltic Sea countries. Because of its own political interest in the matter, the Estonian government (Ministry of Agriculture) shared the responsibility for this second energy policy dialogue under the heading of Stakeholders' experiences on implementing national bio-energy strategies. The following are the key issues in energy discussions:

- Energy policy is a key element in our European development strategy and is decisive for meeting the Lisbon targets but it is not the only element to advance, others include social justice and democratic transparency.
- Key partners in the EU´s energy strategy are suppliers like Russia, Kazakhstan, some OPEC countries and very much the EU-member states themselves. The rest of the world is a competitor.
- Energy efficiency and saving awareness are decisive in order to match the Lisbon ambitions of a sustainable Europe in the future.
- Non-efficiency will increase climate change, lead to even more social injustice in our societies and provoke an even greater disposition to fight for energy globally.
- Up to now we are facing mostly contradictory reactions to these demands from inside the EU-27 as well as from the heterogeneous sub-region around the Baltic Sea.
- The biggest challenge of all seems to be the drastic increase of transport facilities, mainly for civil and military aviation.

This present publication summarises the main experiences and projections which were presented and intensively discussed during the first two dialogues and which resulted in a resolution agreed by all participants demanding the urgent commitment of governments and society to support sustainable energy policy on a national and international level. The agenda and list of participants of Dialogue No.1 in Riga is presented in Annexes 1 and 2.

The next energy policy dialogues will follow soon in 2008 and will focus on energy efficiency, transport systems and cooperation of state, civil society and the private sector.

1. Context of the Energy Policy Dialogues

Elmar Römpczyk [1]

The Baltic Sea Region is exposed to three big challenges concerning its energy policy and must try to position itself somehow:

- The global competition in energy security, i.e. the "fight" for energy that has already started between the global players China, USA, Europe, Brazil, India.
- The EU-competition among its own member states and in the light of the mighty oligopoly of energy trans-national corporations (TNC) like E.ON or RWE or EdF.
- The national development strategies, sometimes based on a tripartite dialogue between state, private suppliers and civil society (but mostly not), where energy security has to be one of the strategic components.

At a global level, the last UN summit on climate protection in May 2007 in New York failed dramatically and, consequently, was not approved by Germany or the EU. It was directed completely against European intentions and therefore not signed. The IPPC scenarios for climate change[2] are presented in Figure 1.

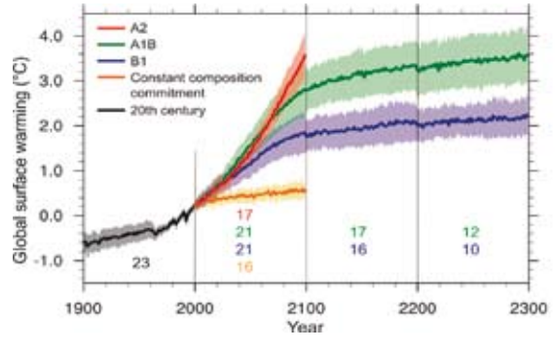


Figure 1. The IPCC scenarios for climate changes in the 21st century.

How hot is it going to get? The black line at the left in Figure 1 shows the 20th century global warming. The coloured solid lines show where the temperature might go using different models -- shading indicates error ranges. Bars at the right show best estimates (solid lines) with the grey showing the likely range.

At the EU level, we advanced recently, somehow, with the initiative for more energy efficiency (including CO_2 reduction for modern cars); and with an energy strategy that includes a bigger

[1] Dr. Elmar Römpczyk is representative of the Friedrich Ebert Foundation in the three Baltic States since 2004.

[2] Taken from: *WMO/UNEP: Intergovernmental Panel on Climate Change: IPCC 4th Assessment Report on Climate Change 2007, Summary for policymakers, Paris Feb. 2007 http://www.ipcc.ch/graphics/gr-ar4-wg1.htm.*

focus on bio-energies. The target is to increase electricity production from renewables up to 22,1 % in 2010; and to cover 12 % of all EU energy consumption through renewables until 2010. Political reality in our region is still far from complying with these EU targets.

And yet: the energy issue is only one of several strategic elements of a kind of challenges pyramid for survival (Figure 2), where the order of the elements and upside-downside can be modified, but hardly the comprehensive characters of the challenges.

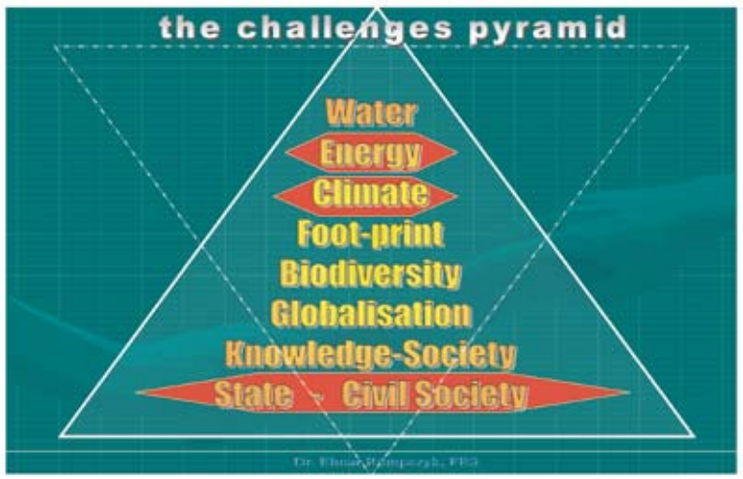


Figure 2. Strategic elements of a kind of challenges pyramid for survival.

The comprehensive attention we pay to life elements like water and energy and to their effects on climate and biodiversity is decisive for societies´ survival; our acceptance of an adequate footprint dimension and democratic relations between state and society and the will to live in knowledge societies determines what kind of future we are facing.

The particular political and economic alarm clock on climate is the *Stern Review on the Economics of Climate Change.*[3] There the authors summarise that economists describe human-induced climate change as an 'externality' and the global climate as a 'public good'. Those who create greenhouse-gas emissions as they generate electricity, power their factories, flare off gases, cut down forests, fly in planes, heat their homes or drive their cars still pay but in factions for the costs of the climate change that results from their contribution to the accumulation of those gases in the atmosphere.

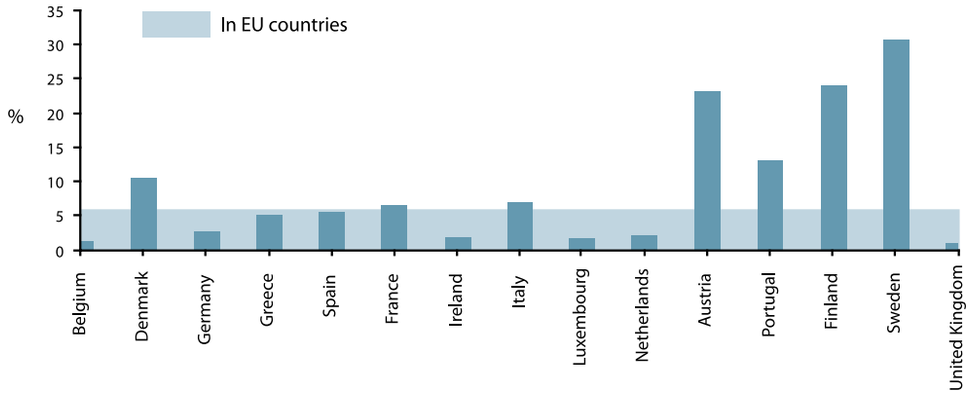
But climate change has a number of features which altogether distinguish it from other externalities. It is global in its causes and consequences; the impacts of climate change

[3] The Review set out to provide a report to the British Prime Minister and Chancellor by Autumn 2006.

are persistent and develop over the long run; there are uncertainties that prevent precise quantification of the economic impacts; and there is a serious risk of major, irreversible change with non-marginal economic effects.

This analysis leads the Stern team to *five major questions:*

- What is the understanding of the risks of the impacts from climate change, their costs, and on whom they fall?
- What are the options for reducing greenhouse-gas emissions, and what do they cost? What does this mean for the economics of the choice of paths to stabilisation for the world? What are the economic opportunities generated by action on reducing emissions and adopting new technologies e.g renewable energy sources (Figure 3)?
- For mitigation of climate change, what kind of incentive structures and policies will be most effective, efficient and equitable? What are the implications for public finances?
- For adaptation, what approaches are appropriate and how should they be financed?
- How can approaches to both mitigation and adaptation work at an international level?



* Renewable energy includes hydroelectricity, biomass, wind, solar , tidal and geothermal energy
Source: Eurostat

Figure 3. Share of renewable* energy sources in gross inland consumption of selected EU countries at 2000.

1.1 View from the Baltic States in the EU context

There is a bigger problem which lies with Europe. The EU does not have a unified energy policy, instead the EU has its energy dialogue with Russia. Germany, the UK and Finland have their own dialogues and so on. There are too many actors on the scene. The European Commission is trying to play a more coordinating role focusing on security of supplies, sustainability and market competitiveness. But not all members agree on that and, therefore, there has been a lack of

strategic thinking and agreement on what kind of dependency the EU can afford and what alternatives must be looked at (alternative suppliers, our own alternative sources). Still in 2000, the EU-15 was saying "we will just get this stuff from Russia". That was too shortsighted even 7 years ago. Only in the last couple of years has the EU started to seriously think of alternative solutions because we now feel coerced. Now the EU is in a complicated situation with Russia as was already seen during the preparations for the EU-Russia summit in Samara in May 2007, during the G8 summit in Moscow in 2007 and ever since. In the Baltic States, Russia's own view of its energy-relations with the EU or with various EU member states is received with contradictory feelings. Russia pretends to focus on its own economic development. It wants to use energy exports for solving pressing long-term tasks, to become a major player and a prosperous country. Europe could help Russia with skills and investment. It is a tradition of the nineties to look at Russia simply as an energy supplier, but it would be better for both sides to have a broader perspective and develop large-scale cooperation. Europe needs energy, no doubt, but it also needs markets for its knowledge. Russia has energy to sell, but needs more diversified cooperation with Europe. Europe and Russia must face a common future as strategic partners – also beyond energy.

The Baltic States know from their own experience how quickly Russian gas supply is turned off as part of political conditioning. Finland was hesitant to let the Nord Stream gas pipe pass through its waters; Estonia objects to it. So, Moscow blocks the oil trains to Estonia as easily as it cancels over-flight rights to Germany's Lufthansa to improve Aeroflot's competitiveness. The Balts also observe with suspicion the accelerated acquisition campaigns of Lukoil, Rosneft and Gazprom in the region. Energy policy within the Baltic countries at the same time is very much linked to bribery, corruption and oligopolistic market control with non-transparent Russian commitment.

Besides, in the Baltic States and partly in Finland and Sweden, environmental concerns are emerging over energy transit increase through the Baltic Sea and the re-nationalization of energy mix and diverse energy supply has already started.

1.2 National and sub-regional perceptions of energy policy in the Baltic Region

1.2.1 Basis for Sustainability in Energy Policy

The following mind map reflects part of the tremendous complexity which should provide a kind of backbone to all our energy policy debates among the Baltic Sea States. It marks the intended balancing of the supply-side with the demand-side; the cost and efficiency; but also the daily increasing need for politically farsighted concepts and it contains the strategic elements of national and international security policy – in its double sense: ensuring national supply and avoiding conflicts for energy security. Even the conservative EU commissioners' majority favours a strict increase of all kinds of renewable energies for Europe's own sake and in order to increase its legitimacy among other big players on the world market.

This mind map (Figure 4) looks at the Baltic states from two complementary angles: Global Rationality / Liberal Market Economy (one) and Global Security / Climate with Natural

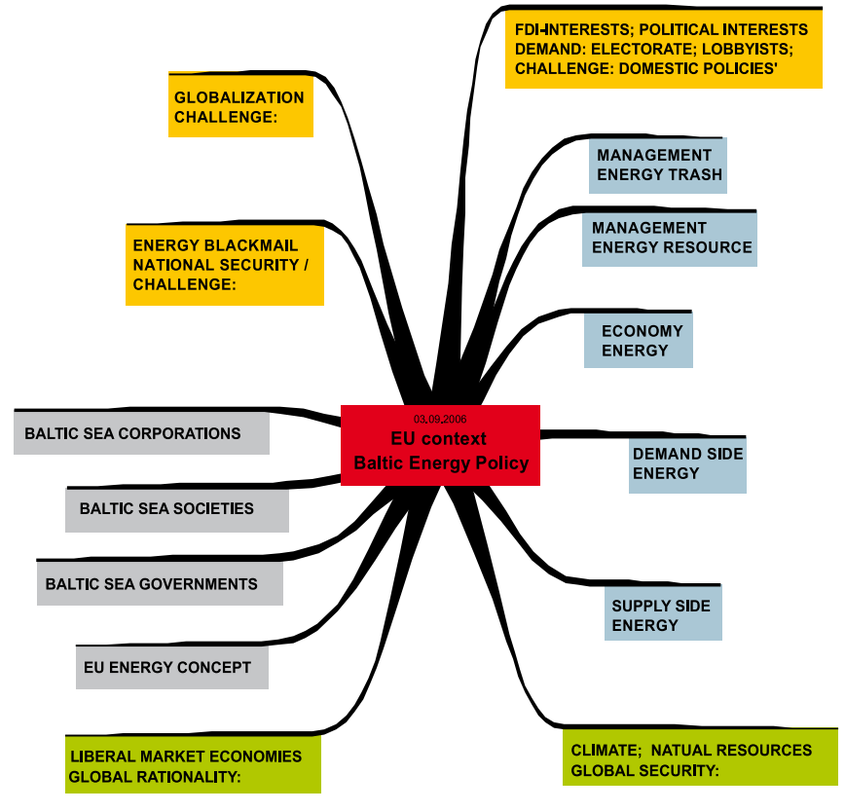


Figure 4. Baltic Energy Policy in EU context by Römpczyk.

Resource Management (two). Both sides must match, like Baltic Sea Governments on the left with Energy Supply Side and Energy Demand Side on the right – and also with Energy Economy and Energy Trash Management on the right. Complexity increases when Baltic Sea Governments and Baltic Sea Societies (both on the left) have to agree on Energy Supply and Energy Economy and Energy Resource Management (all on the right). Experience with political, economic and social management of such complexity is still at quite a low level in the former Soviet republics. Above all, the will and understanding for cooperation among state authorities, civil society and business needs one more generation to be effective.

1.2.2 Under democratic conditions society must participate in defining energy demand and energy supply strategies

When we reduce this quite complex mind map of energy policy to a more pragmatic and manageable level, then we can name **three major reference points on the demand side** as being of immediate importance for the Baltic people:

A electricity
B heating
C transport / communication.

Whereas policy and business have **three political reference areas**,

a local
b national
c international / global;

And all decision makers and social actors in society, politics and business alike should be guided by **two fundamentals**,

(1) efficiency
(2) de-acceleration

Common understanding is missing on these two reference points (1) and (2) in the Baltic Region. There cannot be, because the political history and political culture of the states as former Soviet Republics on the one side and as new neo-liberal capitalist countries on the other side are completely opposite. To mitigate these contradictions the transition process was too short and too exclusively based on "buying" the ex-Soviet Republics into the North-Atlantic community and, after that, on filling them up with EU funds.

Besides, the Baltic Sea Region and particularly the Baltic States suffer from an undefined EU foreign policy towards Russia, including an undefined energy policy. In consequence, Russia´s very active and even coercive penetration of the Baltic energy supply market meets much less resistance than is good for EU energy security.

Society and state should therefore be encouraged to sit together with supply-side business to debate at least **seven bigger challenges for energy policy** in order to match them with the wider range of the challenges pyramid shown above:

1 Energy policy must set clear conditions for how and when the use of NUCLEAR power plants (NPP) should come to an end.
2 Energy policy must lead out of OIL dependency.
3 Energy policy must avoid any other, new monopolistic dependency as on, for example, Gazprom or Ahmadinejad (GAS, OIL).
4 Energy policy must decrease CO_2-output because we are already living the climate change.
5 Energy policy should promote the sustainable use of European primary energy, like modern CO_2-free COAL transformation.
6 Energy policy must promote effective use of bio- and geothermal RENEWABLES and sea-tide energy
7 Energy policy must favour a system for environmental and economic accounting which also values ENERGY SAVING and energy efficient production and consumption processes as ***the* strategic energy source in both Eastern and Western countries.**

1.2.3 Actual situation in the Baltic States

The Baltic States can be identified both by a high potential of energy disposal and by high level discrepancy over energy policy. Decisive in both scenarios are tripartite energy dialogue between society-state-business and the implementation or not of Sustainable Development Governance.

a) Intra-regional potential

The EU Commission opened the debate on a future common **European Energy Policy** with the publication of a "Green Paper" in March 2006. Suggestions include completing the opening of European gas and electricity markets and stepping up relations with major suppliers such as Russia and OPEC. Other key suggestions include boosting renewable energies, energy efficiency, and research on low-carbon technologies. However, **EU member states** have already made clear that they will not tolerate interference with national sovereignty, especially when it comes to taking sensitive political decisions such as opting for nuclear power. For none of these have the Baltic governments invited their civil society to participate in the respective fact finding, planning or monitoring processes. So, democratic instruments are still hardly applied. Instead:

- **The Lithuania-Poland** power bridge, which is based on Nuclear Power Plants and on gas system merger projects, will lay down an essential foundation for the integration of the Lithuanian and other Baltic energy systems into the EU grid and would significantly contribute to strengthening the EU energy market.
- At the start of the year 2007 a **350 megawatt Estonian-Finnish power cable** went into operation through which power companies of the Baltic countries are exporting electricity to the Nordic market.
- The **Russian *Baltenergo*** company has presented the project idea of building a 1,000 megawatt undersea cable through which approximately nine billion kilowatt-hours of electricity could be supplied annually. The project was presented first to Finland then to Estonia. Finland first rejected then accepted it. Estonia never felt much inclined to accept this

or other Russian energy transport systems through its territory and this position became more entrenched after the street riots in Tallinn in late April 2007 when the Russian "bronze soldier monument" was moved out of Tallinn centre.

- A consortium of Russian state-owned nuclear operator *RosEnergoAtom* plus private investors plan an under-sea 1.000 MW power cable between Sosnovy Bor on the southern shores of the Gulf of Finland to the peninsula of Mussalo near Kotka in **Finland**. By this the energy transfer from Russia to Finland will increase by 64%.
- Concerning this project, the Russian companies argue that they act out of purely commercial motives. But, in energy, politics is never far away. Vladimir Milov, president of the independent Moscow-based Institute of Energy Policy, says: "In Russia the energy empire is largely viewed as geopolitical revenge."
- *BaltEnergo* confirms this. The company is owned by the Russian state-owned nuclear power operator *RosEnergoAtom* plus a group of private investors.
- Not only is there debate over the likely increase in political dependence, but also over the reduced environmental safety in the Baltic part of Russia corresponding to the prolonged operation of old and unsafe Russian nuclear reactors.

b) Intra-regional discrepancies

Russia actively fuels regional discrepencies through its 'big stick' energy policy. Partly these discrepancies relate to the oil and gas supply through old Soviet pipelines and partly linked to nuclear power generation.

- **Russian oil-based initiatives in Lithuania: Mazeikiu**

  Mazeikiu´s tortuous history suggests nothing should be taken for granted. Russian companies have long wanted the plant which was built to run on Russian crude oil. However, when Vilnius first privatised Mazeikiu in 1999 it sought a non-Russian buyer to reduce Moscow's influence in Lithuania and sold a strategic stake to Williams, a medium-sized US group.

  First Williams Group ran into trouble and sold its part to Yukos. Then Yukos ran into (political) trouble and prepared to sell its remaining assets, including Mazeikiu. Vilnius feared Rosneft, the state-controlled Russian oil group, might take advantage of the turmoil to win Mazeikiu, and seized the chance to sell it to ORLEN. However, after the deal was announced, an accident on Russia's Druzhba pipeline cut Mazeikiu´s supply line, forcing it to import oil at higher cost by train and sea, at least until Druzhba re-opened in 2006. That setback was followed by a fire soon afterwards that halved Mazeikiu´s capacity and slashed profits. Such "coincidences" would be better responded to by the EU than by a single, small country.

- **The big question mark behind *nuclear energy generation***

  Nuclear energy is responsible for 32 percent of electricity produced in the EU. Some EU member states, like France and Slovakia, have demanded "recognizing that nuclear energy is a valuable tool in cutting down volumes of CO_2 emissions" and entering this provision into the appropriate document. In the meantime, Austria, Ireland, Greece and Portugal have been urging the minimization of the role of nuclear power plants discussed in the draft document.

The Lithuanian MEP Maldeikis, a nuclear energy supporter in the EP, criticizes the European Commission for continuously ignoring nuclear energy. In the MEP's opinion, Brussels should prepare a strategic nuclear vision like the one for renewable energy production. "The EU holds a strong position in this sector and we should not yield to other players, such as the US or China," the MEP says.

- **Lithuania** and **Poland** signed a political agreement in Warsaw on March 2, 2007 to cooperate in the energy sector, including the construction of a new nuclear power plant on Lithuanian territory. So, nuclear energy is a decisive element in this agreement under political, economic and social criteria, because:

  1. Lithuania, **Latvia** and **Estonia** reached a political agreement to build a nuclear power plant at the beginning of 2006 ("energy road map"), without any kind of public debate.

  2. Poland later proposed the second new nuclear plant in Ignalina with higher Polish contributions. Tensions arose when Lithuanian officials explained that Lithuania will seek a 34 percent stake in the joint venture. The other three partners in the project, Latvia, Estonia and Poland, would then each hold 22 percent of the shares. **Estonia**, which had been the most skeptical towards Poland's participation, has recently agreed to bringing the Poles on board.

a. The discrepancy between state and society in energy policy and in sustainable development governance is clearly seen when we understand that all these initiatives are decided and brought forward unilaterally by Lithuanian government. Civil society is not invited, neither debating the new nuclear power plants of "Ignalina III" nor alternatives as, for example, in Sweden (bio-energies plus saving). Disagreement with the Lithuanian nuclear initiative is also reflected on political levels in Estonia as well as among the Scandinavian parliaments and governments: *The Environment Committees of the Nordic Council and the Baltic Assembly met in Daugavpils in Latvia in 26 January 2007. The Chair of the Baltic Environment Committee, Indulis Emsis, said that nuclear power was a form of energy which belonged to the past. Emsis, a former Prime Minister, also mentioned the risk of terror attacks on nuclear power plants.*

   The Nordic politicians were also skeptical about the plans for a new nuclear power plant. The Danish MP, Kristin Touborg Jensen, reminded the meeting about the EU's recent energy strategy which includes an emphasis on alternative forms of energy. (Press release, Vilnius, 29 January 2007)

- And there is more disagreement than only that between the Balts and the Scandinavians. Aigars Stokenbergs, Latvia's former regional affairs minister (until Oct.2007), had no problem with the actual penetration strategy of Russian energy policy in the region. For him – in contrast to the Lithuanian and Estonian governments - the state-owned Russian companies "act on good commercial reasons. Oil producers are interested in integration. This is normal," he said. His Scandinavian colleagues and some of the Latvian parliament of course did not share his views.

c) Allies for political decision making in context:

European parliamentarians are forced to decide upon the final aims of the new European energy policy and if the energy-mix proposed by the Energy Commissioner (Piebalgs from Latvia) is the most appropriate for the EU as a whole, or for the individual EU member countries or sub-regions (like BSR) or even for globally balanced interests.

Parliamentarians today can count on European support of different kinds and different intensities. To react in reconciliation with the *challenges pyramid* I would like to mention just 4 potential allies:

Science

One important scientific aid for any European parliamentarian was commissioned by Tony Blair´s Labour government and published as the **Stern-Review on the economic cost of not changing our actual energy-policy drastically (**Stern Review: The Economics of Climate Change, London 2006)**.** From its scientific perspectives, the evidence gathered by the Review leads to a simple conclusion: the benefits of strong, early action considerably outweigh the costs.

The evidence shows that the acute climate change process is provoked by man-made energy transformation and overuse of non-renewables. Ignoring climate change will eventually damage economic growth. Our actions over the coming few decades could create risks of major disruption to economic and social activity, later in this century and in the next, on a scale similar to those associated with the great wars and the economic depression of the first half of last century. And it will be difficult or impossible to reverse these changes. Tackling climate change is a pro-growth strategy for the longer term and it can be done in a way that does not cap the aspirations for growth of rich or poor countries. The earlier effective action is taken, the less costly it will be.

At the same time, given that climate change is happening, measures to help people adapt to it are essential.

Private business

There is a technological comment from the side of the oil industry which says: biodiesel is not a high quality fuel. There is also an argument from the food supply side that points to the competition of rapeseed with food grain and brings into question the legitimacy of biodiesel and vegetable fuel oils.

The Shell Company accepts both these arguments and pursues a second generation of bio-fuels based on what is up to now left as green garbage on the farms. By doing so, they take up the hundred-year-old proposal of Rudolf Diesel, Henry Ford and others to use alcohol for fuel.

In **Shell's study "Energy Needs, Choices and Possibilities – Scenarios to 2050"**, they underline an important role for natural gas, namely as a transient fuel for the next two decades. The same study also predicts a remarkable growth in renewables with the long-term projection that renewables could become *the* strategic energy source.

It seems somehow surprising that even some big oil companies are getting significantly more sensible concerning the environmental, climatic and social impacts of badly organized energy policy. One case in point is the **Norwegian oil company Statkraft**, which publicly presents its business principles as ***Environmental responsibility: nature at work.*** **Statkraft's strategy and business principles are to:**

- Supply energy based on renewable energy sources and natural gas, and invest in energy businesses that have the potential to enhance environmental performance;
- Play an active role in international markets for green certificates and quotas, helping to reduce GHG emissions;
- Strive to improve technology and processes to benefit the environment and contribute to efficient energy use, even where involvement is restricted to a financial interest;
- Limit environmental impact;
- Consider biodiversity, climate change and pollution when making decisions that may affect the environment;
- Offer customers products that contribute to sustainable energy consumption, at competitive prices;
- Communicate the environmental consequences of business activities in an open and honest manner, and take initiative to engage in a dialogue with stakeholders; and
- Ensure employees whose day-to-day activities may affect the environment process a high level of environmental competence.

Global finance capital

One of the bigger European banks, **Deutsche Bank**, also shows growing awareness and concern for energy and climate issues. One of the areas of major investigation by the Bank are bio-energies and, in particular, the renovation of outdated heating systems such as we find in the Baltic States. While Deutsche Bank promotes higher efficiency in heating systems (wood), lessons which are of great political interest have also been learnt from the German "Green Capital" of Freiburg.

The success story of Freiburg is comprehensive in the social sense, in economic terms, in state-of-the-art technology and environmentally. The city's energy mix policy is based upon:

a) strict rejection of nuclear power by the authorities and all the inhabitants for decades, and instead

b) self-generated energy fed into the public grid from the private houses' roofs (solar-houses); plus

c) energy saving through well organized public transport systems and drastic reductions in individual car-riding; plus

d) implementation of end-of-the-pipe technologies like Combined Heat and Power units (CHP) with efficiency ratios of over 90%; heat-pumps; energy-saving construction methods for factories and private houses.

CHP makes the difference

In contrast to the huge common power plants, where on average 2/3 of the primary energy gets lost and heats the atmosphere, the CHP is a heater and power plant in one and can be installed in a private house or in big apartment blocks or for a whole city district. About ¾ of the transformed energy of a CHP provides heating and warm water and the rest is electrical power. A one-family house needs a CHP which provides 5 kilowatts of electrical power. Most of these CHP units are not bigger than a freezer.

Civil society

The positive lesssons:

The Freiburg's lessons underscore the political importance of including the citizens and, in general, civil society in the reorientation of our European energy policy. It is not enough for a government to publish its "Energy Action Plan", which hardly any citizen in the Baltic States believes, knowing all too well that reality is defined by bribery and high-level corruption.

The negative lessons:

The G 8 summit in the tiny Baltic seaport of Heiligendamm near Rostock also left some open questions of how a democratic European government should try to provide political dialogue on issues of national and global interest with emphasis on international energy policy.

The political challenge for the German G 8 Presidency was and is to close the gap between state rulers and societies, at least in Europe, and pave the way for **modern social justice** and **sustainable development** of the European Community.

The German Minister of the Interior was more interested in presenting the German state's guarantee of law and order for the working meeting of the G8 representatives than in showing Germany's capacity to organize political dialogue with a protesting and well-organized civil society.

The protests in Heiligendamm amongst others were against the spending of nearly **750 billion dollars for a war** in Afghanistan and Iraq which President Bush actually continues to organize. And this war – as we all know – has very much to do with a misunderstanding of energy security for the USA.

Europe, instead, must organize the big battle against the terror of Carbon Dioxide where the tremendous destructive effects are clearly seen in the melting arctic ice shelf and the European hurricanes like Kyrill which will probably result in the dramatic reduction of fruit and berry harvests in the European Union countries and so directly affect the lower social strata by increasing the cost of living. This battle against overuse of non-renewable energies cannot be won against the people and it must also be a battle that increases social justice and democratic relations among the actors.

2. Contributions to Energy Policy Dialogue No. 1

2.1 Energy security beyond Ignalina Energy Policy Dialogue I –

Anthony Froggatt [4]

A crucial period for the development of the European Energy sector was in 2006, as the EU grappled with the possibility of the introduction, for the first time, of a common EU energy policy.

In March 2006 the European Commission released its Green Paper on Energy Policy which was discussed at the Spring 2006 Summit. As a result of these discussions and other self-initiated developments, the Commission has proposed a comprehensive series of measures for the energy sector, many of which are outlined below. In addition to these policy developments the energy infrastructure in Europe will require massive investment to both meet, under business as usual scenarios, the expected increase in demand and to replace aging generating and transportation facilities (grids and pipelines). This new investment will determine the direction and sustainability of the sector for a generation. It is therefore all the more important that any new policy developments in the EU are directed to the implementation of an environmentally sustainable energy policy.

2.1.1 Strategic Energy Review

The European Commission published a Strategic Energy Review on January 10 2007. This compares and contrasts different energy options as they relate to security of supply, competition and environmental sustainability – the three pillars of EU energy policy. The Green Paper[5] states that 'this would need to be developed on the basis of a thorough impact assessment and provide a benchmark on the basis of which the EU's developing energy mix could be judged. The assessment on environmental sustainability must look at a number of issues and not be restricted to CO_2 emissions. While undoubtedly urgent action is needed to reduce CO_2 emissions to alleviate some of the consequences of climate change, this is not the only pressing environmental problem associated with the energy sector. The other major environmental issues facing the energy sector, the threats from nuclear technology, e.g. the risk of an accident, the ongoing discharges of radioactive material from nuclear facilities, the dangers of the proliferation of nuclear material and the unsolved problems of long-term management of nuclear waste, must be factored into any environmental debate on energy choices.

In the context of the Strategic Energy Review, the European Commission proposed specific legislation or position papers for different technologies – a so-called 'energy package'. The following sections introduce the content of it.

[4] Sustainable energy expert

[5] Green Paper. A European Strategy for Sustainable, Competitive and Secure Energy, Brussels March 8 2006, COM(2006) 105 final.

2.1.2 Renewable Energy

The 2004 Communication on Renewable Energy (European Commission 2004), stated that the Commission would 'set in 2007 a [renewable energy] target for the period after 2010'. This objective will be met through the publication of a road map for renewables, which is expected to put forward in January 2007, targets for primary energy production for 2020 and possibly 2030. In addition the Commission will publish a report for a proposal on heating and cooling from renewable energy. Long-term binding targets give confidence to: investors; developers; financiers; and utilities, and enable secure markets for renewable energy to be established. In 2005 the European Parliament's industry committee called on the Commission to set a 20% binding target for renewables in total energy consumption by 2020 (European Parliament 2005). This target must be adopted by the Commission in its roadmap.

2.1.3 "Clean" Coal

Many believe that the use of coal will continue and even increase in the future energy mix. However, according to Commissioner Piebalgs, 'coal use must be accompanied by a reduced environmental impact, which means lower emissions'. The Commission is strongly advocating the use of carbon capture and storage as a possible route to lower emissions and will part fund its development in the 7th Framework Programme. In January 2007 the European Commission will produce a Communication on Clean Coal which will look at new clean coal policies and evaluate how investments in new technologies can be best facilitated through policy measures, and what can be done to ensure effective penetration of clean coal technologies in Europe and abroad. Carbon capture and storage are technologies which support the continuation of large scale and centralised energy systems. Similar to nuclear fusion, it is untried, has significant negative potential environmental consequences and is unlikely to be economic compared to other, already available, carbon-free technologies.

2.1.4 Nuclear

The Commission published a report on the status of nuclear power in Europe in 2007, the so-called PINC paper (Illustrative Nuclear Programme for the Community). Under Article 40 of the Euratom Treaty, the Commission shall publish the PINC paper *'In order to stimulate action by persons and undertakings and to facilitate coordinated development of their investment in the nuclear field'*. The last PINC paper was published in 1997. The Commission has stated that *'we must keep the choice of the nuclear option open for the countries which want to generate or consume nuclear electricity'* and that *'we know that without public acceptance there is no future for nuclear energy'*[6]. *The PINC paper is part of the Commissions attempt – mentioned in the Green Paper – to provide information to the public on nuclear issues. In part due to the Euratom Treaty, the European Institutions have historically and continue today to unjustifiably support the nuclear sector, to the detriment of other energy technologies. Nuclear technologies are not subject to the same competition laws as other technologies; they continue to receive the majority of the EU's research and development funding and nuclear power is subject to less public scrutiny than any other energy sector – as the European Parliament does not have co-decision on most nuclear issues. This has resulted in considerable EU financial and political support towards nuclear technologies which have enabled them to survive despite their environmental and economic disadvantages. Historically the PINC paper has been used as a tool to further promote nuclear power in the EU.*

2.1.5 Energy Efficiency

The Commission published its long-awaited energy efficiency action plan in 2006. This proposed actions in four main areas:

- Implementation of existing Community energy efficiency directives and regulations;
- Promoting energy behavioural changes through public awareness, education and training;
- Improving financial instruments for energy efficiency and;
- Promoting energy efficiency globally in trade and development policy and international agreements.

While action in these areas is welcomed, it is not sufficient in an area which has been described by the Commission as the 'priority of priorities'. Specifically, binding targets should be set that lead to a reduction in the overall energy consumption in member states, through incrementally increasing binding targets for energy efficiency. Action can and must be taken at both the supply and demand side of energy use – contrary to the Commission's statement that little action can be taken on the supply side[7]. The introduction of modern distributed generation can significantly improve the efficiency of the whole energy sector and must therefore be given priority.

The European Council discussed the findings of the Commission's Strategic Energy Review and adopted an Action Plan on a common Energy Policy in 2006. This gave an opportunity for member states to comment and deliver a joint opinion on the various initiatives being put forward by the Commission since the Green Paper. The Commission published its draft conclusions on the energy competition inquiry, which concluded that there were five main areas posing problems for the energy market. These were:

- Market Concentration
- Lack of access to the market for new entrants
- Lack of market integration
- Lack of transparency
- Price Formulation

The major issue identified is problems associated with market concentration, whereby a small number of utilities are gaining market power across Europe, reducing competition and creating opportunities to exert unreasonable market power. In May the Commission launched a series

[6] Speech by A*ndris Piebalgs - Energy Commissioner. What are the EU energy challenges? Spe*ech at the conference "Offshore Northern Seas Conference 2006" Norway, 23 August 2006.

[7] European Commission, Speech by Andris Piebalgs - Energy Commissioner, at the Conference „Future EU Energy Mix - will coal play an important role?" Gliwice, Poland. 29 May 2006.

of unannounced inspections at the premises of major power utilities in Austria, Belgium, France, Germany and Italy on suspicion of anti-trust practices, which must result in clear and binding requirements for companies to allow equal and transparent access to the grids for all companies and protect companies and consumers from the dominance of the large utilities. The Commission has suggested that it will decide after this review whether or not to propose a third package of energy market liberalisation legislation.

2.1.6 The Baltic States and Europe's Energy Policy

The pre-enlargement strategies for the Baltic States – and other 2004 new member states – were supposed to result in the harmonisation of the sector's laws and, to some degree, practices. While this has resulted in the transposition of EU regulations and directives into national laws it has not resulted in the harmonisation of the energy sectors and there are a number of important differences that remain. As the EU seeks to further align its energy sector, with potentially further energy market rules and even streamlining the energy policies in different member states, the new member states must attempt to exert their influence to ensure that their voices are heard in this all too important debate.

2.1.7 Significant Differences Between EU and Baltic States Energy Sectors.

Competition:

Estonia, Latvia and Lithuania have adopted the electricity and gas market directives. However, this has not resulted in as much competition between energy suppliers as occurs in other member states. Currently, in Estonia and Latvia there is only one utility company producing or supplying more than 5% of either countries' electricity: Latvenergo is 100% state-owned and Eesti Energia is also 100% state-owned. Lithuania has more competition, with 3 companies supplying more than 5% of electricity. Lietuvos Energija (Lithuanian Energy), a joint-stock company was formed by the reorganisation of the Lithuanian state power system in 1995 and is the largest electric power company in Lithuania. The Government holds an 86.5% share in the company, with the Swedish utility Vattenfall owning an additional 10.1%. A similar level of competition exists in the Gas sector with Estonia and Latvia also having just one company supplying more than 5%, while in Lithuania there are 4 companies, however, ownership of the main companies is more diverse than in the electricity sector.

In Estonia, Eesti Gaas is owned mainly by Gazprom (37.0 per cent), Fortum (17.7 per cent), E.ON Ruhrgas (34.7 per cent) and Itera Latvija (9.7 per cent). In Latvia, Latvijas Gaze is owned by Gazprom 34 per cent, E.ON Ruhrgas AG has a 48 per cent stake and Itera Latvia currently possesses 16 per cent. Lietuvos Dujos is Lithuania's largest gas importer and Gazprom bought a 37 per cent stake in this company from the government in 2004. The other owners are E.ON (39 per cent) and the Lithuanian state 17 per cent. Part of the deal was that Gazprom would supply 90 per cent of Lithuania's gas up to 2015 at prices indexed to oil. As can be seen, two companies, E.ON and Gazprom are dominant in all countries. The lack of competition makes consumer choice – one of the stated drivers of market liberalization – almost impossible. According to the 2002 energy market directive all member states are supposed to allow full competition – and therefore individual consumers to switch their suppliers – as of mid 2007 – although Estonia has derogation until 2012. However, an important part of enabling consumers to change supplier is that they are given adequate information about their electricity supplier. According to the 2005 EU benchmarking report, none of the Baltic States have transposed the relevant legislation on energy labelling into national law.

Energy prices remain below that of the EU average - in Estonia and Latvia, around 50% of the EU average and in Lithuania around 66%. However, in all three countries the energy bills for household consumers represent around 2% of monthly outgoings, which is around double the average in the EU 15.

Over Capacity:

Another key difference between the EU 15 and new member states in Central and Eastern Europe is the level of overcapacity of electricity generation. On average in the EU15 there is around 28% over capacity. This level is necessary for back-up generation and to enable refurbishment and refuelling of stations. However, in the CEE countries the average is still around 44%. Of the Baltic States, Estonia has 32%, Latvia 50% and Lithuania around 56%. In total, the installed capacity of the three States is 7.4 GW, with a peak demand of 4.8 GW – therefore there is an excess of 2.6 GW. In 2004, Ignalina's installed capacity was 2.4 GW.

Energy Efficiency:

Energy is used very inefficiently in Central and Eastern Europe. Past analysis suggests that the level of energy used per unit of GDP was several times that of the average in the EU 15. This is of fundamental importance for the economies of the countries concerned in particular as energy prices increase. Attempts are being made to reduce the energy intensity of the economy but on average it is still around double the EU average. However, the level of energy used per individual is far lower than that of the EU-15 (up to ten times less) due to the lower use of electrical appliances, size of dwellings, etc.

Nuclear:

The closure of Ignalina is both required and agreed to under the Accession Partnership with Lithuania. The Agreement stated that unit 1 would be closed by the end of 2005 and unit 2 in 2009. Similar closure agreements were reached with Bulgaria – for the closure of Kozloduy 1-4 – and Slovakia – Bohunice V-1. The reactors to be closed were all first generation reactors of Soviet design which have such design deficiencies that it is thought uneconomic to bring them up to an acceptable standard for long term operation. However, the Ignalina reactors are the only RBMK reactors – the same design as Chernobyl. As a consequence of the agreement, these reactors will be operational in the EU for over five years - a fact that most of the population of the community is probably not aware of and would likely raise public concerns.

Prior to the independence of Lithuania, the reactors were operated by Russians with most of the electricity exported. As a consequence Lithuania has considerable conventional – largely coal – generating capacity that has been used much less and even mothballed since 1992. A similar effect has been seen in the other Baltic States, which have increased their electricity consumption from Ignalina post 1992. Lithuania was uniquely dependent on nuclear energy for its electricity having the highest percentage of electricity from nuclear power of any country in the world. However, more worrying was that all of this came from one power station. Therefore it is clear that the closure of Ignalina is a positive development from a security of supply perspective, in particular given the safety and operating records of RBMKs.

The Way Forward:

The closure of Ignalina will have a large impact on the energy sector in Lithuania and the other Baltic states. For unprecedented historical reasons the country has become responsible for a nuclear power plant. While this has bought plentiful electricity for a decade or so, overall it will undoubtedly be seen as a huge burden on the country, in particular as:

- It has locked the country into a uniquely centralised power sector that is highly fragile with dependency on a single power station.
- Existing conventional generation capacity has been closed, which, if retrofitted, could have replaced the Ignalina station at an earlier date.
- The country will be left with a large decommissioning and radioactive waste disposal bill, for which adequate resources have not been set aside, either during the operational life of the facility or as a result of the International Decommissioning Support Fund of the EBRD.

Urgent action is needed to enable a smooth and early transition to a nuclear-free Baltic States. Although the second unit at Ignalina is not due to be closed until 2009, it is highly unlikely that it will operate without incident until this time and, to increase security of supply, alternatives must be rapidly made available. Urgent attention must be given to improve the regions efficient use of energy. While the EU recognises that, on average, the EU could save 20% of its energy at little or no cost, the opportunities in the Baltic States are far higher, in particular as the prices of energy continue to move towards world market prices. Saving energy brings considerable benefits from the environmental, security of supply, market and social perspectives; it is a win-win-win-win technology. Furthermore, a considerable level of energy saving can be achieved rapidly and with little investment cost – through behavioural changes. Given the almost certain supply problems that will occur from Ignalina over the next few years, it would be advantageous to introduce these measures as soon as possible. New generating capacity will be needed in the Baltic States to replace Ignalina.

Renewable technologies can be relatively rapidly – compared to all other new generating sources – introduced to create a new domestic energy resource that is secure from supply interruptions and price instability. Priority must be given to this area. It should be noted that the electricity output from unit 2 was over 10 TWh, which is unique for the unit, even greater than when it was authorised to operate at 1500 MW. It is unlikely that such a large output will be repeated in the next years.

Investing in a new reactor will only delay the introduction of other, more appropriate measures, in particular, energy efficiency. Given the long planning and construction time for nuclear, any new station would not, even under the most optimistic timetables, be producing electricity in the region until 2015 - 2020. Investing in new nuclear will, at best, create a five-year energy shortage.

2.2 Nuclear Power in Central Europe - a regional overview

Jan Haverkamp[8]

2.2.1 Introduction

Nuclear power has always had a strong position in Central Europe. The technique was seen as front-line engineering giving it heroic status under socialist development. Much of the nuclear lobby in Central Europe still has its roots in the Moscow – or rather Obninsk – (the nuclear university near Moscow) driven nuclear networks. In this paper we will look at the status of nuclear power in the region stretching from the Baltic States to Bulgaria. It will address the situation in order of urgency concerning nuclear debates: Bulgaria, Slovakia, Hungary, Romania, the Baltic States, Poland, the Czech Republic, Slovenia, Serbia, Macedonia, Croatia, Albania and Montenegro. I will not dwell on Eastern Europe. There are strengthening plans in Ukraine and Russia for a large amount of new nuclear power stations, and even Belarus put nuclear power in its energy plan. But the political, social and economic dynamics in that region are different than in the regions part of or moving towards the European Union. I will also not discuss nuclear research reactors.

This paper is not meant to discuss nuclear power in detail. It is meant to give a concise overview of the situation in the countries mentioned.

Recent developments on a global level have been used by the nuclear lobby to give a new push to a technology that many already thought had one foot in the grave. In spite of all the plans – including the ones described here – and in spite of all the PR talk about a nuclear renaissance, nuclear power still is a slowly dying technology, with more reactors going to be closed in the coming two decades than there will be opened[9]. Its safety problems have only been addressed partially and even the most modern reactor designs under construction, like the EPR in Finland, cannot promise full and fool-proof safety[10]. Even an EPR can deliver Chernobyl-like consequences. The chances may be small, but the consequences of Chernobyl should not be forgotten. Now,

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[9] Mycle Schneider, &Antony Froggatt, *The World Nuclear Industry Status Report 2004*, Brussels (2004), the Greens-EFA Group in the European Parliament, http://www.greens-efa.org/cms/topics/dokbin/102/102943.the_world_nuclear_industry_status_report@en.pdf

[10] Helmut Hirsch, Oda Becker, Mycle Schneider, Antony Froggatt, *Nuclear Reactor Hazards: ongoing dangers of operating nuclear reactors*, Amsterdam (2005), Greenpeace International, http://www.greenpeace.org/international/press/reports/nuclearreactor-hazards

20 years after that catastrophe, it is estimated that between 10,000 and 100,000 people will die of Chernobyl-related causes[11]. Greenpeace last April brought contaminated soil from a forest and a village 50 km away from the reactor in freely accessible areas into the offices of the International Atomic Energy Agency. The radioactivity of the soil was up to 25 times the limit of low radioactive waste in the EU. In the IAEA office precautions like a vessel with 20 cm concrete and 1 cm lead walls, as well as a 1 meter safety zone were needed to protect the public from the radiation. In Ukraine, this is the ground that people live on[12]. The question of nuclear risk is not about the chance, not even about chance times extent – it is a qualitative question as to whether we want to run any risk with such large consequences. Nuclear accidents are not only a story of bad outdated Russian designs (though there are still power stations of that design operating in Russia and Lithuania!). Central Europe faces almost every year an incident that scores 2 of 7 on the INES scale. At a certain moment it could become 3 (where radioactivity is released into the environment) or more.

2.2.2 Central European energy campaign

Nuclear power is at the moment pushed as an answer to climate change. We in Greenpeace have given this idea serious attention and found that nuclear power cannot deliver. For a decrease of CO_2 emission of only several percentage points, the number of nuclear power stations would have to be tripled. In that case, available uranium stocks would survive one generation of power plants, most of which would come on-line after 2030 – which is far too late. There would be enormous amounts of CO_2-emitting fossil fuels needed to boost power station building, uranium mining and processing capacities, and the costs would far outweigh the costs for other alternatives like energy efficiency and the development of renewable energy sources like sun, wind, water and biomass.

Nuclear power is also pushed forward as a solution to energy security. After Russia closed the tap on gas for Ukraine (and harmed the flow to Poland, Hungary, Slovakia and further), countries search for more independence in their energy sources. Nuclear power, however, is not going to give that independence. Nuclear technology is advanced technology in the hands of a small number of companies and countries. Uranium is only available in larger amounts in a very small number of countries. And especially the reactor types that seem to be affordable for Central European countries are Russian built and Russian fuelled. Real energy security comes from energy efficiency and renewable resources. The wind in Poland is Polish, the biomass that can be grown on the plains of North Bulgaria is Bulgarian, the sun that shines on Romania is Romanian.

[11] Greenpeace (editor), *The Chernobyl Catastrophe - Consequences on Human Health*, Amsterdam (2006), Greenpeace International, http://www.greenpeace.org/international/press/reports/chernobylhealthreport

[12] Greenpeace, *Chernobyl sampling operation briefing (October 2005)*, Amsterdam (2006), Greenpeace International, http://www.greenpeace.org/international/press/reports/chernobyl-sampling-operation-b

2.2.3 Energy Security = Renewable!

The continuing problems that the nuclear industry is faced with remain:

There is no solution for nuclear waste and reducing the risk that the highly radioactive waste might leak into the environment in the coming 100,000 or so years is a question that seems to be unanswerable. The only ongoing project for long term storage in the Yucca Mountains in the USA is stalled indefinitely, all other projects, including an oft-mentioned one in Finland, are only in a study phase. We continue to produce dangerous nuclear waste without knowing what to do with it.

Nuclear power is extremely expensive and puts a large financial burden on the countries dealing with it. Slovakia, Hungary and the Czech Republic already face shortages for their decommissioning and nuclear waste funds that run into the hundreds of millions of euros – a problem that the UK lately had to face by pumping in 23 billion euros of state aid into its nuclear industry to prevent it from going bankrupt. New nuclear power stations appear only feasible with either government incentives or loan guarantees – a practice that is inadmissible under EU law for any grown-up energy industry.

And then there is the risk of terrorist attack. Each nuclear power station – and especially designs like the VVER 440 operated in many Central European countries, but also the most modern EPR[13] – is vulnerable to terrorism. Whether you think of people taking over the operator room with the help of people within (two years ago a Romanian worker was arrested in the attempt to smuggle a machine gun into the Cernavoda NPP on the orders of unknown people), or an attack from outside on exposed operator rooms and electricity supplies, or an attack in the form of a hijacked passenger airplane as on 9/11, nuclear power stations and nuclear waste storages form an unacceptable risk to the public.

Greenpeace has not passed judgement on nuclear power lightly but nuclear power cannot deliver its promise of clean and cheap energy. On the contrary, it is expensive, risky, anti-democratic and above all, it is not necessary. Recent studies have shown that we can phase out nuclear power in Europe before 2025, and reach a goal of 70% CO_2 emission reduction in 2050 relying on a policy of decentralising our energy infrastructure, developing renewable energy sources and putting more effort into energy efficiency[14].

2.2.4 Bulgaria

Operating nuclear power plants: There are six nuclear reactors for electricity production in Bulgaria, all situated near the town of Kozloduy on the shores of the Danube. Two of these reactors of the type VVER 440/230 have been closed in 2002 and await dismantling. Two more were closed on 31 December 2006. This is done in cooperation with the European Union because this type of reactor could not be upgraded to a satisfactory safety level. Two more

[13] Large and Associates, *Assessment of the operational risks and hazards of the EPR when subject to aircraft crash*, Amsterdam (2006), Greenpeace International, http://www.greenpeace.org/international/press/reports/assessment-of-the-operational

[14] Sven Teske / Greenpeace, *Energy Revolution: a sustainable pathway to a clean energy future for Europe*, (2005) http://www.greenpeace.org/international/press/reports/energy-revolution-a-sustainab

VVER 1000/320 reactors will continue to operate in Kozloduy. Reactor block 5 had on 1 March 2006 an INES 2 incident, when 22 out of 61 control rods failed to fall into the reactor. A former Kozloduy director and current researcher at the Institute for Risk Analysis in Vienna compared it to driving a train full speed without safety breaks.

Planned power plants: Bulgaria is planning to finish a project for two nuclear reactors near the town of Belene, around 150 km downstream from Kozloduy on the Danube. Belene is situated in a seismically active area and, for financial reasons, the Bulgarian government would like to see Russian reactor types built that either would never receive permission in Western Europe (e.g. the VVER 1000/320) or have not been licensed before in Europe (a VVER 1000/466). Bulgaria is to choose the types and builder at any moment as I am writing this paper.

Main nuclear debates: The closure of Kozloduy blocks 3 and 4 returns regularly in debates, but it is in practice an uncontested issue. For reasons of popularity politicians raise the issue of keeping these two blocks open longer, but there is no chance that the EU would accept that. The Belene project is still hotly debated, especially on an international level. Bulgaria has problems in convincing banks to finance the project and environmental groups are arguing that it is a bad investment - especially since Bulgaria is the most energy *IN*efficient country in Europe – even worse than Russia, and has not even started to develop its wealth of renewable energy sources. Bulgaria is currently looking for sites for nuclear waste storage. Most of the discussed places are heavily opposed. Recently, the Bulgarian government also started discussions to re-open uranium mining in Bulgaria, which could have major consequences for watersheds running towards Greece.

2.2.5 Slovakia

Operating nuclear power plants: Slovakia has one closed nuclear power station near the town of Jaslavske Bohunice. The A1 reactor was closed in 1977 after two serious accidents. Two more reactors of the VVER 440/230 type, the Bohunice V1 block, were closed down in 2006 and 2008 respectively. The newer VVER 440/213 type reactors in Bohunice block V2 will continue to operate, as well as the two VVER 440/213 reactors in Mochovce.

Planned power plants: Slovakia is putting pressure on operator ENEL, which recently bought the privatised state utility Slovenske elektraren (SE), to finish two blocks VVER 440/213 in Mochovce where building was stopped in 1992. ENEL now works on a feasibility study and it is already clear that it is not economically viable to build entirely new NPPs – only finishing the existing structures is now under investigation. ENEL would like to get government guarantees for the financing, but environmental groups like Greenpeace have already pointed out that this is against EU free market regulations.

Main nuclear debates: Closure of Bohunice V1 has similarities to Bulgaria's Kozloduy 3 and 4 – a recurring political debate with little practical consequence. Re-opening this discussion would need unanimous support from the old EU 15 because the EU Accession Treaty of Slovakia would have to be re-opened. Several EU countries already have made clear that they will not support such a re-opening. Slovakia also looks at re-opening its uranium mines. Heavy opposition to the furthest developed project, in Jahodna near Kosice, arose. This includes opposition in downstream Hungary.

2.2.6 Hungary

Operating nuclear power plants: Hungary has one location with four VVER 440/213 blocks: the Paks NPP. At present there is a fierce debate concerning the plant lifetime extension (PLEX) of these four blocks. VVER 440 reactors have no containment and the operator rooms are situated in an unprotected position. Therefore, amongst others, Greenpeace, Energia Klub and the Austrian state argue that these NPPs should rather be closed after having fulfilled their planned life-time. At present an Environmental Impact Assessment (EIA) is nearing its closing phase on this project. Paks block 2 suffered an INES 2 incident in 2004, when, during a cleaning operation of fuel rods and because of a lack of cooling, several rods broke and released part of their radioactive fuel in the cooling pond. Implemented clean-up operations can be counted as one of the most complicated and risky operations in the history of nuclear power in Central Europe.

Planned power plants: In its energy plan, the Hungarian government mentions it would like to see new nuclear power development in Paks after the year 2020.

Main nuclear debates: In 2004, the Hungarian government signed, a few days before EU entry, a declaration of intent with the Russian government for the delivery of spent nuclear fuel from Paks to Russia. This project seems to have been abandoned after initial protests from environmentalists against the risks of such deliveries. The PLEX of the Paks reactors is still an ongoing debate, as is the clean-up of Paks 2. Hungary, furthermore, is looking for a long-term storage site for highly radioactive waste and has mentioned several sites, amongst which, one, in Boda, is starting to create local opposition.

2.2.7 Romania

Operating nuclear power plants: Romania has one NPP operating in Cernavoda. Initially five reactors of the Canadian built CANDU 6 type were intended there.

Planned power plants: Romania is at present finishing testing of the 2ndreactor at Cernavoda. This is also a CANDU 6 type reactor. Romania is planning to start procedures for finishing reactors number 3 and 4 in Cernavoda. It is currently looking for possible financing mechanisms.

Main nuclear debates: Nuclear power is little debated in Romania. There is stiff opposition to the Bulgarian Belene project, certainly in the provinces bordering on the Danube, but many people see their own NPPs as different. Still, the Canadian type reactors also have a history of problems and their own risks, a fact that is little known in Romanian society. The most important debate is around the necessity of Cernavoda 3 and 4. Romania wants to finish these reactors with an eye on the international electricity market and is hoping to be able to export electricity to Western Europe. Romania has a lot of hydro energy, but discussions about energy efficiency and other renewable energy sources are only at a starting phase.

2.2.8 The Baltic States

Operating nuclear power plants: Lithuania has two Chernobyl type RBMK reactors in Ignalina. Under an agreement with the EU, these reactors will be closed in 2007 and 2009 respectively because they are deemed too unsafe.

Planned power plants: Lithuania is presently searching for support from the other Baltic countries and Poland for a new NPP in Ignalina. It looks at present most strongly to the French EPR design.

Main nuclear debates: The Baltic States are very scared of their dependency on Russia. This seems to be the major factor behind the drive for new nuclear. Their huge potential for renewable energy sources like wind and biomass and for energy efficiency gets a lot of attention in Latvia but less in Estonia (traditionally looking at pro-nuclear Finland) and Lithuania (struggling with what to do with its mainly Russian minority group of soon to be ex-Ignalina NPP employees).

2.2.9 Poland

Operating nuclear power plants: None. Poland stopped its only construction of an NPP after the Chernobyl catastrophe.

Planned power plants: In its national energy plan, the Polish government has taken up one NPP to be ready in 2022. Voices in the current government would like to speed up that process.

Main nuclear debates: The Polish population is traditionally strongly opposed to nuclear power. Poland also suffered from the Chernobyl catastrophe and a majority of the population would not like to see Poland choosing the nuclear pathway. Energy security, however, has given the small nuclear lobby in Poland an argument to put the issue on the political agenda. Next to this, there is a strong debate about nuclear fuel transports on Polish soil (or rather, rail) for the Czech Temelín NPP.

2.2.10 Czech Republic

Operating nuclear power plants: There are in total 6 NPPs operating in the Czech Republic. Four VVER 440/213 reactors are situated near the village of Dukovany in South Moravia and two VVER 1000/320 reactors were opened in the early 2000s near the village of Temelín in South Bohemia.

Planned power plants: The Czech government's energy plan foresees another 2 NPPs to be built most probably near Temelín around 2020. Czech utility CEZ started investigations into that possibility in 2007.

Main nuclear debates: The Temelín NPP is an ongoing debate. The reactor is a thorn in the side of neighbouring Austria and suffers many smaller incidents that each time reinvigorate discussions. Greenpeace documented faulty welding work directly on the reactor vessel of block 1 and, although the authorities have so far successfully been able to sweep that under the carpet by intimidation and manipulation of the legal system, the discussion keeps resurfacing. In addition, there is a hot debate around possible sites for the storage of highly radioactive waste, with opposition from a strong majority of the population around proposed sites. The discussion about further expansion of the Czech nuclear programme is at an early phase, with the entrance of the Green Party in parliament after the last elections postponing discussions for the moment.

2.2.11 Slovenia

Operating nuclear power plants: Slovenia operates one Westinghouse BWR (Boiling Water Reactor – a similar type to the Russian VVER) in Krsko. This was part of a deal between Croatia and Slovenia during the time that Yugoslavia was still in existence, in which one NPP would be built in Slovenia and one in Croatia and both would be owned in a joint venture of both countries. Only Krsko was eventually built and when Yugoslavia broke up, both Croatia and Slovenia remained owners of this plant.

Planned power plants: The Slovenian parliament has several times voted in favour of full implementation of the nuclear agreement with Croatia, but Croatia is strongly anti-nuclear and there is no real chance that it will ever accept an NPP on its soil. As an alternative, Slovenia now mentions a new reactor in its energy plan, most likely also to be situated in Krsko and to be built in the second half of the next decennium.

Main nuclear debates: There is some initial debate about a new NPP in Slovenia. Next to this there is an ongoing debate about possible storage of nuclear waste, which triggered a lot of emotion in neighbouring anti-nuclear Austria when sites were mentioned near to the Austrian border.

2.2.12 Serbia, Macedonia, Croatia, Albania and Montenegro

Serbia

Planned power plants: The Serbian government has mentioned the possibility of a nuclear power plant in its energy plan.

Macedonia

Main nuclear debates: Nuclear power is a completely new issue for Macedonia. Recently, possible participation in the Bulgarian Belene NPP stirred some discussion, followed by interest by Macedonians in participating in the Environmental Impact Assessment of Belene, as a large accident in that power plant could also have consequences for Macedonia.

Croatia

Croatia counts as an anti-nuclear country. The debate in Slovenia about a possible NPP in Croatia does not get much support in Croatia itself.

Albania and Montenegro

In these two countries, nuclear power is no issue.

2.3 Concluding remarks

Nuclear power is an issue that cannot be seen separately from the issue of energy policy in general. Energy policy is no longer a national issue, but a regional one, especially concerning electricity. Central Europe is to be seen and treated increasingly as one market. Greenpeace has concluded that a phase-out of nuclear power is needed as soon as possible. Central Europe, as a region, offers incredible potential for increasing energy efficiency. Also, the development of renewable energy sources is only starting. The largest barrier to a progressive and future-

oriented energy policy seems to come from the centralised orientation of the energy expert elite in these former socialist countries. Still, we do not have much choice. Climate change forces us to think in a different way. If we are to keep the global temperature rise under 2°C, we in Europe will have to reduce CO_2 emissions by around 70% in 2050. If we continue longer with centralised structures – under the pressure of the black (coal) and the nuclear lobbies, we will still anyway have to change rigorously within a few decades. And the longer it takes to go from the wasteful centralised energy system we know now to an efficient and renewable energy-based system that we will need in the second half of this century, the more difficult and harmful it will be for our economies.

3. Contributions to Energy Policy Dialogue No. 2

3.1 Stakeholders' experiences on implementing national bio-energy strategies[15]

The Baltic Energy Dialogue II seminar 'Stakeholders' experiences on implementing national bio-energy strategies' took place in Tallinn in 15-16 May, 2007. As part of the energy debate among stakeholders and social partners in the Baltic Sea Region the draft resolution was developed by the participants of the Riga seminar. Due to a lack of time, it was not adopted in Riga. In addition, one of the brainstorming sessions in Riga focused on the topic of the Tallinn seminar. Afterwards, the Friedrich Ebert Foundation (FES) and the Estonian Institute for Sustainable Development (SEI-Tallinn) continued the preparation of the Tallinn meeting and the topic of implementation of bio-energy strategies was agreed upon. After some negotiations, the Estonian Ministry of Agriculture decided to join in the preparation work and to support the seminar with a big lecture hall free of charge and carrying the costs of the reception dinner.

The actual preparation of the seminar started 2 months before the event, somewhere in mid-March. Project manager Mr. Ahto Oja was hired to implement and moderate the seminar. FES and SEI-Tallinn provided some ideas for possible speakers. Ahto Oja also identified possible interested institutions in Estonia and interviewed their key representatives, such as Dr. Andres Koppel, the Vice-Rector of the Estonian University of Life Sciences (EULS); Dr. Aivo Vares, Head of the Bio-energy Research Centre of EULS; Dr. Ülo Kask, Chairman of the Biofuel Association of Estonia; Mr. Tõnu Lausmaa, Chairman of NGO Taasen and others. FES assisted in finding speakers and participants from Latvia, Lithuania and Germany. Agreements with all speakers were achieved and a draft agenda completed by mid-April. After that, some speakers changed (Hungary, Lithuania), but all topics were covered. In addition, we had a few more offers for additional presentations from Finland, Ukraine and the European Commission. Due to the tough agenda we were able to accept only one additional presentation from the Intelligent Energy Agency of the European Commission. We decided to skip the Finnish presentation, as we already had one speaker from Finland and we kept the Ukrainian presentation in reserve in case one of the speakers cancelled their presentation at the very last minute. The international INFORSE network was used to identify international speakers and speakers from the UK, Poland and Ukraine actually came through the INFORSE network.

After having technical arrangements agreed and a final agenda, we started to invite participants. We aimed to have around 40 participants, half from abroad and half from Estonia. The interest towards the seminar was massive, and, after the deadline, we got at least 10 more applicants. Finally, 62 participants were registered, around 5 cancelled at the very last minute but there was also interest at the very last minute so that, finally, there were actually 62 participants.

[15] Ahto Oja, Expert, Mõnus Minek SEES LLC, Sustainable energy and environmental solutions, ahto.oja@gmail.com

The transcripts of 9 presentations and adopted resolution are presented in this chapter. The agenda is in Annex 3 and the list of participants is in Annex 4.

Also, all speakers gave excellent presentations. More than half of them also helped to implement the small round table discussions using the 'world café' methodology. We also recorded all presentations and plenary sessions, where the host of the table discussion summarized the results from the group discussion. The content of this chapter is based on the transcription of recorded presentations and on additional slides from the power point presentations. During the final plenary session the draft resolution was jointly modified.

Considering the huge interest in Estonia towards the event and its results, one can conclude that the seminar on stakeholders' experiences on implementing national bio-energy strategies was very successful. The organizers have been contacted on several occasions and copies of the presentations have been requested, including by the Estonian Parliamentary Commission on the Environment and by the Estonian Rural Development Agency which has arranged to upload all the presentations onto the Baltic Bio-energy website[16] for which the Agency is responsible.

[16] http://www.bioenergybaltic.ee

3.2 Promoting Biomass and Bio-energy production in Estonia

Andres Oopkaup[17]

3.2.1 Current Situation

Biomass and bio-energy production don't yet add a lot of money to the bio-energy sector. The Biomass and Bio-energy Development Plan (BBDP) aims to create an enabling environment *(R&D, policies monitoring, public awareness, etc.)* for bio-energy development. Most of the financing to implement the BBDP comes from the RDP, structural funds and CAP as well as from energy market prices and tax reductions.

The share of CHP-produced electricity from biomass in domestic consumption was 0.2% in 2005, the policy target is to produce 3% of electricity with CHP by 2013. Biofuels share of total consumption was non-existent in 2005 – the policy target to use biofuels is 6% by 2013. According to my knowledge, one bus company is currently using biofuels.

The share of district heating from RES of total district heating production is 21% – the policy target is 33% by 2013.

The total share of renewable energy resources from total end-use energy consumption is 11% in Estonia, primarily this comes from district heating plants which mainly use peat, log wood and woodchips. The total size of agricultural land is 1.2 million ha, 71% from the total agricultural land is currently in active use (850 000 ha), and 350 000 ha (29%) are not currently in use.

3.2.2 National Biomass and Bio-energy Development Plan (2007- 2013)

The National Biomass and Bio-energy Development Plan (BBDP) 2007- 2013 is divided into two phases because of the limited knowledge of the actual problems and their solutions. Thus, information is gathered and analysed in the first phase which has a total budget of EUR 600 000 for 2007. The second phase will involve implementing the findings, analysis and actions identified during the first phase. The BBDP is guided and monitored by a council which performs an advisory and supervisory role and is comprised of representatives of relevant ministries. The implementing body is the Rural Development Foundation[18].

The measures under the BBDP are planned as follows: (1) the funding of R&D; (2) the dissemination of information; (3) the standardization (which will fall mainly under the responsibility of the Ministry of Economic Affairs and Communications); and (4) the application of fiscal instruments if the analyses made in the first phase show that such instruments are relevant and will have the greatest future impact.

The prime objective under R&D during the first phase is to assess the availability of land resources – how much land is in fact additionally available for energy crops production and what value

[17] Ministry of Agriculture of Estonia

[18] http://www.mes.ee/

that land has. We need to know whether it is cost-effective to take into use abandoned land for energy crops or for biomass production. But this abandoned land might have lower soil quality or may otherwise be less attractive for profitable agricultural activities. We also need to know what types of crops are profitable to grow generally and, specifically, on these abandoned areas.

Secondly the availability of wood and field crops for bio-energy production is to be assessed; both of those are currently in deficit. On the other hand, agricultural and forestry residuals and municipal and industrial waste are sometimes underutilized for bio-energy purposes. We need to undertake supplementary statistical surveys and we need to have an overview of the market prices for bio-energy products.

The energy crop studies concentrate on agro techniques and technologies, the studies focus on opportunities to find out how far it is possible to use existing technology and how great are the investment needs for new technologies. Another aspect is to determine the cost efficiency of using different energy crops and to ensure that all environmental aspects are considered. In addition, the danger of inadequate land for food production exists when energy crop production booms. These interests and conflicts of land use either for food or for energy should be kept in balance, and for this balance we need a lot of information. For some, bio-energy production seems a risky business while others already know what they are doing and believe it to be profitable.

The technology studies focus on mapping bio-energy production, the compatibility of biofuels with different furnaces; biogas technologies; transport biofuels; life cycle analysis for different products; and on using biomass in the textiles industry.

Analysis of the policy tools (including social, economical, environmental, regional, etc. assessments) includes the assessment of regulations, taxes (incl. Green Tax Reform), support/ subsidies, public procurement procedures, and standards. To make it an obligation to add 5% biodiesel to diesel is in the hands of the Estonian government.

Estonia is producing huge amounts of wood pellets, but 97% of this production is exported. The same applies to biodiesel production as it is exported to other countries. We all know the European target to achieve 5.75% of usage of biofuels by 2010. If Estonia would use all its rape seed in biodiesel production, it would still not be enough to satisfy Estonian domestic biodiesel consumption. Thus Estonia is currently acting the other way round: others are selling biofuels and Estonia is importing them instead of concentrating on promoting domestic biofuel production and consumption.

The other side of our activities, once we have all the required information, will concentrate on questions of how to actually disseminate this information. We are aware that not all knowledge and information is in Estonia and so, via exhibitions, seminars and conferences, study trips, consulting and training we will promote the collection, analysis, translation, design, and publication of all relevant information on the bio-energy homepage.

A Memorandum of Understanding on bio-energy between the MoA's of the Baltic States was signed on 23 May 2006. Shared responsibilities and actions between Baltic States are agreed in this Memorandum. Lithuania will organize a scientific conference, Latvia organized a biomass conference in May 2006 and Estonia is responsible for managing the Baltic Bio-energy website: http://www.bioenergybaltic.ee. Of course, all stakeholders from all Baltic countries are expected to send and share all relevant information on this website. The web page will thus serve as an information source for all the Baltic States. Finally, all information on this website should also be available in Latvian and in Lithuanian.

Funding the creation of and participation in the joint project is one of the opportunities to learn more about the implementation of bio-energy initiatives. Various different cooperation projects are currently (May 2007) being implemented (e.g. Baltic Bio Energy Net "BaBEt" coordinated by the Ministry of Economic Affairs and Communications, Baltic 21 Lighthouse projects, etc). Few new applications have been prepared for funding (e.g. the EU Interreg, FP7 etc.). The budget for these activities was EUR 160 000 in 2007.

Additional hectare-based subsidies were provided for farmers who cultivated energy crops in the amount of 45 EUR/ha starting from 2007.

The Estonian Parliament adopted an amendment to the Estonia Electricity Market Law which came into force on 1 May 2007. The new regulations are valid for RES-E production facilities with capacities of less than 100MW. There are three options:

1. To sell electricity to the national energy company, for a feed-in tariff (7.35€cent/kWh), which is fixed for the next 10-15 years;
2. To sell electricity to the market with a premium (of 5.4 €cent/kWh);
3. To sell electricity directly to the market and receive a certificate of origin of green energy.

The Estonian Wind Power Association has commented on these prices to the effect that now RES-E is almost profitable and on a competitive level. The Estonian Rural Development Plan includes the following measures to promote bio-energy:

Measure 1.4.3 Bio-energy investment aid for agricultural producers;

Measure 2.8 Aid for the establishment of energy forests *(starting in 2009);*

Measure 1.6 Agricultural and forestry produce processing sector:

Measure 1.5 Micro enterprises processing and marketing forestry products:

Measure 1.7 Processing, R&D, Product development.

Within structural funds the Living Environment Implementation Plan includes priority axis 3 called 'Development of the energy sector' and it includes the following measures:

Energy efficiency improvement in building stock;

Renewables and ambient air protection.

These measures are under the MoEC and are mainly focusing on energy saving.

A few examples of existing projects and projects in the pipeline for bio-energy production in Estonia in May 2007 are presented below according to their products and volumes.

- Bioethanol
  - Moe/Rakvere (optional)
  - Kunda (2008 - 100000 t of product) the need is 300 000 tons of cereal, which is 40% of Estonian cereal production

- Biodiesel
  - Pärnu (6000 t biodiesel)
  - Jõhvi (8000 t biodiesel)
  - Antsla (6000 t biodiesel)
  - Paldiski (2008 - 100000 t biodiesel)
- Biogas
  - Jööri (biogas collection in pig production unit) 40000m3 of biomass in year
  - Märja (University – training and promotion)
  - Oisu (1300 cows in one herd)
  - Torma (800 cows in one herd)
  - Loo (10 milj chickens)

This list is very short, in practice the MoA doesn't know where all the plants might be located. The first biogas plant is working and is used for heating purposes. The biogas plants suit those farmers who have a lot of manure for biogas production.

- Waste for heating
  - Väo
- Wood pellets
  - AS Flex, Viru Nigula (105000 t)
  - Graanul Invest, Väike Maarja (80000 t)
  - Tootsi Graanul, Tootsi (20000 t)
- Wood for heat
  - About 10000 TJ/y (several district heating plants)

3.2.3 Concluding remarks

We think we do not have enough resources for the implementation of all the measures in our plan. The plan itself doesn't add too much money to the promotion of the sector, but our aim is to create an enabling legal and institutional environment for bio-energy producers.

Most of the financial resources for implementing all the plans mentioned above should be available from EU structural funds where application procedures are strict.

The possibilities for using bio-energy products, e.g. wood pellets, in Estonia are hampered by the high price of those products for Estonian consumers. This is a question of tax and macroeconomics.

3.3 German experiences on national level policy measures for the promotion of bio-energy use

Dipl.-Ing. Franziska Müller-Langer[19]

Sustainable energy systems are under discussion and development not only in the context of European targets but all over the world. In order to be sustainable, these systems have to deliver benefits. We have, first of all, enormous potential for climate protection and, furthermore, for economic innovation and the development of technologies which use renewable energy. We have the possibility to be less dependent on fossil fuels, primarily mineral oil and we have the possibility to create employment in the renewable energy sector. We are thus able to secure the energy supply in the future. These are the issues of primary importance when renewable energy and how it would be achieved has been discussed over the last few years in Germany.

3.3.1 Current status

The status of the energy sector in Germany in 2006 was as follows: The total end-energy demand was 2562 TWh, a mix of renewable energy sources contributes to the share of renewable energy sources of 7.4% (190 TWh) out of the total end-energy demand. Wind and water are mainly used for electricity production. Smaller sources of electricity production are photovoltaic, solar thermal and geothermal. The biggest part of bio-energy comes from biomass; it contributes approximately 70% (139 TWh) of total renewable energy production. Solid biofuels constitute the biggest share here with 42%, biofuels for transportation follow with 14.5%, gaseous biofuels have 6.7% and a smaller share belongs to the organic biowaste with 4.2% and liquid biofuels with 1.1%.

Policy instruments and targets

Target	2010	2020
To increase the share of renewable energy sources of the *total energy demand*	4.2%	10%
to increase the share of RES for *electricity production*	12.5%	20%
to increase the share of biofuels of the total *fuel demand in transport* (Biofuel Quota Act)	6.75%	8% (2015)

[19] The German Institute for Energy and Environment, Leipzig. The German Institute for Energy and Environment GmbH is a not-for-profit research company with one main focus on biomass and bio-energy. German experiences of national level policy measures to promote the implementation of bio-energy strategies are introduced in this chapter.

3.3.2 Policy Instruments

These targets will be achieved by the policy instruments introduced below.

The first policy instrument is the German Renewable Energy Act for electricity (EEG) production. Germany has the Market Incentive Program (MAP) which primarily deals with technologies for heat production. For the transportation sector, Germany has the Biofuel Quota Act.

Renewable Energy Source Act (German EEG)

The Renewable Energy Source Act was adopted in 2000 and amended in 2004. Currently the German Government is working on revising this act to take into account the new situation on feed-in-tariffs. It is compulsory for power network operators to give priority to feeding electricity from renewable energy sources into the grid and to pay fixed prices (feed-in-tariffs) for 20 years, starting from the commissioning date of the power plant.

Current promotion of bio-energy

Power plants with a maximum capacity of 20 MW_{el} are eligible for feed-in-tariffs.

Base feed-in tariffs decrease with increasing capacity and ranged from 11.16 to 8.15 €ct/kWh_{el} for those power plants commissioned in 2006. For new plants, annual tariff digression is 1.5%/a. Additional to the base feed-in-tariffs are bonus tariffs. Bonus tariffs ranging from 2.5 to 6 €ct/kWh_{el} are paid additionally to electricity producers if energy is produced using energy crops from agriculture or biomass from forestry (e.g. maize for biogas, wood chips for combustion plants). Moreover, the bonus tariff is 2 €ct/kWh_{el} for using innovative technologies (e.g. fuel cells or organic ranking cycle) and for combined heat and power production (CHP).

What could be achieved as a result of the adoption of EEG? The number of solid biofuel CHP plants started to increase from 2000 after the adoption of EEG and reached a total number of 162 units by 2006. The biogas CHP plants started to boom after 2004 when EEG was amended and have reached a total number of 3280 plants by 2006. CHP plants using vegetable oil (discussion is on-going whether rape seed oil or palm oil is preferred) have increased significantly during recent years and have reached a total number of 1800 by 2006. In total, one can conclude, there are 5250 power plants in Germany in 2006, which together produce 17 TWh_{el}, which is a 3% share of net electricity production or 24% of RES electricity in Germany. The total electricity production from RES is 11 to 12%.

Market Incentive Program

The program started in 1999 and up to now there are 7 adaptations. Incentives by means of financial subsidy are provided primarily to private households for heat provisions (water, heating). Combustion and/or gasification chambers using solid biofuels (e.g. pellets, split logs) and solar thermal collectors are means of support under this program. Credits at reduced interest rates, partly including remission of a share of the debt, are another means available, primarily for commercial and public-law applicants under this program. Also "large" biomass combustion plants (e.g. district heating) (>100 MWh_{th}), biogas plants and partly local heat networks are eligible for these incentives. The budget for this program was 180 million € in 2006 and 213 million € in 2007. Almost 140000 heating plants received incentives in 2006 under this program. The focus is on solar thermal plants, biomass heating systems, small scale split log gasifiers, etc. The new measures in 2007 were an innovation bonus for large solar thermal plants, e.g. for process heat provision or solar cooling, and secondary measures for emission reduction and efficiency increase for biomass plants.

The results from the implementation of the Market Incentive Program were as follows: A significant increase began in 2003, also because of increasing oil prices. Approximately 90 TWh_{th} RES of heat was supplied in 2006 (approx. 5.5% of the total heat demand in Germany) including 82% of solid biofuels used in households (69%) and industry / biomass CHP (13%) as well as 12% other biofuels.

Biofuel Quota Act

Tax exemptions exist for biofuels until August 2006 for the implementation of transportation biofuels (e.g. biodiesel and bioethanol) as straight fuel or blend (since 2004).

Only tax privileges for biofuel use as straight fuel for biodiesel and vegetable oils, no taxation until 2015 for synthetic biofuels, bioethanol based on lignocelluloses and E85 are in force since August 2006.

Introduction of biofuel quotas (based on calorific value as blend or straight fuel without any tax privileges) since January 2007 including regulation of sanctions in case of non-compliance for (1) producers and traders of diesel fuel and gasoline and (2) producers of biofuels (biodiesel, vegetable oils).

Total quota increases up to 8% in 2015, minimum quota for diesel is .4% and minimum quota for gasoline is 3.6% in 2015.

A strong increase was in biodiesel production until 2006. Germany is one of the world leaders in biodiesel production and consumption. Approximately 45 biodiesel/bioethanol production plants were in operation in Germany in 2006. Transportation biofuels achieved a level of approximately 5.2% of the total fuel demand in the transport sector, However, due to reduced tax privileges and biofuels quotas, over-capacities in the biodiesel sector are expected in the next years. In addition, some new biodiesel production plants are coming to market and competition will be tougher.

Effect of Policy Instruments on GHG Mitigation

Total greenhouse gas (GHG) mitigation was 97 million tons in 2006. The electricity sector was mainly dominated with energy produced from wind and water, as well as from biomass. Altogether, 67 million tons GHG-s were mitigated. The transport and heat sectors used mainly biomass for energy production where GHGs were mitigated. Thus, half of the GHG mitigation achieved is thanks to the EEG and the other half on the basis of biomass.

Another positive effect of development of the bio-energy sector is job creation. The number

employed in the bio-energy sector shows an increasing trend: 157 000 jobs were created in 2004, 190 000 in 2005 and 214 000 jobs were created in 2006.

Future development of the bio-energy market strongly depends on policy conditions. The expected technical biomass potential in 2010 is 1600 PJ/a, using available technology and taking into account land availability for energy crop production. This potential is based on available forestry wood residues, industrial used wood, substrates for biogas production, straw and energy crops which will further increase in the future. These will be used for heat, CHP and biofuels production. A significant amount of biofuels will be imported by 2010. The reason for the larger share of imported biofuels lies in the fact that the production of biofuels is less cost-intensive in other countries.

3.3.3 Concluding remarks

There are large technical biomass potentials in Europe and Germany – currently these potentials are used only partly. The role of energy crops will have great importance in the future. However, in Germany and in other parts of Europe a dynamic development and use of bio-energy has started, promoted by means of appropriate policy instruments. Thus, the use of bio-energy already contributes to favourable climate change via GHG mitigation, positive employment effects as well as the security of energy supply. But, through increasing biomass use, competition is expected at different levels (land area for biomass production, feedstock, and end-energy sources). Germany has to focus on R&D in order to improve the basis for decision-making processes and to develop further promising paths for bio-energy use. Particularly, research and development is relevant to the following issues: (1) energy efficiency; (2) technology development (e.g. new biofuels, feed-in of bio-energy sources – biogas into national gas grid); (3) available biomass potentials and competition for the use of biomass, and (4) requirements in the context of sustainability (e.g. certificates).

3.4 Sustainable Energy Vision for Lithuania 2050

Mr. Saulius Piksrys[20]

3.4.1 Recent Developments in the Energy Sector

Renewable energy has been treated by governmental authorities with very little interest in Lithuania. Different EU directives are obligatory, but these are being implemented with minimum effort. The Lithuanian Energy Strategy was adotped in 2003 which stated that, after the closure of Ignalina nuclear power plant (NPP), small CHP plants should be developed close to the heat end-users, e.g near big towns and other settlements. But, at the begining of this year the Lithuanian government changed the abovementioned energy strategy and adopted a new one. A new NPP was pushed politically by the "bulldozer principle" through Parliament to be included in the new energy strategy and is to be built together with the other Baltic States and Poland. The alternatives and renewable energy options were not considered or discussed in public or among stakeholders' groups (Finnish experience). Thus, since the beginning, the new NPP project in Ignalina looks speculative and the whole process is not transparent at all. The feasibility study was made by the energy companies themselves, the scientists were not involved in this process and the feasibility study is not available for public debate.

The total installed capacity for electricity production is 4300 MW in Lithuania. The capacity of Ignalina is 1300 MW and even without Ignalina there is overproduction of electricity in Lithuania. A lot of CHP plants are planned to be built around cities but still renewable energy sources meet a very tiny part of total energy demand in Lithuania.

Some arguments of Lithuanian NGOs against nuclear power:

- Dangerous (Chernobyl, Three Mile Island, Fukushima, Monju, Tokaimura) – the possibility of human error and accidents will always remain;
- No major changes introduced into the safety systems of generation III and III+ reactors – no significant improvements in safety, changes are minor and mainly in design;
- Radioactive waste problem – an increasing problem in the world;
- Expensive and not competitive;
- Heavily subsidized;
- Does not solve climate change problems;
- Does not contribute to the mitigation of social issues;
- Blocks development of alternatives;
- Resources of uranium are limited;

[20] Lithuanian NGO Atgaja, NGO Atgaja is part of an international NGO network called Central Eastern Europe Bankwatch Network.

Olkiluoto 3, Finland:

- Rough EPR design;
- Low contract price (2 million EUR/MW);
- Scandals on construction quality;
- Hidden state subsidies;
- Investigation at EC;

Renewable energy in Lithuania should be promoted according to the opinion of Lithuanian NGOs. This was the reason behind the creation of the "Sustainable Energy Vision for Lithuania 2050" which is introduced below. The arguments in favor of renewable energy are listed below:

- Most modern technologies;
- Stimulating business;
- Increasing occupation in agriculture;
- Generating jobs;
- Decentralized power generation;
- Local energy resources;
- Cheap (no or low fuel price).

Energy efficiency is very low in the Baltic States. Energy intensity is two times higher in these countries than in the EU-15. Through increasing energy efficiency it is possible to recover up to 30% of total energy demand in Lithuania according to different energy efficiency studies. The "Factor Four" principle should be adopted in decision-making. This means Doubling Wealth, Halving Resource Use and it is the title of a book published by Ernst Ulrich von Weizsäcker, Amory and Hunter Lovins in 1995[21]. Factor Four plays an important role within applied sustainability research, especially within material flows and resource management. We regard Factor Four as a normative guideline for decision-making that points out ways of relieving environmental burdens. Factor Four signalizes appreciable environmental relief, particularly in the field of resource productivity. To cite an example given by Amory Lovins: To improve a pipe system, straighten the pipe and enlarge its diameter. That will reduce the energy necessary to pump fluid through the system by more than half. Keep it simple and straight!

3.4.2 Aim of the Vision

The main aim of Energy Vision 2050 was firstly to demonstrate to the governmental authorities that alternatives to dangerous and dirty nuclear power exist. Secondly to encourage discussion in Lithuanian society on the possibilities of sustainable energy development scenarios. The third aim was to prove that the best way to ensure security of energy supply is by using local resources.

[21] http://www.wupperinst.org/FactorFour/

Methodology

We used a simple MS Excel-based mathematical model for our calculations and scenario building. For checking our model software developed by Alborg University to evaluate hourly energy balances for both electricity and heat was used. The data for calculating the potentials of renewable energy sources were taken from existing scientific studies. Assumptions of future energy sector development trends were made on the basis of the analysis of governmental programs, e.g. how much the energy demand will increase.

The following elements were used in the scenario building process:

1. Energy efficiency will increase;
2. Heat savings in buildings will take place;
3. Effective transportation will be used;
4. Growth in energy services will happen;
5. Development of renewable energy sources will increase;
6. Usage of fossil fuels and nuclear power will decrease;
7. Usage of modern energy forms (Hydrogen engines, Heat pumps, etc.) will increase.

3.4.3 Renewable Energy Resources in Lithuania

Lithuania has significant potential for energy production using biomass. Energy forest can be cultivated on 2200 km^2, which is equal to 7 % of the arable land in Lithuania. The energy which is possible to produce on this area ensures the minimum need (base load) for electricity production in Lithuania. Additionally to this, agricultural residues (straw) and residues from forestry and saw-mills should be used efficiently for bio-energy production.

Wind power potential is 1000 MW in Lithuania. Opportunities to use off-shore wind power are huge but not very well studied. Recently, two big wind farms started to produce electricity with installed capacity 30 and 14 MW in Lithuania. Tenders for the building of new wind farms with installed capacity of 150 MW were invited by the Ministry of Economics.

The use of wind power may be phased in as follows: until 2010 – 200 MW; until 2020 – 800 MW; until 2050 – < 1000 MW including off-shore wind power potential and a connection with Sweden.

Lithuania has huge theoretical geothermal potential, however, a very conservative approach was taken and this was not seriously considered due to a number of uncertainties in our scenario building process.

It is predicted that only 37 km^2 of roof covers for solar collectors (from 2010) with a capacity of 400 kWh/year for hot water and 100 kWh/year for PV will be used.

In 2000 1.2 PJ (0.34 TWh) of electricity was produced by hydro power in Lithuania. The potential on small rivers is 1.5 PJ (0,4 TWh) and the potential on big rivers is 3 PJ. The capacity of hydro power used in the Vision was 2.7 PJ (existing and small rivers potential).

According to our scenario, the primary net energy supply will decrease almost half because of energy efficiency (Figure 1). The nuclear power plants will be closed by 2010 and the main source for primary net energy supply will be biomass.

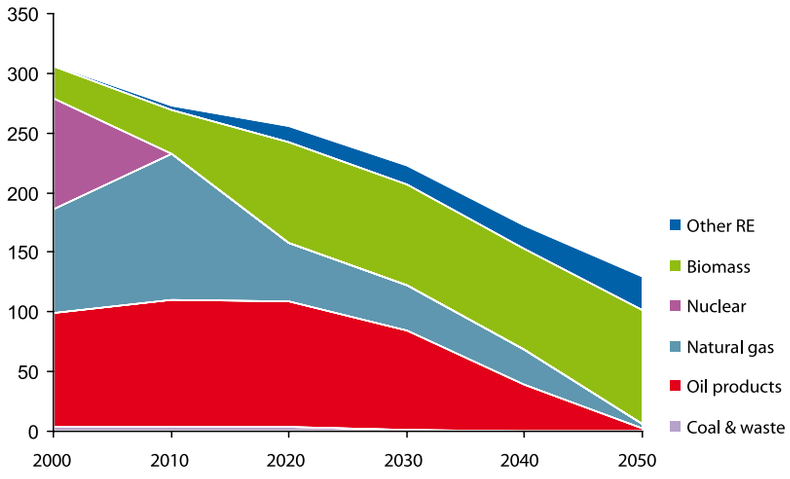

Figure 1. Primary net energy supply by energy sources 2000-2050 in Lithuania.

Investments in renewable energy sources and energy efficiency will have the following positive impacts on society and on the economy and the environment. It will stimulate local production and create jobs. It will promote the development of local infrastructure. Also, natural resources are not over-used and bio-energy has very low or no pollution.

The division of renewable energy by sources is presented in Figure 2. The main source for energy produced is biomass, both solid biomass and energy plantations.

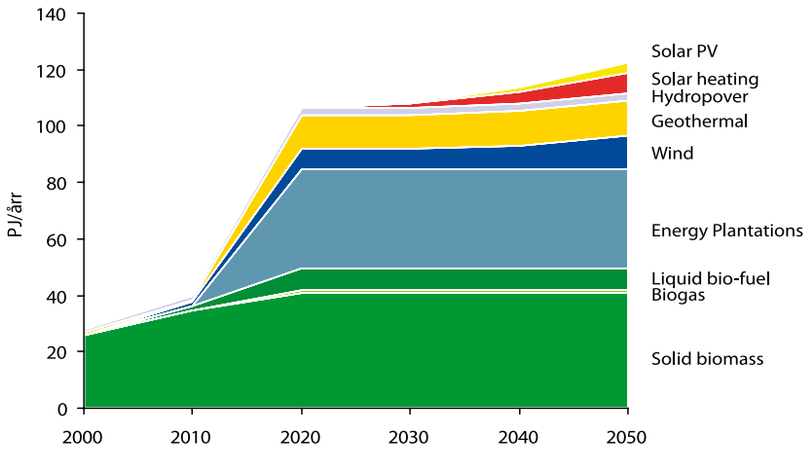

Figure 2. Renewable energy sources 2000-2050 in Lithuania.

The Lithuanian electricity supply by sources is presented in Figure 3. Here again bio-energy has the most significant share in electricity production.

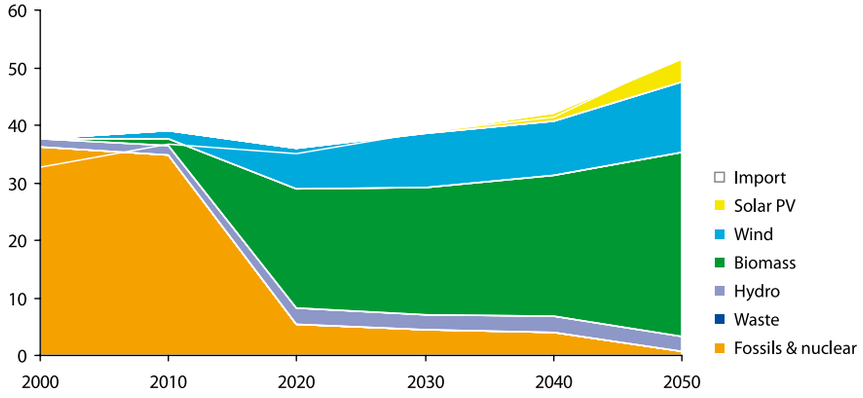

Figure 3. Electricity supply by sources 2000-2050 in Lithuania.

The implementation of the scenario introduced above might look very mysterious at first glance. But when we have discussed this with leading politicians and experts, it is actually a very realistic plan and the only option for Lithuania to achieve carbon-neutral and nuclear-free energy production in Lithuania without compromising the present standard of living.

3.5 The Põlva County Vision and the potential for independent energy supply on the basis of bio energy

Villu Vares, Ülo Kask, Aadu Paistt[22]

3.5.1 Utilization of renewable energy sources – technical, economic, social and environment-related aspects

Estonia has declared its commitment to increase the share of renewable energy sources in the energy balance of the country. More extensive utilization of biomass for energy production has been indicated by

1. the Estonian Forestry Development Program 2001 – 2010;
2. the Long-term Development Plan for the Estonian Fuel and Energy Sector until 2015 and
3. the Long-term Development Programme of Promotion of Biomass and Bio-energy for the years 2007 – 2013.

In the Estonian context one of the first attempts at regional level is the energy development plan for Põlva County. The aim of this project is to create a self-supply and independent area based on local renewable resources.

3.5.2 Present energy consumption

The total area of Põlva county is 215 342 ha, the population is 32 601 inhabitants. The county is divided into 14 local governments: 1 town and 13 rural municipalities. The population is concentrated in the neighbourhood of Põlva town and the energy consumption is correspondingly concentrated. The second largest energy consumer is Räpina.

Wood fuel is the main fuel for households in 37 - 47% of cases. The county is dependent on imported fossil fuels –the share of natural gas is 21 - 27% and the share of motor fuels is 27 - 30% of total fuel consumption. Specific to Põlva are experiments of using grain and grain processing residues as fuel.

In Põlva County at present about 5.6% of the county's electricity consumption is produced by small hydro power plants.

Wood fuel resources have a significant role, particularly in heat production. The total forest area of Põlva County is 103 400 ha, out of which state forests are located on 47 189 ha and private forest owners have 56 210 ha. The distribution of forest land by protection categories is as follows in Põlva county – protected forests are on 3 018 ha, protection forests cover 10 568 ha and commercial forests are managed on 89 814 ha. The total amount of fuel wood is 29 250 m^3; tops and branches form a significant amount of 88 900 m^3. Wood processing residues (from sawmills, log-house building, furniture and other) are calculated to be produced annually in the amount of 100 000 m^3. Sawdust is sold to pellet and briquette factories.

[22] Tallinn University of Technology

3.5.3 Potential of renewable energy and peat resources

During the years of the restitution process and reforms in **agriculture**, the area of arable land decreased dramatically. The area of arable land was 35 685 ha in Põlva county in 2005. The abandoned agricultural land can be used either for the re-establishment of traditional crops or for the cultivation of energy crops. The choice depends on the market situation.

Traditionally, straw as a by-product from agriculture has been considered as solid biofuel.

In general the yield of cereals in Põlva county is low (2.1 t/ha) due to the low level of utilization of fertilizers. In addition to that, the soil of the county has an extremely low humus content. Only in the case of increased levels of fertilization can a certain amount (one third or 11 thousand ha) of the land be used efficiently for energy production.

Wetland plants, mostly reeds, stretch along the shore of the Baltic Sea, lakes and rivers. The reed beds stretch along the shore of Lake Peipus in Põlva County and from the total area of 170 ha, 1.7 thousand tons per year can be harvested (at an average productivity of 10 t/ha/y. Normally reed is used as a roofing and insulation material. The average yield of reed is 5 t/ha/y.

Until now all biodegradable waste was landfilled. At the moment the only official landfill is located in Adiste, but it will be closed by the year 2009. All other, smaller landfills have been closed already. All waste will be landfilled in a new landfill in the future the location of which is under discussion at the moment. To decrease the quantities of landfilled waste one of the alternatives for waste processing is the production of energy from the waste via burning or producing biogas. Biogas is the better solution. The total amonts of municipal and biodegradable waste together with their estimated energy contents are presented in Table 1.

Table 1. The amount of municipal and other biodegradable waste 2003 – 2013 with estimated energy content in Põlva county

	2003	2010	2013
Municipal waste, t	4 164	4 700	4 980
Other biodegrable waste, t	7 079	8 180	8 700
Estimated energy content, MWh/a	33 730	38 700	41 000

In the county there are several sources for biogas production: cattle manure, sewage sludge, biodegradable part of MSW, organic waste from industry, commerce and the service sector. Theoretical amounts of biogas are presented in Table 2.

Table 2. Theoretical amounts of biogas produced from manure, sewage sludge and biodegradable waste with estimated energy content in Põlva county

Source	$10^3 \cdot m^3$	GWh
Manure	21 463	134
Sewage sludge	521	3.3
Biodegradable waste	321	1.9
Total	**22 305**	**139.2**

Hydro Energy

There are 40 rivers and streams located in the county. Before the Second World War there were 67 small hydropower stations in operation with a total capacity of 700 kW. Due to environmental restrictions the construction of new hydro plants is impossible or at least problematic. Currently 8 hydro power plants are in operation in Põlva County. If the improved technical parameters of water turbines today are taken into account, the theoretical potential of hydro energy in Põlva county can be estimated to be up to 2 000 kW.

Wind-based Electricity Generation

Regarding resources and technology there are some possibilities, but it would be more beneficial to invest in better locations than Põlva County, where average wind speeds exceed 4 m/s, but in the best places around the country the average wind speed exceeds 8-9 m/s. Wind generators may be installed in Põlva (near Lake Peipus) but these would have to be connected into the Estonia's national grid as utilization of wind electricity for local needs only is not economically feasible.

3.5.4 Potential of Renewable Energy Resources and Peat in Põlva

The data indicates that the biggest unused resource is abandoned agricultural land which makes up nearly half of all available resources. In addition to that, traditional fuel wood, harvesting residues from the forest, wood processing residues, straw, and peat and wind energy can make the biggest contribution to the energy supply of the county.

3.5.5 Supply-Demand Balance of Renewable Resources by Municipalities in Põlva County

The resources are distributed throughout the county quite evenly and therefore all municipalities have the potential to increase the share of renewable resources in the energy balance. The only exception is Põlva Town, which depends on the neighboring municipalities.

3.5.6 Technological Possibilities for Using Different Renewable Sources

In Põlva County, therefore, the range of capacity is from approximately 100 kW to some MW. Suitable technology for this capacity range includes:

1. Solid fuel burner for combustion of wood chips up to 0.5 MW (a new or an old boiler);
2. New boiler with fixed or mechanical grate for wood chips, with capacity of 0.5 MW and higher;
3. Shaft furnace for wood logs and/or sod peat - up to some hundred kW;
4. Combustion systems for pellets – up to some hundred kW.

Straw Combustion

Fuel (straw) is transported into the boiler plant as straw bales and fired without any shredding. Combustion will take place by single bales in batch-fired boilers. "Cigar-type" combustion with successive feeding is another option. Fuel is supplied into the boiler plant as straw bales, then bales are shredded and crushed straw is fed into the furnace. Straw is shredded during harvesting, transported to the boiler plant and fed through a special fuel bin. There is a possibility to produce pellets and briquettes but the price of these would be too high for heat producers and consumers, at least in the present economic situation.

Additional problems with the combustion of straw have been identified. The moisture content of the straw must be ≤ 25%. The possibility of additional drying in a storage hall (blowing air through the straw bales) is an option to overcome this obstacle. Usage of straw needs large fuel storage to keep an annual quantity of straw. The technological need for boilers of special designs to enable the co-combustion of various types of fuels is problematic.

Combustion of grain is possible (with certain problems) in wood-fired boilers, particularly in pellet boilers. This will cause slagging, corrosion of heat transfer surfaces and other problems. Special boilers are not available for grain combustion as there are only a few users. This is cost effective only due to subsidies given to agricultural field crops. It has to be pointed out that motor fuels are needed in the process. Due to ethical problems it is recommended to use the surplus of grain for the production of bioethanol. This may be used occasionally to cover the heat usage.

Steam Cycle-based Cogeneration of Heat and Electricity (CHP) using Biofuels Small CHP plants (1-2 MW_{el}, 5-10 MW_{th}) are not cost effective. The comparison of large and small CHP is shown in Table 3.

Table 3. The comparison of technical and economical indicators of large and small CHP.

Indicator	Large CHP plant	Small CHP plant
Electrical capacity, MW_e	17	3.5
Thermal capacity, MW_{th}	40	16
Total number of staff	30	8
Total investment, MEEK	500	185
Feed in tariff*, EEK/MWh_e	810	810
Pay back time, a	7.7	11.2
Net present value, MEEK	267	10.3
Internal rate of return, %	11.5	6.3
	Pays back	**Risky**

*-tariff was valid until 2006

Possibilities for Utilizing Solar Energy

Regarding utilization of solar energy, Estonia (incl. Põlva County) is located in a moderately unfavourable region. PV electricity generation might be under discussion in exceptional circumstances – as an autonomous source in the case of no connection to electricity networks. Solar energy may be used for hot water supply during the summer. Specific investments are high, excluding self-made primitive systems. Possible use of solar energy is described in the case of Põlva hospital. Põlva hospital may use the solar energy for hot tap water preparation – 100%

during the period from May to August and 60% as an annual average under the following conditions (based on German methodology):

1. 24 hours need for hot tap water – up to 15 m^3;
2. total area of solar collectors – 415 m^2 (direction to south, horizontal angle 25 – 45°);
3. Volume of storage tank – 22.5 m^3.

Use of Heat Pumps

Using additional energy, up to 75% of the energy from the ambient environment can be utilized through heat pump usage. In the case of water-based central heating, floor heating is the most suitable option (using energy from the ground or from a body of water) and is therefore mainly applicable to new buildings. In the case of ground heat pumps, a certain area is needed for installing collector pipes. Air-air heat pumps/conditioners coupled with additional heat sources can be installed in office buildings. This requires large initial investments and, therefore, pay-back analysis is needed for each project.

3.5.7 Concluding remarks

The analysis of the supply-demand balance of renewable resources in Põlva County has proved that there is theoretical potential for creating a self-supply and independent area based on local renewable resources. The utilization of forest resources must be improved and the abandoned agricultural lands should be exploited for the production of energy crops. Other renewable energy resources (wind and hydro energy, straw, biogas etc.) can provide an additional contribution.

Technological possibilities:

Up-to-date technological solutions are available – combustion of wood, peat and straw; wind generators, hydro plants, cogeneration of heat and electricity, production of biogas, etc.

A lack of technology suitable for the small capacities in Põlva County – in particular for waste combustion – may cause problems for using this technology. Technological solutions need more testing under specific conditions, e.g. combustion of grassy biomass.

Economic feasibility is related to specific investments, to the prices of fuels and energy and to compatibility with energy load curves (heat). Special economic assessment has to be made for every project, with particular consideration of load curves. Most prospective projects at present concern wood and peat boilers. Solutions that need more detailed analysis will take more time and effort to bring into use e.g. combustion of straw, biogas projects, etc.

Projects of steam cycle-based cogeneration are probably not cost effective, as there is no such demand for heat. Cooperation is needed with other regions on using wind energy, waste utilization, etc.

Feasibility of several projects depends directly on subsidies and tax policy. The price of new fuels depends on the use of these fuels. Success of projects depends a lot on local initiative and enthusiasm and on other social aspects of using renewable energy sources. Job creation is mainly related to the production of biofuels, less to the usage, marketing and trading of these fuels.

3.6 Finland – Experiences on biogas production in Finland

Dr. Ari Lampinen[23]

The Finnish Biogas Association includes biogas producers, users, researchers, technology producers and some other interested organizations and individuals. The main product of the association is the annual register of all biogas plants in Finland, describing the amount of energy produced, technologies used, etc. The register is available on the Internet at the address http://www.biokaasuyhdistys.net in Finnish.

3.6.1 Renewable Energy in Finland

The share of renewable energy (RE) of total primary energy supply (TPES) was 24.1 % in Finland in 2006. Three sources of renewable energy dominate, namely hydropower, industrial wood waste (black liquor and bark wood) and domestic firewood, together making up 23.4 % of the total RE. Domestic firewood is "free" as it is usually collected from privately-owned forest for the owners' heating purposes. All of these sources are very competitive without any subsidies or policy support from the government.

Industrial waste wood provides 10% of electricity in Finland and the share of hydropower in electricity production is 20%. Black liquor and bark are used in large industrial CHP plants to produce electricity, heat and process steam. Saw mill waste and industrial logging residues are used in large municipal CHP plants for the same purposes. Electricity produced from industrial wood waste in industrial CHP plants is much cheaper than electricity generated from nuclear or fossil energy sources. It is a good example of using waste from bioresource processing industries. Consumption of all other biomass is very low, including logging residues of which vast majority is left in the forest. This has large growth potential in Finland and in some other countries as well.

The share of all other RE sources is only 0.7 % and the share of biogas is only 0.1 % of TPES. The potential for biogas generated from waste base material is 3% of TPES, but currently only 3% of this potential is used. The potential for biogas production from energy crops using 1 million ha arable land is 7% of TPES. Thus, with the given preconditions, the total potential for biogas production is 10% of TPES.

The Finnish Renewable Energy Promotion Program was made in 1999 after the EU renewable energy promotion program was launched in 1997. The target for biogas production in the Finnish Renewable Energy Promotion Program is 0.5% of TPES by 2025, which is 20 times smaller than the actual potential of 10% described above.

The total number of biogas plants in Finland is 61[24]. A little over half, namely 33, are landfill gas plants, all of which are located in active landfills. All active landfills must have biogas collection systems by law. But there aren't any requirements to have biogas collection systems in old landfills. As a result of the recent closure of many landfills methane escapes from these to the

[23] Finnish Biogas Centre, (lampinen@kaapeli.fi), Vice Chairman, Finnish Biogas Association.

[24] Source: Biogas plants register 2005 by the Finnish Biogas Association and the University of Joensuu.

atmosphere. Finnish greenhouse gas (GHG) emissions have increased 20% since 1999 waste management sector being the only sector that managed to decrease GHG emissions due to the policy of compulsory landfill gas collection.

Only 15 out of 416 Finnish municipalities have biogas collection systems in municipal wastewater treatment plants. Comparing this number to other EU countries, it is still quite high. The number of farm-based biogas plants/reactors is 7, which is 0.01 % out of 70000 farms. This indicates a huge bottleneck in biogas technology diffusion as farms have a lot of resources for biogas production and thus considerable potential for reactors. This is a primary focus of the Biogas Association. A recent publication[25] made for the Finnish Ministry of Agriculture shows that farm-based energy resources and production potentials (not limited to biogas) is higher than Finland's total energy need. But most farmers don't want to invest in biogas production, even if it is economically profitable, due to the high investment barrier.

There are only 3 industrial wastewater treatment plants in Finland and 4 co-digestion plants. Only one of the co-digestion plants in city of Vaasa uses the sorted biowaste from households for biogas production.

About 80% of biogas was produced in landfill biogas plants (118 million m^3) in 2005, while municipal wastewater treatment plants produced only 23000 m^3.

The first landfill biogas plant was built in Helsinki in 1990 before any legal requirements for this. The Finnish Waste Management Law was adopted in 1993 but it didn't require landfill gas collection. However, the preparation process included ideas and discussions about obligations for landfill gas collection and this started the building of biogas collection facilities in landfills. The obligation of landfill gas collection came into force in 1997 with the Finnish Governmental Regulation no. 861/1997. The same requirement at the EU level was enforced by the EU Landfill Directive (1999/31/EC) in 1999.

Landfill gas collection is a good example of the increased use of environmental technologies. The current problem is that about one third of the gas is flared. The law requires collecting of landfill gas, but doesn't require use of the gas stating that 'the gas should be utilized, if possible'. Thus this is only half the solution and the 30% of landfill gas which is unused indicates the real need to amend the law with a requirement to use the collected landfill gas for energy production.

As a result of increased landfill gas collection the total biogas production has increased 150 million m^3 in 2005, out of which 50 million m^3/a is flared. The biogas production from reactor plants has not increased since 1995 remaining at around 25 million m^3/a out of which 5 million m^3/a is not used. No laws require the use of biogas technology for treating bio-wasted, e.g. municipal sewage waste or sorted bio-waste from households.

Most of the plants producing biogas use it for heating purposes: 420 GWh in 2005. The amount of electricity produced has remained under 50 GWh. Even further behind is traffic fuel production: only 19 MWh in 2005. Traffic fuel production started in one farm in 2002 and it still is the only traffic biogas production and refuelling facility in Finland. The amount of cars using it has increased to nine.

[25] http://ebooks.jyu.fi/1795_6900/9513924971.pdf

The largest biogas producer is Ämmässuo landfill in Espoo close to Helsinki. The total biogas production in Ämmässuo landfill was 63.9 million m^3 (Mm^3) in 2005. Most of the Ämmässuo gas have been flared and heat production started only at the end of 2004. 27.9 Mm^3 of flared biogas is equal to 14.2 Mm^3 methane which could be used for running 43 million bus km. This is equivalent to the annual fuel consumption of 430 buses or 140 % of Helsinki City's annual bus fuel needs.

The largest reactor plant is the sewage water treatment plant in Viikinmäki in Helsinki with annual biogas production of 9.5 Mm^3. The total energy production is 46 GWh: 15 GWh for electricity and 31 GWh for heat production.

Landfill gas and sewage water biogas is not used in the Helsinki buses even though more than 70 buses are using natural gas coming via pipeline from Siberia and even though biogas was used in about 100 vehicles in the 1940's.

One of the working examples of a bio-energy farm with diverse biomass inputs is Kalmari farm. Efficient use of energy and exergy of wastes takes place at Kalmari farm via co-digestion of cattle dung, agricultural waste, kitchen waste, and industrial waste and energy crops. An article about the farm's production is available in English in the journal 'Refocus 5/2004'[26].

Co-production of electricity, heat, traffic fuels and fertilizers (poly-generation, bio-refinery) takes place there and the payback period was only a few years without subsidies. Micro-CHP is installed at Kalmari farm with a capacity of 30 kW_{el} electricity production and 60 kW_{th} for heating purposes using a modified Valtra tractor engine. Also, a vehicle refuelling facility is installed and fertilizers from digestion residues are produced.

Interestingly, the nearby Valtra tractor factory is so far not shown interested in producing biogas tractors even though the Sisu engine they use is powered in the Kalmari farm on biogas. A similar situation occurred a few years ago with the use of biodiesel in Valtra tractors. German market changed their policy, because German farmers who produced biodiesel demanded biodiesel compatible tractors. A similar process could happen with biogas if the market starts to demand biogas compatible tractors and other machinery.

Current bio-waste treatment policy priorities in Finland are as follows:

(A) composting is the preferred waste management technology, which means losing energy content of the waste and losing energy and nutrients in the process;

(B) the biogas usage priorities are

(1) flaring;

(2) heat production only;

(3) combined electricity and heat (CHP) production;

(4) biofuels production for vehicles.

Policy based on environmental and economical considerations should be the following:

First priority should be:

[26] http://www.kaapeli.fi/~tep/projektit/liikenteen_biopolttoaineet/Refocus_biogas.pdf

(A) anaerobic digestion as the preferred waste management technology; and secondly

(B) in biogas usage priorities:

(1) biofuels for traffic;

(2) electricity + heat (CHP);

(3) heat production only;

(4) flaring.

The importance of using biogas in traffic is also based on the fact that CO_2 emissions in the EU have increased in the last 15 years by almost 20%, when in all other sectors there has been a decrease since 1985 or CO_2 emissions have approximately stabilized at the 1985 level.

Also, waste based biogas offers the lowest lifecycle greenhouse gas emissions of all traffic biofuels, including the so-called second generation biofuels[27]. Only wind and solar power combined with fuel cell technology enables fuels with lower lifecycle emissions. Often the Toyota Prius gasoline hybrid car is considered as a very environmentally friendly vehicle, although it produces 126 CO_2 g/km. For biogas cars, the lifecycle CO_2 emissions are ten times less, between 9 and 12 CO_2 g/km. Hybrid cars can, however, offer significant CO_2 emission cuts if they are powered by biogas. For Toyota Prius converted for biogas use the value is about 5 g/km[28].

The following lessons are learned from Finnish experiences. The main success story is the biogas collection in landfills, as a result of environmental legislation. Very low diffusion of biogas technology has taken place in all other sectors, where legislation does not favour the biogas option, especially in farm scale systems. The most advanced technologies should be disseminated EU wide with BAT and BEP status within the IPPC directive implementation in the bio-waste sector. An example of such technology is farm scale poly-generation of traffic fuels, electricity, heat and fertilizers.

Still in 2003 a Finnish motor vehicle law from 1966 obliged consumers to pay very large extra tax for using biofuels (e.g. for the Volvo V70 Bi-fuel the tax was 11 000 Euro/year). Now this tax has been removed due to EU pressure, i.e. the energy taxation directive (2003/96/EC) and traffic biofuel directive (2003/30/EC). Further EU wide action is needed to enable efficient utilization of the biogas potential.

[27] http://www.lbst.de/publications/presentations2004/WHEC15_GM-WtW_Reinhold-Wurster_28JUN2004.pdf

[28] http://www.gronabilister.se/public/dokument.php?art=511&parent01=1

3.7 Production, distribution, and use of biogas in Gothenburg and in the western region of Sweden

Mr. Ingemar Gunnarsson[29]

The main aim of Göteborg Energi is to distribute energy (heat and gas) to citizens of Gothenburg, as the company is owned by the City of Gothenburg. The number of company customers was approximately 300,000 in 2005 while the total population was 400 000-500 000 citizens at the same time, one can guess that the company covers almost all city. In 2005, Göteborg Energi had 1,040 employees; the operating revenue was MSEK 3,600 and profit was MSEK 615. Investments were made in the order of MSEK 1,628 in 2005. The company's main product is heat for distribution via a district heating system in the amount of 4,200 GWh/a. Göteborg Energi also produces electricity and gas and deliveries of gas amounted to 1,300 GWh in 2005.

Environmental issues have been very important for Göteborg Energi throughout the years. The company has its own **Environmental policy**, which states: "In our attempts to satisfy our customers' demands for energy, we always bear in mind the environment and are working towards a *sustainable energy system for our society.* Each employee is responsible for taking our environment into account. We are constantly *working to reduce our impact on the environment and prevent pollution from our activities.* We comply with and strive to exceed applicable environmental legislation, regulations and other requirements."

In the last 30 years Göteborg Energi has worked hard on issues of district heat production and developing the district heating network as well as how to reduce the negative environmental impacts from heat and electricity production on the surrounding environment.

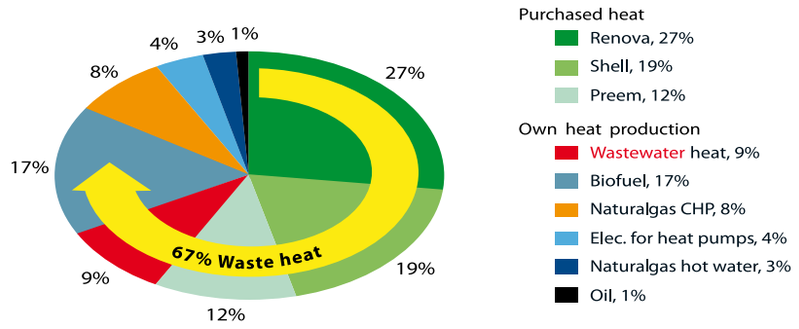

Figure 1. Fuel mix for production of district heat by Göteborg Energi Group in 2005

The mixture of energy production sources is given in Figure 1. A lot of waste heat originates from incineration of waste and from the refineries of other companies such as Renova, Shell and

[29] Göteborg Energi

Preem. Göteborg Energi produces heat from natural gas and biofuel (woodchips), only 17% of total heat produced is used for CHP, 1% of heat is produced from oil.

Gothenburg city has a long history of using gas networks for public purposes – gasification of coal was used for gas production and distributed via the town's gas system since 1846.

Göteborg Energi produced most of the heat for district heating in the amount of 2 TWh using fossil fuels in the early 1970s. The main source for heat production was sulphur-rich mineral oil so that sulphur oxide, nitrogen oxide and carbon dioxide contents were much higher than today. The switch from fossil fuels to usage of biogas reduced air pollution down to close to zero and, during the same time, heat production almost doubled. The company considers this to be a success story in relation to climate change **and fulfilling the company's vision:** *'Göteborg Energi shall actively contribute to the development of a sustainable Gothenburg. The target is to successively replace natural gas with biogas'.*

Biogas in this context is mainly understood to be methane (CH_4) produced from biomass and from other biological substances such as sludge. It does not add greenhouse gases when combusted since it has absorbed CO_2 via photosynthesis during the growth period. Methane is the simplest hydrocarbon, it is 100 % renewable fuel, very clean and there will be no additional CO_2 contribution to the atmosphere in using biogas. The additional advantages are local production and safe supply.

Biogas (methane) has global potential for growth, it represents a way of solving a lot of problems. It is compatible with existing systems of gas distribution which can easily be used for biogas distribution. The idea behind this is to use the same system for natural gas and biogas. However, the biogas should be upgraded to the same quality level as natural gas and then it can be easily distributed, either in the form of a mixture of gases or only biogas. The company has a growing market and has reliably supplied its customers.

More customers have the opportunity to replace other fuels with biogas reducing pollution. The surplus of biogas produced during the summer can be pumped into the natural gas grid instead of being burnt off. The reliability of the biogas supply improves by connecting the biogas grid with the natural gas grid (Figure 2).

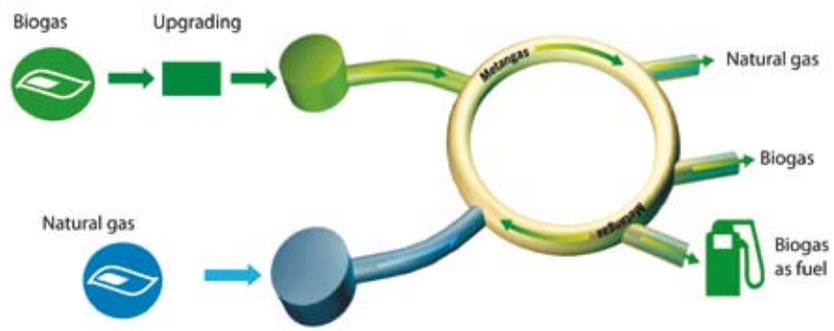

Figure 2. After upgrading biogas can be distributed by natural gas grid to costumers.

Some facts about a few biogas projects that Göteborg Energi is implementing:

The 'Biogas Arendal' project is supposed to upgrade biogas to a level allowing distribution in the natural gas grid in the Arendal area. The biogas is produced by digestion of sludge from a wastewater treatment plant. The biogas is bought from the local wastewater treatment company, Gryaab, which has a production volume of 50 - 60 GWh/year with calorific value of the raw gas: 6 kWh/Nm³. The target is to upgrade the calorific value of the product gas to 11 kWh/Nm³. This is achieved via removal of CO_2 (Figure 3). The plant has been in operation since December 2006.

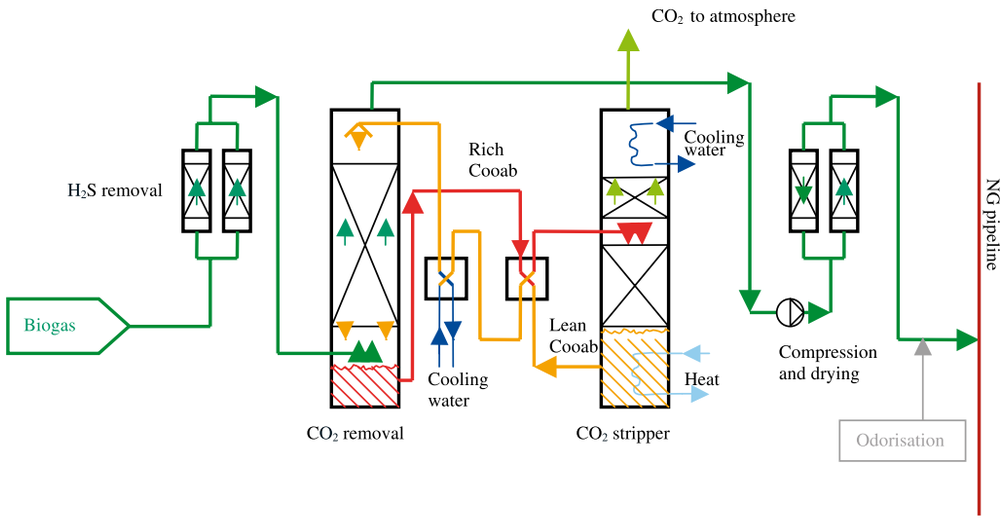

Figure 3. Biogas, produced in wastewater treatment plant, is upgraded to calorific value of 11 kWh/Nm³ via removal of CO_2.

Plans for biogas production in Falköping

The existing plant for biogas production from sewage sludge is currently working. The new plant for refining raw gas for use as fuel has been in operation since spring 2007. A connection to the filling station in Falköping is established and the capacity of the plant is from 5 to 10 GWh/year.

Plans for production of biogas in Lidköping:

Digestion of waste from existing ethanol production and removal of CO_2 is the approach here. Production of compressed biogas (CBG) is the planned solution in Lidköping, which will be used as fuel for vehicles. Planned capacity is 20 - 30 GWh/year, the investment of around 50 MSEK is in process and the plant should be in operation in 2008.

GoBiGas *is the acronym of* ***Go****thenburg* ***Bi****omass* ***Gas****ification Project.*

The purpose and objective of the project is to demonstrate the possibilities of the gasification technology on a commercial scale and to build a gasification unit that produces renewable and CO_2-neutral natural (bio)gas. The objective of this is to take a significant step towards Göteborg Energi AB's long-term target to replace the natural gas in our own plants and meet our customers' demand for renewable biogas.

The planned technology for this plant is thermo-gasification of biomass and production of bio-methane on a commercial scale with total production of 100 MW gas per year. Production of high-calorific gas by methanation will be used for distribution on the gas grid. Also, it is possible to use the produced gas in Rya CHP. The plant is planned to be in operation by 2012. Heating power will also be taken into use. The plant will use residues from forestry, agricultural waste, and sludge from a water treatment plant. It offers further advantages by using a variety of raw materials which have so far been considered as waste (Figure 4).

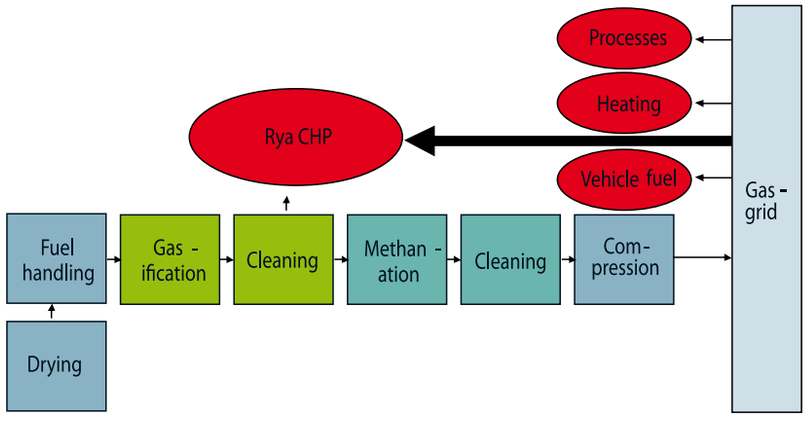

Figure 4. Principal process of biogas upgrading process and distribution to an end-users.

The growth in gas vehicles and gas filling stations during the last decade is significant. The number of vehicles using gas is now close to 8000 including buses, heavy duty vehicles and family cars.

In order to make it possible for customers to use biogas, the company plans to build a network of biogas filling stations. One hundred filling stations were in operation in the western and southern part of Sweden in May 2007.

The use of biogas creates conditions which could enable a switch from biogas to hydrogen in the future.

3.8 Bio-energy Village Jühnde – Sustainable Concepts for Energy in Action

PD Dr. Ing. Marianne Karpenstein- Machan[30]

Bio-energy Village Jühnde is a very complex project. It is introduced here very briefly. As we all know, climate change is really happening. We can see it nearly every day. Floods destroyed a whole city and 2 villages were damaged by a big hurricane in Eastern Germany in 2003. It has now become more or less typical in our country every year. We can't consider this a normal way of life and each of us should do something about it. We need quite urgently to use sustainable alternatives to fossil fuels such as sun, wind, water and biomass energy sources.

Complex problems need complex solutions via interdisciplinary science and research groups. One of those interdisciplinary groups was established for the Bio-energy Village Jühnde project which involved researchers from the following disciplines: Agronomy, Geoscience, Economy, Sociology, Soil Science, Political Science and Psychology from the University of Goettingen and the University of Kassel in northern Germany.

The definition of "bio-energy village" used was to cover the heat and electricity demand of a village with biomass via active participation of village people. At the same time, research was carried out to study the effects of the bio-energy village on agriculture, ecology and social life. Researchers play a double role: firstly they are actors in the implementation process and secondly they do applied research. This is also called "action research", because researchers do something practical during their research.

Project implementation started after receiving support from the government with the selection process of the village. The first step was information dissemination via media and advertisements about the possibility to participate in a pilot bio-energy village project. Mayors were asked to invite researchers to the village to introduce the project to people, not only to decision makers. A questionnaire and survey were conducted in 17 interested villages. One of the questions was on citizens' interest in their homes becoming connected to a central heating system once the project was implemented, another on farmers' interest in producing biomass and energy crops. The motivation was considerable in the villages. Four competing villages succeeded to the second round where technical, ecological and economical feasibility studies were conducted and, finally, Jühnde village was selected as the pilot village. Jühnde is located in Lower Saxony in central Germany. It is a small village with 800 inhabitants, 9 farmers use 1300 ha farmland and there is 800 ha of forest which surrounds the village.

3.8.1 Technical Concept

Technical Concept

The current energy consumption in Jühnde by 800 inhabitants is 2 million kWh electricity and 4.5 million kWh heat energy.

[30] University of Goettingen

The bio-energy facilities in Jühnde are an anaerobic digestion plant with a 680 kW_{el} power station with a capacity of approximately 4.5 Million kWh and a central heating plant fed by wood chips with a capacity of 550 kW. In addition, there are 2 heat storage facilities and a 1500kW peak load boiler (fuel oil).

The implementation of the project was supported by the Ministry of Food, Agriculture and Consumer Protection (BMELV) in co- operation with the Renewable Resources Agency (FNR).

Two energy producing plants are installed in Jühnde. Liquid manure and specially cultivated energy crops are processed in an anaerobic digestion plant in order to produce biogas, which is used in a combined heat and power (CHP) plant to produce useable heat (50%) for central heating and electricity (35%) which is sold to the public grid. Hot water pipelines (5.5 km in length) were built as a central heating system for the delivery of produced heat to households. However, heat from CHP is not enough in wintertime with very low temperatures. Therefore an additional central heating plant was built which uses wood chips as its energy source. This plant can fully cover the high heat demand of households during wintertime – no other source of heat production is used. A real challenge was to convince people to take part in this as there was low trust towards this new, innovative system at the beginning but, finally, 75% of households are connected to the central heating system.

The required biomass quantities to run the energy plants in Jühnde are as follows: 9500 m^3 liquid manure is available from 6 animal farms (swine and cattle). Most energy comes from annual crops cultivated on 250 ha of farmland, which make up 20 % of the total farmland. Wood chips from the forest are produced in the amount of 300 tons/year, which comprises 10 % of the annual re-growth.

3.8.2 Agricultural Concept

This project is a holistic project by nature. As energy crops play a crucial role in this project, it was very important to get farmers interested in cultivating energy crops. But not in a conventional way with considerable inputs produced with fossil fuels. It was vital to follow ecological demands in the sustainable cultivation of energy crops. The farmers were educated to meet ecological requirements such as plant diversity, no soil erosion, a minimum of nitrate leaching, minimising pesticide treatments, fertilisation with digestion residues and ashes, and high biomass yield/year.

In order to maximize the biomass production yield, a new cultivation concept was developed at the university called the Double Cropping System. A book entitled "Energy crop production for operators of biogas plants" (Karpenstein-Machan, 2005[31]) in Germany was published on the double cropping system and details of this system are described there. This system is suitable to use in very fertile soils. It is possible to produce two crops in one year because the first crops are either winter rape; winter cereals, or legumes and the second crops are maize, sunflowers, sorghum spp., (Sugar Millet), or ryegrass. The first crop is harvested very early in June with a high water content which is needed for digestion and the production of biogas. A diversity of crops is used in this cultivation system and monocultures are thus avoided. This follows considerable discussion in Germany concerning the use of monocultures for biogas production which negatively impact on the environment. Minimum tillage is used to prevent soil erosion. Intercropping and double cropping are used to avoid pesticides.

The harvest concept is very simple – all farmers know it, this is like "sauerkraut"– the whole plant is harvested, chopped into small pieces and taken to a transport vehicle. This biomass is then conserved as silage for many months and used in biogas production for a year.

All the nutrients are in the digestate and this can be used as a liquid fertilizer and returned to the fields. In this way the import and usage of mineral fertilizers can be dramatically reduced – down to almost 80%.

In answer to the question: "who operates the company?" Village people established a co-operative society with limited liability and this runs the operations. Members of the co- operative society are heat supply clients, farmers, other village people and sponsors.

The project costs together with sources of finance are presented in Table 1. The German Ministry of Agriculture, Food and Consumer Protection gave a special grant in amount of €1,500,000 to the project.

Table 1. Financial concept of Jühnde Bio-energy Village pilot project by funding sources.

Financial concept:	
Co- operative Shares	500.000 €
Private Loans	500.000 €
Bank Credits	2.700.000 €
Grant (Ministry of Agriculture, Food and Consumer Protection)	1.500.000 €
Capital Investment:	**5. 200.000** €

Motivating and encouraging the participation of village people in the project was a challenging task for the project team. A very useful motivational tool is practical and empirical experience of existing bio-energy utilities – visiting them in order to see, to touch, to hear, to smell and to have discussions with their operators. To get a good impression, to learn what it means to have a biogas plant, what it does not mean and to make the decision whether it is the right thing for them or not!

Organisation of the planning process was carefully planned and methodically thought through. Altogether 8 groups worked in the following special fields which were organised:

1. Operator company management
2. Anaerobic digestion plant
3. Energy crop cultivation
4. Biomass wood
5. Housing technique
6. Central heating plant
7. Hot water pipeline
8. Public relations

[31] Karpenstein-Machan, (2005): Energiepflanzenanbau für Biogasanlagenbetreiber, DLG-Verlag, Frankfurt ISBN 3-7690-0651-8

Working groups prepared discussion papers and decisions were made by the Central Planning Group of 35 members consisting of representatives from the District Council Joint Community, Clubs, the University, Church, the young generation, the old generation and Speakers for the groups.

A high participation rate was ensured via workshops and information evenings. Outside experts were often invited to speak on interesting issues around bio-energy. As a result of extensive participation and information exchange, about 75% of Jühnde's households signed heat supply contracts which were a precondition for starting to prepare the investment project.

Climate protection has already been implemented in Jühnde while the rest of Europe still aims towards the European Union target of a 20% reduction of CO_2 emissions by 2020. Reduction of CO_2 output by 3,300 tons/a was achieved, which is a 60 % CO_2 reduction per capita per year in Jühnde.

3.8.3 From Idea to Completion of Energy Plants

The idea of establishing a pilot bio-energy village was born at a workshop in 1998. Financial support for the research group was received in 2000; planning and engineering lasted until 2004 and the groundbreaking ceremony took place in 2004. The supply of heat energy commenced in September 2005 and the energy plants were completed at the end of 2006. A further 8 bio-energy villages are planned to be established in Goettingen district in Hemeln, Lödingsen, Erbsen, Barlissen, Reiffenhausen, Gelliehausen, Landolfshausen, Krebeck, and Wollbrandshausen in the coming years.

3.9 NGO co-operation on implementation of bio-energy strategies - UK and European experiences

Mr. Pete West[32]

Interestingly, the UK does not have a very well developed biomass sector. The Baltic States seem to be much more advanced in it. The International Network for Sustainable Energy - Europe (INFORSE-Europe) joins member organizations (67 NGOs) across Europe, all of them are active at a local level both on local renewable energy policy development and on strategy into actions.

3.9.1 Introduction to Our Organization

Severn Wye Energy Agency is an independent, not-for-profit local Energy Agency established in 1997 under the EU SAVE II programme. We are a sustainable energy advice centre with 16 full-time staff covering a mainly rural area in South West England with a population of approximately 500,000. We actively promote renewable energy and energy efficiency and are part-funded by Local Authorities, the Energy Saving Trust (UK Government) and project-based funding. We are currently partners in 8 international projects funded through Intelligent Energy Europe. We are extremely committed to European cooperation; we have worked with more than 100 partner organisations representing all EU 27 member states during the last 5 years. So it is very easy to start learning from other countries. Our main work is to inform people on energy saving. We try to change behaviour, and our main direction is to convince people how easy it is to save energy via the insulation of houses. Sometimes it is possible to save up to 50% of both heat and electricity via different energy saving measures. We have helped more than 9000 households to insulate their houses during the last 5 years and our NGO has received awards for this effort. It means that we work together with local authorities – we get ready information on governmental support schemes so that inhabitants can easily pick up the phone and they get all the information they need to know about the insulation of their houses. Energy efficiency is probably the best point to start looking for renewable or bio-energy development.

Another big driver we have found is climate change – there is no doubt now that climate change is happening. According to the National Geographic Magazine, Sept 2004, North Pole summer ice coverage is shrinking by 9% per decade (Figure 1). There will be no ice on the North Pole during the lifetime of our children.

[32] Sustainable Energy Projects Manager, Severn Wye Energy Agency, Gloucestershire , U.K., Member of the Management Board INFORSE- Europe

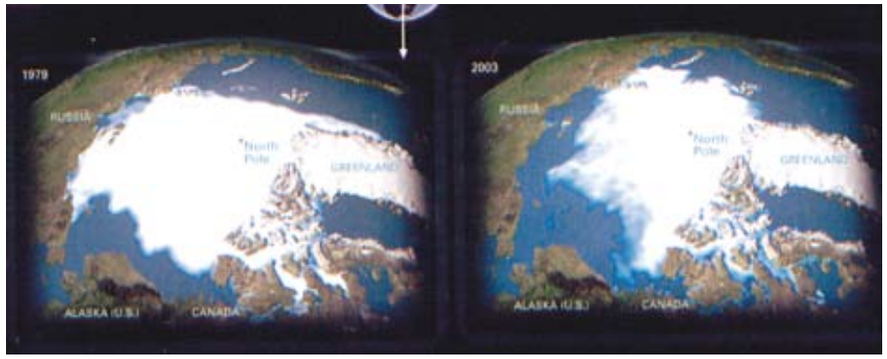

Figure 1. Our children might see a North Pole without ice in the future. Ice cover has decreased significantly between 1979 and 2003. According to some estimates, the ice cover at the North Pole decreases 9% each decade.

What is the UK's contribution to finding out the cost of climate change? The government of the UK asked the previous chief economist of the World Bank, Nicholas Stern, to do a review with a small working group to calculate the cost of climate change. After one year of hard work with leading economists the report was published in December 2006. The main finding was that continuation of a business as usual approach using fossil fuels will cost between 5 and 20% of the world's GDP. Putting this into a UK context, it means the cost of climate change is 3000 euro per person or 12 000 euros per household per year for the damage of climate change like floods, hurricanes, draughts, deaths, etc. I wouldn't question at all that subsidies are needed for renewable energy sources to stop this happening. The German example is excellent in this context, where 200 million euros are paid for biomass-based energy production for the installation of 160 heating units. That is actually 3 euros per person! The total support program for renewable energy is 35 euros per person per year in Germany. It's not expensive to save the world, to make change happen in favor of renewable energy sources compared to the cost if we do nothing.

And nuclear power is not an option. Nuclear power plants produce electricity, they don't produce heat. Electricity production causes only 30% of carbon emission. Only 20% of electricity is produced with nuclear power in the UK. Nuclear is very good for base load, it's very difficult to turn up and down and this it is not controllable. Another thing is the cost of nuclear energy, it is subsidized in the UK with 3 billion euros per year, which is 60 euro per person per year in order to handle nuclear waste properly. It is a hidden subsidy, thus, if someone declares nuclear energy as being cost-effective, it is actually not because of these hidden subsidies and if the costs are calculated according to life-cycle analysis which includes the nuclear waste management and the cost of closure of NPPs.

Estonia has 5 times more biomass per capita and Lithuania 10 times more than UK. Finland and Sweden are the leading countries in this, e.g. the amount of bio-energy produced in Sweden is equal to the amount of energy needed to keep a car on the road for a year by all citizens of Sweden. One of the reasons why the UK does not have big biomass use per capita is because we haven't got anything like such good resources as you have in the Baltic or Nordic countries. Less than 10% of the UK land area is forested compared to 47% in Austria. Excluding the state-owned Forestry Commission, there are an estimated 50,000- 80,000 smaller private woodland holdings, which are spread out around the country. A high percentage of private woodland is unmanaged, because it is not economically viable to get machinery, etc.

Some facts on UK bio-energy production:

- **1% of UK heat requirements are supplied through wood fuel and energy crops;**
- **0.5 % of UK electricity in 2004 was supplied from wood fuel and energy crops.**

Current biomass development policy definitely takes into account biodiversity in the UK. The UK is a relatively small country and people don't want big plantations of coniferous forests or energy crops. What they do want is better management of existing forests and woodland. Sustainable forest management has mutual benefits: thinning the trees gives timber and forest residues, which can be used for bio-energy production, but it also has recreational and tourism value for the wider public. Off-cuts of timber in saw mills can be used for heating. Nature paths and trails are used by urban populations for recreation.

Regardless, it is very important that we do not look to cover the landscape with the trees of new forests but that we actually better manage the existing forests.

It is very interesting to look at the economics of different fuels. The cost of wood chips in the UK is less than 3 €cents per kWh. In comparison, the cost of fossil fuels is a lot more expensive, approximately twice as high as wood chips. There is a slight barrier, because this is the actual cost of heat from the biomass or from an oil boiler which includes capital cost and that is why you need some subsidies to reduce the capital costs of biomass boilers which are considerably more expensive.

A Woodfuel Strategy for England[33] was published in March 2007 by the UK Forestry Commission in response to a government call. The target stated there is: 'To bring to market 2 million additional tonnes of woodfuel every year by 2020'. This is equivalent to heating 250,000 new homes. It represents a 60% increase in woodfuel production. The priority areas are local heat generation with biomass on small to medium scale biomass CHP (combined heat and power) in schools, district heating systems, etc. The issue is that the Forestry Commission prepared the national strategy – how to get local action to deliver that strategy? The Strategy will definitely be based on local use of biomass for environmental and economic reasons. The Strategy might be similar in most countries and will vary only in details. The training of heating engineers and installers is needed for implementation of these strategies and so that people feel confident when these boilers are installed.

The Strategy will help to set up woodfuel supply infrastructure for £3m- £5m per year in order to ensure woodfuel supply at a certain price for the next 20 years. Capital grants for boilers

[33] www.forestry.gov.uk/england

of £5 m -£10 m per year are provided and training for woodfuel suppliers and foresters is organised. Awareness-raising for property owners and demand creation is also supported via study tours and demonstration site visits for seeing existing installations. It is a pity that the Government of the UK is not committed to supporting bio-energy in reality, not putting money into it. The maximum amount of subsidy for biomass-based energy will be 23 million euros in a year, which is only a 10th of the subsidy Germany allocates to bio-energy. It is also a pity that subsidy is dragged out for a long period of time. It would be better to put a higher subsidy into the development of the market and then to reduce the subsidy once the market is developed. But it seems they want something for nothing, something very cheap to start with which, according to my own feelings, is a mistake.

3.9.2 Role of NGO's in Implementing UK Biomass Strategy

This is again working at a local level. Severn Wye Energy Agency obtained a central government grant to set up a local wood chip supply co-operative consisting of farmers and foresters. Any woodland owner in the county can sell wood chips through the co-operative. We use some of our own reserves to subsidise this company because we see a necessity to make something happen on the ground. The hire of a wood chipper is subsidised for 3 years. This is part of a woodfuel supply infrastructure subsidy for 20-30 producer groups around the country with a total budget of 5 million euros. The benefits of such a subsidy are, for example, you can have a subsidized wood-chipper, the machine is expensive but, with a government grant a group of producers can afford it, and it can be used at different sites in the county.

The next example is on the largest district heating system in the UK with 450 houses. This very old industrial site has been cleared of gas works and an old diesel engine factory and a new biomass boiler were installed for district heating. This site is located in a valley which is surrounded by several towns. The site is owned by the Regional Development Agency and partly by the government. When they said they will re-develop the site, they said they wanted a 50% reduction in CO_2 for the whole new development compared to modern building regulations. And this is the way the UK wants something for nothing – so they are basically going to make these building regulations for new buildings very strict so that the buildings have to be low carbon by 2015. They want every new development in the UK with more than 50 houses to be carbon neutral and they wound not get planning consent unless they are carbon neutral. The Regional Development Agency approached commercial building developers and said: "OK, how would you propose to make the site carbon neutral". And quite a big commercial company approached the local energy agency on how to achieve the target of carbon neutrality, how to organize tendering for biomass district heating, etc. As well as being very low carbon, it is supposed to be an example of a very nice layout (with trees, cycle paths, people can walk to work). 1000 jobs were created and they are going to re-locate the factory which was there. The school is also connected to the district heating system.

3.9.3 Establishing a Woodfuel Economy in the Thames valley

Thames Valley Bio-energy Ltd (TV Bio-energy) is a wholly-owned subsidiary of the energy agency Thames Valley Energy (TVE), established in 2001. TVE was established in 2001 as a not-for-profit, independent renewable energy agency for the Thames Valley region. TV Bio-energy trades in fuel-wood, buying wood from 20 different suppliers, processing it, and selling to users. In 2005 they supplied over 6,200 tonnes of wood. TV Bio-energy also has a 20 MW CHP plant, there are not very many CHP plants in the UK, something like 17. The profit from the company, in amount 300 000 euro per year, is used to finance NGO activities.

Midlands Wood Fuel is a commercial biomass company that began as part of an NGO, Marches Energy Agency. This is a different model, where staff of the NGO left the NGO and set up the abovementioned private company, which installs biomass boilers.

3.9.4 NGO's Lobbying Role and Responding to Policy Consultations

INFORSE-Europe comment on the Biofuels Progress Report[34]

INFORSE-Europe does not agree that biofuel is the only way to increase renewables in transport: when 67% of the energy for rail transport comes from electricity, there is a potential to use renewable electricity in transport. In the future also electric cars can play an important role. We welcome the proposal to introduce sustainability criteria and propose that they are introduced as fast as possible. We propose that it is included in the criteria that GMO biofuel crops are excluded from sustainable biofuels. We propose that in the amendment of the directive 2003/30/ EC is set a target of 10% renewable energy in transport for 2020 instead of 10% biofuels in transport fuels.

'Green fuels' could be bad for the environment[35]

A misjudged push for `green' fuels could instead damage the climate and trash rainforests, according to the UK's largest environmental groups today. Biofuels – which are similar to petrol but less environmentally damaging because they are made from crops and wastes – could play an important role in tackling global warming. But, say bosses from the RSPB, WWF, Greenpeace and Friends of the Earth, the Government's dash for biofuels is ill thought out, lacks appropriate safeguards and could be creating more problems than it solves. Making biodiesel from soy planted on cleared rainforest takes 200 years before it could be considered carbon neutral. The expansion of tropical crops such as palm oil is also linked to the loss of indigenous peoples' land rights, human rights abuse and the destruction of local communities' natural resources.

An example of the use of EU Structural Funds in Wales to develop the biomass heating sector including capital grants for boilers and support for wood fuel suppliers is available at www.woodenergybusiness.co.uk The £6m project proposal was developed by the Forestry Commission and the Welsh Assembly.

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[34] Report COM(2006)0845, Draft, March 27 2007

[35] Press releases Apr 10 2007: 'Green fuels' could be bad for the environment

3.9.4 Concluding remarks

The requirements necessary to support biomass heating are similar in different EU countries. NGOs can play an important role in biomass policy development and implementation. EU Structural Funds are particularly useful for biomass and other renewable energy developments in eligible areas which include most of the new Central and Eastern European member states. The Intelligent Energy Europe programme is important to support the development of European sustainable energy policy through co-operation between organisations in different member states.

3.10 Intelligent Energy – Europe: converting policy to action

Mr. Priit Enok[36]

The Intelligent Energy Executive Agency is quite unique in the European Commission. This is the first executive agency established in the EU in order to implement the programme called Intelligent Energy Europe (IEE). The main objective of the IEEA is to convert policies into actions, to support tools and instruments to help people and institutions to implement the policies. Now, for first time, the real energy policies are in place, as agreed in climate change policies: directives on renewables, buildings, biofuels, CHP, energy services, biomass strategies and in the Green Paper on energy efficiency. The following targets for 2020 are set down:

- at least 20% less greenhouse gas emissions;
- 20% better energy efficiency;
- 20% share of renewables in the energy mix;
- 10% biofuels in transport fuel.

Energy has become a major policy issue and Europe needs to have ambitious objectives. 'Intelligent energy' is part of a competitive and innovative Europe and new jobs. Vast potential for intelligent energy exists in Europe but there is a pressing need to innovate and to get the conditions right. Intelligent Energy Europe I was an independent programme under DG TREN; IEE II is a big part of the Competitiveness and Innovation Programme (CIP) Framework 2007-13. This doesn't mean a huge difference for IEE objectives and target groups, but the budget is much bigger (52 million euros). The IEEA will soon become the EACI (Executive Agency for Competitiveness and Innovation).

The CIP builds on a broad notion of innovation which is not limited to activities within the business sector and the development of new technologies. Instead, innovation is understood to also cover, for example, socio-economic, regulatory and organisational changes – hence the type of transformation that the IEE programme wants to catalyse.

The IEE programme is guided by a 6-year Energy Efficiency Action Plan, Renewables legislation and the EU Strategic Energy Technology Plan.

IEE objectives are to create the policy and market conditions for energy efficiency and renewables; to support the uptake of state of the art technologies and to promote exchange between the different actors for the creation of innovation from diversity by acting as a catalyst for innovation and new market opportunities.

Every EU citizen can take advantage of IEE II as part of a "target group" of projects or as a beneficiary of better market conditions. Every one of us can directly participate by sponsoring a project or by participating in a project. Sponsorship is preferred from national or local governments to contribute to the projects.

The IEE II programme runs from 2007-13. Annual work programmes are issued each year to define specific priorities and actions. IEEA co-finances projects which support the programme

[36] European Commission, Intelligent Energy Executive Agency, (IEEA), priit.enok@ec.europa.eu

objectives. Applications are submitted following annual Calls for Proposals and successful proposers conclude grant agreements with the IEEA.

The last call for proposals was in September 2007. The total budget for support is about 52 million in 2007. Up to 75% of the eligible project costs may be supported by IEE.

Any public or private organisation established in the EU is eligible to apply for support from IEE, e.g. international organisations registered in EU member states. Organisations from Norway, Iceland, Liechtenstein, and Croatia are still to be confirmed and natural persons cannot apply.

3.10.1 IEE Project Criteria

A project to promote intelligent energy with European added value; involving at least 3 partners from different countries and 3 years maximum duration are eligible for funding. The average project budget is € 1,000,000 and needs to fall within the scope of the Work Programme 2007. The success rate of applications from previous years has ranged between 30% and 50%. Roughly 100 projects have been funded out of 200-300 proposals. The promotion of market development, capacity building, institutional change and regulatory shifts are the preferred types of projects. Proposals on 'hardware' type investments or R&D are not eligible - these will be funded under other mechanisms such as structural funds.

The budget of IEE is divided into 2 parts, € 49 million are allocated to projects and €3 million is allocated to the establishment of new local or regional energy agencies, which is a great opportunity for the Baltic States. There are more than 300 agencies around Europe but there is no such agency in Estonia. The only one regional energy agency is in Riga in Latvia and there are a few in Lithuania of which the most active is located in Kaunas. This latter agency has already been active for the last 4 years and is a good example of how local competences can remain in place in a changing political environment (where mayors come and go). The Kaunas regional energy agency has supported a lot of interesting projects and has lent sustainability to energy projects in Lithuania.

Intelligent Energy Europe has a broad focus and covers many different areas and themes, stretching from buildings to industry, renewable electricity, transport, training and education and so on.

In order to organise and structure this variety of themes, the new programme is built around three main themes, which you know from the previous IEE I programme and which run across the programme: **SAVE** (Energy efficiency and rational energy use), **ALTENER** (New and renewable energy sources, including small scale (under 1 MW installed capacity) facilities) and **STEER** (energy in transport). The COOPENER dimension of the first IEE programme was not included this time but transferred to a different EU funding programme.

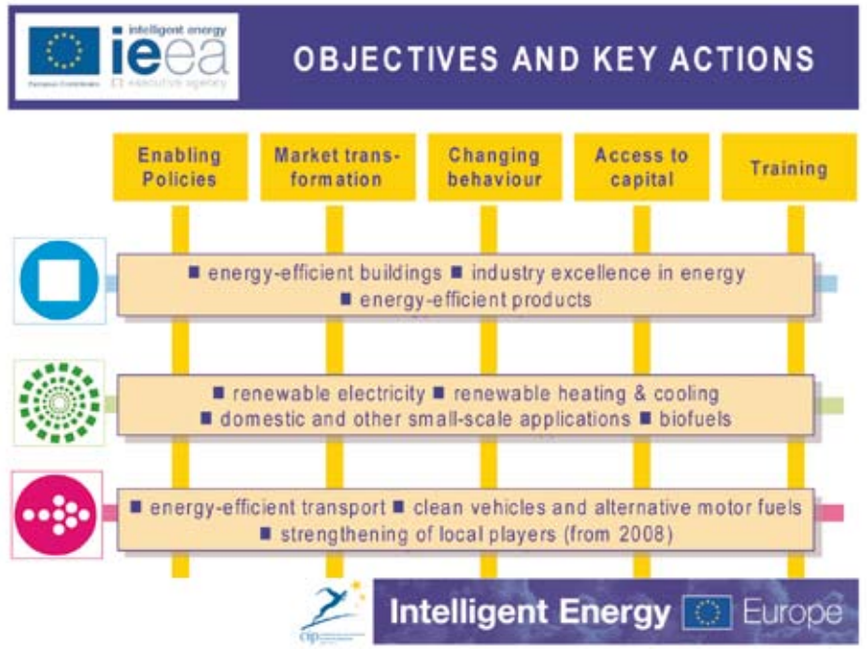

Figure 1. The matrix of objectives and key actions under the IEE II programme for 2007-13.

The three main axes – energy efficiency, renewables and transport - are overlapped by a number of policy objectives focussing on the creation of enabling policies, the transformation of markets, behavioural change, better access to capital for intelligent energy, and training and are presented in Figure 1. The main priorities of the programme are located at the intersection of the main themes and policy objectives. For instance, energy efficiency should focus on buildings, industry and consumer products, serving the different policy objectives.

In addition to the matrix presented in Figure 1, IEE expects that there will be two specific funding areas called "local leadership" and "special initiatives". These allow for having a greater focus on a number of themes which are considered particularly important such as the continued creation of local energy agencies or dedicated initiatives on energy services or combined heat and power. These horizontal actions under local leadership should promote the creation of local and regional energy agencies and should include European networking as a value-added component for local actions and to support sustainable communities such as the Jühnde community. Special initiatives include bio-business initiatives; energy services initiatives; intelligent energy education initiatives; combined heat and power initiatives and concerted action for the buildings directive.

The bio-business initiative is planned to stimulate integrated production of solid, liquid and gaseous bio-energy sources, to build major bio-businesses at regional level and to support the EU

framework for public authorities and businesses. Pre-planning large-scale integrated bio-energy production at regional level, with biodiversity and balanced production for electricity, heating and cooling, biofuels and other applications are preferred. Long-term business agreements and commitments to invest in bio-energy supply should lead to large-scale planting, management and harvesting of crops and forestry, fuel processing and support distribution to user-groups.

Details of all IEE-supported projects, calls for proposals, applications, publications, information on support for partners, contacts and help are available at the IEE website on the Internet[37].

The IEE-funded project 5 EURES serves as an example. The project provides an initiative and the tools for the RES-heat pilot regions. Objectives of the project were as follows:

1. to foster RES-heat markets in five European regions: East Lithuania, North Karelia & Central Finland, Brandenburg (De), Marvão (Pt) and Catalonia (Sp);
2. to support implementation of fuel market structures by the transfer of know-how;
3. dissemination of best practice to other regions.

The actions focused on the development of local training schemes, regional feasibility studies on technologies for fuel and heat supply, viable biofuel business models and on the development of value chains[38].

Let me also introduce you to our News Review – the magazine that carries all the latest news on IEE activities. It will be published every four months and will be available in six languages – English, French, German, Italian, Polish and Spanish. The first News Review in English is already available – if you have not done so yet, please pick up a copy from the IEE stand outside in the foyer. Secondly, we have just published 12 brochures which give easy access to information on the whole range of projects under each theme of the programme.

[37] http://ec.europa.eu/energy/intelligent/index_en.html

[38] Details are available at: http://www.5eures.eu.com

4. Resolution of participants of Baltic Energy Dialogue 1 and 2

Participants of Baltic Energy Dialogue No 1 'Energy security beyond Ignalina', which took place in Riga 2006 and participants of Baltic Energy Dialogue No 2 'Stakeholders practices on implementing national bio-energy strategies', which was implemented in Tallinn 2007 concluded the following **Resolution**:

The energy sector in the Baltic States is in transition due to the enlargement of the European Union, new environmental standards and changes in energy consumption patterns. This offers a unique opportunity to radically reform the sector in a way that it becomes truly sustainable as opposed to the centralised inefficient status quo. Urgent action is needed if this is to be an orderly transition. The process should be guided by a strict and sustainable energy policy within and among the Baltic States.

The Baltic States should fully participate in achieving EU target to produce 20% of energy from renewable resources by 2020 as minimum requirement. EU energy policy does not fully reflect environmental needs and must be seen at best as a minimum requirement and not as best practice.

These proposed changes should be an example for the reforms necessary in the wider *Baltic State Region* and the continent as a whole. Particular actions are needed in the following areas:

1. The high energy intensity of the economy and low energy efficiency offers the Baltic States a unique opportunity to make huge savings. This can become a reality only if (all parts of society and state are educated and motivated, and adequate financial resources are made available (from both national and EU sources). This will enable measures to be rapidly deployed resulting in clear and binding standards and targets in each sector, including the need for green public procurement requirements.
2. Renewable energy offers the only opportunity for truly sustainable, secure and accessible energy options for current and future generations. This must be given priority above all other energy options, including research and development, as well as access to grids and funding.
3. Priority must be given to decentralised energy sources which can capture both heat and electricity [Combined Heat and Power units (CHP)], thus radically increasing the overall efficiency of the system. While strengthening international grid links to increase diversity of sustainable energy sources can further develop supply security.
4. Removal of all direct and indirect subsidies for fossil fuels and nuclear power to assure that energy prices reflect the full environmental cost of energy.
5. The phase out of *oil shale* transformation must be accompanied by creating new jobs in environmentally friendly renewables. Bio-energies must be given better opportunities to transform part of traditional agriculture.
6. The phase out of *nuclear power* in Lithuania must be completed as quickly as possible and halt the plans for new nuclear construction.

7. There must be a reduced reliance on *fossil fuels,* including the increased risk level of oil and gas transportation through pipelines and cargo and their possible targets for international terrorism
8. The transport sector is the fastest growing consumer of energy and consequently urgent action is needed to reduce energy consumption through the increased use of public transport, efficiency gains in the existing transport systems during transition, and the development of alternative transport mechanism not reliant on fossil fuels.
9. The Baltic States should support the reduction of CO_2 emissions across the EU as a minimum target in line with the EU energy package. The benefits of introducing a sustainable energy system will enable the EU to meet its commitments of the *2 Celsius Degree* target, which is essential for global wellbeing. CO_2 emissions reduction in CO_2 emissions will be needed across Europe. The current Kyoto targets are only a first step and clearly further and more far reaching cuts will be required.
10. The only way that these radical reforms can be achieved in the time scales necessary is for the public to fully understand and support the required measures. This will require greater public involvement in decision making and an increased transparency of the strategic energy policy discussion. The resultant energy sector will have a reduced dependency on imported energy, greater employment opportunities, new opportunities for rural development and general economic stability.
11. The participating organisations and institutions understand and commit ourselves as the relevant partner to support implementation of the measures within this resolution. We will monitor the development and implementation of above mentioned measures. Only an active involvement and participation of strengthened civil society actors guarantees the implementation of sustainable energy strategies in the Baltic States and the *Baltic Sea Region.*

Riga, 13.10.2006

Tallinn, 15-16.05.2007

5. Outlook

The Energy Dialogues made clear: Energy policy is no longer a national issue, but a regional one, concerning both electricity and heating. Central Europe is to be seen and treated increasingly as one market. Central Europe, as a region, offers incredible potential for increasing energy efficiency. Also, the development of renewable energy sources is only starting. Climate change forces us to think in a different way. If we are to keep the global temperature rise under 2° C, we in Europe will have to reduce CO_2 emissions by around 70% by 2050. If we continue any longer with centralised structures – under the pressure of the black (coal) and nuclear lobbies, we will still anyway have to change thoroughly within a few decades. And the longer it takes to go from the wasteful, centralised energy system we know now to the efficient and renewable energy-based system that we will need in the second half of this century, the more difficult and harmful it will be for our economies.

There are large technical biomass potentials in Europe in countries like Germany and Estonia which are only partly used. The role of energy crops will have great importance in the future. However, in Sweden, Germany and others a dynamic development and use of bio-energy has started, promoted by means of appropriate policy instruments. Thus, the use of bio-energy already contributes to favourable climate change via greenhouse gas mitigation, positive employment effects as well as the security of energy supply. But, through increasing biomass use, competition is expected at different levels (land area for biomass production, feedstock, and end-energy sources). Already bigger EU-member states like Germany and Sweden have focused on R&D in order to improve the basis for decision making processes and to further develop promising opportunities for bio-energy use. Research and development is particularly relevant to the following issues: (1) energy efficiency; (2) technology development (e.g. new biofuels, feed-in of bio-energy sources and biogas into national gas grids); (3) available biomass potentials and competition for the use of biomass, and (4) requirements in the context of sustainability (e.g. certificates).

The analysis of the supply-demand balance of renewable resources in Estonia's Põlva County and in Jühnde in Germany has proved that there is theoretical potential for creating a self-supply and independent area based on local renewable resources. The utilization of forest resources can be improved and abandoned agricultural lands could be exploited for the production of energy crops. Other renewable energy resources (wind and hydro energy, straw, biogas, etc.) can provide an additional contribution.

Up-to-date technological solutions are available – combustion of wood, peat and straw; wind generators, hydro plants, cogeneration of heat and electricity, production of biogas, etc.

A lack of technology suitable for the small capacities in Põlva County or in Jühnde – in particular for waste combustion – may cause problems in using this technology. Technological solutions need more testing under specific conditions, e.g. combustion of grassy biomass.

Economic feasibility is related to specific investments, to the prices of fuels and energy and to compatibility with energy load curves (heat). Special economic assessment has to be made for every project, with particular consideration of load curves. Most prospective projects at present

concern wood and peat boilers. Solutions that need more detailed analysis will take more time and effort to bring into use e.g. combustion of straw, biogas projects, etc.

Projects of steam cycle-based cogeneration are probably not cost effective, as there is no such demand for heat. Cooperation is needed with other regions on using wind energy, waste utilization, etc.

Feasibility of several projects depends directly on subsidies and tax policy. The price of new fuels depends on the use of these fuels. Success of projects depends a lot on local initiative and enthusiasm and on other social aspects of using renewable energy sources. Job creation is mainly related to the production of bio-fuels, less to the usage, marketing and trading of these fuels.

The requirements necessary to support biomass heating are similar in different EU countries. NGOs can play an important role in biomass policy development and implementation. EU Structural Funds are particularly useful for biomass and other renewable energy developments in eligible areas, which include most of the new Central and Eastern European member states. The *Intelligent Energy Europe* programme is important to support the development of European sustainable energy policy through co-operation between organisations in different member states.

Some members of the Baltic EU-states must urgently apply more democratic procedures in their various strategic development approaches. These governments frequently reflect the former authoritarian political culture too closely. Without convincing the increasingly better organized civil society, the chances of realising the intended changes of EU energy policy remain small.

Other major questions also require more intense consideration like the ***EU Energy Charter Treaty*** to deal with Russia on energy policy issues. It could be advantageous to design more appropriate political instruments for the EU to apply in these matters. Creating a **Strategic Force on Energy** of not more than 5 EU-member states could help to more effectively determine direction in the tense area of EU-Russia cooperation. With a mandate to act, such a Strategic Force could defend the interests of the member states more effectively than their governments can do individually.

The leading thoughts for the continuation of the *Energy Policy Dialogues* have to do with the debate on energy within the OECD, EU and also Baltic Sea Region countries driven by security interests and new efficiency technologies.

To many citizens and politicians alike, the Stern Review of 2006 came as a shock with its prognosis of some 5.5 thousand billion Euros in climate change damages that will occur within a generation if things are not drastically changed.

IN LIGHT OF THESE MANY UNSETTLED ISSUES, FRIEDRICH EBERT STIFTUNG (FES) EXTENDS AN INVITATION TO FURTHER ENERGY-POLICY DIALOGUES AND COOPERATION IN 2008[39]. THREE OF THESE ARE IN PLANNING BY FES-RIGA UNDER THE *LEITMOTIV* OF "DEMOCRATISATION OF ENERGY-POLICY IN THE BALTIC SEA REGION". **THE POSSIBLE WORKING TITLES OF NEXT DIALOGUES ARE:**

- Energy-policy for the Baltic Sea Region as a whole
- Energy-efficiency in the BSR sub-regions
- Energy-market needs social and ecological regulations

In addition, the Baltic Sea Region is facing ever increasing road and sea transport intensity due to largely irrational movements of goods and components. This aspect of globalisation is increasingly questioned and civil society in the EU and beyond ask for more regulation, more rail transport, more green shipment in general and, above all, a decrease in the volumes transported.

The most difficult of all, nevertheless, is the inevitable deceleration of the modern development process, because it implores industrialised countries (the OECD, G8) to decouple energy demand from production processes and urges transition countries (the China, India, etc.) not to follow the capitalist development model but to take their chance to improve quality of life for the majority of their populations while maintaining cultural and historic identity.

If we all mean it when we talk about sustainable development then we demand and help to implement a ***policy of limited material and energetic demand*** (i.e *buy regional*) in each of the EU countries.

[39] The actual dates and venues will be given in due course on our website: http://www.fes-baltic.lv. For further questions please contact Ahto Oja +372 5082990, skype: ahtoja, or balti.bioenergia@gmail.com

Annex 1. Agenda of Baltic Energy Dialogue No.1

Energy security beyond Ignalina - *Baltic Sea Region* –
Riga, Latvia Sep 29, 2006

Welcome note by **Prof. Dr. John J.A. Burke**, Rector, Riga Graduate School of Law

Welcome note by **Alda Ozola**, Latvian Green Movement

Introduction by **Dr. Elmar Römpczyk**, Friedrich Ebert Foundation, coordinator Baltic States: *Baltic energy policy - a failing debate*

Plenary: Questions

9:30 – 10:30 Hartmut Wöllner, Development Agency Altmark, Germany: *Lessons learnt: Future energy production – economic growth in agriculture and rural areas*

Plenary: Questions

10:30 – 11:00 **Anthony Froggatt**, independent energy and environmental consultant, London: *Lessons learnt: The need for NGO networking in Europe to create a sustainable energy sector*

Plenary: Questions

Coffee Break

11:00 – 13:00 The participants are invited to discuss current trends and challenges of sustainable energy policies in the Baltic States and the whole Baltic Sea Region. The two main questions to be discussed in the Networking Café:

A - How to build a BSR network platform for environmental NGOs related to energy issue questions?

B - What are the main aspects concerning a common resolution for the vision of future energy policy of BSR NGOs?

Hosts of the Networking Café tables:

- **Gunnar Boye Olsen**: *Sustainable Energy Visions, for the World, EU, and Baltic Countries*
- **Valdur Lahtvee**: *Baltic Energy Situation*
- **Harri Lammi**: *Anti-nuclear campaigning in Finland - experiences and current situation*
- **Magdalena Zowsik**: *The Polish energy situation*
- **Anthony Froggatt**: *Looking beyond Ignalina*

14:00 – 15:00 **Continuation:** The BSR NGO Networking Café

15:00 – 15:30 **First Summary** of Results (Networking Café)

15:30 – 16:00 **Break**

16:00 – 16:30 **Perspectives:**
Juris Ozolins, Special Advisor to the European Union Commissioner for Energy
Dagnija Blumberga, Chair of the Council of Environmental Science and Education in Latvia: *Electricity End-User in Latvia today and tomorrow*

16:30 – 17:00 **Plenary:** Questions and Discussion

17:00 – 17:45 **A** – **Plenary**:
Building a network platform for environmental NGOs related to energy issue questions:
Concrete activities for the future –
B – **Working Group** (only the Networking Café hosts):
– **Developing a draft resolution** for the vision of future energy policy of BSR NGOs **–**

17:45 – 18:30 **Presentation of results and final conclusions**

Annex 2. List of participants of Riga Dialogue No.1

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Annex 3. Agenda of Baltic Energy Dialogue No.2

STAKEHOLDERS PRACTICES ON IMPLEMENTING NATIONAL BIO-ENERGY STRATEGIES

Regional seminar of Friedrich Ebert Foundation, SEI-Tallinn and Ministry of Agriculture of Estonia

Energy Café Tallinn

15-16 May 2007

Purpose: Aim of the seminar is to share different stakeholders practices on implementing national bio-energy strategies in Central-Eastern EU member countries towards use and development of bio-energy production.

Location: conference room at Ministry of Agriculture, Lai 39/41, Tallinn, Estonia

Agenda, 15.05.

Views on Status and Trends with Use of Bio-energy Production

9:30 - 10:00 Arrival, registration, coffee

10:00 - 10:30 Welcome, Minister of Agriculture of Estonia
Opening: *Dr. Elmar Römpczyk*, FES
Introduction of participants and objectives of the seminar

10:30 – 11:50 I session: National bio-energy strategies and policies (´a 15+5 min)

Estonia, National Development Plan for Promotions of Use of Biomass for Energy Production.
Andres Oopkaup, Ministry of Agriculture

German experiences, National level policy measures for promotion of use bio-energies.
Dipl.-Ing. Franziska Müller-Langer, Institute for Energy and Environment, Leipzig

Latvia, Renewable energy strategy 2006 - 2013 – the first year of implementation.
Mrs. Andzela Petersone, Climate and Renewable Energy Department, Ministry of the Environment of the Republic of Latvia

Lithuania: "Sustainable Energy Vision for Lithuania 2050"
Mr. Saulius Piksrys, Lithuanian NGO Atgaja

11:50 – 12:10 – Coffee and tea break

12:10 – 14:15 II Session: NGOs and research community presentations about their role on implementing and developing national bio-energy strategies.
(´a 20+5 minutes)

1. Poland, small heat sector experiences.
Prof. Adam Gula, Faculty of Fuels and Energy, AGH-University of Science and Technology

2. Lithuanian achievements in incineration of solid bio-fuel and production of heat and power from biomass –
Mr. Remigijus Lapinskas, Lithuanian Association of Biofuel Manufacturers and Suppliers, Association Litbioma

3. Estonian case – Põlva county vision and potential for independent energy supply on the basis of bio-energy
Prof. Aadu Paist, Tallinn Technical University/Biofuel Association (NGO)

4. The New Hungary – Development Plan 2007-2013; Strategy and operational plan for environment and energy development
Ms. Terezia Koczka, Konett Team

5. INFORSE – Europe, UK and European experiences on NGO cooperation and participation in the implementation of bio-energy strategies.
Mr. Pete West, Sustainable Energy Projects Manager, Severn Wye Energy Agency UK, member of the management board of INFORSE- Europe.

14:15-15:15 Lunch

15:15 – 17:00 III session: Energy Café (using the methodology of World Café – **http://www.theworldcafe.com/knowhow.html)** *3 times 30 minutes*
Subjects of discussion: NGO role and possibilities on putting national bio-energy strategies into practice. Three rounds of round table small working groups 'a 30 minutes, after which participants change the tables, only table moderator stays.

17:00 – 18:00 Short reports of working groups 'a 5 minutes, discussion and conclusions of the day.

20:30 –22:30 Joint dinner – reception in Medieval Restaurant **Olde Hansa**
Vana-turg 1, Tallinn, phone +372 6279020

Agenda, 16.05
STATE OF THE PLAY: Stakeholders views on Status and Trends with Use of Bio-energy Production

9:00 – 9:10 Introduction to the day

9:10-10:30 IV Session: Stakeholders presentations (Bio-fuel producers, farmers, researchers, practitioners, municipalities, *20+5 minutes)*

Sweden – Production, distribution and use of biogas in Gothenburg and the western region of Sweden.
Mr. Ingemar Gunnarsson, Göteborg Energi

Germany – Bio-energy Village Jühnde
Dr. Karpenstein-Machan, University of Göttingen

Finland – Experiences on biogas production in Finland.
Dr. Ari Lampinen, Finnish Biogas Centre

10.30-10.50 Coffee and tea break

10.50-11.45 IV Session continues
Sweden – Sweden's second largest source of energy used is bio-energy.
Dr. Tomas Kaberger, Svebio

Intelligent Energy – Europe: converting policy to action
Mr. Priit Enok, European Commission, Intelligent Energy Executive Agency

11.45 – 12:00 Introduction to the V Session Coffee and tea break

12:00 – 13:00 2 rounds 'a 30 minutes of Energy Café: Stakeholders possibilities on putting national bio-energy strategies into practice.

13:00 – 14:00 Reports of working groups
Final conclusions, statements and adoption of the resolution.

14:00 – 15:00 Lunch

Annex 4. List of participants of Tallinn Dialogue No. 2

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History textbook 2100:
„Nearly one hundred years ago the fossil fuels ruled the world most. Fortunately this is over by today and world gets its energy 100% from renewable sources. NB! Nuclear is not considered as renewable and was ruled out by 2050, as it consisted huge damage potential like Tshernobyl 1985."

RĪGAS JURIDISKĀ AUGSTSKOLA

Pasaules Dabas Fonds sadarbībā ar WWF

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SEI

Latvijas Zaļā kustība
Latvian Green Movement

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