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Cooperative Local Energy Transitions.

Recommendations for a Socially Just and Ecologically Sound Renewable Energy Self-Sufficiency – with an Emphasis on Bioenergy

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Executive Summary

From 2009 to 2013 the "EE-Regionen" (Renewable Energy Regions) project examined the transition to renewable energy in Germany - exploring it not only from a technical point of view, but also asking how it can be achieved in a manner that contributes to social justice and ecological compatibility in communities. In analysing how social-ecological renewable energy (RE) self-sufficiency can become a reality, the project specifies challenges and defined ways to overcome them.

"Social justice" not only relates to the importance of spreading/sharing the cost of the energy transformation fairly, and in distributing benefits such as increased employment, additional tax revenue, etc. across the locality, but also relates to issues such as participative processes, equal rights and access to resources (e.g. bioenergy) and common goods (e.g. biodiversity), as well as local and global land-use-changes, including land-grabbing that might be induced by an increased demand for biofuels and biomass.

Six key recommendations have been identified for local and regional governments' decision-makers to guide them in developing Social-Ecological Renewable Energy Self-Sufficiency. The recommendations are applicable primarily at the regional / local level.

1. **At the outset, create your vision together with key actors including citizens**

The broad acceptance of changes by all stakeholders, as well as the involvement of key actors, but also citizens with their knowledge, vision and skills to realise the energy transition, is of crucial importance.

2. **Quantify and equitably distribute the regional value of the energy system**

Benefits accruing from the local energy transition, financially or otherwise, should be evaluated and communicated to citizens by local governments (LGs). Besides the financial gains for many local and regional stakeholders, special emphasis should be placed on identifying and monitoring social benefits that are triggered by the local energy transition. If only a marginal part of the community enjoys the benefits of the renewable energy technology roll-out, LGs should actively seek adjustments and options with a low threshold of engagement, e.g. help to establish a cooperative that is capitalised in small amounts and in a rotating system for the acquisition of shares.

3. **Allocate space ecologically**

The ecological compatibility of the energy transition can be enhanced through strategic land use. The utilisation of bioenergy should minimise negative environmental effects like high inputs of pesticides or biodiversity loss e.g. by using adequate crops and management systems. Waste biomass and other residues should be used whenever possible. It is also important to create an urban area which reduces reliance on private vehicles, by having sufficient amenities in the locality.

4. **Select the right renewable energy technology based on the local context**

Decision-makers should select an optimal set of renewable energy technologies (solar, wind, biomass, geothermal, hydro etc.) and implementation strategy based on the location, infrastructure and renewable energy potential of the area. Otherwise the renewable and efficient energy value chain remains disintegrated to the region and conflicts of interests are more likely to occur.

5. **Facilitate intelligent energy distribution**

Adapting the transmission and distribution grids is a necessity to ensure the energy produced is used as efficiently as possible. Additional flexibility, like demand-side-management or storage systems, need to complement these modifications and help to cope with volatile peaks of production and demand.

6. **Set up a networking centre**

A local or regional networking centre allows to coordinate the cooperation of actors, could provide information, communication, mediation as well as monitoring services and could even implement measures. The additional tasks of a networking centre could be executed by an existing institution, like an economic development agency or an energy-related position in the administration, rather than setting up a completely new organisation.

Introduction

The project “EE-Regionen” (Renewable Energy Regions) examined the transition to renewable energy within different regions of Germany. A trans-disciplinary research group not only explored the local energy transition from a technical point of view, but also asked how it could be achieved in a manner that contributes to social justice and ecological compatibility in communities. At a time when social cohesion in the EU-zone is at an historic low, an energy system that can contribute to the diverse needs of communities, including new employment opportunities and greater social equity, is of immense value. The recent steep increase of renewable energy systems in some countries is strongly tied to financial support programmes and the general political framework conditions. A continuing acceptance of these aspects by citizens and the gradual phase-out of financial support can be supported by showcasing best-practice examples in real-world laboratories as the “EE-Regionen”.

This policy paper proposes a concrete method to deliver ecologically sound energy production that simultaneously supports social justice. Through putting energy production into the hands of citizens, Social-Ecological Self-Sufficiency with Renewable Energies can not only meet our current energy challenges, but provide a pathway for more sustainable and more just communities. The following recommendations are mainly targeting the regional / local level.

What is Social-Ecological Self-Sufficiency with Renewable Energies?

Realising Social-Ecological Self-Sufficiency with Renewable Energies is a process whereby electricity generation is moved from centralised and mostly fossil-based production to smaller-scale production based on a variety of regionally available renewable sources (solar, wind, biomass, geothermal, hydro etc.). Reducing energy consumption is crucial for “EE-Regionen”, even more so in the heating sector. The residual heat demand is to be supplied efficiently, if possible from renewable sources. In this respect the regionally distinctive technical, economic, social and environmental aspects interact and form a set of options and requirements concerning the self-sufficient energy supply. Moreover, it is a shift of an inert energy system towards a flexible and inter-responsive, smart grid and heating system. Social, financial and environmental costs and benefits should be shared among regional stakeholders. Energy saving and efficiency strategies are further important pillars towards a 100% self-sufficiency through renewable energies.

Policy Recommendations

1. At the outset, create your vision together with key actors including citizens

So-called “key actors” are central to the success of the regional energy transition. They ensure the participation of different societal groups and relevant stakeholders in the design process. The actors are the main contact to the public and the local press, and help to introduce the concept of a transition to renewable energy to citizens. Key actors which contribute to the

project include energy producers, investors, political actors, supporting institutions, citizens and NGOs. Local and regional decision-makers can involve key actors through pin-pointing their interests in the projects and tying that to overall goals. **It is crucial that decision-makers engage key actors in the process from the start and apply continuity to the involvement so that a lack of trust doesn't compromise the interaction.**

Citizen involvement will help to build a sense of ownership, and thus acceptance, of specific projects and the overall process. Citizens have the capacity and motivation to design, implement, operate and contribute to the energy system in their role as consumers and investors as well as political and social drivers. However, they may not be aware of opportunities to do so. Through targeted information campaigns, political involvement, cooperative investment opportunities etc., spearheaded by the regional / local government, citizens should be informed and activated to contribute to the transition process. **Keeping citizens and key actors informed and actively seeking their contribution, therefore needs to be prioritised by local and regional authorities. Respectively a stakeholder concept needs to be developed.**

The lower the energy consumption in a municipality or region is, the more rapidly renewable energy self-sufficiency can be achieved. It is necessary that **regional / local governments facilitate and encourage behavioural change that leads to lower energy consumption and greater energy efficiency**. To this end, the level of energy consumption should be analysed and the potential savings derived.

2. Quantify and equitably distribute the regional value of the energy system

An important argument for self-sufficiency with renewable energies is that a large part of the added value is generated locally and thus the region will benefit. These benefits include:

- Enhanced regional identity
- Improved regional development
- Increase in green jobs
- Additional tax revenues

For decision makers, it is important that the economic effects and correlations with self-sufficiency are made transparent including: qualitative values, monetary added value, employment effects, added value potential, involved actors and beneficiaries. However, negative effects should be analysed and published to clarify net effects and to ensure openness.

One of the best ways for decision-makers to encourage broad stakeholder engagement is to ensure that the added value is organised in partnership, so that it is in the interest of all stakeholders to engage in the long term. **In the spirit of good partnership, actors distribute costs and benefits fairly along the value chain between each other.**

Besides the financial gains for a wide range, but every so often not all local and regional stakeholders, special emphasis should lie on identifying and monitoring social benefits that are triggered by the local energy transition. If only a marginal part of the community enjoys the benefits of the renewable energy technology roll-out, **LGs should actively seek adjustments and options with a low threshold of engagement**, e.g. help to establish a cooperative that is capitalised in small amounts and in a rotating manner.

3. Allocate space ecologically

The use of land for renewable energies stands in competition with alternative uses for the land - growing biofuel crops, for example, precludes usage for food production, nature reserves or leisure space. For this reason, it is necessary to develop an utilisation concept, which protects vulnerable flora and fauna, whilst balancing the need for energy crops. Decision-makers should make an assessment of the ecological potential of the land and consider the effects of any technological construction or energy crop growth on such issues as soil loss, water contamination, etc.. All information should then be set out in a **Regional Bioenergy Strategy.**

Rather than growing biofuel crops, local / regional governments are also encouraged to use flowering plants, which minimise negative environmental effects and contribute to the protection of flora and fauna, along with residual biomass and residual waste energy whenever possible, and to consider sustainably harvested forest wood.

Structure of settlements

The demand for energy is significantly influenced by the structure of settlements, e.g. by higher energy requirements for urban sprawl or separation of living, working and leisure places.

Compact settlement structures can, for instance, be created through redensification or redevelopment of vacant buildings.

Rural shops can promote local shopping, accessible on foot and the energy consumption of mobility can be reduced by alternatives to individual car traffic. By creating more compact settlement structures heating energy is saved. Infrastructure is used to capacity and can be operated economically. Attractively designed public spaces can reduce the need to travel and might **improve the social climate in rural areas.**

4. Select the right renewable energy technology based on the local context

The selection of a combination of different, optimally adapted technologies is the basis for the development of RE use. Decision-makers should select an optimal set of technologies based on location, infrastructure, renewable energy potential, costs and the targeted energy user. Otherwise, the renewable and efficient energy value chain is likely to remain unintegrated into the region and conflicts of interests and acceptance can be expected to occur.

Further criteria that will influence the application of various renewable technologies are:

- The existing sustainable potentials in the area and their attributes (quantity and availability, quality and cost)
- financial conditions for the construction and operation of the plant
- existing infrastructure
- legal authorisation
- different preferences of the key actors

Additionally, using waste heat from the production of energy through combined heat and power plants increases efficiency significantly, and should therefore be used to the extent possible.

5. Facilitate intelligent energy distribution

For several years, the capacity build-up of facilities that produce electricity from RE has rapidly progressed, especially the increasing amounts of generation units drawing on fluctuating sources require adjustments to the entire power supply system. To further ensure a secure supply of electricity for all consumers, a technical grid-enhancement is necessary. Ideally, grid optimisation has priority over grid reinforcement, which in turn has priority over expansion. This can be complemented through other measures to increase flexibility such as storage expansion, local control strategies or the use of demand-side-management (smart grid approaches).

A particular challenge is to take into account social-ecological criteria: the new construction of transmission networks is often perceived by the public as a negative landscape change and connected to a possible loss in property value. Further, impacts on the environment and electromagnetic fields tend to hold a negative connotation and are suspected of being a potential health hazard. Thus, some grid companies in the EU currently experiment with stakeholder involvement models where affected people benefit financially from the quantity of transmitted energy through their “backyards” in order to enhance acceptance and speed up the expansion. Local and regional governments should neutrally facilitate the respective dialogue.

For decision-makers, the following points should be kept in mind:

- Citizens and bodies representing citizens (e.g. NGOs) should have right to co-decision making
- The ability to influence new lines should be examined, if applicable, in cooperation with other affected neighbouring municipalities
- Continuous communication with citizens should be ensured in order to preserve transparency during the process
- It should be examined as to whether financial participation opportunities for citizens are possible to attract interest

- The technical options should be disclosed and the solution that fits the local conditions best selected
- The adaption of the power supply system should be in line with nature conservation

6. Set up a networking centre

A networking centre can help to ensure a socially just and environmentally sound local energy transition. The configuration of the networking centre needs to fit the municipal or regional circumstances, there is no one-size-fits-all solution. Already the level on which it is to be set up, municipal, district or greater region, should have been decided individually, based on an initial state and potential analysis. The networking centre should act as an independent organisation and contact point for relevant actors in the field of renewable energies. It allows to coordinate the cooperation of actors and thereby forge synergies. It could provide information, communication, mediation and monitoring, and also ensure public participation in the processes. The centre could even implement measures itself, e.g. feasibility studies or showcase technologies.

The centre can either be established as a new organisation or the additional tasks can be assigned to an existing institution like an economic development agency or an energy-related position in the administration. Actors of all relevant actor groups should be included and the relevance of the centre's recommendations should be agreed upon.

Conclusion

Social-Ecological Renewable Energy Self-Sufficiency provides a path forward at a crucial period for the European energy system. It expands the current concept of energy supply to incorporate citizens in an holistic manner and makes energy production and use an active rather than passive pursuit.

Through the devised approaches, the impacts (benefits and costs) of the energy endeavor are spread more equitably amongst the community, with the principle of social justice at the forefront of the distribution. Ecologically, the landscape is preserved, with the pitfalls traditionally associated with energy supply (pollution of the local environment, disruption to wildlife, negative impact on local inhabitants in terms of air / water quality and noise pollution) largely avoided. In a broader sense, the system helps to stem climate change and protect future generations.

Other concrete benefits include:

- **Enhanced regional identity**
- **Improved regional development**
- **Increase in green jobs**
- **Additional tax revenues**
- **More just, equitable communities**
- **Lower environmental impact**

Through adopting measures in the prescribed fields of action **local/ regional decision-makers can bring value to their cities and towns, provide sustainable energy and thus improve quality of life and social security.**