



1. Update of the Energy Concept of the Administrative District of Northern Saxony

Summary

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**CENTRAL
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Update of the Energy Concept of the Administrative District of
Northern Saxony



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The Update of the Energy Concept of the Administrative District
Of Northern Saxony was implemented by

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CENTRAL EUROPE PROGRAMME

CENTRAL EUROPE is a European Union program that encourages cooperation among the countries of Central Europe to improve innovation, accessibility and the environment and to enhance the competitiveness and attractiveness of their cities and regions.

CENTRAL EUROPE invests €231 million to provide funding to transnational cooperation projects involving public and private organizations from Austria, the Czech Republic, Germany, Hungary, Italy, Poland, the Slovak Republic and Slovenia. The program is financed by the European Regional Development Fund and runs from 2007 to 2013.

About VISNOVA

The CHALLENGE of VISNOVA pursues an integrated approach which addresses both the supply (provision of sustainable energy) and demand site (efficient use). Based on best practices collection, transferred and tested in pilot measures (both pre-investment and small investment), included to regional energy development plans adopted with a political vote, financial resources from national programmes will be explored and responsibilities for the plans' implementation assigned.

Thus, VIS NOVA partners aim to integrate a concept of energy autonomy based on renewable sources and energy efficiency into regional development policies, public authorities in rural regions need adequate planning instruments to avoid isolated approaches that fail to unfold the full potentials for territorial cohesion, competitiveness and employment. Furthermore, public authorities lack profound knowledge about the transferability of European good practices and have poor access to cutting-edge innovations in intelligent energies.

The overall OBJECTIVE of VISNOVA is to cover in the medium and long term up to 100% of the territory's energy demand by energy being produced off regional resources. Sustainability and a secured supply shall be turned into a location factor; the possibility to determine prices can be exploited as a new incentive to promote economic development. Moreover, regional added value and hence employment in the energy sector is strengthened.

With other words, the aim is to integrate instruments to promote energy efficiency ("Energy Efficiency Plan") based on EU good practices, new technologies and transnational learning into regional development policies. The project therefore assists rural regions to plan and to take action to create new value added in the renewable energy sector, to secure local energy supply, to improve energy efficiency performances, to strengthen their competitiveness as locations for economic activities, and to promote territorial cohesion comprehensively.

Furthermore, pilot investments and feasibility assessments subject to transnational peer review test and demonstrate new means to exploit endogenous energy sources in a sustainable way and enhance their efficiency.

Already existing energy/regional development agents (usually those participating in the project) will assume the competency of a regional sustainable energy centre to master the energy development plans' medium and long-term implementation.

1. Introduction

The energy concept for the district Nordsachsen and the region Dübener Heide in the districts Wittenberg and Anhalt-Bitterfeld - district of Nordsachsen (in the following referred to as energy concept Nordsachsen) was adopted in June 2011 and is now running for approximately two and a half years. This is a relatively short timeframe for the implementation of an energy concept. Thus, the summary of the energy concept 2011 will be repeated here once again. Chapter 5 shows the development of energy consumption and energy production since the data were generated and initially recorded in the energy concept 2011. There has been no significant change in the consumption data. The main change can be detected in the field of energy production, mainly due to the enormous development in the area of photovoltaics. Hence, the administration was required to review and thus update the energy concept. In the following, the results of this update will be shortly summarized.

2. Adoption of the summary of the energy concept 2011

The aim of this energy concept was to show the status quo of energy consumption in the district Nordsachsen, taking into account the amount of energy already being produced within the administrative district. Furthermore, the authors were called to determine the theoretical- technical potential resulting from a possible use of renewable energies in the region.

The following compilation shows the power production in the year 2009 (concession fee 2008), relating to power consumption.

Electricity Consumption	1.058.555 MWh
Electricity Generation	
Biomass	272.532 MWh
Solar Energy	18.202 MWh
Water Power	608 MWh
Wind Power	155.891 MWh
Total	446.222 MWh

According to this, 43 % of electric energy needed in the district was already in 2009 being produced off regional renewable energy sources.

(Thus, the district already lies above the target of at least 24 %, given by the Saxon State Government for 2020.)

Urban areas will not be able to fulfil their targeted share due to their structural situation. The rural areas will therefore be required to significantly exceed the 24 % value in order to reach the district's average target.

Under consideration of the population development and expected energy consumption development in general, this concept is based on the assumption, that the prospective annual energy consumption in the district Nordsachsen will be equally as high as in the year 2009.

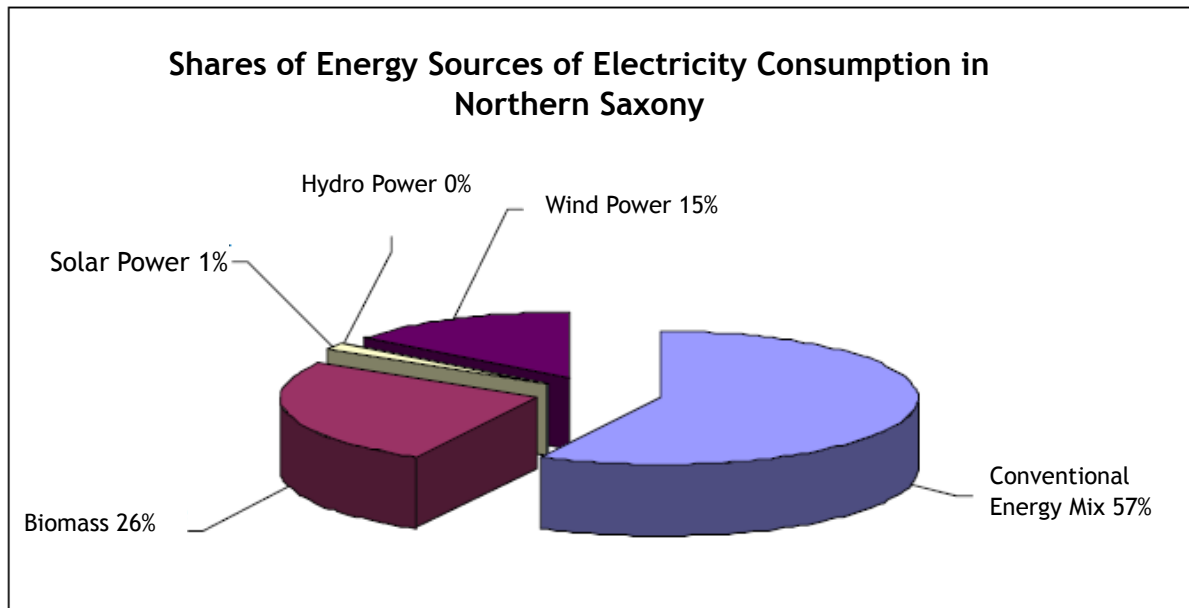


Figure 1: Shares of Energy Sources of Electricity Consumption in 2009 (Source: Energy Concept 2011)

The potential assessment shows that the amount of renewable energy sources theoretically available in the region can contribute even more significantly to cover future energy needs.

Theoretical Potential of Generation of Renewable Energies in Northern Saxony	
Electricity Consumption in 2009	1.058 GWh
Photovoltaics ¹ 1 - Theoretical demand of photovoltaic surface to cover the electricity demand (level of efficiency of PV-module =14 %)	10.580.000 m ²
Wind Power ² 2 - projection with an estimated increase of 78 %	279,8 GWh
Biomass ³ 3 - theoretical potential of electricity generation	485,1 GWh
Forestry	24,0 GWh
Water Power ⁴ 4 - based on the laws in the federal state of Saxony there is no further potential	-

However, this theoretical potential is not to be confused with technically and economically viable potential. Also, the development of the shown potentials is a longer lasting process and its intensity and pace depend to a great extent on energy prices, suitable funding instruments as well as on administrative measures, political settings and social and economic developments.

The actual contribution of renewable energies to the total power generation does not only depend on their further expansion but also on the development and costs of the particular technologies, such as photovoltaic systems, wind turbines, energy storage.

Furthermore, energy sources such as wind and sunlight cannot be used constantly and efficient energy storage systems are still in development. Thus, fossil energy sources will still have to be used to compensate energy shortfalls at least in the medium term. The District Office has already launched several initiatives in the district Nordsachsen to promote efforts for a further use of renewable energies.

Chapter 10.2 also shows concrete measures and areas which require further action.

The possibility of further using renewable energies strongly depends on the future political direction, especially on the EEG (Renewable Energy Act) as well as on the development of different prices, e.g. of biomass, oil, electricity and gas. In this context, the appropriate expansion and restructuring of energy networks need to be prepared promptly to secure a stable future supply for the district. A more extensive use of renewable energies in conjunction with an increased efficient energy consumption will bring new jobs to the region in the medium term. Installation of technologies but also maintenance and other services will generate regional added value, and so will services for the energetic restoration and renovation of buildings.

3. Characterization of the District of Northern Saxony

The administrative District of Northern Saxony is located in the northern part of the Free State of Saxony and adjoins the districts Anhalt-Bitterfeld and Wittenberg in the north (both Saxony-Anhalt). The districts Elbe-Elster (Brandenburg) and Meißen (Saxony) are adjacent in the east. The Saxon districts Mittelsachsen and Leipzig as well as the urban district of Leipzig border in the south. In the west, the district adjoins the Saalekreis in Saxony-Anhalt.

The district of Northern Saxony has a surface of 2,020 km². On 31.12.2013, 30 municipalities belonged to the district. Seat of the administrative district is the city Torgau. The most populous city is Delitzsch.

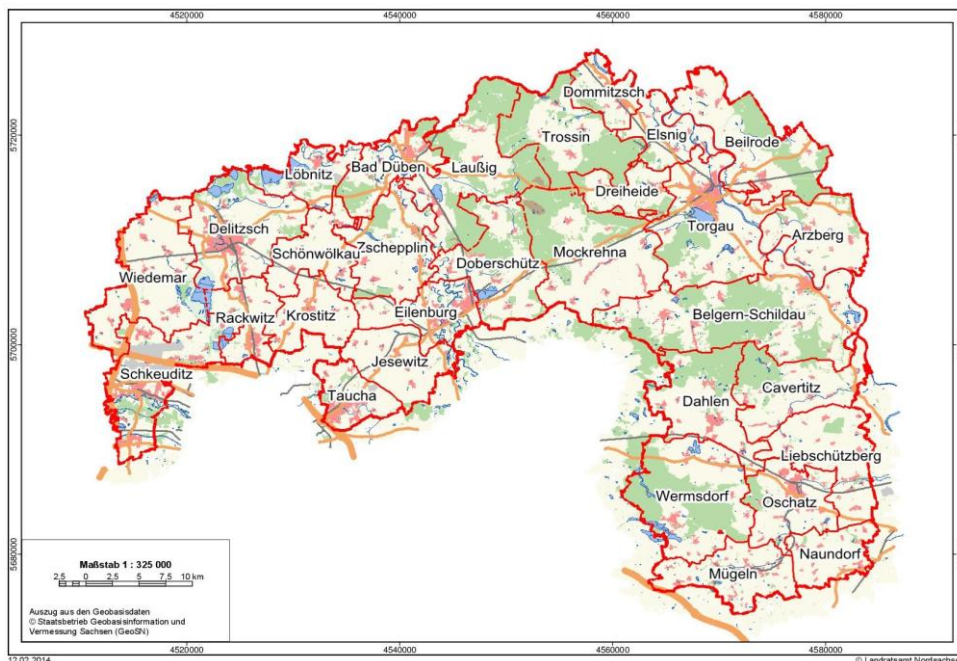


Figure 2: District of Northern Saxony

Out of the 30 municipalities, 6 cities have more than 10,000 inhabitants. Those are: Delitzsch (25,148), Eilenburg (15,539), Oschatz (14,814), Schkeuditz (16,877), Taucha (14,291) and Torgau (20,428).

The District of Northern Saxony has 50,284 residential buildings, 41,886 of which are buildings with one or two housing units. 9,026 building have more than three housing units. The living space per resident amounts to 40.41 m².

Following economic sectors are especially important for Northern Saxony: paper processing, metallurgy, wood and glass processing, logistics as well as the food economy. In 2012, there were approx. 15,300 companies with approx. 67,000 employees in the District

of Northern Saxony. Figure 2 shows the distribution of employees in economic sectors.

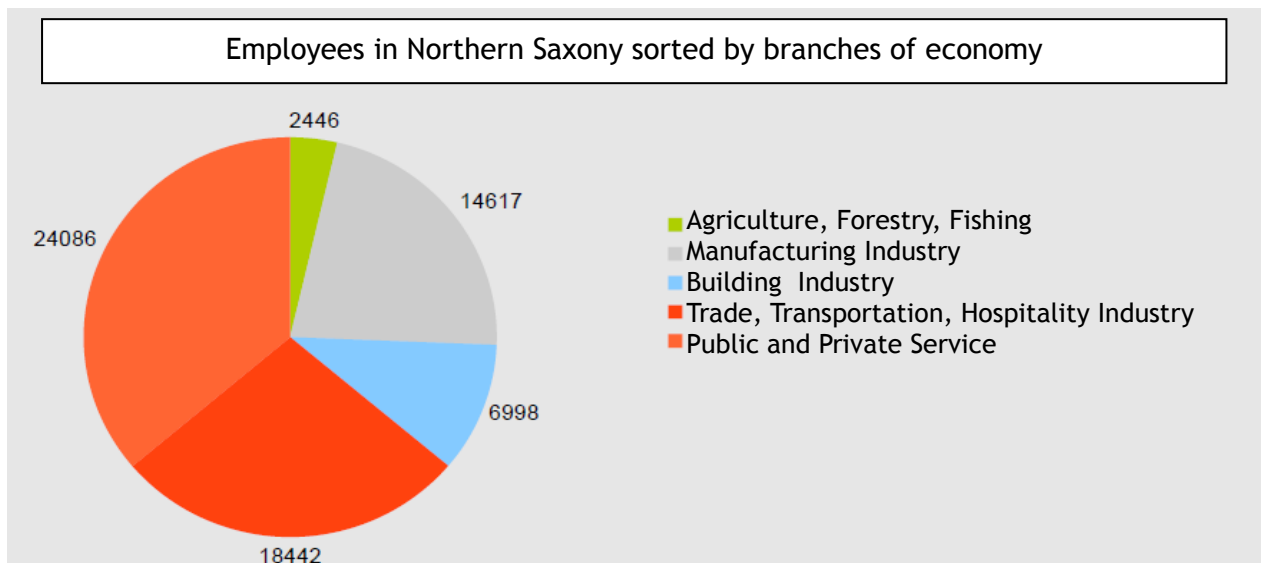


Figure 3: Employees in Northern Saxony sorted by branches of economy (Source: Planungsbüro Landmann, 2012, Bewertung Wirtschaftsstandort Landkreis Nordsachsen)

The per capita gross domestic product at market prices in 2011 was 21,050 Euros per inhabitant.

The district's supply networks for power, gas and district heating are divided between the following power supply companies: Delitzsch Netz GmbH, Mitteldeutsche Netzgesellschaft Strom mbH, Mitteldeutsche Netzgesellschaft Gas mbH, Stadtwerke Eilenburg GmbH, Stadtwerke Schkeuditz GmbH and Stadtwerke Torgau GmbH. The trans-regional networks are operated by 50Hertz Transmission GmbH and ONTRAS Gastransport GmbH, a company of Verbundnetz Gas AG.

4. Statements of superordinate planning levels

The development plan of the Free State of Saxony makes reference to the importance of regional planning authorities for creating spatial prerequisites for energy infrastructure. It also gives the responsibility for the regional development of energy supply to the regions. This is what the energy concept of the District of Northern Saxony aims at. According to the state development plan, lignite is still the most important energy source. However, it has no relevance for the District of Northern Saxony.

Saxony's energy and climate programme determines the expansion targets for renewable energies. With a share of 21.5 % of land, the spatial-planning-region Leipzig-West Sachsen, to which the districts of Leipzig and Northern Saxony as well as the city of Leipzig belong, would have following targets in 2022: 473 GWh/a in the area wind power, 387 GWh/a in the area photovoltaics, 387 GWh/a in the area bio energy and 68 GWh/a in the area hydropower. Hence, the regional planning association is required to determine further preferential and suitable areas for wind power.

The currently valid regional plan dates from 2008. Since the regional plans have to be adapted to the targets set by the state development plan within 5 years, the regional plan will probably be realigned within the next years. This is especially relevant for the new assignment or extension of preferential and suitable sites for wind power. Considering the enormous expansion of photovoltaics in industrial parks, a stricter regulation of this problem should be envisaged.

5. Energy projects of the District of Northern Saxony

The District of Northern Saxony and the Economic Development Corporation of the District of Northern Saxony GmbH are partners of the EU project VIS NOVA, funded by the European Union within the CENTRAL EUROPE programme. Further partners are the district of Schwäbisch-Hall (Germany), the regions Tullnerfeld-West (Austria), Malopolska (Poland) and South Transdanubia (Hungary). The University of Science and Technology in Krakow and the CERE - Centre of Excellence for Renewable Energy - in Vienna accompany the project from the scientific point of view. The Aufbauwerk Region Leipzig GmbH takes care of the administrative management. Common aim of this project is the use of renewable energy and energy efficiency in rural areas. Main topics are the international exchange of good practices, development of common strategies for rural areas and the implementation of a pilot action. The update of the energy concept of the District Northern Saxony was promoted by the VIS NOVA project.

Since 20.03.13, the District of Northern Saxony also participates in the European Energy Award. The European Energy Award® (eea) is the quality management system and method of certification which collects, assesses, plans, controls and regularly reviews the district's activities in terms of energy and climate protection in order to identify and develop potentials for sustainable energy policies in a structured manner. The eea comprises the following periodic procedural steps: analyse - plan - implement- review - adapt, hence it is based on the principle of continuous improvement. Its most important tool is the web based eea-Management Tool with a catalogue of measures (implementation status), a work program (planned measures) and an indicator system (controlling). For its implementation the north Saxon energy team was founded, which is being supported by an eea-consultant.

6. Energy consumption and production

Data from the energy suppliers showed the following consumption data for the district:

	2008	2010	2011
Electricity Demand	1.058.0 GWh/a	1.130,8 GWh/a	1.093,7 GWh/a
Gas Demand	577,2 GWh/a	2.246,5 GWh/a	1.893,3 GWh/a

Demand of Electricity and Gas in the District of Northern Saxony (Source: data for the 2008 from Energy Concept 2011, Data provided by energy suppliers)

Since the survey methodology of the energy concept 2011 is unclear, the big difference between the gas consumption in 2008 and 2010 cannot be explained.

Following table shows the electric power production in the District of Northern Saxony from 2008 until 2012.

2008	2010	2011	2012
446,2 GWh/a	569,2 GWh/a	623,4 GWh/a	693,7 GWh/a

Generation of Electricity in Northern Saxony (Source: data provided by energy supplier and 50Hertz Transmission GmbH)

The electric power is mainly produced off renewable energy sources. Especially biomass, wind and solar radiation have a significant share. In the years 2012 and 2013, the District of Northern Saxony experienced an enormously increased development of open-field photovoltaic plants. At the end of the year 2013, there were 37 open-field plants with an installed capacity of more than 0.5 MW_{peak} in Northern Saxony. In order to compare this with the energy concept 2011: in 2010 there were 4 open-field plants with a surface of 75 ha and an installed capacity of 24.02 MW_{peak}. At the end of 2013, a minimum of approx. 278 ha surface with a capacity of approx. 140 MW_{peak} was installed. This is an increase of 370 % in surface and approx. 580 % in installed capacity compared to the year 2010.

Also, the number of biomass plants has risen to 43 plants with an installed capacity of

more than 50 kW_{el} since the initiation of the energy concept 2011. The energy concept 2011 stated only 26 plants with this capacity for the year 2009. The biomass plants in the District of Northern Saxony show an installed capacity of 63.9 MW electric and a minimum of 7 MW thermal. When talking about thermal capacity, one needs to consider that there are no data for a big portion of the plants. The real installed thermal capacity could in fact be higher.

The number of wind turbines in Northern Saxony amounts to 95 plants with a capacity of 102 MW. This means that only 2 plants were built in 2011.

Hydro power and electric energy production from geothermal sources are of no importance for the district. The hydro power plant in Bad Dübén with an installed capacity of 22 kW_{el} from the year 2000 and a hydro power plant in Schkeuditz with a capacity of 90 kW_{el} from the year 2006 shall be mentioned here for the sake of completeness.

In terms of figures, the share of electric energy produced in the district covers more than half the demand. This splits over the years as follows:

	2008	2010	2011	2012
Electricity Demand	1.058 GWh/a	1.130,8 GWh/a	1.093,7 GWh/a	1.101,9 GWh/a
Electricity Generation	446,2 GWh/a	569,2 GWh/a	623,4 GWh/a	693,7 GWh/a
Share	42,2 %	50,3 %	57,0 %	63,0 %

Share of electricity demand generated in Northern (Source: data provided by energy supplier and 50Hertz Transmission GmbH)

Since the consumption data for the year 2012 were not available in some cases, this is a calculated value.

62 % of the 63 % of produced electric energy were gained from renewable energies, especially biomass, wind and solar radiation. 1% of the electric energy produced in the district was obtained from cogeneration systems. The remaining 37 % are distributed among conventional energy sources. This is again shown in figure 3.

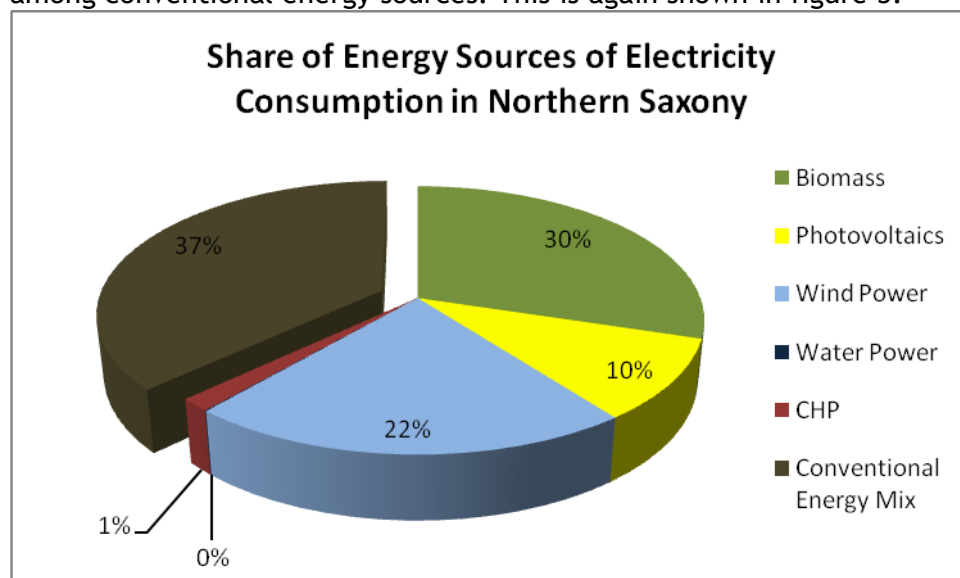


Figure 4: Share of Energy Sources of Electricity Consumption in Northern (Source: data provided by energy supplier and 50Hertz Transmission GmbH, own Figure)

7. Model and recommended actions

The energy concept presented in 2011 contained the proposal of a model and actions. Within this update and under consideration of the development in the area of open-field photovoltaic plants, this model and the proposed actions were put to discussion. The model and actions are as follows.

The District of Northern Saxony aspires to

1. Increasingly cover its energy demand from renewable energies, to operate efficiently, to sustainably use its regional potentials and land and thus to secure the required base load of energy demand.
2. Provide eco-friendly energy, which is sustainable, secure and socially acceptable and which contributes to the regional added value. The integration of regional actors will be implemented comprehensively. Fortunately, the population shows a high degree of acceptance towards this kind of energy supply.
3. Have development processes designed by regional key players, end users and producers together. The energy concept serves as a first basis for this. The process shall be designed in close coordination with the cities, municipalities and districts.
4. Have a collaboration across districts and states, especially in the area of the Dübener Heide.
5. Create favourable regional conditions for investors to become economically active in the EEG area, also by using possible funds for the implementation of model and pilot projects.
6. Collaborate across regions to create framework conditions for a safe and economically viable operation of production plants for renewable energy.
7. Link the capacities of all partners for energy efficiency consulting. All participating actors play an active role in the information about the potentials of energy efficiency. Consulting about the promotion of energy efficiency measures will also be possible.
The district shall act as a model by implementing energy efficiency measures in the building stock owned by the district.
8. Create the necessary network capacities for an appropriate distribution and for handling and controlling the power fed into the system - intelligent networks.

This model results in the following catalogue of measures, divided into areas of action with their respective measures and responsible actors. The catalogue of measures comprises the following:

Area of action power production

Action	Agent
Designation of locations for electricity generation by combined heat and power (CHP)	Municipalities, Energy Suppliers
Evaluation of potential of geothermal energy	District of Northern Saxony (NOS), Municipalities, Energy Suppliers

Development of a concept for efficient usage of biomass und the aspects of sustainability and regional sources	NOS, Energy Suppliers, Farmers
Support of using conversion areas for renewable energies	NOS, Municipalities, Energy Suppliers
The municipalities and the District of Northern Saxony work towards an exclusion of photovoltaics on commercial and agricultural areas	NOS, Municipalities
Elaboration of the potential of suitable roofs for photovoltaics	NOS, Municipalities, Energy Suppliers, Spatial Planning Organisation (SPO)
Elaboration of an Energy Usage Map as base of information	SPO, NOS, Energy Suppliers
Expansion of usage solar heat for non-potable water in the industry	Industry, Citizen, Municipalities, NOS

Area of action increasing energy efficiency / energy saving

Action	Agent
Reduce loss of Energy <ul style="list-style-type: none"> • Building refurbishment • Refurbishment of energy grid • Optimisation of teleheating grids 	Citizen, Municipalities, Energy Suppliers, Independent Energy Advisers, NOS
Usage of heat energy in agricultural companies	Farmers, Municipalities, Energy Suppliers
Construction of heat grids based on regional heat grid concepts	Farmers, Energy Suppliers, Municipalities
Implementation of independent energy advisers and advise for energy efficiency	Independent Energy Advisers, NOS
Heat recovery and CHP for community facilities	NOS, Municipalities, Energy Suppliers
Determination of saving potential in public sector (administration as good practise)	NOS, Municipalities,
taking part in the European Energy Award as a tool for energy efficiency	NOS, Municipalities,
Exemplary function of the district administration in energy efficiency refurbishments of administration buildings	NOS
Intense networking with the saxonian energy agency (SAENA)	NOS, SAENA

Area of action energy storage

Action	Agent
Usage of energy storage systems for optimisation of self usage of photovoltaics	Industry, Energy Suppliers, NOS
Application of latest scientific insights and technologies	Science, Energy Suppliers, NOS

Area of action energy distribution

Action	Agent
Usage of smart grid	Energy Suppliers, Independent Energy Advisers, NOS
Installation of local heat grids with biogas CHP	NOS, Municipalities, Energy Suppliers, Farmers

8. Conclusion

The energy concept 2011 with its measures to increase energy efficiency and to promote the use of renewable energies has proven to be the right move. The uncoordinated development of open-field photovoltaic plants in business parks is an example which shows that there is a strong need for control, based on the energy concept. It is important to develop the use of renewable energy in a sustainable way. This holds especially true for the matter of availability of land and the competition between food plants and energy crops. However, an unproportional increase of corn, that was feared to spread over the landscape for power production, cannot be detected. In terms of figures, the district already produces the main share of its demand for electric power itself. 63% of this energy comes from renewable energies. Since renewable energies are volatile, the topic of reliable power supply must be tackled even more with priority.

The topic of energy efficiency is already being addressed by many initiatives, especially by municipalities like the city of Delitzsch, which won the European Energy Award in gold, or with the implementation of a project called “Wettbewerb energieeffiziente Stadt” (“competition energy efficient city”) in cooperation with the Federal Ministry of Education and Research. Further municipalities of the European Energy Award shall be mentioned here: the towns Bad Döben and Oschatz. These initiatives for energy efficiency need to be supported as sources of inspiration.

In the context of the district’s participation in the European Energy Award, the collection of all energy data as well as an analysis of the status quo are finalized. Since the energy team of the European Energy Award works across authorities, the implementation of the energy concept shall be assigned to the district’s energy team. This team will be in charge of the implementation of energy efficiency measures in the long term and is able to work specifically on those measures, where the district is the designated actor. This way, responsibilities would become clearer. The energy team would be the driving force for the implementation of the energy concept, complemented by the catalogue of measures elaborated by the European Energy Award.

The first Energy Symposia of Northern Saxony in December 2013 showed that energy efficiency is of great interest for companies. The symposium was held in line with the aforementioned VIS NOVA project. Information and consulting should be fostered and specified for sectors, also with the help of such events.

This update of the energy concept was also made possible through the VIS NOVA project. Information on energy efficiency and renewable energies were also provided in conferences and in a trade fair. The completion of aforementioned pilot action is expected in 2014.