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CROSS-BORDER COOPERATION IN THE ENERGY SECTOR*

Contents

Abstract
The recent history of the Greater Region has been strongly characterised by fossil fuels. The area thus faces significant challenges as a model region in terms of the cross-border activities necessary to meet the requirements of climate protection and the energy transition. Based on the targets defined in Europe, this paper presents examples of approaches to action and projects undertaken in the field of energy in the Greater Region. Experiences gathered in the area – including those of the authors – reveal the need for action, firstly in relation to the implementation of structures and networks, and secondly to the potential development of research excellence in the field of energy/climate protection. As relevant actors in the energy transition, the municipalities have a particular role to play here.

Keywords
Energy transition – climate protection – cross-border energy projects – network structures – zero-emissions municipalities – research platform

* This article was first published in 2018 and is based on data from 2017 and previous years. As such, the figures presented in this article do not reflect the European member states' most recent progress in terms of renewable energy targets, the current state of European climate policy or the more recent developments regarding the European exchange of electricity.

1 Introduction: Energy targets – The European challenge

In the 2020 Climate and Energy Package,[1] the European Union (EU) has set binding targets for greater climate protection, the expansion of renewable energies (RES) and increased energy efficiency. The package sets the following three key targets:

> 20% cut in greenhouse gas emissions (from 1990 levels)

> 20% of EU energy from renewables

> 20% improvement in energy efficiency[2]

To achieve these targets, directives have been adopted requiring all member states to cover a certain proportion of their energy consumption through renewable energy (Directive 2009/28/EC) and to increase energy efficiency in the heating and electricity supply (Directive 2012/27/EU). The reduction in greenhouse gas emissions is also addressed by the European Emissions Trading instrument, which, following a reform, aims to ensure that the sectors affected will produce 30% fewer emissions in 2030[3] than in 2005 in affected sectors.[4]

While emissions trading is centrally organised at EU level, the paths to achieving the renewable energy expansion targets and energy efficiency must be implemented and documented by each member state at country level.

New targets for the period 2020 to 2030 have already been agreed in this regard to reduce greenhouse gas emissions and further increase energy efficiency and to expand renewable energies (COM 2016). These can be represented as follows:

> at least a 40% reduction in greenhouse gas emissions from 1990 levels

> at least 27% of the total energy consumption to be supplied from renewable energy sources

> at least a 27% increase in energy efficiency[5]

While the RES targets are expected to be met by most member states by 2020 (COM 2015a), the achievement of the efficiency targets by 2020 and even beyond is rather uncertain (COM 2014).

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1 https://ec.europa.eu/clima/policies/strategies/2020_en (16 May 2017).

2 Related to the consumption of primary energy in the forecast for 2020: this target translates into a reduction of 368 million tonnes of oil equivalent (Mtoe) and primary energy consumption (gross inland consumption less non-energetic uses) by 2020 compared to the consumption of 1,842 Mtoe, which is forecast for 2020 (http://ec.europa.eu/energy/en/topics/energy-efficiency) (16 May 2017).

3 Energy production and energy-intensive industry (approximately 12,000 plants across Europe).

4 https://ec.europa.eu/clima/policies/strategies/2030_en (16 May 2017).

5 Cf. footnote 4.

2 Status quo – Energy in the Greater Region

2.1 Starting point and objectives

France, Luxembourg and Belgium, among others, will have difficulties in achieving their targets for expanding renewable energy by 2020. It is clear that there is a need to develop joint strategies at European level, not least in view of the somewhat heterogeneous starting points of the various countries, both in the expansion of renewable energies and in energy efficiency. Figure 1 documents the expected achievement of the target for the expansion of renewable energy by all 28 member states by 2020.

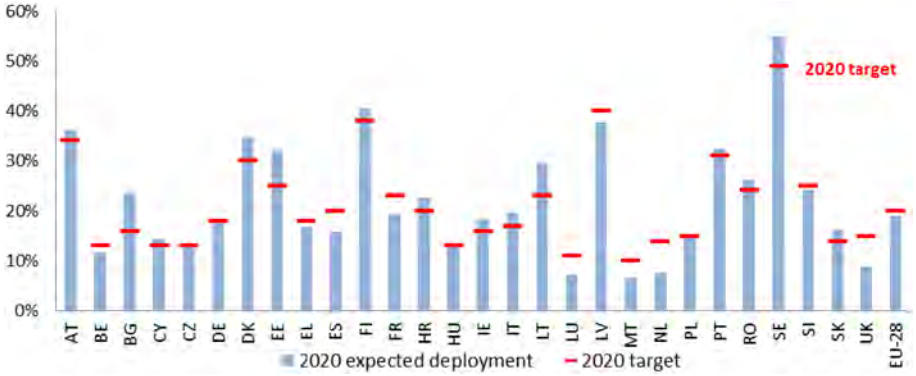

Fig. 1: Expected achievement of the target for expanding RES in the EU-28 countries[6] / Source: COM 2015a: 5

Developments in the EU towards achieving the climate protection targets by 2020 and beyond by 2030 are also uneven. In regard to European emissions trading, the CO_2 reduction target of -20% by 2020 compared to 1990 is likely to be overachieved at -24%. In the transport, agriculture and private household sectors, which are not covered by emissions trading, the targets set out in the so-called 'Effort Sharing Regulation' are not expected to be met by only four member states, including Luxembourg and Belgium (COM 2015b).

As regards the climate protection targets by 2030 agreed under the European Emissions Trading Scheme, the planned 40% reduction in greenhouse gas emissions is expected to be missed by a margin of 13% with the instruments currently implemented in the member states (a 27% reduction is likely) (COM 2015a: 10).

6 The graph is based on data from the member states up to 2013. All policies implemented after 2013 to promote RES have not been taken into account.

Nevertheless, the Greater Region has a comparatively heterogeneous starting point with regard to the strategic objectives and framework conditions of the energy sector. This is reflected in (generally national) targets which are similar in and of themselves but which express differing levels of ambition for the reduction of greenhouse gas emissions and RES shares by 2020.

Figures 2 to 5 show the progress made by Belgium, Luxembourg, Germany and France under Directive 2009/28/EC. The actual expansion of RES in 2013 (darker colours) is compared to the respective target for 2020 (lighter colours) in the electricity, heat and transport sectors (Keep on track 2015).

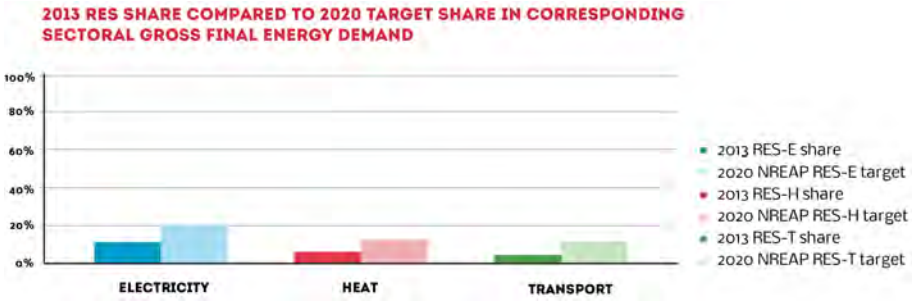

Fig. 2: Actual expansion of renewable energy compared to the target in Belgium (as in 2013) / Source: Keep on track 2015: 22

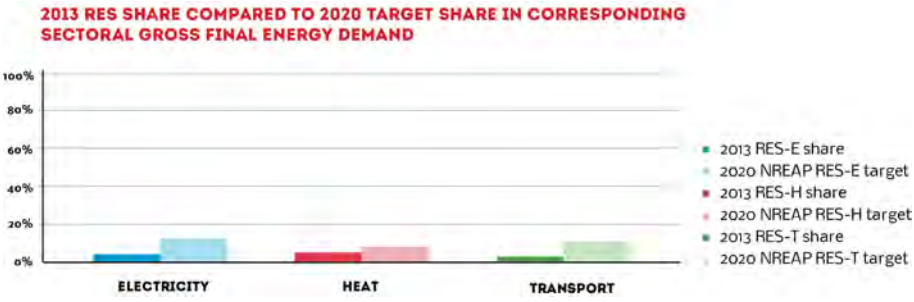

Fig. 3: Actual expansion of renewable energy compared to the target in Luxembourg (as in 2013) / Source: Keep on track 2015: 70

The figures show that the target levels vary widely from one country to another and that there is still a long way to go to achieve the target for 2020, particularly in Belgium and Luxembourg. This lag could be compensated by closer cooperation in the border region, as already started by the projects mentioned below.

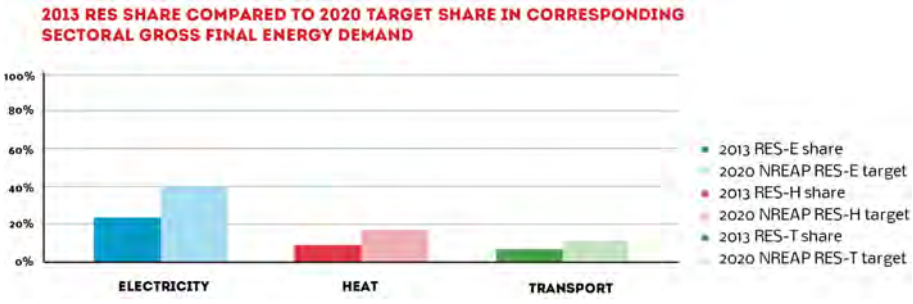

Fig. 4: Actual expansion of renewable energy compared to the target in Germany (as of 2013) / Source: Keep on track 2015: 49.

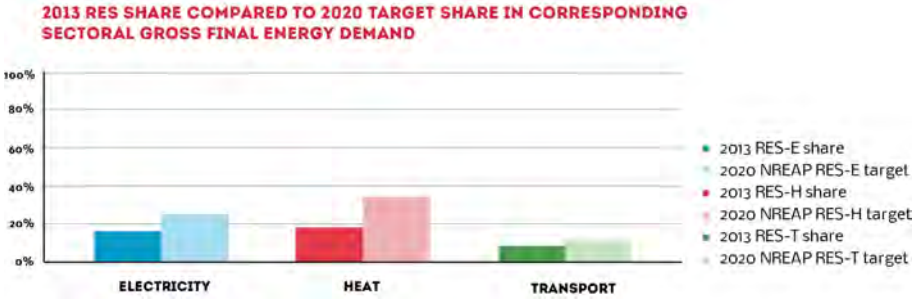

Fig. 5: Actual expansion of renewable energy compared to the target in France (as of 2013) / Source: Keep on track 2015: 46

With regard to incentive systems and financing mechanisms for the expansion of renewable energy in the Greater Region, different instruments have been implemented in the currently very dynamic environment. The following options may serve as examples (in part also as a mix):

> fixed feed-in tariffs for renewable electricity

> defined RES expansion corridors; flexible caps, in which feed-in tariffs are linked to the RES expansion

> tendering process models, quota models

> flexibility incentives (e.g. biomass)

> with/without incentives for biomethane feed-in

> investment grants (e.g. heat market)

Depending on the financing mechanism (and associated investment security), various stakeholder structures are involved in the corresponding project developments.

Taking into account the long-term (by 2050) successes that will be required to reduce greenhouse gas emissions in accordance with the COP 21,[7] this shows the need for increased cooperation in the climate protection and energy sectors at both transnational/international and at the transnational/interregional levels. Corresponding contexts and approaches are thematised below with reference to the example of the Greater Region.

2.2 Cross-border cooperation in relation to energy – Approaches in the Greater Region

Directive 2009/28/EC on promoting the use of energy from renewable sources provides for cross-border cooperation between member states. The further development of the internal energy market in the important electricity sector also aims at an established, sustainable energy exchange and trade across national borders, which should contribute to greater climate protection, affordable energy prices and security of supply. However, significant efforts are still needed to achieve and unite both the climate protection targets and the objectives of a European Energy Union.[8] At present, there is more evidence of a conflict of objectives between climate protection and further integration of the electricity market.

The electricity trade within the EU was regulated for the first time by Regulation 1228/2003, which sets out conditions for access to the network for cross-border exchanges in electricity. Since then, the intensity of trade between member states has developed considerably. For example, the electricity trade between Germany and other EU countries increased from 59,878 GWh in 2010 to 74,588 GWh in 2014 (ENTSOE Database 2015).[9]

The conversion of the CWE Market Coupling[10] to the load flow method in May 2015 has made it possible to reduce grid bottlenecks in the cross-border electricity exchange/trade and to prioritise, at least theoretically, renewable energy with almost no marginal costs. This coupling of previously disparate markets is intended to level price differences in the individual bidding zones and to make optimal use of boundary coupling points for physical load flows.

However, as European emissions trading has been missing its target for years, coal and lignite power plants in Germany in particular can produce electricity particularly cheaply. This is increasingly being exported abroad because it is not needed in Germany due to the favourable cost structure of renewable energy and its feed-in

7 UN Climate Conference Paris Nov/Dec 2015: Climate Agreement limiting global warming to well below 2°C, 1.5°C if possible.

8 On the current status of the Energy Union, see COM 2015c.

9 https://www.entsoe.eu/data/data-portal/exchange/Pages/default.aspx, for download: Detailed Electricity Exchange (16 May 2017).

10 https://www.entsoe.eu/data/data-portal/exchange/Pages/default.aspx, for download: Detailed Electricity Exchange (16 May 2017).

priority. As a result, German coal-fired power is displacing more expensive gas-fired power plants in Europe.[11]

In order to achieve the EU's desired climate protection targets in the integrated European electricity market, cross-border activities must be increasingly initiated, e.g. in the form of target-oriented research approaches as a basis for energy projects within the meaning of Directive 2009/28/EC. At the level of the Greater Region, however, there is currently no institutionalised cooperation in the field of energy, as has long been established in other areas such as culture, education or spatial planning. Therefore, the last Summit of the Greater Region in December 2016 instructed the Energy Working Group to progress the implementation of the relevant declaration of the Summit of March 2014 and to promote 'potential cooperation between universities, research institutes, companies and public authorities'.[12]

Not least against this background, the Greater Region positioned itself in terms of a joint development strategy for the energy sector at the Energy Summit in Trier in March 2014. The following points were documented, among others (Energy Summit of the Greater Region 2014):

> Cross-border cooperation in energy policy is to be more closely coordinated in the future.

> Energy dependence is to be reduced and the Greater Region's own energy production increased.

> The Greater Region is expected to make a significant contribution to tackling climate change and can make a major contribution to the European energy transition. It sees itself as a European model region for renewable energy and energy efficiency.

> Regional energy infrastructures will be further developed and networked across borders.

> The existing regional, business and scientific networks are to cooperate more closely across borders in the future.

> Greenhouse gas emissions associated with mobility in the Greater Region should be reduced, both in a regional and supra-regional context.

These target agreements were taken up again at the 14th Summit of the Greater Region in Mainz on 4 December 2014. This states that the Greater Region wants to 'contribute to the energy and climate protection goals of the European Union and reduce its dependency on increasingly scarce fossil fuels' (14th Summit of the Greater Region 2014).

11 See also Agora 2015.

12 Joint Declaration of the 15th Summit of the Greater Region of 20 December 2016: 33.

The settlement structures relevant to the supply infrastructure cover both densely populated areas (partly shaped by the mining industry) as well as rural areas throughout the Greater Region, such that the aspect of urban-rural interaction is of great importance in terms of the supply of 'own' resources and mobility needs (living/working environments, supply of goods/services for daily needs).

The municipalities of the Greater Region are key players in the provision of public services with regard to the objectives and fields of action defined in the context of the energy transition due to their mediating function between different interests (e.g. citizens, land users, companies, etc.) as well as their planning responsibility for very heterogeneous issues and to a large extent for climate/energy-relevant issues (e.g. urban land-use planning, urban/regional development, utilities, transport planning). Strategically and operationally, they therefore have an important role to play, especially with regard to the transformation of the energy system – also and especially in the heat market – as well as the implementation of energy and resource efficiency measures or energy-saving measures. The focus in this regard is not only on the direct possibilities for action on the part of the local authorities, but also on the manifold possibilities of interaction with other municipal actors as well as the stringency of a planning responsibility to be claimed for the implementation of the Greater Region's objectives. In this context, new, additional areas of responsibility arise for the municipality on its way to becoming a 'zero-emissions municipality', which is necessary in the long term, with generally complex and trans-sectoral issues as well as a wide range of interactions (see Figure 6).

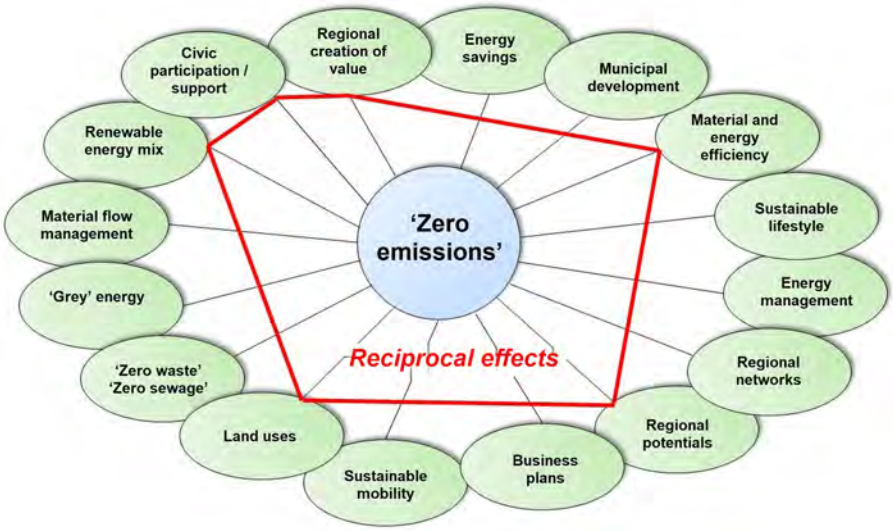

Fig. 6: Essential elements of zero emissions municipal strategies in the context of resulting responsibilities / Source: The authors, IZES (Institute for Future Energy Systems)

Against this background, a number of cross-border projects have been carried out in recent years, mainly based on INTERREG A funding, which have specifically focused on the issue of biomass due to its relevance for the area and the potential cross-border material flows. Some examples of such project approaches are explained below; the authors of the present paper took part in many of them.

Project RUBIN – Regional strategy for the sustainable implementation of biomass use (INTERREG III A, Final report 2008)

The RUBIN project approach was based on the fact that biomass use, e.g. can make a significant contribution to a sustainable energy supply due to the availability and potential of land in rural areas as well as the demand for energy in densely populated areas; it can also entail a high level of regional creation of value and lead to a strengthening of the region.[13] Despite the potential,[14] the development of biomass in the area stagnated and fell far short of the European and national targets. In order to address and potentially remove the existing barriers, the RUBIN project pursued the following objectives (IZES 2008):

> Establish a biomass study to document the general regional conditions with regard to current resources (biomass potentials), activities, legal bases and technological possibilities.

> Develop an interregional biomass strategy for the Greater Region in cooperation with the relevant political structures with a view to defining recommended actions.

> Support and initiate model and pilot projects in the Greater Region, taking into account cross-border cooperation opportunities.

> Establish and maintain regional and cross-border stakeholder networks, including communication activities, websites, information events, conferences and working groups.

> Create an interregional biomass centre of excellence with the aim of strengthening the networking of existing research institutions and intensifying university cooperation.

Among other things, an analysis of potentials was undertaken; although the varying availability of data and methodological approaches of the project partners did not result in a uniform data structure for the study area, it nevertheless provided the first indications for a framework for the total available biomass. Figure 7 illustrates the potential of grassland grass in Saarland by way of example.

Together with political and administrative decision-makers, the project also developed the basic principles of an interregional biomass strategy. However, despite the consensus reached, it has not been possible to produce a politically legitimised paper for the whole region, which could be used to jointly further develop the biomass issue.

13 E.g. new fields of action in agriculture and forestry; securing a sustainable, regional energy supply.

14 E.g. interested stakeholders/enterprises, biomass potentials, derelict land, innovative potential, etc.

The project approaches accompanied or initiated[15] initially pursued a primarily regionally-oriented approach, generally without cross-border effects. Only the efforts to establish the Warndt-Rosseltal energy region as part of the Saarbrücken/Moselle-Est METROPOL initiative had a cross-border focus, but despite great interest at the municipal level the project was not pursued further due to unclear structures in Lorraine.

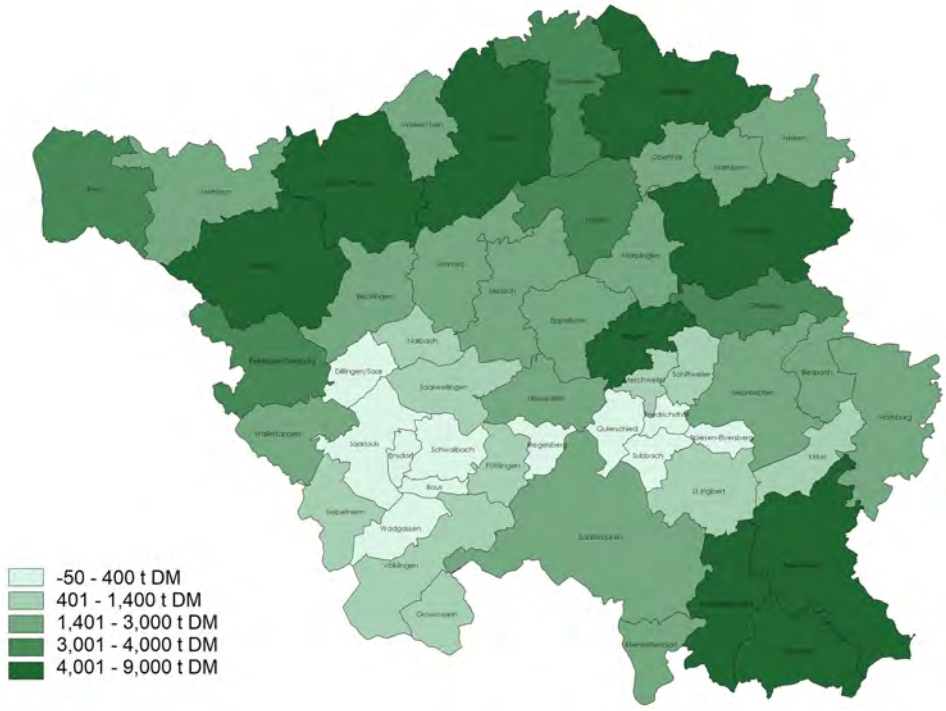

Fig. 7: Grass potential of each municipality in Saarland / Source: The authors, IZES

Saarland-Lorraine joint projects in the field of waste management (ongoing since 2012)

A joint project between two waste management associations, EVS in Saarland and SYDEME in Lorraine, developed partly on the basis of the stakeholder networks formed through the RUBIN project. This project has now led to cross-border material flow management, in which residual waste from the SYDEME area is used for energy consumption in one of the two thermal treatment plants in Saarland. In return, part of the biowaste collected in Saarland is recycled at the SYDEME biowaste fermentation

15 E.g. for the De-Lor study area: renewable energy centre at the Warndt former open-cast mining facility, recycling centre for by-products of a sawmill and planing plant on the Moselle, biogas plant for the recycling of green waste, renewable resources and landscape maintenance materials in the Saarpfalz district, implementation of the Méthavalor project of the SYDEME/Forbach, wood chip drying system at the Zweibrücken disposal and service plant, feasibility of two biogas plants for gas feed-in in the Perl-Merzig-Sierck-les-Bains border region.

plant in Forbach. Thanks to the ecological and economic improvements that were achieved, the waste management associations (Saarland) received the special prize for cross-border cooperation awarded by the German Association of Local Utilities *(Verband Kommunaler Unternehmen, VKU)* in 2013. It is currently planned to extend this joint project to the green-waste sector. The foundations for this were again developed in an INTERREG project.[16]

ENERBIOM (project completed in 2011)
The INTERREG IV A project ENERBIOM looked at the possibilities for the sustainable use of energy crops in the Greater Region. Scientists cooperated with the public administration to establish a regionally consistent definition of requirements profiles. In addition, interregional cultivation trials have been launched, some of which have been continued by other projects (OPTIBIOGAZ, ECOBIOGAZ) in recent years. The cultivation variants of these energy crops were investigated for their economic efficiency, eco-balance and practical relevance. The results provide important information for biogas plant operators on the sustainable use of substrates in their plants.

OPTIBIOGAZ and ECOBIOGAZ
The research contacts established in ENERBIOM were expanded with stakeholders in the biogas sector and further intensified in the INTERREG IV A project OPTIBIOGAZ (completed in 2012) and ECOBIOGAZ (completed in 2015). As a result, an interregional biogas research team was established in the Greater Region with largely compatible skills profiles (mutual learning).

The OPTIBIOGAZ project focused on the eco-balance and improvement of the general ecological conditions for the operation of biogas plants. The plants in the Greater Region and their potential for technical optimisation were examined in detail on the basis of representative model plants. This study of the model plants has helped to improve the technical efficiency of the entire biogas supply chain – from cultivation to gas feed-in and electricity and heat production. In addition, for the first time, a comparison of the specific support and funding mechanisms and the environmental aspects in the context of the biogenic energy supply in the countries of the Greater Region was carried out.

The ECOBIOGAZ project has now expanded to include economic aspects. The focus was again on biogas plants, which have now been economically optimised on the basis of ecologically consistent requirements profiles along the entire bioenergy supply chain. In particular, the various funding mechanisms could be compared in terms of their economic effects. It was demonstrated, for example, that in 2014 Germany had the best conditions in the entire Greater Region, especially for small biogas plants. On the other hand, the possibilities for biomethane feed-in were the most advantageous in Luxembourg. The major legal differences in the conveyor systems, but also in the application systems for fermentation residues, were also evident.

All of the projects have been supported by intense publicity and further education so that the results could be disseminated both in agricultural colleges and universities as well as among farmers throughout the Greater Region.

16 INTERREG IV B – ARBOR, 2015.

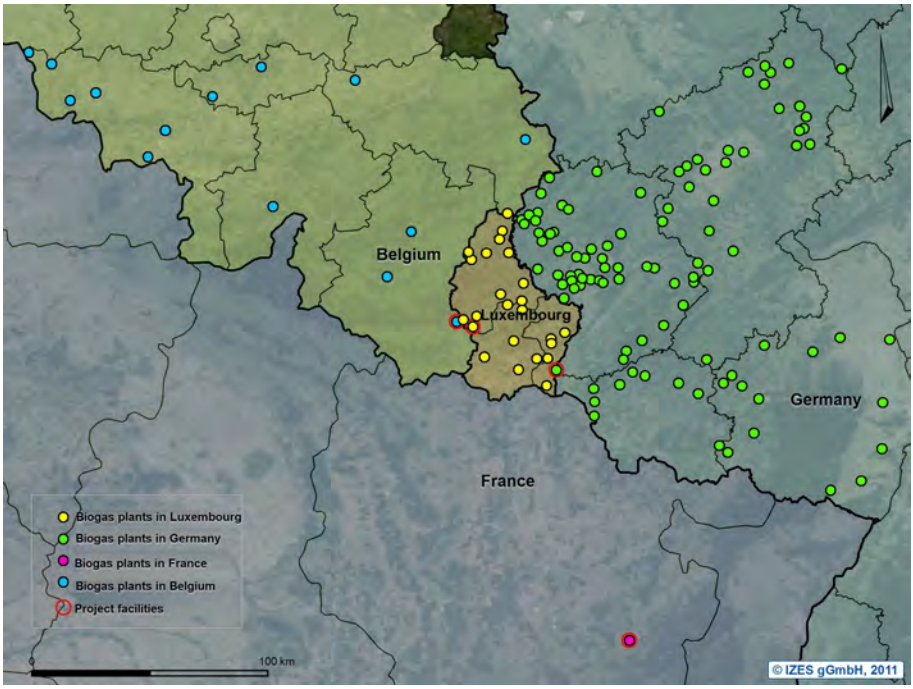

Fig. 8: Biogas plant stocks in the Greater Region – Project OPTIBIOGAZ as in 2011 / Source: The authors, IZES

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Between 2013 and 2015, a cross-border mobility strategy was elaborated to reduce the individual commuter traffic in the Greater Region by promoting electric mobility solutions as a complement to public transport systems. In addition to the IZES, the technical partners were *imove* at the TU Kaiserslautern, *LIST* in Luxembourg and the *Département Moselle* in Lorraine.

Further projects are currently being prepared in the INTERREG V A programme. With the participation of the authors, the projects PERSEPHONE[17] and GR energy zones[18], among others, were developed.

In addition, in the context of the energy sector, the activities to establish the Environmental Technology Network of the Greater Region in November 2013 and the Franco-German 'Energy Efficiency/Renewable Energies – *ENEFF' (Energieeffizienz/ Erneuerbare Energien)* network are noteworthy.

17 Transfer of biogas plants to the structures of the bio-economy. The aim is to consider how other products in addition to energy, such as ecosystem services, fertiliser or algae can be provided with the help of biogas technology.

18 Regional and cross-border regulation of electricity generation and demand in defined model areas (energy zones) in Luxembourg, Lorraine and Rhineland-Palatinate in order to avoid curtailing the RES entering the grid as far as possible.

2.3 The need for action

Building supporting structures

At the EU level, there is a medium-term risk of failure to meet climate change targets. Especially in connection with effort sharing,[19] the member states must implement instruments that contribute to a significant reduction in greenhouse gas emissions. The internal energy market being aimed at has also not yet been fully implemented, e.g. due to a lack of transmission capacities, insufficiently competitive markets and inadequately involved consumers.[20]

Apart from the established working groups,[21] no institutionalised cooperation in the field of energy exists as yet in the Greater Region. This may be one reason for the sluggish expansion of renewable energy in the region. The initial steps toward a cross-border expansion of renewable energy were undertaken by the German Federal Government with the 'Ordinance for the tendering process for promoting electricity from renewable energy and the amendment of further regulations for promoting renewable energy' (BMWI [Federal Ministry for Economic Affairs and Energy] 2016). This ordinance is to be applied in a first step to tendering processes for PV open air installations.[22]

Not least because of the energy projects that have already been and are in the process of being implemented in the Greater Region, networks have been created with the participation of administrations and authorities, municipalities, NGOs, research institutions and energy actors in the private and commercial sector. These should be brought together by creating a framework for lasting cooperation through harmonised network management, without any need for new funding to be requested, and linked to the established working groups in the Greater Region.

The following points, among others, would be on the agenda:

> Ensuring security of supply in the energy sector in the Greater Region, taking into account the widest possible expansion of renewable energy from regional potentials and future activities in the field of sector coupling (transport, heat)

> Developing interregional objectives, strategies and action plans through participatory processes

> Implementing a cross-border research network/energy cluster for a 'European model region for renewable energy and energy efficiency'

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19 Areas not covered by European emissions trading, such as agriculture, transport and private households.

20 For details in this regard, see COM 2015c: 2-11.

21 The energy issue has been dealt with thus far in a sub-committee of the Environment Working Group. In accordance with the joint declaration of the Energy Summit of the Greater Region of 17 March 2014, a specific working group for this issue has been set up.

22 Cf. the relevant ordinance: BMWI 2016; for further explanations, cf. *BMWI* 2017.

  - Setting up a network of best practice examples; setting up a fixed, established annual meeting
  - Establishing interregional working groups for specific issues

> Compensating for the diverging freedom of discretion among the partners and diverging general conditions, e.g. in relation to financing mechanisms, through cross-border synergy projects

> Creating a homogeneous, transparent investment landscape to reduce potential risks

> Strengthening cooperation and training in the trades and other enterprises in the energy sector to create synergies, particularly in education and training

> Strengthening cooperation between educational, in-house or other educational institutions to better embed knowledge about the energy transition and its benefits, as well as the techniques and behaviours necessary for this purpose

> Involving the municipalities in the Greater Region as key players in climate protection and the energy transition as well as setting up an interregional and European network of municipalities (e.g. Covenant of Mayors for Climate & Energy).

In order to cope with the challenges ahead, additional capacity would have to be built up at the municipal level, which is problematic in view of the budgetary constraints in many municipalities in the region. Therefore, funding budgets are often used, e.g. for municipal climate protection strategies, but these are usually time-limited and thus do not provide a long-term solution for adapting administrative structures. It would therefore be expedient to establish regionally effective structures in the Greater Region to support the municipalities in decision-making processes.

Building supporting structures

In the context of the approaches outlined above, as well as the global challenges in relation to climate protection and resource conservation, various research institutes have developed in the Greater Region in recent years and have established themselves as institutions of supra-regional significance. As a result, a (currently still rather loose) network has been created, which has already successfully developed and completed joint project approaches in several instances (e.g. EU-INTERREG, EU-CONCERTO, 6th Research Framework Programme).

An increased need for discussion, communication and cooperation is now perceived due to increasing complexity and the increasing necessity of systematic observation of the examination of regional energy and material flow systems, which could be met by establishing a shared research platform at the interregional level. Such an approach would provide an important impetus for an innovative reorganisation of the Greater Region, e.g. as a study area for zero-emission strategies and as a model region for renewable energy and energy efficiency, as well as for the idea of cross-border cooperation in the sense of a European approach. For example, the expansion of

renewable energy within the meaning of Directive 2009/28/EC and possibly also direct cross-border electricity exchange/trade could be tested here.

In the context of an informal discussion with various institutes of the Greater Region, the following potential objectives were formulated with regard to the design of a corresponding platform:

> Stabilisation and further development of research excellence in the Greater Region by pooling and expanding existing competences

> Development of an interregional 'brain pool' as an ideas workshop and facility for political consulting for the Greater Region

> Creation of a personnel pool to optimise the allocation of competencies for specific tasks

> Optimised quality management, e.g. through improved availability of people with management functions

> Increased attractiveness in terms of attracting skilled, qualified employees through an international focus

> Sharpening and highlighting the profiles of each institution within the framework of a joint development plan

> Creating regional added value through exemplary implementation strategies

> Creating complementary educational opportunities through regional universities

To this end, the (partly) existing bilateral forms of cooperation should be deepened within the framework of a common supra-regional organisational structure (e.g. establishment of a supra-regional 'research holding'). This structure should be developed in consensus with the participating countries and should be consistently aligned with sustainability criteria in terms of content. A distinctively thematic approach relates to the (applied) scientific examination of climate protection and energy strategies as well as to the prospective implementation and monitoring of corresponding measures and projects.

The actual work on the structure of the organisation (including its financing) and on the integration of strategic approaches to sustainability in the Greater Region could be carried out within a joint project. Based on the results of the discussions thus far, potential requirements for the new research platform can be summarised as follows:

> The new structure will require basic staffing and a 'face' (both within the organisation and in external relations). Thematically, competent employees from the participating institutes will be allocated to specific tasks.

> The research platform will mainly deal with overarching conceptual issues with a strategic dimension (projects close to implementation will remain with the individual institutes).

> The legal form (company, holding, foundation, etc.) of the new structure should be consistently aligned with the tasks and partner structures that are ultimately defined.

> The platform should initially be formed from a 'core' of primarily suitable institutes of the Greater Region. The inclusion of further research institutions and cooperation with the University of the Greater Region would have to be aligned with the research corridor to be further defined.

> The research platform should have an internationally perceivable profile.

> In addition to addressing scientific issues, the platform should be seen as a political advisory body.

Suitable approaches for the implementation of the platform were discussed at a joint cabinet meeting of the governments of Saarland and the Grand Duchy of Luxembourg in November 2010 and at a meeting of the Environment Working Group of the Greater Region in February 2011. Both meetings concluded with a positive vote, but no further steps have been taken.

3 Conclusions

Not least against the background of the target agreements under COP 21, Europe faces enormous challenges in meeting the targets for climate protection and the energy transition. Given its hitherto strongly fossil- and nuclear-oriented energy landscape and the innovative energy research landscape, the Greater Region offers excellent conditions for becoming a model region for the sustainable conversion and networking of energy systems in the context of a European energy transition.

On the basis of multifaceted but still strongly sectoral projects, mutual definitions of targets have already been developed and network structures have been established. This must be further developed in a systemic sense and integrated into a cross-border political discourse and decision-making process in order to achieve the climate protection targets. This requires appropriate structures that connect the key players in the Greater Region and provide a framework for existing research institutions to promote efficient and excellent research collaborations and active political advisory functions. The establishment of a cross-border research platform on 'Climate Protection and the Energy Transition' could be a basis for developing the Greater Region as a European learning area for the energy transition.

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