Cooperative Local Energy Transitions

Guide for socially just and ecologically sound renewable energy self-sufficiency – with a focus on bio-energy

Chantal Ruppert-Winkel, Jürgen Hauber, Astrid Aretz, Simon Funcke, Michael Kress, Sophia Noz, Steven Salecki, Patric Schlager, Järmo Stablo

SPONSORED BY THE
Federal Ministry of Education and Research
FONA Research for Sustainable Development BMBF

Project "Renewable Energy Regions: Socio-ecology of self-sufficiency"

ee-regionen.de

Research focus

Local governments and regions aiming to complete renewable energy self-sufficiency – with a focus on bio-energy

SPONSORED BY THE
Federal Ministry of Education and Research

FONA Research for Sustainable Development BMBF

Scientific project partners

ZEE Zentrum für Erneuerbare Energien

UNI FREIBURG

i | ö | w
INSTITUT FÜR ÖKOLOGISCHE WIRTSCHAFTSFORSCHUNG

UNIVERSITÄT HOHENHEIM
Institut für Landschafts- und Pflanzenökologie

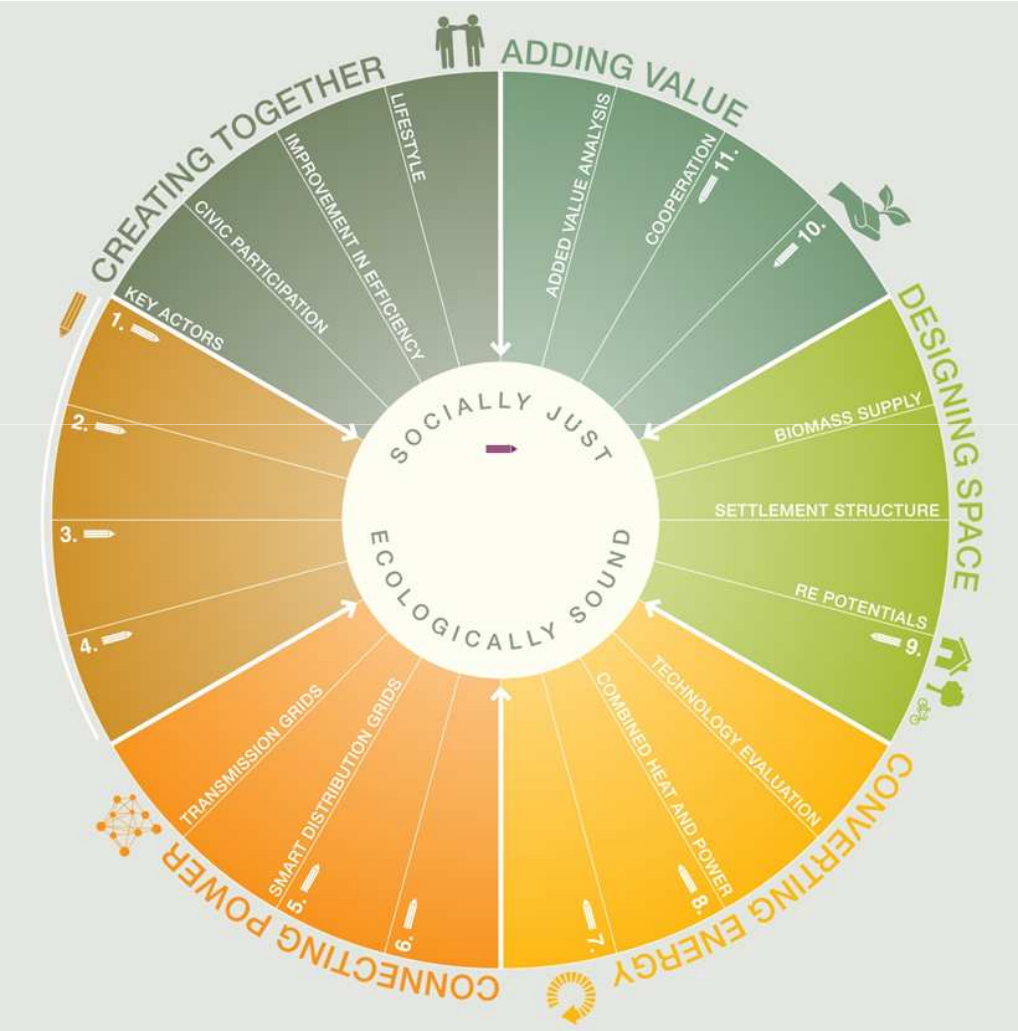
Duration May 2009 – May 2013

Project Renewable Energy Regions: Local and regional government partners




- Four governmental partners with the political decision-making power for renewable energy (RE) self-sufficiency
  - Counties:
    - **Schwäbisch Hall** (Baden-Württemberg): 190,000 people
    - **Lüchow-Dannenberg** (Low Saxony): 50,000 people
  - Local governments:
    - **Wolpertshausen** (Baden-Württemberg): 2,000 people
    - **Morbach** (Rhineland-Palatinate): 11,200 people

The Energy Compass



Fields of action

Creating Together:

- **key actors**
- **participation of citizens**
- **energy efficiency and energy saving lifestyles**

Create jointly

Use values

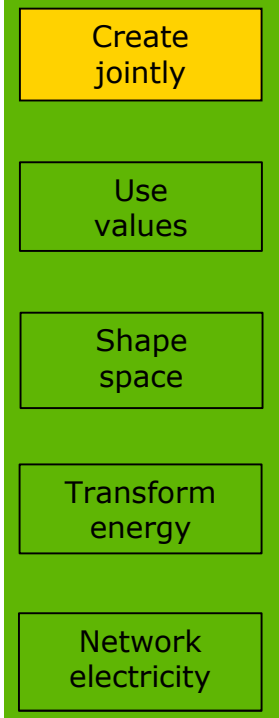
Shape space

Transform energy

Network electricity

Key actors and their networks

- The successful transition towards RE depends primarily on **key actors within a region** that take the initiative to raise awareness and mobilise fellow campaigners.
- **Networking** of actors is an important precondition to bring **different objectives** and **roles** to the table and enter a dialogue about the **vision** and **aims**, and initiate **flagship projects**.
- Existing **networks** of actors shall successively be extended and perpetuated with the aim of creating **sustained structures**.



Key actors and their networks

Vision

Key actors are central for the regional energy transition. They have different **knowledge and skills**, network with each other and ensure the participation of different **societal groups** and **relevant stakeholders** in the design process. They create **permanent structures**, are open to innovation and supported by **political** and **societal decision-makers**.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Key actors and their networks

Guiding questions

- Who is already active and in which way?
- Who should be integrated because of their
  - function, knowledge, skills
  - position within society, social justice?
- What are the respective motives for action, available resources, possible roles?
- Which networks exist already? Where are gaps within, but also beyond, the region?

Create jointly

Use values

Shape space

Transform energy

Network electricity

Fields of action

Creating Together:

- **key actors**
- **participation of citizens**
- **energy efficiency and energy saving lifestyles**

Create jointly

Use values

Shape space

Transform energy

Network electricity

Participation of citizens

- **Citizens** are **key actors** for renewable energy self-sufficiency. Through technological and social developments new ways of **participation** are created.
- Citizens can take on **new roles** as energy producers, investors and planners in addition to energy use.
- Citizen participation can also help to **increase acceptance**.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Participation of citizens

Vision

• **Local governments** draw **attention** to the various opportunities for action, and support citizens in the **perception** and **implementation of these options**.

• Hence, at the beginning **transparency** is achieved, active **participation** enabled and the new is dared (e.g. participation in electricity grids), **sovereignty** of citizens accepted and **conflicts** taken seriously.

• Any option for the participation of citizens is guided by the principle of **justice**.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Participation of citizens

Guiding questions

- In which projects planned (e.g. energy sites, grids) is participation of citizens possible?
- Are citizens informed about the possibilities of participation?
- Are citizens informed about the process and can they actively shape it?
- Do engaged citizens/groups already exist that can be won over for the extension of RE?
- Do (potential) lines of conflict that are related to aspects of justice and the extension of RE exist?

Create jointly

Use values

Shape space

Transform energy

Network electricity

Fields of action

Creating Together:

- **key actors**
- **participation of citizens**
- **energy efficiency and energy saving lifestyles**

Create jointly

Use values

Shape space

Transform energy

Network electricity

Energy efficiency and energy saving lifestyles

- The more rapidly the objective of RE self-sufficiency can be achieved, the lower the **energy consumption**.

  In recent years significant progress in **energy efficiency** in buildings and appliances has been achieved, however, energy savings were partially eaten up by **rebound effects**.
- Consumers have a huge responsibility due to their **consumption and investment decisions**, and their **lifestyle**.
- **Higher energy prices** can promote savings, but **impact on different social groups differently; an eco-bonus can counteract a social divide.**

Create jointly

Use values

Shape space

Transform energy

Network electricity

Energy efficiency and energy saving lifestyles

Vision

At municipal level, the **level and structure of energy consumption** are analysed and the **potential savings** derived. Consequently, measures are developed and progress is evaluated.

The local government, with their estates, shall lead the **way by example**, motivating and supporting other actors in various ways to save energy (**including social differences** within the population).

Create jointly

Use values

Shape space

Transform energy

Network electricity

Energy efficiency and energy saving lifestyles

Guiding questions

- Is the energy use recorded in regards to its level and structure (consumer groups, energy sources)?
- Were the highest saving potentials identified?
- Were the measures and communication strategies for a low energy lifestyle taken?
- How is the social impact of measures and tools taken into account?

Create jointly

Use values

Shape space

Transform energy

Network electricity

Fields of action

Adding value:

- **analysis of added value**
- **cooperation**

Create jointly

Use values

Shape space

Transform energy

Network electricity

Analysis of added value

- **Regional value** is, in addition to climate protection, often an important **argument** for targeting renewable energy self-sufficiency. However, the quantification of the added value is often difficult.

  At the same time the increase of value added can **displace revenues and jobs**.

  The **recording** of regional value is the **foundation** to support the planning and development processes and the results can be incorporated **precisely** into discussions.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Analysis of added value

Vision

RE self-sufficiency has a positive impact on **regional identity** and **regional development**. **Stable jobs, additional tax revenues for the municipal budget or new economic opportunities** are aspects which are important for the social and economic development of the region and the acceptance of RE. The qualitative and quantitative values of the expansion of renewable energies are the basis for the transparency and evaluation of the process.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Analysis of added value

Guiding questions

- Is the generated value in a community systematically recorded?
- Are information about added value from RE disseminated and accessed by relevant target groups?
- Are measures taken to secure the added value in the community?
- Who profits and who loses out? Can disadvantaged persons with the objective of fair distribution be compensated?

Create jointly

Use values

Shape space

Transform energy

Network electricity

Fields of action

Adding value:

- **analysis of added value**
- **cooperation**

Create jointly

Use values

Shape space

Transform energy

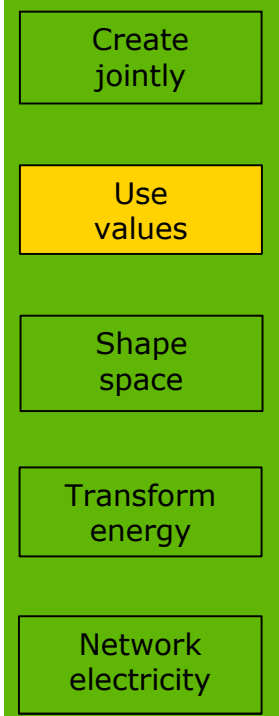
Network electricity

Cooperation

- For RE self-sufficiency, different actors within **value chains** need to work together. **Conflicts** may arise due to divergent interests or values.

  A **concept of added value** can assist in controlling and coordinating the value chains through the definition of socio-ecological values and principles within a good partnership. The objectives are evaluated in regular meetings through the stakeholders.

  With the creation of a **socio-ecological brand**, the socio-ecological values are communicated to the customer and rewarded.



Cooperation

Vision

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. Partners intend to be **economically viable** and **valuable** in the market. Actors involved are aware of their **responsibilities** towards their **community**.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Cooperation

Guiding questions

- Which economic, social and ecological values are generated?
- Who benefits from these values?
- Are these values generated with the perspective of long term cooperation?
- Are these values evaluated and communicated through indicators?

Create jointly

Use values

Shape space

Transform energy

Network electricity

Fields of action

Designing space:

- **Supply of bio-energy**
- **Structures of settlements**

Create jointly

Use values

Shape space

Transform energy

Network electricity

Supply of biomass

- **Land use conflicts** are often associated with the use of RE.
- Pressure can be taken off of cultivated areas through the use of **residues and waste biomass**.
- A **regional biomass strategy**, in which the three sub-areas are considered - residual and waste biomass, biomass from agriculture and forestry - can help to avoid competitions and disclose interests.
- A **mix of blooms** can enrich the landscape and contribute to conservation.
- Further **potential** may be gained from the **landscape work, SRC or graded edges of forests**.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Supply of biomass

Vision

Es existieren Flächen mit **großem Blütenreichtum** und **geringen Belastungen** für den Naturhaushalt.

The regional potentials are exploited in balance with **land use conflicts** and suitable concepts of use. The delicate **balance of different interests** (this relates to the various stakeholders and conservation) can be observed. **Residues and waste biomass** are extensively used. Agriculture and forestry provide **sustainable raw materials** for the energy supply.

There are areas with a **great abundance of flowers and little pressure** on the ecosystem.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Supply of biomass

Guiding questions

- Does an assessment of the ecological bio-energy potentials for the region exist?
- Do biomass plants use the potentials that are sustainable?
- Are residues and waste biomass used?
- Does conflict exist between the different usage possibilities of biomass?
- Does a regional biomass strategy exist?

Create jointly

Use values

Shape space

Transform energy

Network electricity

Fields of action

Designing space:

- **Supply of bio-energy**
- **Structures of settlements**

Create jointly

Use values

Shape space

Transform energy

Network electricity

Structures 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 by foot** and the energy consumption of mobility can be reduced by **alternatives to individual car traffic**.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Structures of settlements

Vision

By creating more **compact settlement structures** heating energy is saved. **Infrastructure is used to capacity** and can be **operated economically**. Through greater **proximity** of housing, work and leisure, a regional supply of goods and services for everyday use is secured. **Attractively designed public spaces** will **reduce the need to travel** and improve the **social climate** in rural areas.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Structures of settlements

Guiding questions

- Are measures taken to reduce the pressure on land use?
- Are rural centres designed in an attractive way?
- Are rural centres unoccupied and measures exist to act against this tendency?
- Do alternatives to individual mobility by car exist?

Create jointly

Use values

Shape space

Transform energy

Network electricity

Fields of action

Converting energy:

- **Assess technology**
- **Combined heat and power**

Create jointly

Use values

Shape space

Transform energy

Network electricity

Assess technology,

Combined heat and power

- The selection of a combination of different, **optimally adapted technologies** (e.g. concerning location, infrastructure, renewable energy potential, energy user) is the basis for the development of bio-energy use.
- To assess the **environmental impact**, i.e. from the upstream chain for the provision of substrates to the use of fermentation residues, the entire life cycle must be considered.
- The use of **waste heat** (combined heat and power) increases efficiency significantly and should therefore be used in power-generating plants as much as possible.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Assess technology,

Combined heat and power

Vision

The **emissions and energy costs** along the supply chain are **minimised** (this also affects the release of methane from fermentation residues). The bio-energy is used as **efficiently** as possible and simultaneously replaces fossil fuels. Thus, most of the **mitigation effectiveness** and **resource savings** can be achieved.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Assess technology,

Combined heat and power

Guiding questions

- Are ecological bio-energy potentials efficiently used with existing / planned bio-energy plants? Are the facilities sized so that no long distances / imports of energy sources are necessary? Are all the existing substrates used?
- Is waste heat used to a large extent?
- Do the bio-energy plants meet the state-of-the-art with respect to efficiency and other environment related facilities (e.g. sealed storage for fermentation residues)?
- Are large heat consumers involved in the planning of bio-energy plants?

Create jointly

Use values

Shape space

Transform energy

Network electricity

Fields of action

Connecting Power:

- **Power grid**
- **Intelligent distribution grid**

Create jointly

Use values

Shape space

Transform energy

Network electricity

Power grid,
Intelligent distribution grid

- The expansion of renewable energy requires the respective **adaption** of the transmission and distribution grids. On a technical level, **grid expansion and amplification** are necessary for a continued secure supply of electricity. Energy storage and smart grids can supplement this adaption.
- Communities may be affected by the new lines in relation to the expansion of transmission grids.
- On the level of the distribution system, **bottlenecks** can impede the expansion of renewable energy. Bio-energy plants can relieve the grid from congestion through **controlled planning**.
- Communities have the opportunity to influence the development of the expansion by **owning the distribution grid**.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Power grid,
Intelligent distribution grid

ee-regionen.de

Vision

The increasing distances of electricity transport are absorbed by the **expansion and amplification** of the transmissive and distributive capacity. **Alternatives or additions** to the grid expansion, such as the increase of flexibility in the overall system (e.g. through increased energy storage, smart grid approaches) will also be implemented at appropriate locations. The adaptation of the entire system occurs under consideration of **conservation issues** and the **participation of stakeholders**.

Create jointly

Use values

Shape space

Transform energy

Network electricity

Power grid,
Intelligent distribution grid

ee-regionen.de

Guiding questions for the power grid

- Is the municipality affected by the planned lines of the power grid?
- Does the municipality use the right to voice its interests towards the Federal Network Agency, which coordinates the expansion?
- Is the population continuously and transparently informed about plans?
- Is the financial participation of citizens in the grid possible / planned?
- Are citizens informed about technical possibilities and environmental and health impacts?

Create jointly

Use values

Shape space

Transform energy

Network electricity

Power grid,
Intelligent distribution grid

ee-regionen.de

Guiding questions for the distribution grid

- Is sufficient capacity in the distribution grid available for the expansion of RE?
- Is a necessary expansion progressing rapidly?
- Are biomass plants used flexibly to stabilise the grid?
- Are smart grid approaches considered for the flexible operation of facilities and control of the network?
- Is the grid owned by the municipality and if not, could new room for manoeuvre be gained through a repurchase?
- Does the possibility of citizen participation exist?

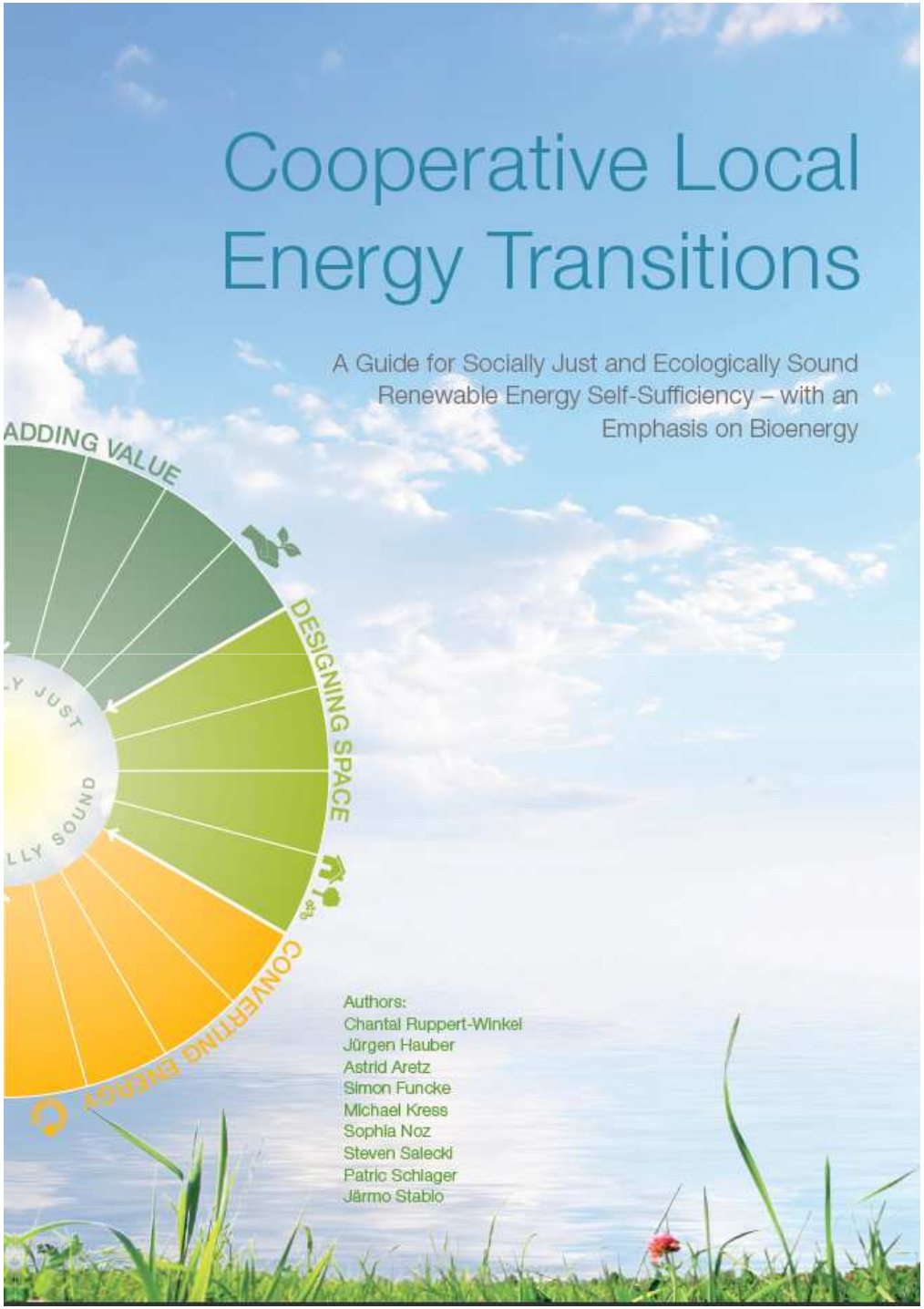
Create jointly

Use values

Shape space

Transform energy

Network electricity



Guide available at:

www.ee-regionen.de

www.zee.uni-freiburg.de