







Business Models Sustainable Energy Planning 2



North Sea – Sustainable Energy Planning

How to transfer energy planning into business Business models and agreements in energy planning in the NSR

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1. Background

1.1. Interreg IV b North Sea Sustainable Energy planning

This report is the conclusion from a survey undertaken within Workpackage 3 North Sea Sustainable Energy Planning (North Sea SEP) project. It is a transnational EU project, partly funded within the North Sea Region Programme, Interreg IVB. The North Sea SEP project objective is the sustainable development of energy self-sufficient regions. The project was initiated by a group of interested specialists from different fields: green industry, regional planning and regional and municipal development. The project mainly focuses on the specific challenges municipalities and provinces face in the field of renewable energy and energy efficiency. The development of regional energy strategies is an important part of the North Sea SEP project. The project aims to be holistic; it covers all of the aspects of energy planning that rural municipalities will encounter. WP3 deals with the development and implementation of energy strategies. The WP3 consists of seven activities: Activity 3.1: Stocktaking Activity 3.2: Roadmaps and strategies Activity 3.3: Business models Activity 3.4: Public buildings Activity 3.5: Dissemination Activity 3.6: Concept of Economic Analysis Activity 3.7: North Sea Investment Appraisal Model

1.2. Why North Sea SEP focuses on regional energy planning

The cost of fossil fuel energy has been increasing significantly during the last few years. It is clear that it will remain high (and continue to increase) in the medium and long term. A possibility of absorbing rising costs is to critically question the status quo of energy consumption in order to use existing local energy saving and production potential. Rising energy costs and declining budgets contribute to steadily increasing financial pressure for public utilities. In addition, towns and small towns, often situated in rural areas, have to face population decline. This leads to a negative cycle: the citizens and public bodies have a lower budget at hand while at the same time the costs are rising, despite the lower demand. This combined with the flow of money out of regions because of the centralized (fossil fuel) energy supply, and the fact that the potential for the transition towards renewable energy is mainly based in local projects, means there's need for sustainable energy planning on a regional level.

1.3. Partners in North Sea SEP

The main partners in this activity are the partners who developed a regional strategy. They are shortly introduced here:

Aberdeen City Council (United Kingdom)

Local government for the City of Aberdeen. Aberdeen is known as Oil Capital of the world and is also know for its granite buildings. The City has approximately 217.000 inhabitants. The City Council focuses on promoting Renewable Energy in Public Sector Buildings and promoting low energy build through planning policies.

County of Osterholz, Germany

The County of Osterholz is located in Lower Saxony and neighbouring directly to the hanseatic city of Bremen. The region is represented in the North Sea - SEP consortium by two partners, the municipality of Osterholz- Scharmbeck and the stock company REON. The participation in North Sea - SEP is part of the mission 'Energiewende OHZ 2030' ('Energy u-turn Osterholz 2030'). Under this mission-statement municipalities, county and local businesses in Osterholz aim on meeting the demands of climate protection in combination with economic development since the economy in the region is quite weak. Overall goal is to become largely independent from energy importation until 2030.

Energykontor Sydost, Sweden

The Energy Agency for South-east Sweden, was established in 1999 as an EU project under the Association of Local and Regional Authorities in Kronoberg. The Energy Agency is working to initiate, coordinate and implement projects aimed at improving the energy efficiency and increased supply of renewable energy in all sectors of society. The agency works strategically and systematically to link the projects at the local and regional level with the projects of the European and international market.

Green Network, Denmark

Private companies and public sector partners work together in Green Network to achieve greater sustainability in the fields of environment, social commitment and occupational health and safety. Five municipalities were involved in North Sea SEP: Hedensted, Kolding, Fredericia, Middelfart and Vejle.

Intercommunale Leiedal

The intercommunale Leiedal is a partnership of thirteen municipalities in the Kortrijk region. The intermunicipal co-operation supports the broad socio-economic and spatial development of the region and deals with regional challenges. Making the shift from a traditional to a knowledge-based, creative economy is one of those challenges. Leiedal develops knowledge about the local implementation of sustainable energy and regional energy planning, and applies this on sustainable business parks, housing development projects and regional approaches towards the implementation of windmills. Leiedal developed an overarching regional energy strategy as a type of energy planning, to bring together a broad network of public authorities,

Impressions from a meeting in Middelfart, Denmark





private companies and education partners around the future of sustainable energy in the Kortrijk region.

Province of Drenthe and the Municipality of Tynaarlo

Drenthe is one of the three northern provinces of the Netherlands. With its beautiful landscape, dynamic economy and excellent working and recreational facilities, Drenthe is a great place to live! The Province of Drenthe has responsibilities in the field of Energy Planning, encouraging and subsidizing the use of renewable energy, organizing cooperation between municipalities, business and energy companies, climate change adaptation and mitigation. Energy is one of the areas for special attention in the Northern Netherlands. In North Sea SEP the province is responsible for Workpackage three, together with subpartner the municipality of Tynaarlo. The municipality developed an integrated vision on the development of an energy neutral area and focuses on an innovative business model for building sustainable housing development.

1.4. The holistic approach of North Sea SEP

The North Sea SEP concept of energy planning is based on an holistic vision. In this vision energy planning is concerned with regional development as well as a renewable energy supply, and includes the involvement of citizens as well as strategic planning. The scheme below shows all themes of the NS-SEP project and how they are related. In dark blue the activities in Workpackage 3 are showed. The

Business models

development of regional energy strategies (centre) are the core to regional energy planning and steer local development. These strategies are encircled by (identifiable) local conditions requiring simultaneous attention. The light blue circles show the supporting tools and models: the focus is on sustainable strategies for the long term.

Regional Development	\leftrightarrow	Sustainable Energy planning	\leftrightarrow	European Energy Roadmap 2050 Renewable Energy and Savings
		Communication		
		Strategy		
		Research and data collection		
		Networking		



The scope of Sustainable Energy planning

1.5. Content

In this document best cases of business models in the North Sea Region are described. In the next chapter, background information about business models is described. After chapter 3, the business models are described in sections:

- Models for financing and implementing energy saving in public buildings;
- Models for energy saving and renovation by private home owners
- Models for large scale generating renewable energy;

- Models for implementing energy strategy in new urban areas;
- Models for climate partnerships;
- Performance agreements with companies.
- At the end of the document there's a conclusion.

Introduction to business models

2.1. Business models

The expression, business model, has been adopted by various types of organizations and put to various uses. Numerous different definitions can be found, though often the expression is used without explicit definition. This section selects some key aspects offered in Edinburgh's note on terminology for the North Sea SEP. It considers some uses of business models that may be of use to North Sea SEP partners in establishing energy initiatives, particularly with regard to financing these initiatives. This chapter is an abstract of the Background paper Business models and private finance, Dave Hawkey, Edinburgh University, 2010, North Sea SEP.

2.2. Definition

Business model is a more specific term [than organizational form] for the scope and arrangement in an undertaking or enterprise (or a collaboration among enterprises), of its objectives, strategies, production and trading activities, target markets, relations to suppliers, customers, regulators, etc., and particularly its ways of generating income (Source: Background paper Business models and private finance, Dave Hawkey, 2009 North Sea SEP).

As such a business model concerns more than just the goals of an enterprise (such as 'to keep a higher proportion of energy payments within a region') or

2.3. Responsibilities and relations

This paper shows, under different best practices, how the responsibilities and relations among local and regional authorities and other bodies, including private sector partners, community organizations and energy users; between the enterprise and suppliers and contractors; between the enterprise and regulators, may differ. the output of an enterprise (such as 'the installation of photovoltaic panels on x% of municipal buildings'). A business model encompasses (though is not limited to) the relationships between the various actors involved (e.g. whether a company sells units of gas to a customer or a guaranteed level of thermal comfort). Different business models may allocate different responsibilities and incentives to different actors and may therefore have significant impacts on the scale and distribution of costs and benefits associated with the enterprise or undertaking.

Consideration of business models must acknowledge and identify the different character, interests and responsibilities of the different sorts of party, and the consequences of these for their involvement.

The broad characteristics of the business models considered here have a variety of implications for

the mobilization and cost of private investment and expertise

- for the degree and form of control the public sector may exercise over an enterprise
- for the scope and scale of an enterprise
- for public attitudes to an enterprise.

A business model may be articulated for a variety of reasons – for example

- to enable potential investors to appraise an enterprise
- to allow participants and funders to compare the viability of different business models
- to allow regulators to consider the legality of the enterprise and its compliance with licence conditions and other requirements.

For local and regional authorities exploring different business models for energy initiatives and the scope for drawing in private investment, important (overlapping) considerations will be:

- On what criteria are partners recruited and selected?
- How are responsibilities for the successful operation or completion of each activity in

2.4. Transnational variations

Developing novel business models can involve establishing new, complex relationships between different bodies, and may incur considerable legal costs in designing agreements and contracts which are both attractive to private partners while allowing public bodies to retain sufficient control over the initiative. Countries vary in the degree of experience they have with different business models and consequently the degree to which legal frameworks have been established to enable different forms of the initiative distributed across the different organizations involved?

- How are the various risks associated with the initiative distributed across those involved?
- How do risks and responsibilities align with each organization's capacities?
- How are the benefits of the activity distributed among the parties? In particular how is the level of any income or cost savings to the enterprise determined – for example, through the setting of prices to end users – and how are these benefits divided among beneficiaries within and outside the enterprise?
- Is the distribution of costs, risks and benefits equitable or otherwise justifiable? To what extent is there a subsidy of one party by another?
- Can the initiative under a particular business model take advantage of financial support, favourable tax regimes, regulatory exemptions, etc. from government and other public agencies?
- What consequences does the business model have for the wider goals and terms of operation of the authority, and in terms of the business and sustainability indicators selected for the energy initiative?

contractual agreement. Related variations between countries include the existence, scale and focus of partnership-support organizations, and the extent to which a market in competent contractors exists in the country. Some business models may therefore be easier than others to adopt in different countries, and some may prove impossible in one country but not in another.

Business models for municipal buildings

3.1. Introduction

Implementing energy saving measures in municipal buildings is important for different reasons. The example set by governments makes their policy more effective. And the municipals can use the money saved by the measures too, of course.

3.2. Middelfart's model for energy saving with an ESCO firm

The Municipality Middelfart has been the first to try the ESCO-model for all municipal buildings in Denmark. Many municipalities and major building owners are presently considering whether to enter into ESCO collaborations and which models they should use and are therefore very interested in experiences from Middelfart. In this chapter the 'Middelfart model' is described shortly. In a separate North Sea SEP document called 'Business model Middelfart, Energy savings with ESCO-firm' the model is described in more detail.

3.2.1. What is an ESCO?

ESCO (Energy Service Company) is a term for companies engaged in energy-saving measures in buildings and finances them through the achieved economic savings. It is companies or consortia, who in a single package solution offers to be responsible for analysis, project design, financing, execution and start-up, including user training. Another financial solution is known as EPC Energy Performance Contracting. Here the idea is that the company guarantees a certain energy performance. This could be a contract regarding a certain temperature in buildings.

3.2.2. The pilot

Some municipalities in Sweden had used an ESCO for energy-renovation and the model was presented to the city council as a model where the energy savings would pay all costs of energy renovation. It was a model which appealed to Middelfart's politicians and a pilot project was launched. At the same time the local energy supply company Trefor was invited to participate. They were promised that energy savings in municipal buildings could be included in their statutory annual energy savings and therefore made free energy consultancy available. In the pilot project a representative sample of 8 municipal buildings (30,000 m2) was reviewed by consultants from Trefor. They found potential savings of 19-24% with a simple payback time of 6-10 years.

3.2.3. Energy planning on market terms

The city council decided on a total funding of 44 million DKK which would encompass both energysaving measures and other wishes for building modifications. They decided to put the project out for procurement. There were 5 companies who made bids on the energy savings they could guarantee. The winning bid secured an overall saving of 20% annually and provided a payback time on energy investment of 10-11 years. After winning the procurement, the company should prepare the actual project design including what type of initiatives would be implemented in which buildings and calculate the amount of savings that could be achieved.

The municipality was assisted by the Swedish municipalities and by consultants in designing the procurement and contracts. Stopping points were deliberately incorporated, so the city council could opt out on several points during the progress of the project and renew their position towards the plan. With this procurement it was up to companies themselves to find the building improvements that By comparison with the total building stock (133 190,000 m2) and its energy consumption a savings potential of approx. 20% at a total investment of 33-41 million DKK was made probable.1)

would provide the greatest energy savings. From the beginning the municipality has thus deselected to let other requirements for the renovation and energy solutions affect the project, for example experimental solutions, or renovations with an emphasis on comfort, aesthetics or building improvements.

However, it has been part of the negotiations that other improvements could be added to the defined initiatives, which in turn would cause a longer payback time. The city council has been able to determine how large a sum was to be spent on energy improvements with guaranteed savings and what additional improvements they wished for to be carried out simultaneously. If these additional costs were to be also paid back via energy savings, the payback period for the total investment will be approximately 19 years.



3.2.4. Investment model

The city council agreed on spending 44 million DKK on the projects. The municipality has loaned the money themselves as they can obtain cheaper loans, and then made them available to the ESCO. The ESCO must in turn perform the specified tasks. If the guaranteed 20% savings each year (compared to the situation prior to the project) in the first 7 years is not achieved, the ESCO must pay the difference. Additional savings up to 3% will accrue

3.2.5. Role of the ESCO

The ESCO performing the work, is a large multinational company, Schneider Electric, which has energy services as one of their specialties. The task for the ESCO in Middelfart is to specify a number of tasks that can provide at least 20% savings and execute them within the agreed period of time, and to train users to operate the equipment. In an agreed period of 7 years they are required to pay the difference if savings are less than 20%, and in return they receive half of the profits if they manage

3.2.6. Role of the energy supply company

Trefor has provided analytical work for free, both in the pilot project and the major project. Their interest is to record the expected annual savings as a part of the savings they are required to provide according to an agreement with the national government as part of the Energy Agreement 2005. For them it is a question of what it costs to achieve these savings, for example in comparison with replacing circulation pumps in the industry sector or providing private energy consultancy.

3.2.7. Operational period and users

After projects are completed in each institution energy consumption must be registered and employees are to be trained to manage systems and installations etc., to ensure correct measurement of savings. However, it may become difficult to prove any discrepancy from the expected savings. to the municipality. Additional savings beyond that are shared between the ESCO and the municipality. After the first 7 years all future savings accrue to the municipality.

The city council decided on that basis to launch the project. At the same time they decided that the possible 3% additional savings should go back to the respective institution to provide an incentive for behavioral change and additional savings.

to save more than 23%. Furthermore, they perform a series of tasks which the municipality wishes carried out simultaneously under normal conditions.

The ESCO has the role of turnkey contractor but they outsource sub-tasks to other companies, among others local craftsmen. The municipality has in this case financed the work themselves through municipal loans, but the ESCO would also have been able to handle the financing.

Perhaps a price will be put on these savings in the future. The municipality might have sold their savings too cheap by giving them away in exchange for analytical work.

Trefor has through the project achieved competence in performing these tasks and will in future be able to develop a business concept as an ESCO.

Employees and users have received the project favorably. There have been no objections or additional requests from users. It is already the central administration who is in charge of building maintenance. It has given some unrest in the city that each school cannot use the craftsmen they are accustomed to, but it is the ESCO that assign contractors and craftsmen to do the work. Problems may also arise

3.2.8. Transferability of the ESCO model

Schneider Electric are gaining ground in Denmark and several other municipalities are now cooperation with them, among others Kalundborg, Kerteminde and Gribskov. There are other possible models for ESCO-cooperation; DONG has for example, in collaboration with the Spar Nord bank, announced that they offer energy services as an ESCO, and there if subsequent investments in further energy saving measures are made and alterations implemented. To whom will the possible additional saving accrue?

could also be local partnerships with financiers, energy supply companies and local contractors. The ESCO model cannot be used by everyone, as other municipalities may have already completed the most profitable projects, and therefore there is little to achieve for an ESCO.

3.2.9. Conclusion

Middelfart municipality sees this project as a good solution for their renovation needs. They have not themselves been able to perform the analytical work Trefor has provided and anyhow they would have to sign a contract with a company that could carry out the renovation work. They have also achieved a lot of PR on being pioneers on this field. Critics of this scheme argue that the ESCO can perform a sub-optimal energy planning, where only

the offhand economically cost-effective sub-projects

are implemented. Perhaps the future will see large supplementary bills for needed renovation. A coherent long term plan for maintenance, energy savings and a focus on renewable energy could provide more optimal solutions in terms of both economy and in terms of CO, reductions.



3.3. Osterholz: Energiekindergarten 'Am Wurth Wald' in Worpswede

3.3.1. Rationale of the project

Since 1977 German Red Cross (GRC) Worpswede runs a Kindergarten 'Am Wurth Wald' in Worpswede on behalf of the municipality Worpswede. The house was built in 1978 based on first 'Wärmeschutzverordnung' which included guidelines for insulation. After 30 years in use, energetic status-quo is more than insufficient. Enormous heat loss during the winter time and temporarily interrupted floor heating during cold periods required action. A public-private-partnership was founded, consisting of the GRC, the municipality of Worpswede and John Becker Engineers from Worpswede, a private actor contracted to implement the project.

In addition to the renovation of the Kindergarten 'Am Wurth Wald' in Worpswede, a public energy trail for children and adults was installed. In addition to the technical and economic objectives of lowering the energy consumption substantially, also the idea emerged to teach children more about alternative energy production and saving. Some

3.3.2. Additional goals

- To spread the seeds of sustainable energy amongst children
- To build awareness for sustainability and care for nature amongst very young children
- A respectful and responsible approach to nature
- To inspire children and adults through childoriented and playful training
- The Kindergarten as a role model for environment oriented education (Umwelterziehung) To give girls and boys an understanding of physical and technical features

of the installations around the compound are well suited to demonstrate this to youngsters as well as grown-ups.

'Energiewende Osterholz 2030' wants to reach a goal of energy self-sufficiency of the administrative district of Osterholz in 2030. Essential activities to reach this goal are, on the one hand, to promote energy saving and the reduction of energy consumption and on the other hand an increase of regional renewable energy production. The Kindergarten is only one in a chain of many projects; by the year 2030 all households, companies and other installations in the administrative district of Osterholz are to run self-sufficiently.

After finishing the energy related renovation of the Kindergarten the next step of transition is to follow. We are used to having cheap electricity all day long. The aim is to assign a value to electricity and point out it is high time that a respectful and responsible approach to electricity starts.

- To start a lifelong learning based on a bottom-up approach
- To promote the energy trail and its pedagogical approach towards other Kindergartens
- To promote the energy trail as a destination for tourists and inhabitants learning something new about energy production and energy saving
- The energy trail as a new remarkable sight for the municipality of Worpswede.

3.3.3. Partner of 'Energiekindergarten Worpswede'

The 'Energiekindergarten Worpswede' is part of the initiative 'Energiewende Osterholz 2030' project. The 'Energiewende Osterholz 2030' in turn, is the local implementation of Interreg IVB North Sea – SEP project in the administrative district of Osterholz. This project is co-funded by the European Regional Development Fund (ERDF). John Becker Engineers took over a sponsorship for the energy trail and remains the patron for this. By creating this lighthouse project, it is hoped for public interest among citizens, tourists, visitors and children and

3.3.4. Results

Dissemination of energy-related and environmental topics starts in the Kindergarten. Children spread the knowledge they gain through every day practice, that's why early child education should be in a playful and child-oriented way. The well-known domino effect is vital to reach a wider audience and especially adults. Children are

3.3.5. Project costs

The costs for the investment in energetic optimisation to achieve the label 'Energiehaus', following a detailed calculation according to DIN $_276$, are: 306.736 \in in Total.

a strong identification as a basis for an on-going sponsorship.

some kind of 'energy & environmental ambassadors' who raise the awareness of their parents and other adults how to change behaviour, regarding a) Saving energy

b) Energy saving training in a child-oriented way

c) Learning about renewable energy resources



Models for private building energy renovation

4.1. Introduction

The municipality of Middelfart (DK) as well as the municipalities of Osterholz (DE) Tynaarlo (NL) and the province of Drenthe have developed and tested models for renovating private houses.

4.2. Middelfart: Transferring the ESCO model to private buildings

Employees in the area of environment and climate could see that there is a large potential for savings in the municipality's housing stock. They could see possibilities in transferring the ESCO model to private buildings. The idea is to get private owners to carry out energyrenovation, if they were offered a package deal where project design, financing and implementation were carried out by a company or partnership.

4.2.1. Partnership

Middelfart municipality summoned various local actors in order to establish a collaboration, among others:

- Middelfart savings bank
- Energy supply company Trefor
- The district heating company
- The local energy service
- Rockwool
- Region South

The aim was to develop a model to offer energy services to private home-owners. At first they could not agree on a model for financing - several questions arose on credit assessment, ownership of the installations - what if the house changed hands? It was agreed to make an effort with an offer of free thermo graphic tests, energy analysis and energy investment plans for 2 neighborhoods. The energy supply companies provide energy advice, banks finances communication and investment advice and the municipality is responsible for the administration.

4.2.2. We have an offer for you ...

Two residential neighborhoods were chosen, a wealthy neighborhood and a residential neighborhood from the 60-70s, from the point of

view that these areas would have many savings opportunities. Around 60 households were approached – and for the first meeting no one turned up! For the next meeting the aim was to spread the word via more unofficial channels in order to get people to persuade neighbors to join in. It helped! 40 out of 60 accepted the offer of a free thermo graphic test and energy review with suggestions for improvements - a personal climate plan.

The next step was to review the actions, pool them and offer them out to craftsmen. It could be a number of windows in the area which craftsmen could make an offer for. The municipality organized a major conference on May 11th for everyone in the construction and consultancy industry where this project was described. However, it is up to people whether they will take the offer and how they wish to obtain financing.

The municipality's role is to manage the project and to be a kind of guarantor. They have become aware that people want follow-up checks of the construction work and tests of whether the promised savings are achieved. It is essential that construction work is coordinated and controlled.

However, it is a source of wonder that only 40 out of 60 have accepted the offer of free visits from an energy consultant with a value of 7-8000 DKK. It would probably help with grants for renovation or financing via the energy bill.

4.2.3. Next step in the model - before the first step is put to ground

Before the project finished a new was elaborated. Called 'My Climate Plan 2.0'. Here the ambition still is to collect data and experience for private house ESCO. But other business models also were examined. First of all, a new neighborhood was found. This time the neighborhood was selected because they wanted to participate. The idea was to give all the houses a free energy analyses of the houses energy performance, and also give the house owners an offer regarding implementation of the analysis – the idea was to make a model, that provides economy of scale. In this case possibilities were also found.

4.3. Municipality of Tynaarlo and province of Drenthe: 'SMART'

4.3.1. Introduction

The provinces of Drenthe, Groningen and Friesland work together on a common energy strategy. They want the northern region to become and stay a frontrunner in energy savings and renewable energy. Examples of projects that were developed are the 100.000 Housing Plan and the 100.000 Vehicle Plan. To convince and stimulate private homeowners to carry out sustainable renovation and energy saving measures, a customized approach was needed. This was the project to establish a new business model for energy saving, called 'SMART' (in Dutch: Slim).

4.3.2. Moving the market for energy saving and renovation

Energy saving is proved to be complex for home owners and it's very often not a priority. On the other hand a lot of money can be saved and kept in the region, home owners and local companies can benefit. The market for energy saving needs to start moving. The starting point of the concept is to make it easy for home owners. The idea took shape that the whole chain of companies, financers and consultants involved in a renovation project, should be organized in consortia. The customer, the private home owner gets service instead of headaches. And still, freedom of choice between consortia. But it is no longer needed search for the best/ the cheapest constructor, installer or advisor etc. The three essentials of the concept are:

Collaboration

- Marketing;
- Service.

This way, the concept is centered around the consumer. Without consumers there is no market for energy saving measures.

4.3.3. The project

The Center for Private Builders (KUUB) was responsible for the recruitment of consortia. Local companies were invited to develop consortia and until 2012, 13 consortia have been established. The consortia consist of a chain of companies that can provide consultancy, installation of all sorts of energy measures etcetera. The Province facilitates

municipalities and companies with the development of an overall marketing concept, six communication strategies and 8 strategies to reach the consumers. Moreover, an implementation plan was developed to roll out the concept. Municipalities have an important role in the communication to consumers; they organize neighborhood events.

way to act'.

4.3.4. The need for branding and marketing

The need for recognizable and unequivocal communication is apparent. Consumers want to be sure they come to the right company with a certain level of service and knowledge. A common brand is much more powerful and enhances the charisma of the project. It makes it easier to reach more people. Plus, it saves municipalities time and money because they don't need to think about branding energy saving. With the logo and the brand 'Smart' all involved partners talk the same language. Together they send out a powerful signal to reposition energy-

4.3.5. Quality criteria or promises

All of the consortia subscribe the six promises of the project. These are:

- All options: The customer gets a complete overview of all possible options so he or she can make a choice based on knowledge;
- The SMART-advises are clear, complete and synoptic
- Customization: personal wishes, planning and budget are taken into account;

4.3.6. Pilot Municipality of Tynaarlo, Pilot Westlaren

The Municipality of Tynaarlo started a pilot in the small village of Westlaren (500 households). Together with one of the consortia and Drenthe's Federation

for Envirionment and Nature, an information market was organized. As a first step a questionnaire was send out to estimate the wishes and motivations.



• 1 window, 1 contact person that organizes the whole package, from advice to realization;

'SMART living with energy = the ultimate home

The brand and the logo can be added to the

companies and municipalities own logos, which

experience, the new way of living'.

makes it very flexible to use.

- Reliability: agreed is agreed, companies do what they promise.
- Service from A to Z: the project is finished when the customer is happy.

29% of the households returned the questionnaire. In 90% of the houses some energy saving measures already took place. 60% of the respondents think there are more possibilities for saving. One third has asked for an energy advice. 11 persons volunteered for the neighborhood's energy team.

The consortium established an offer for the home owners. The first 100 energy consults cost only 25 euro and the project support costs only 140 euros. A group of enthusiastic home owners has joined and is now developing a project. An unexpected turn of the project is that the home owners in Westlaren wanted to develop a consortium themselves. A workgroup was established, a website was developed. The project has set people in motion and dialogues between homeowners were stimulated. It will take a longer time to measure the effects on concrete energy saving and CO₂ and the local economy.

4.3.7. Transferability

The SMART model is rolled out in all three provinces so transferability is very good. The municipality of Tynaarlo wants to use the experience in Westlaren for a further roll out in the municipality. They've learned that home owners still want the freedom to choose a consortium. An advantage is that the project produces information about the state of the existing and private housing stock that is not registered.

4.4. Osterholz: Energy consulting campaign Ritterhude

4.4.1. Project rationale

Under the umbrella organisation 'Energiewende Osterholz 2030' the Municipality of Ritterhude provided 80 free energy consultations for home owners. The Hanoverian campaign 'Gut beraten starten' was used as an example for that. Consultations were held in selected streets of Ritterhude where a lot of buildings in need of redevelopment are situated. Energy advisors from the region advised home owners in different quarters. They used the methodology of 'Gut beraten starten'.



This initiative should encourage house owners to renovate their homes for energy-saving reasons. At the beginning all home owners filled in an energycheck questionnaire about the status-quo of parts of the building, illustrating options for renovation and energy saving potentials. Home owners get information about economic benefits of investing in their buildings. Not only citizens benefit from energy consultation; the Municipality of Ritterhude also gains an overview of the energy consumption of different types of buildings in the city.

At several events, citizens were informed about optimization and energy saving potentials and technical issues. Home owners are motivated to invest using the latest information available. 'Gut beraten starten' was developed by the 'target GmbH' (Hanover) and Ritterhude used their concept for the energy consulting campaign. Ritterhude focuses on two quarters ('Seefahrersiedlung' and 'Großen Geeren'), because a lot of older buildings are located in those areas. Therefore potentials for energy related optimization are extra high.

Each of the four energy advisors counseled 20 home owners and completed energy-checks. They went from door to door and spoke to all citizens

4.4.2. Pilot project's partner

'Energiewende Osterholz 2030' is the local realization of the Interreg IVB project North Sea – SEP in the administrative district of Osterholz. This project is co-funded by European Regional Development Fund (ERDF).

4.4.3. Results

There is need for energetic renovation of residential buildings in Ritterhude. Hence following activities have to take place to reach the goal of energy transition. These are required and useful to reduce the energy demand. Similar projects and campaigns should continue in Ritterhude and other municipalities of the administrative district. Further information and explanation is required, as well as individually. Free energy-checks about energyrelated renovation were adapted for each client. All citizens of Ritterhude could advertise their interest in energy consultation. Information was disseminated through events, flyers, and press articles. Issues of 'Energiewende Osterholz 2030' should be made tangible for every citizen.

Within the 'Energiewende Osterholz 2030' several initiatives in every municipality of the administrative district of Osterholz took place. Ritterhude focuses on energy-related renovation, inspired by 'Gut beraten starten' from Hanover. While there is a written version of 'Energiewende Osterholz 2030', Osterholz wants to live and shape that vision.

Aim of this campaign is counseling home owners and sharing information concerning potentials for energy-related renovation. The 'Energiewende Osterholz 2030' does not only promote renewable energy, it also demands energy saving. This initiative explains to citizens the opportunities for saving energy and thereby saving money too. On the one hand energy saving potential for residential buildings is demonstrated and on the other hand opportunities of civic participation are shown.

The Municipality of Ritterhude is project partner of the 'Energiewende Osterholz 2030'. The project was implemented by energy advisors from the administrative district.

on-going encouragement of home owners towards necessary energetic renovation.

A clear calculation of costs for involved project partners and economic benefits for home owners, involved energy advisors and local craftsmen is hard to define. Only a non-monetary added value, as lessons learned during the project, can be quantified with certainty.

Business models for generation of renewable energy

5.1. Tynaarlo's social cost-benefit model for income generation with renewable energy

5.1.1. Starting point

Tynaarlo's initial emphasis was upon an energy strategy and business model for the sustainable housing development 'De Bronnen'. Aspirations for an energy producing housing district were set down in the 2009 Globaal Ontwikkelkader (global development framework). In the light of the subsequent energy studies implemented as part of North Sea SEP the realization of an energy producing district did not appear to be feasible within the limits of the existing site conditions. That led to the question of how the energy model could be optimized within as well as outside the development. It became obvious at the same time that the housing market was deteriorating. This prompted inquiry into renewable energy production potential for contribution to the municipality's financial and socio economic objectives.

5.1.2. Renewable energy beneficial to social objectives

The municipality of Tynaarlo has asked consultancy agency Triple E to investigate how renewable energy can contribute to both its financial and social objectives. The energy solutions that arose from the energy studies for 'De Bronnen' were the starting point. Emphasis has come first to rest upon the municipality's financial task arising from the decreased income from building-plot sales at the new housing district 'De Bronnen'. The use of renewable energy production to make up the shortfall in income is investigated by Triple E.

5.1.3. Financial scenarios - wind and solar comparison

In the model, a solar park and wind turbine were compared. In strictly financial terms it appears that wind energy (which could deliver 60,481 euros per year) is the only viable option at this moment. Large scale solar energy generation could become cost effective in the longer term. This depends on the price per kWh. Based on the studies and experiences from other solar parks the price should be at least 0.22 euro kWh. With the current price of 0.07 euro per kWh, there would be a cost of 210,000 euro per year. An advantage of a solar park is the flexibility. Wind energy is already feasible at a price of 0.059 euro per kWh (Source: De Bronnen leveren altijd Watt, Triple E consultants, October 2012).

5.1.4. Filling the municipal income gap with energy generation

When these benefits are related to the financial scenario for the housing district, a wind park of 20 turbines would deliver the same annual yield as a total of 550 houses to be developed in a period of 10 years. If the pay back time is 15 years instead of 10 years, 15 wind turbines are needed. This way, a flexible model can be made, where generation of

renewable energy fills in the municipal income gap caused by the deteriorated housing market. It shows the potential of energy as an economic sector in municipalities. There are different variables in the exploitation, such as the interest rate, pay back time and the amount of space needed for the generation.

	Scenario 1 - 0 houses	Scenario 2 - 150 houses	Scenario 3 - 370 houses
2014			
Amortization in 10 years	20	12	5
Amortization in 15 years	15	8	4
2016			
Amortization in 10 years	22	12	5
Amortization in 15 years	16	10	4
2018			
Amortization in 10 years	24	14	6
Amortization in 15 years	18	11	4
2020			
Amortization in 10 years	26	15	7
Amortization in 15 years	19	11	<u>,</u>

Solar park	
Space needed per 1000 mWh in ha	3 ha
Price in € per kWh	0,07
Revenues per year	70.000
Building cost 1000 mWh park in €	3.000.000
Amortization per year (15 years) in €	279.341
Cost for network per year in €	11.000
Break even price energy in €	0,22

Wind energy (2 MW turbine)		
Yield of energy per year in kWh	5.200.000	
Price in € per kWh	0,07	
Revenues per year in €	364.000	
Amortization per year (15 years)	260.719	
Maintenance cost per year in € per kWh	0,004	
Total cost of maintenance per year	20.800	
Cost for network per year in €	22.000	
Yearly balance	60.481	

5.1.5. Socio-economic criteria

Financial viability is not the only reason for Tynaarlo to develop renewable energy projects. Also socioeconomic benefits play a role. Energy measures are compared to local criteria such as the contribution to:

- the climate for investments;
- attractiveness of the landscape and living environment;
- connection to economic sectors, such as agriculture and building;
- high quality living;
- spatial and environmentaal criteria;

- social acceptability;
- the achievement of environmental goals;
- control of rising consumer and agricultural sector energy costs

Biomass

It turns out that biomass energy generation is an attractive and financially viable option on a regional scale. Tynaarlo municipality is well vegetated and agricultural, with substantial potential for biomass production. Farmers will have more manure from Scheme 1: Number of wind turbines needed in addition to housing, to keep a neutral budget for the development of De Bronnen.

Scheme 2 Cost and benefits of a solar park and wind turbine 2015 since its spreading on fields will no longer be permitted from that date. This improves the business case for biomass power stations and the benefits for residents and farmers. Biomass initiatives already exist within the municipality.

Energy saving in houses

Measures on a residential scale are just as important. Sustainable building and the production of renewable energy contribute to the municipality's 'green' profile and help to meet European objectives for energy and the reduction of CO₂ emissions whilst also providing the possibility to deal with emissions legislation. Stricter EPC standards and residential scale generation of renewable energy can make a positive contribution to the financial position of lower income groups by reducing monthly bills. Above all, the money that is saved stays within the region.

5.1.6. Spatial requirements and energy transition parks

Energy production locations are required for the large scale generation of renewable energy from wind turbines, solar parks and biomass. It is appropriate to note at this point that large scale production of sun and wind energy within the new housing development is unfeasible; another suitable location will have to be found. The municipality is now developing a master plan for Vriezerbrug-Zuid along the highway. This location has possibilities and provides the potential development location for an Energy Transition Park (ETP).

5.1.7. Concession model

In order to generate income from wind energy it is necessary for the municipality to direct its exploitation. This could, for example, be done by setting up a local energy business or by selling the production rights for (as yet) unspecified locations, also described as a concession model. Under a concession a private company designs, builds, finances and operates a revenue generating facility in exchange for rights over the revenues generated for a specified period. Generally, ownership of the assets produced under a concession remains with the public sector, and in The installation of wind turbines and the development of a solar park will require planning permission from the Province (and Municipality). Wind turbines often lead to disquiet among local communities because of overshadowing and negative (visual) impacts upon the landscape. It is however anticipated that when the financial gains from the wind turbines reach the municipality and (local) residents, rather than a third party, acceptance will come more easily.

some cases the private company (the concessionaire) is required to pay a concession fee. Generally what distinguishes a concession from a purely private enterprise is that the public sector holds some resource or power (such as a statutory monopoly over the provision of highways or a publicly owned energy resource) which it allows a private company to exploit on certain conditions. Such models transfer a high degree of risk and control to the private sector (Source Background paper Business models and Finance, Dave Hawkey, Edinburgh University 2010, North Sea SEP).

5.1.8. Sustainability in terms of long term continuity

A concession model has advantages in terms of continuity. The Municipality keeps ownership of the land and can benefit from a structural money flow. The end users are also assured of supply because there are no subsidies in this model. The revenues for the municipality are being used for other sustainable projects or to pay for social facilities like pools or community centers. Continuity is therefore one important motivation for sustainable energy planning.

6. Participation models

6.1. 'Solarstrom für Osterholz'- Solar energy for Osterholz

6.1.1. Project synopsis

'Solarstrom für Osterholz' is a regional initiative supporting citizens in the administrative county of Osterholz to build their own photovoltaic plant. The aim of this initiative is to promote the production of renewable and climate friendly solar energy in the region. Energy suppliers (EWE Energie AG and Osterholzer Stadtwerke), banks (Volksbank Osterholz and Kreissparkasse Osterholz), sales company for solar engineering (Solare Energiesysteme Nord (SEN) Vertriebs-GmbH), local electrician guild and the

6.1.2. Roof register Grasberg

The municipality of Grasberg worked out a 'Dachkataster' in which all roofs were classified in different parameters (inclination, alignment, roof dimensions). The results of this project visualize that there is a high potential for photovoltaic installations. Grasberg could produce more electric power on the roofs than it would consume itself.

The political decision towards energy transition acts as a boost for the regional economy because consumers are in favour of changing their behaviour. High bills for energy imports will decline, once the production of power is started on local or regional level. The more money remains within the region, the more will be invested within. Nowadays power from small and medium solar plants is for own consumption and in times of high production there is a possibility to feed into the public grid. This has become a very successful way of energy production and decentralization over the last years. 'Energiewende Osterholz' project office cooperate to achieve this objective.

The 'Energiewende Osterholz 2030' wants to reach the goal of energy self-sufficiency of the administrative district of Osterholz by 2030. Essential activities to reach this goal are on the one hand energy saving and reduction and on the other hand an increase in regional and renewable energy production.

Two sales companies for solar engineering exist in Grasberg itself: 'Solare Energiesysteme Nord (SEN) Vertriebs-GmbH' and 'Osmer Solar', more are located in the neighbouring villages: 'Laudeley Betriebstechnik' (Ritterhude) and 'AUKOS GmbH' (Osterholz-Scharmbeck). Several companies in solar engineering and sales have their headquarters in the region and contribute their expertise and long experience to regional developments. Home owners thinking about installing solar power at home have a good choice option because of many competent craftsmen offering their services.

Technical and economic applicability increased over the last years – especially since 2010. Solar power plants on residential building roofs are on the increase. In several municipalities (Grasberg, Lilienthal and Schwanewede) citizens founded solar initiatives. The rural area of Osterholz, with its huge roof areas on farm buildings, is perfect for installing solar power plants. The conditions for further expansion seem to be very good, because the acceptance for new energy production is still rising and there are still many unused roofs in the administrative district of Osterholz.

The 'Solarstrom für Osterholz' initiative should reach new audiences in the administrative district

6.1.3. Pilot project's partner

- The Project office for 'Energiewende Osterholz 2030' in Osterholz-Scharmbeck leads project activities and communicates towards the energy transition project,
- The local electrician guild offers know-how and brings in expertise
- Solare Energiesysteme Nord (SEN) Vertriebs-GmbH is well known in Grasberg and has good reputation as supplier for solar engineering.

6.1.4. Results

'Solarstrom für Osterholz' is a real success story. Demand for solar engineering and support along the procurement is still very high (status-quo: May 2012). Many citizens in the administrative district of Osterholz take the offer and benefit from the network structure of the initiative. of Osterholz convincing them to use solar energy. Fostering new innovative networking between partners goes ahead with further expertise in energy related projects. The project in Osterholz was a starting point for a county wide campaign and a milestone to an energy self-sufficient region by 2030.

• Both, the Kreissparkasse and the Volksbank Osterholz, biggest and most important banks in the region, enjoy public confidence and are widely accepted.

The Osterholzer Stadtwerke and the EWE Energie AG are major energy suppliers in the region.

Cross-linking among project partners and strengthening of regional value-added chains are two of the most important outcomes of this project. The regional growth initiative ENERKOM-OHZ (energy competence Osterholz) got financial support by some of the network partners.

6.1.5. Evaluation of pilot project and recommendations

The main concept of the solar energy campaign can be described as low-threshold access to information and a field-tested methodology of participation in the energy transition. Financial incentives are additional benefits offered when attending the campaign and building own solar energy plants. Participation of citizens is crucial to speed up both the energy transition and the expansion of the renewable energy production. At this point the initiators cannot make a cost-benefit analysis because of the on-going strengthening of co-operations between project partners still creates more added value. This small-scale project gives evidence of the possibility for a regional energy transition, which will proceed over the next years

Business models for energy in new urban areas

7.1. Spatial planning as a part of a business model?

The municipality of Middelfart and Tynaarlo are combining experiences within its field of spatial planning, and working on a new model regarding energy savings in private houses as well as generation of renewable in combination with core municipality tasks as spatial planning.

7.2. Middelfart: Low Energy Class 1 as requirement for new buildings

There were no energy requirements for construction in the local plans when Middelfart started discussing energy issues. When the new energy strategy was decided the city council decided to set out demands for low energy class 2. But they were reluctant to several other requirements. They invited the technology and environment committee to Egedal municipality so they could see how such rules could work and that it did not necessarily lead to houses made of straw bales and cooking over a bonfire. The case was reopened and the city council was so excited about what they had seen in Egedal that they adopted the whole package; low energy Class 1, collection of rainwater, environmentally friendly building materials etc.!

The requirements apply to new constructions in the new local plans but it is also possible to go through the old local plans and change them. Existing buildings are not affected, only when they need to be demolished and new buildings are constructed.

7.3. Tynaarlo: Integrated planning model for integrating energy in housing districts

7.3.1. Towards another way of planning

The Municipality of Tynaarlo discovered the need for an integrated planning model aiming to develop 'sustainable' housing districts. In the new model, the emphasis is not only on developing a plan, but in the same time at building a network of partners and creating social commitment as well as learning an innovation. Traditionally the municipality implements building projects on the basis of the so-called MOOT model. This means that the projects are put up to tender on the basis of an urban development plan. The Municipality sets certain criteria for the choice of project developers and a number of these are then invited to give their own interpretation. This model allows for maximum use of the creativity and expertise of those parties involved in spatial planning. Basically the MOOT model is more or less necessary when creating 'sustainable' living areas, using a set framework to achieve sustainable ambitions. So the new model can be seen as an extension of the MOOT model with communication, learning and building partnerships.

7.3.2. Pilot De Bronnen: urban planning for different dimensions

Under North Sea SEP, the Municipality of Tynaarlo, together with ROiD consultants developed an innovative model for urban planning as a business model for new housing developments. The model is based on a concrete pilot, the planning of the new housing district De Bronnen. De Bronnen has to accommodate 370-550 houses and a multifunctional accommodation which is planned to fit the surrounding landscape.

7.3.3. Seven principles

- 1. The new planning model is based on seven principles:
 - The municipality is the director. This means;
 - The municipality is a reliable partner and commits itself to the sustainability ambition for the long term. The municipality is the primary contact person for all stakeholders.
 - The municipality invites other stakeholders to participate and directs for different interests;
 The municipality communicates and involves
 - citizens;
 - The municipality organizes knowledge development;
- 2. Integrality and transparency;
 - Sustainability is an integrated concept and will be considered in all dimensions of people, profit and planet. Instruments such as social cost benefit analysis, Sustainability Performance on location –index (DPL) and

GPR Sustainable Urban Design, will be used to make choices and its effectiveness intelligible.

- 3. The planning includes innovation;
 - Sustainability is very similar to innovation. This means planning for sustainability requires an open and flexible attitude towards new developments. The frameworks that have to be determined by the municipality must leave space for innovation, and even better, be challenging.
- Multiple layered, integrated design and concept development is part of a planning process for sustainability;
 - Sustainable measures mean changes on every scale. Planners must be aware of chances determined by scale and time.
 - Time is needed for exploring by design to find out new concepts and design solutions.
- 5. Financial cycles are balanced;



- Cost and benefit have to be considered simultaneously and not only for the short term, but also for the long term. Also benefits for others than the investor need to be concerned as well as soft and hard values. They should be balanced in an integrated business model.
- 6. Risks are being managed;
 - Innovation means uncertainties. Different parties carry different responsibilities. This is part of corporation models.
- 7. The project is a catalyst for the development of knowledge about sustainable urban design;
 - Frontrunners and innovators are attracted to the planning process and are invited to bring in their knowledge. The project is a breed nest for new knowledge and this will be disseminated.

7.3.4. Integrated planning model for sustainable urban development

Following, the principles are applied to the planning process. This is shown in the scheme below. There are three dimensions:

- Implementation (definition of content, plan and design, business cases;
- Transparency: (setting criteria, evaluation and analysis, instruments);
- Commitment (dissemination and marketing, building a network, recruitment of partners).



Planning model MOOT plus (Procurement based on criteria)

Thus, in the process new aspects are incorporated or enhanced.

- Network development finding committed partners and high level experts;
- Marketing a clear message that will attract interested parties;
- Financial and legislative frameworks;
- Process design;
- Development of the (municipal) energy strategy;
- Communication and process organization of commitment in advance;
- Monitoring and social cost-benefit analysis (SCBA) with applied instruments such as the Sustainability Performance on location –index (DPL) and GPR Sustainable Urban Design;
- Collaboration and exchange of knowledge with other municipalities.

7.3.5. How did it work

For each stage of the process (initiative, definition, design, preparation, realization, maintenance), an activity plan was made. Each stage was finished by the establishment of decisions in a formal document.

7.3.6. Distinction of fundamental, interdependent and independent relations

The planning model is centered around the idea that implementation of sustainable measures requires a joint responsibility and involvement of stakeholders and individuals, private companies and the municipalities. But not all have the same interest or impact. As director, the Municipality needs to know who to involve for what. The scheme below maps the position of different partners. The scheme helps the Municipality in its role as director.



7.3.7. How did it work

During the planning process citizens, experts, other governments were invited. A lot of knowledge was unlocked and this improved the plans. The communication with experts and citizens worked cyclically, as a testing and evaluation environment. Even in the beginning of the planning process, it was possible to distinguish the big options from 'low hanging fruit'.

7.3.8. Collaboration strategy

The next step is the design of the collaboration strategy. During the process the influence and the role of stakeholders and private partners changes. The Municipality can make different choices. This may affect the possibilities for some measures. For example, building houses with a higher norm for energy saving may require a larger role for project developers instead of individual buyers. It is easier to make agreements with project developers.

The scheme below shows an example of such a decision panel on collaboration.

Initiative	Definition	Design	Realization	Maintenance
80% Municipality Initiating and policy making	40% Municpality and other governments	40% Municpality and other governments	20% Municpality and other governments 40% End users (renters	50% Municpality and other governments
	40% Citizens	40% Citizens and end users	and buyers) 40% Project developers	50 % End users
20% Citizens	20% Experts and suppliers	20% Experts, suppliers, developers, energy companies		

Scheme 3: decision panel on collaboration through the planning stages

7.3.9. Results and lessons

Planning for the neighborhood is still going on. It takes time to get used to the complexity of planning for sustainability. Roles within the municipality are changing too. Communication officers are becoming of strategic importance for example. It is very important to keep politicians and managers informed because the process is more dynamic than normal.

Knowledge

As a result of the planning model knowledge about sustainable urban design in the municipality has increased among the workers.

Selection of options

It is now easier to put choices in a time frame and to make a distinction between fundamental and collective measures, individual (or independent) options and options that depend on others.

End user

With the planning model, the interest of the end user and stakeholders, is pulled forward and played a role from the beginning of the process. This has enhanced decision making and saves on planning costs.

Climate Partnerships

8.1. Introduction

The European Union promotes public-private partnerships (PPP's) as a means to mobilize private and public investment for economic recovery and long-term structural change, and sees them as contributing to sustainable development (Source: Commission of the European Communities, 2009). However, we should be aware of the limitations and drawbacks of PPPs and acknowledge that they will not always be an appropriate means for the achievement of public sector goals. One way a

8.2. Frederica climate partnership Dong

The Municipality of Fredericia entered a climate partnership with DONG Energy, Denmark's leading energy supplier. partnership model may be inappropriate for a given goal (such as installation of solar panels on x% of buildings in a region) is that it may fail to generate sufficient investment at an acceptable financial cost to the public sector. However, different models may impact a broader array of factors than can be captured by financial analyses. That is why within the North Sea sep WP 5.2 sustainability criteria have been developed.



8.2.1. Agreement

This agreement sets out the terms and conditions of a close collaboration on energy saving projects and supports the further advancement of renewable energies. In cooperation we develop new solutions and climate projects.

DONG Energy intends to reverse the ratio between its fossil and non-fossil energy production from 85/15 to 15/85 within one generation. Therefore they need to increase the production of renewable energy and to develop and test new energy systems. One of the cooperative projects is for production of biogas. Fredericia Municipality has the second largest waste water treatment plant in Denmark. For several years there has been a minor production of biogas out of the wastewater. In cooperation with

8.2.2. The model

The goal of the climate partnership is that the partners in cooperation through innovation and development creates tangible results concerning energy savings, green transportation and increased use of renewable energy, and to disseminate the acquired new knowledge and experience we gain from this cooperation.

DONG Energy created the concept of climate partnership and they have entered several partnerships with companies, organizations and municipalities. Each Partnership however is designed to each individual municipality or company. DONG Energy the production of biogas is doubled and the biogas is upgraded to natural gas and injected into the natural gas grid. Energy savings resulting from the different projects in the partnership is included in DONG Energy's statutory annual energy savings. The municipality in return benefit from DONG Energy's expertise and technology in the task of reducing the use of fossil energy. Examples of other energy saving projects initiated in the partnership are:

- production of energy out of waste from households
- energy renovation of public buildings
- employee programs which focus on a more energy-conscious behavior

One of the projects in Fredericia Municipality, initiated by the climate partnership, is energy labeling and energy renovation of the municipal buildings. Energy labeling enables municipal loans for financing the renovation. Part of the financial savings resulting from the reduced use of energy, is used to finance other climate projects in the partnership.

The climate partnership is also used to drive the market for renewable energy as the municipality purchase green electricity from DONG Energy's wind farm in the North Sea.



8.2.3. Organization

Leaders from both organizations are members of a steering committee. The steering committee ensures momentum in the different projects, approves framework conditions and implementation of new projects.

Technicians from both organizations cooperate in the project teams



All the projects are financed by the municipality. The partnership is not legally binding and it does not exclude the Municipality from cooperating with other relevant partners.

8.2.4. Results

- Energy renovation of public buildings is initiated.
- Employee programs which focus on a more energy-conscious behavior. This project demonstrated an energy saving potential of 10%.
- REnescience project: A new technology that makes it possible to sort and convert household waste into biogas. Preliminary analysis is conducted.
- Biogas produced from wastewater is now upgraded to natural gas and injected into the natural gas grid.
- Busses and garbage trucks running on biogas: Preliminary analysis is conducted.

8.3. Business-model for the regional Triangle Denmark.

8.3.1. Introduction

The Triangle Region is situated in the southerncentral part of Denmark, and is a sub-region of the South Denmark Region. The South Denmark Region includes the southern part of the Jutland peninsula, bordering Germany, and the Island of Funen.

The Triangle Region Denmark was established as an association in 1994 by 8 municipalities located in the Triangle Region, with the task of drafting common development perspectives for the Triangle Region spatial planning. The priorities were urban development, business development, education, environment, culture and tourism.

Today the Triangle Region is organized as an association of 6 municipalities (due to the 2007 municipal reform we now have fewer, but larger municipalities and a larger population). The total size of the region is 3.450 sq km and approximately 350.000 inhabitants. Denmark has a size of 44.000 sq km and 5.5 million inhabitants.

8.3.2. Establishment of a regional network

Due to the legal status of the Triangle Region, the objective of the network is to develop a methodology for cooperation between municipalities, companies and educational institutions in the field of energy efficiency and climate activities. This is done in order to develop a coordinated approach of defining common visions and goals suited to the policies in each municipality. Each municipality has developed or is developing its own SEAP and also has established its own network with companies, educational institutions and private

8.3.3. Networking activities

Activities in the network:

- Knowledge sharing between municipalities
- Project development eg. common CO₂ baseline, common infrastructure for electric cars, biogas planning etc.

The Triangle Region has activities within a number of fields, including spatial planning, transport, culture, education and promotion of business. The Triangle region supports the municipalities with consultant assistance and facilitates different kinds of networks between the public, companies and educational institutions (Triple Helix model).

One sub-regional network within The Triangle Region Denmark has recently been developed working with initiatives/activities within the field of energy and climate. These initiatives include overall coordination of relevant climate and energy initiatives to reduce energy consumption and environmental impacts in the Triangle Region.



 Development of a common SEAP including TVIS (Cross boarder transmission system for central heating)



Communication with different stakeholders takes place through the municipalities. They have different ways to involve and communicate with local stakeholders e.g. citizen and business panels.

8.3.4. Definition of stakeholders

As mentioned before the Triangle Region is facilitating the existing network. As illustrated here, each municipality has its own network, which will be activated when needed. in their local areas. To the extent there is need for additional networks or contacts in relation to specific projects, new networks will be created/established. It could be in relation to joint biogas planning and development.



It is assumed that the municipalities have established contacts with all relevant stakeholders

8.3.5. Planning for the SEAP

The municipalities in the Triangle Region decided in 2009 to join the EU initiative Covenant of Mayors as a single member with The Triangle Region Denmark as the signatory. As a part of this, the municipalities were obligated to make a joint SEAP in order to fulfill the requirements in CoM. But due to various new circumstances, it has been decided to withdraw the membership of the Covenant of Mayors. Thus a new process to develop a common SEAP will start in the spring/summer 2011.

In the last few years the municipalities have already launched a number of initiatives which in time will help reducing CO₂ emissions, energy consumption

and increase energy efficiency by integrating energy efficient products and increase the amount of renewable energy sources. They have also developed their own SEAP.

As a consequence of this, the main focus will be on methods of cooperation between municipalities (strategic planning) and development of cross-border projects between the municipalities, e.g. biogas planning, energy planning and joint infrastructure for electric cars. Each municipality will still have its own SEAP, where focus will be on local conditions.

Performance agreements with companies

9.1. Introduction

Companies may well be interested in sustainable energy. By facilitating them and stimulating to join sustainable projects, a lot of commitment can be obtained.

9.2. Kolding (DK): Green Shops

In Kolding 100 shops have made agreements to act more environmentally friendly.

There is a Green Shop coordinator who visits shops in the municipality 2-3 times each year. When a shop wishes to enter the certification scheme they must point out some areas in which they want to improve.

9.2.1. Goal

In the Municipality we use the model to make actions towards citizens in any sustainability aspects. The aim is to influence citizens' behavior as well as the shopkeepers' behavior in running their business. This is often related to lighting and technical equipment. Each year there is an evaluation together with the coordinator and new effort areas are determined. The project was initialized by the Municipality of Kolding and later expanded to the rest of Denmark.

There are two goals in the project. One is to reduce energy consumption in the shops and thereby reduce their costs. The other goal is to make it easier for customers to choose shops which act responsibly.

9.2.2. Background

The project was started in the municipality of Kolding in corporation with a national organization of energy services to citizens. Development started in 2000 and has been developed on through the years in corporation with the shops. The project is financed by the Municipality who provides the project with a coordinator. The specific investments made by the shops is made by themselves with the goal of energy savings or expectations of more customers in their shops.

9.2.3. Partners involved

The Municipality – including the business service department and the department of Tourism, the Energy Service Denmark and the shops. The Municipality has provided the coordinator. The Danish Energy Service provides the technical part of the audit in the shops. The shops are the most important partners as they have to carry out all the activities afterwards.

Marketing activities are undertaken by the coordinator in corporation with the shops. This

is especially at the annual event for the shops where activities, competitions etc. take place. The coordinator also makes sure to provide the local press with everyday stories from the shops primarily related to their energy savings.

In the daily activities the shops do their own activities. Some see the status as a green shop as very important to attract more customers and others do not specifically use the title to attract customers. It seems to depend on the type of store - grocery, clothes, health products etc.

9.2.4. Results

By 2012 there are 100 Green Shops in Kolding.

9.3. Hedensted Municipality (DK) Agreement on saving

Hedensted Municpality has committed itself to reduce the electricity consumption. Hedensted Municipality has made an agreement with Elsparefonden in saving 3% in electricity consumption for the period 2008-2011. The agreement relates to behavior, and aims at getting the employees to think about their consumption. Remember to turn of the light, computers etc. when leaving the office.



9.4. Hedensted Municipality (DK) Agreement on electric cars

Private individuals in Hedensted Municipality are testing electric cars to experience how electric cars can be adapted into every day life.

The project is the first of its kind in Denmark, and is a corporation between Hedensted Municipality, Horsens Municipality, Energi Horsens, NRGI and Teknologisk Institut. The project gets economic support by Energistyrelsen and Region Midtjylland.

The unique issue is that private individuals are testing electric cars. The project runs for 4 years

and during that period 8 electric cars is going to be tested in about 100 families. Each family has a car at its disposal for three months, and it will increase the project with the possibilities and challenges in use of an electric car.

Furthermore both Hedensted and Horsens Municipality are testing 4 electric cars for internal transport.

9.5. Hedensted Municipality (DK) Climate and energy lessons for schools

Schools in Hedensted Municipality have the opportunity to get travel expenses and receive climate and energy lessons for free.

The project is a corporation between Hedensted Municipality and Okolariet, which is a knowledge and exhibition center. Energi Horsens is supporting the project economically.

The idea of the project was formed in relation to the EU project 'North Sea Sustainable Energy Planning'. Hedensted Municipality participate in the EU project among with four other municipalities and Green Network, and together they corporate on a series of different exhibitions concerning energy in Okolariet. Now school classes in Hedensted municipality have the possibility to get their transport and energy lessons funded, when they visit the exhibitions in Okolariet.

It is a fact that children are keen to share and tell about their knowledge and experiences, which is one of the reasons Hedensted Municipality initiated the project.

10. Conclusion

The variety of business models presented in this document is very high. They show how municipalities and regions in the North Sea Region want to implement their energy strategy.

Although varied the business models show similarities across the countries. Marketing and branding, as well as communication, plays a big role in much of the models. Most of the models use a broad definition of the concept of business models. The focus is on publicprivate collaboration more than on making money. By doing this, the municipalities stimulate indirectly that money is kept in the region, and the region gets more sustainable energy as well.







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1 Regional Strategies

2 Business Models

3 Networking

4 Public Buildings

5 Dissemination

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