

# Different organisational structures and examples for community biogas plants

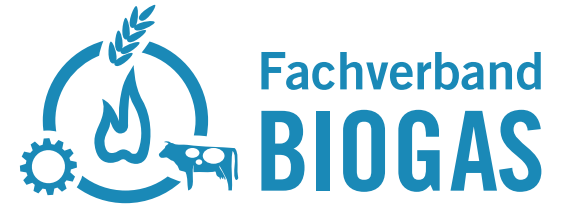
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**Biogas  
can do it!**

# Content



- **The German Biogas Association - Fachverband Biogas e.V.**
- Biogas in Germany
- Community based RE/Bioenergy/Biogas in Germany
- Community based Bioenergy in Thailand

# Structure of the German Biogas Association



# Objectives of the German Biogas Association

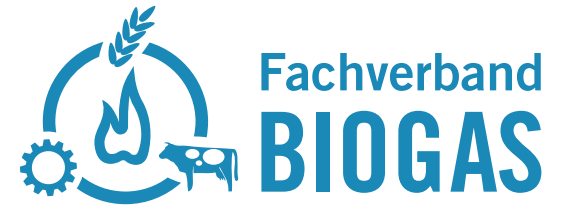
## Objectives :

- **Promotion of the biogas sector**
- Promotion of a sustainable energy supply
- Definition of legal framework for reliable and long-term investments
- Creation of adequate technical rules and standards
- Promotion of R & D
- Exchange of information
- Members service

## Lobbying on federal state, federal and EU level in the following fields:

- Renewable Energy Act (EEG)
- Energy management
- Regulatory approval
- Environmental laws
- Laws on agricultural issues
- Tax law
- ...

# Content



- The German Biogas Association - Fachverband Biogas e.V.
- **Biogas in Germany**
- Maintenance
- Safety
- Conclusion

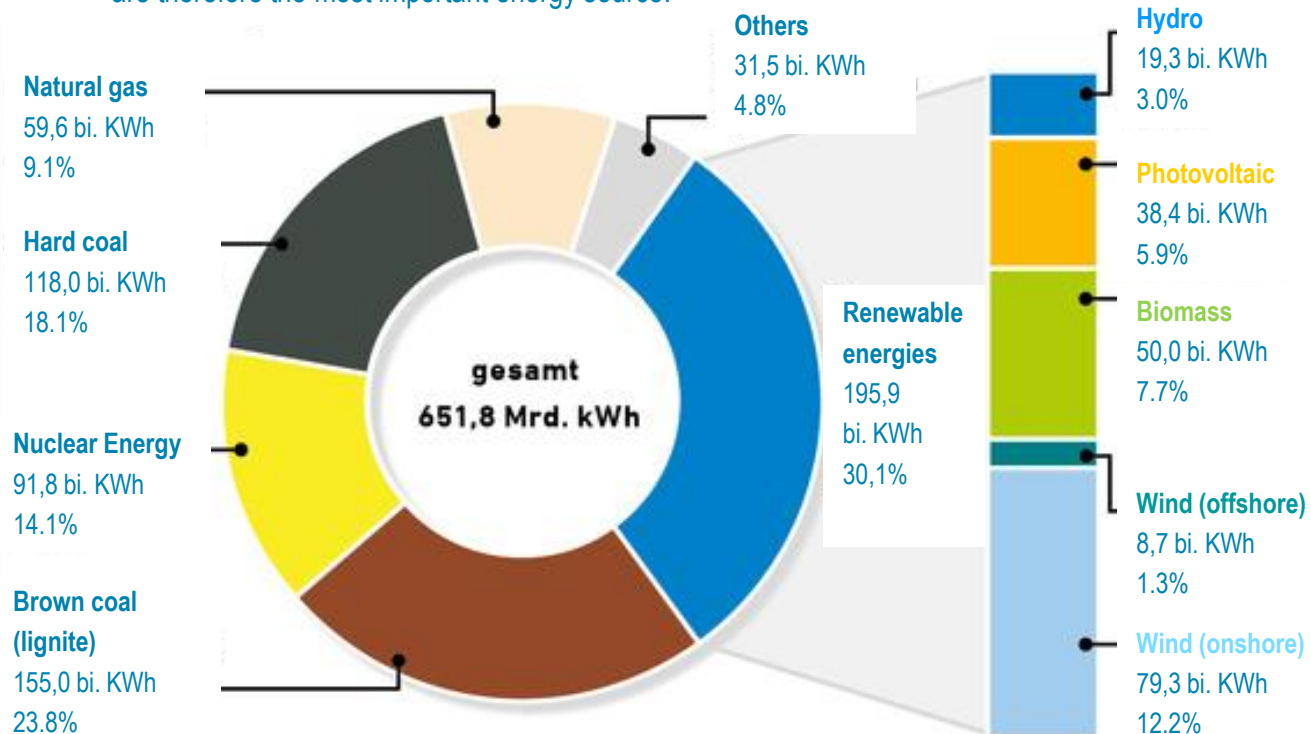
# Reasons for the energy transition in Germany

- Climate and environmental protection
- Sustainable development of energy production
- Reduction of costs for German national economy by incorporating long-term external effects
- Conservation of fossil resources
- Independency from imports of fossil fuels
- In the long term costs for fossil fuels will rise; “fuel costs” for RE are for free or will probably decrease
- Technology development
- Creation of employment, especially in rural areas
- Development of new markets and sales

# Structure of the German electricity production

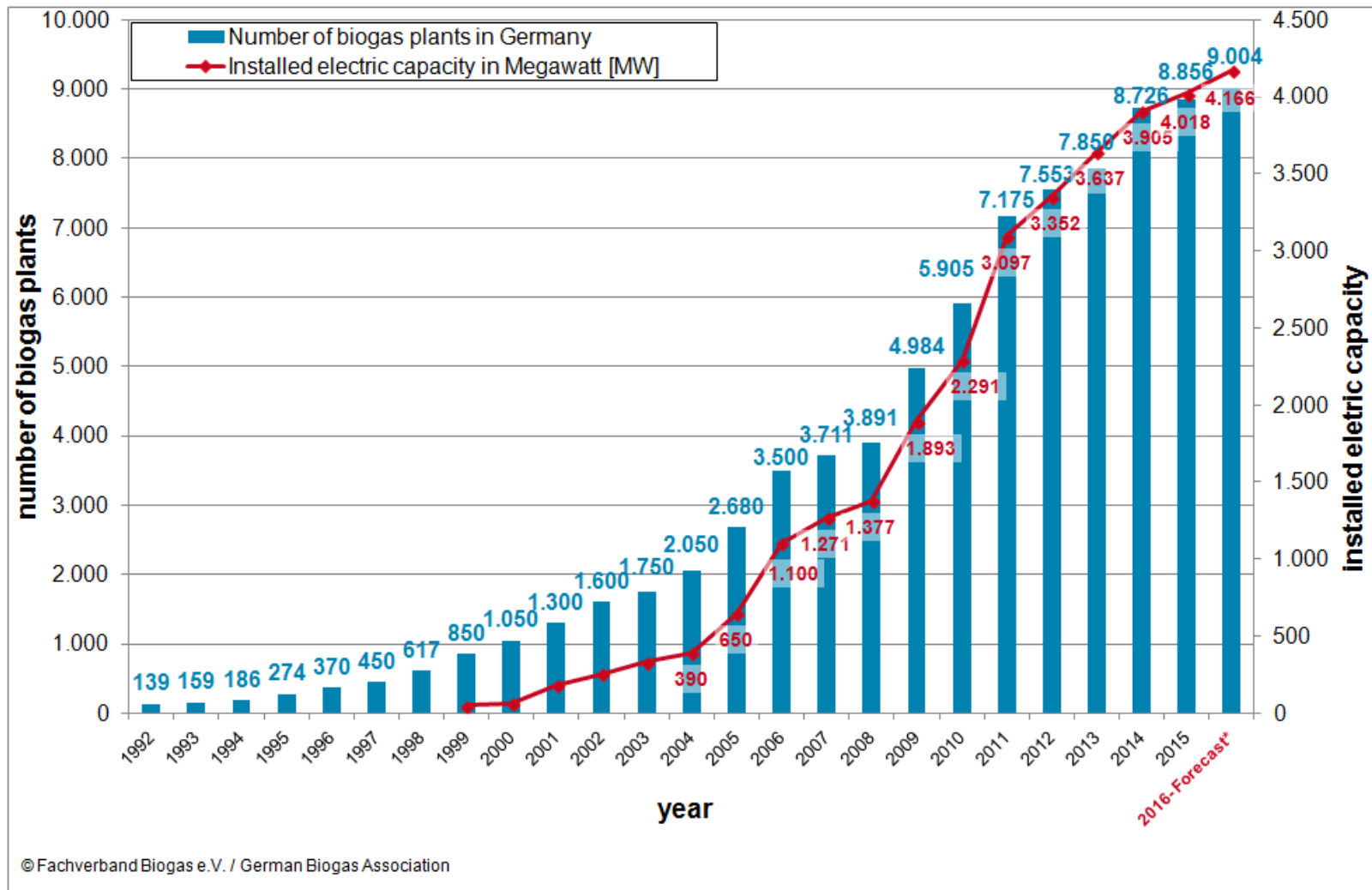
## The electricity mix in Germany in 2015

With almost 196 Billions KWh renewable energies supplied 30,1% of the German gross electricity production and are therefore the most important energy source.



Source: Renewable Energy Agency  
As of 2.2016

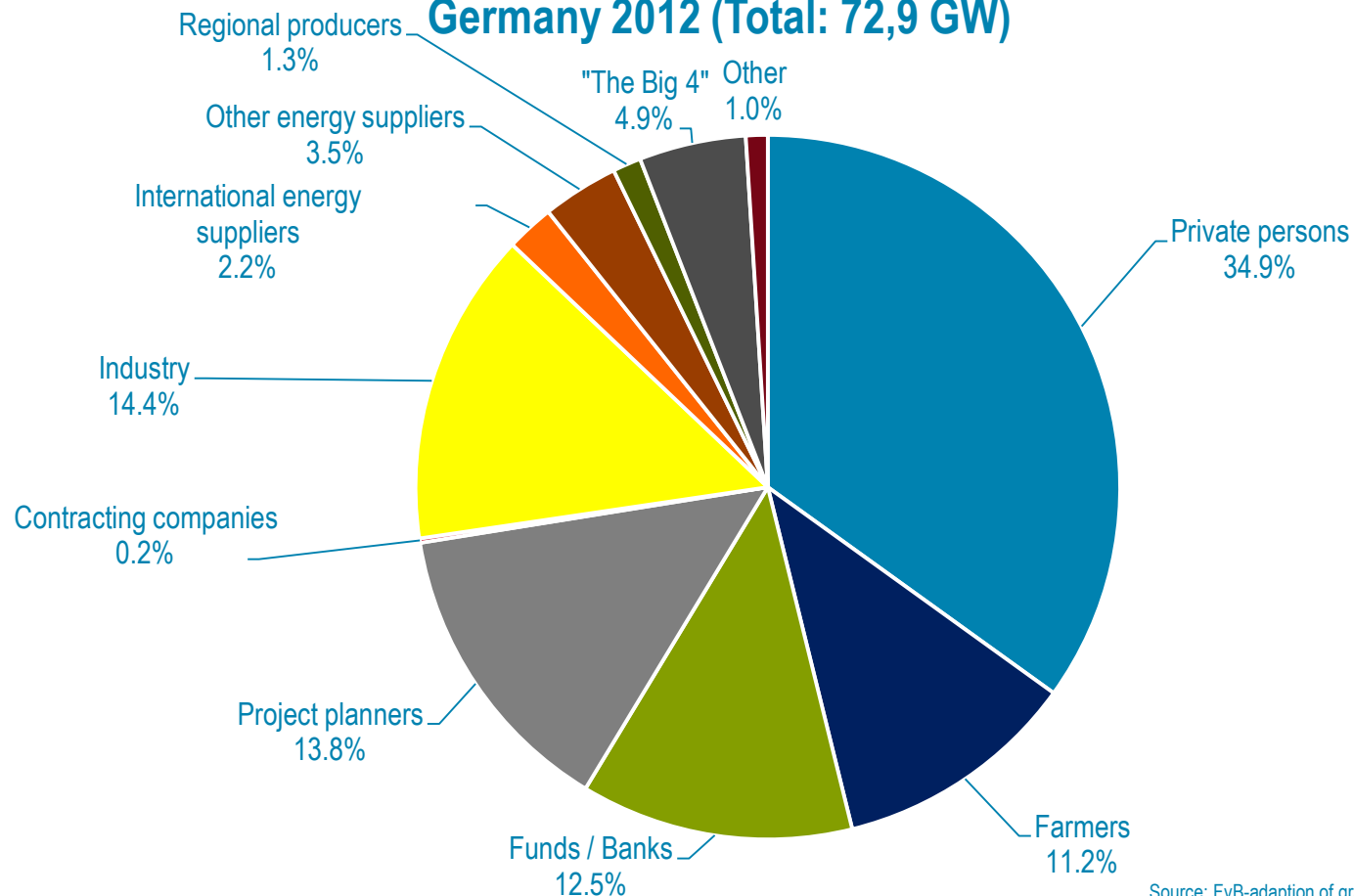
# Biogas in Germany - number of plants and installed capacity





# Community based Energy

## Structured Renewable Energy according to Group of Owners in Germany 2012 (Total: 72,9 GW)



Source: FvB-adaption of graphic from trend:research 2013

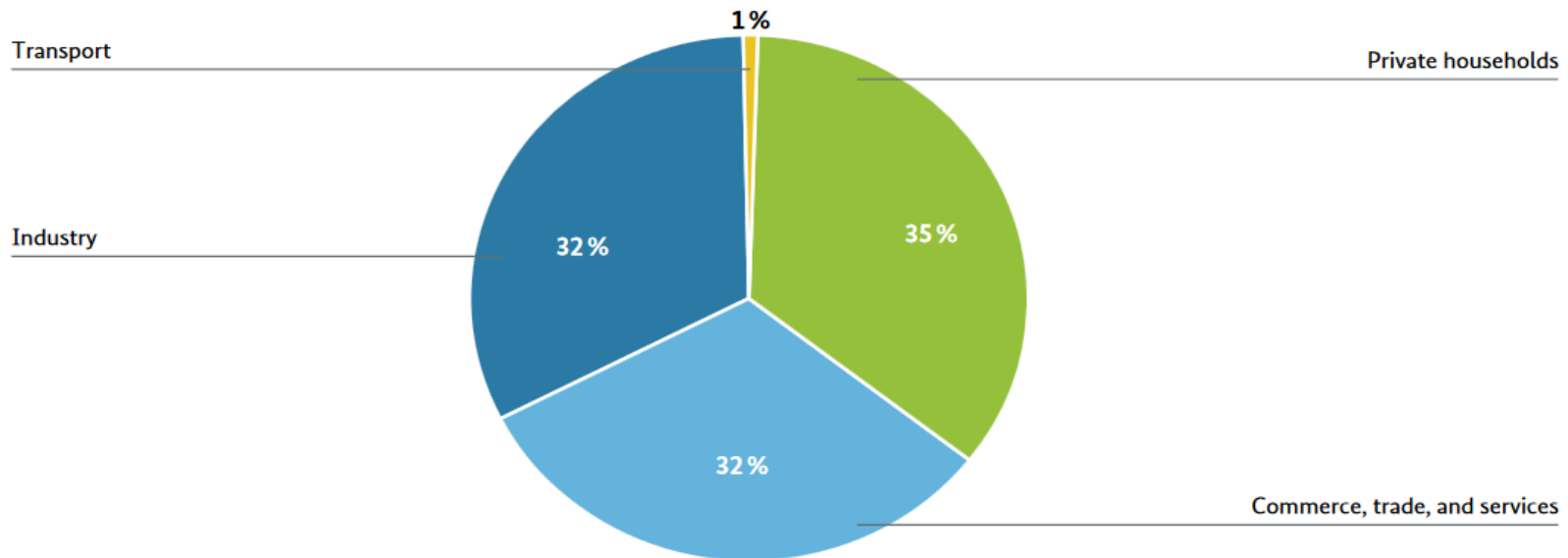
# Citizen Participation in Renewable Energies (RE) projects

- Citizen participation models in the energy sector, as energy cooperatives, exist in Germany since the 20th century, when their role was to provide electricity to rural areas. Some of these are still active!
- In the 1980's energy cooperatives had a rebirth focusing on wind and solar energy and in 2012, 47% of the renewable energy installed capacity was „citizen energy“.
- Why are citizens in Germany interested in investing in RE?
  - ▶ Returns on investment (granted by the EEG)
  - ▶ The opportunity to actively participate in the local energy policy and planning



# Financial contribution to the German energy transition

## Financial contribution according to end consumer group

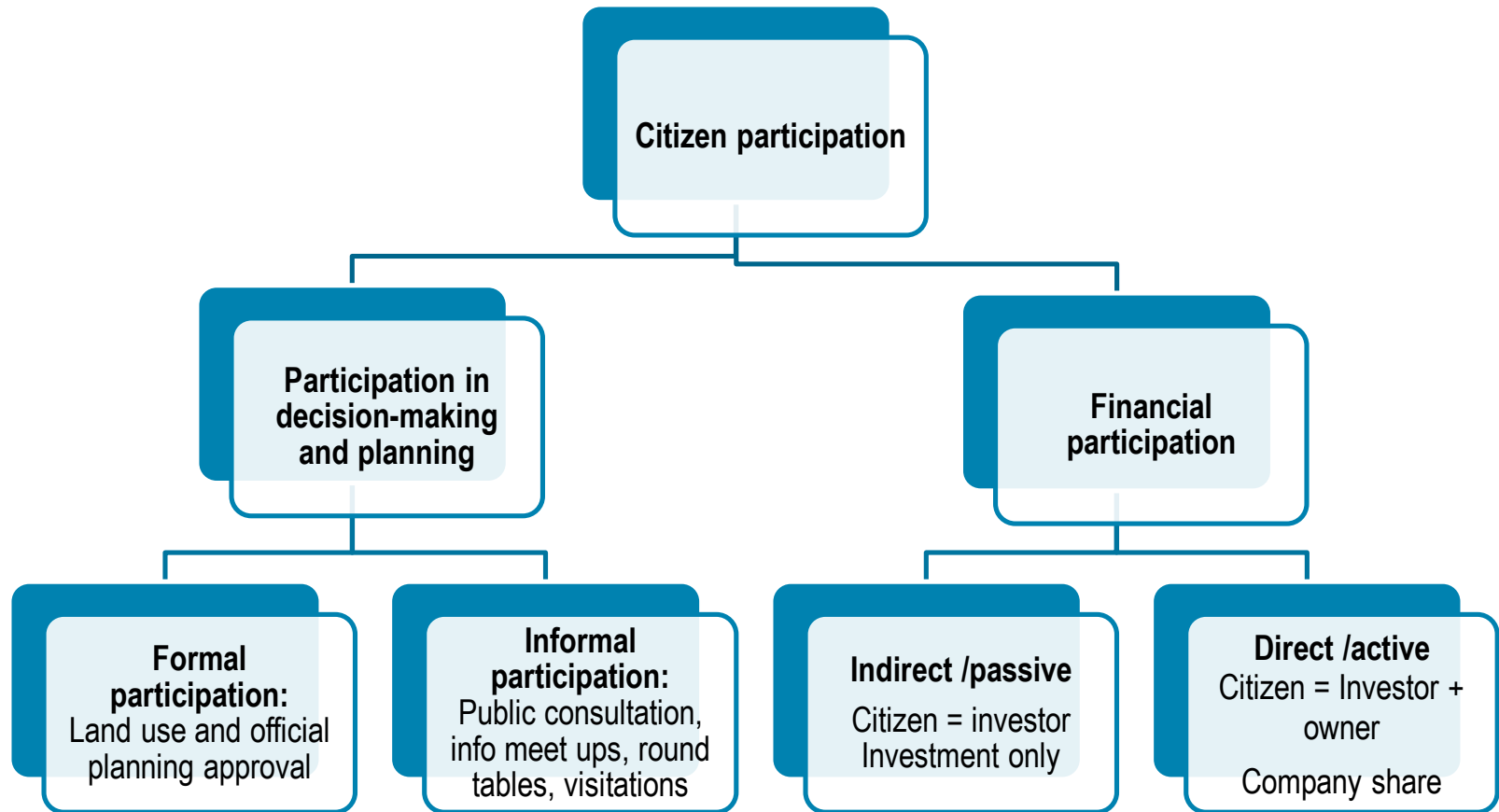


Source: Transmission system operators ([www.netztransparenz.de](http://www.netztransparenz.de))

# Motivation for Community based RE in Germany

- German Energy Transition should be
  - Decentral, renewable energy plants are smaller than conventional power plants
  - People should be involved in the energy transition
    - Ecological investment
    - Ownership, operation and maintenance by local stakeholders
      - ▶ local business creation
      - ▶ local employment
    - Responsibility in shaping the energy future in a sustainable way
    - Independency ▶ proud of own energy production
    - Rural development
    - Finance by a lot of people
    - ▶ improved acceptance and motivation  
(avoid the NIMBY-effect, “Not In My Backyard”)

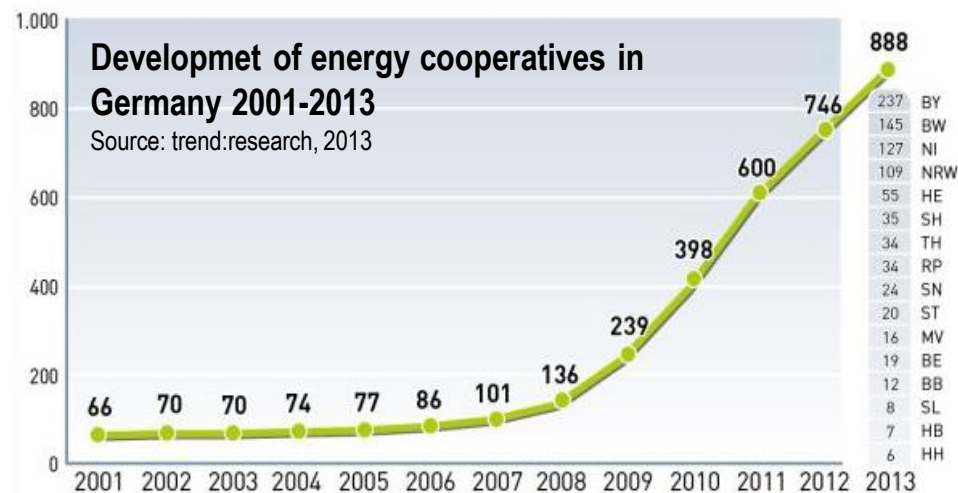
# Types of citizen participation in Germany



Source: Kaufhold, Universität Kassel (2012)

# Cooperatives I

- Cooperatives were firstly introduced in Europe in the 19th century.
- Today we find different types of cooperatives: credit, rural, commercial, housing and consumption cooperatives.
- In Germany, due to the decentralization of the energy supply and the intensification of the renewable energy use, unions of citizens have chosen more and more frequently this model
- About 200,000 people participate in cooperatives for RE-projects



**Above 800  
energy  
cooperatives!!!**

# Cooperatives II

- Advantages
  - Possible to implement multiple RE-projects, while administrative costs remain the same
  - Risk is distributed among the members
  - Inclusion of lots of investors that participate with low amounts of money (in Germany so low as 50 EUR per share).
  - Broad participation resulting in one of the safest organisation forms
  - Active role of the members through general assemblies, where each member has one vote
- Disadvantages
  - High bureaucratic expenses (in Germany) because they have to be inspected

# Other models often used in Germany

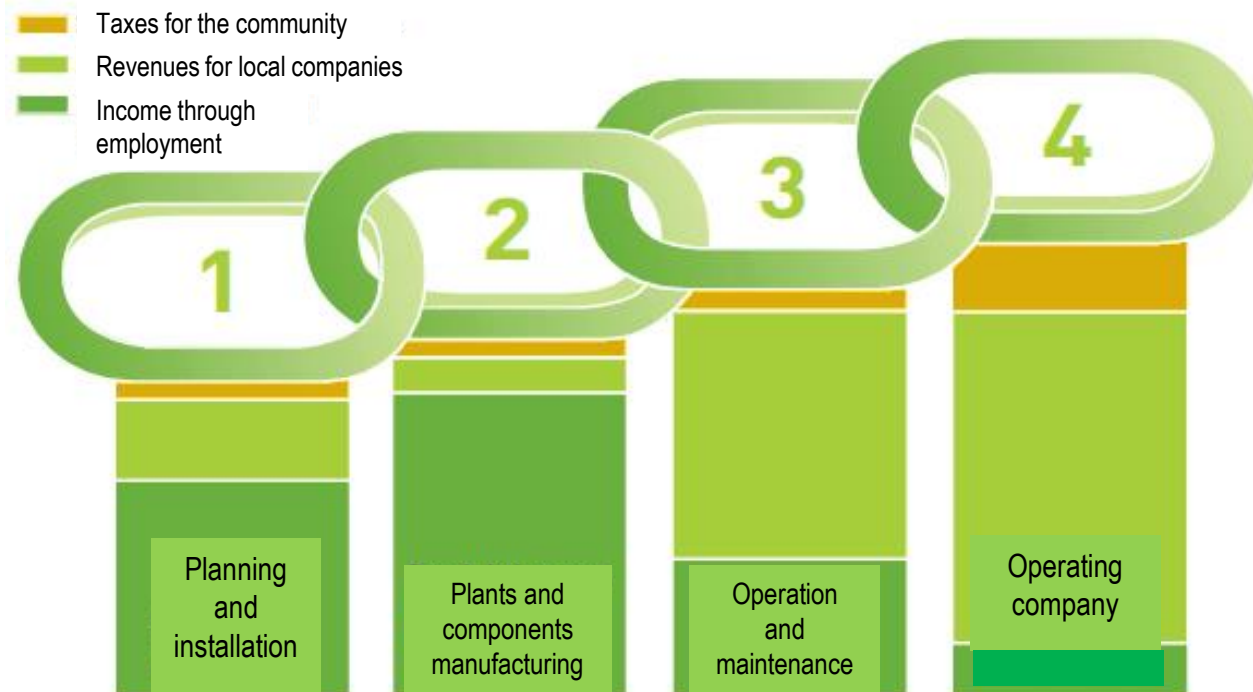
- GmbH & Co KG ► “the wind-park model”
  - A legal form where a general partner takes over the business management and the citizens, as limited partners share profits but not the risks
  - Ideal model for expensive and often complex installations like bioenergy plants, solar and wind parks and local heating grids
- Loans
  - The citizens invest in RE projects through their municipal utility companies (Stadtwerke)
  - Citizens can not influence or control the projects
- Contracting
  - A company, the contractor, plans, builds, maintains and operates a RE plant, the community buys the energy for a fixed period of time and frequently after this period the community takes over the plant





# Local added value of citizen participation

- Local added value chains have 4 stages with three effects each: the higher the involvement in each stage, the more money is left in the community



Source: Agentur für  
Erneuerbare  
Energien

# Bioenergy Village Schlöben

- Location: Thuringia
- Inhabitants: 480 (187 households)
- RE projects: Biogas plant with installed capacity of 795 kW
- Model: Cooperative, established in 2009 with only 5 members



# Bioenergy Village Schlöben

- There is a large agricultural company in the community which supplies the necessary feedstocks for the biogas plant.
- They have also built a local heating grid to distribute the heat, 2 CHP units are located 1.6 km away from the biogas plant to optimize heat distribution
- The citizens have now a new sense of community and discuss issues that affect all of them like the use of the heat in summer.



# Energy Village Wilpoldsried

- Location: Bavaria
- Inhabitants: 2,600
- RE projects: wind, solar, biogas and hydropower
- Model: Cooperative, established in 1999 with 30 members



# Energy Village Wildpoldsried

- The overall investment was of about 2.2 Million Euros for 7MW of windpower
    - 25% was financed by the citizens,
    - 100,000 Euros were invested by the the federal state of Bavaria
    - And the big rest was financed through banks, which was only possible under the EEG
  - The positive experience with wind energy resulted in the development of further projects with other RE sources:
    - Various private households have PV or solar thermal units of a total installed capacity of 1,580 KWp
    - 5 biogas plants using waste from the barns of the community
    - 3 small hydropower plants
- this community produces 250% more energy than they consume!





# Bioenergy Village Jühnde

- Jühnde is a village located in the south of the federal state of Lower Saxony.
- Since 2005, with a project financed by their citizens (in the form of a cooperative), the village produces almost double of the electricity they consume.
- The bioenergy plant has three essential components:
  1. Anaerobic digestion plant with a block-type thermal power station
  2. Wood chip burning boiler (to meet high demand in winter)
  3. Village heating grid



# Bioenergy Village Jühnde

- **Technical details**
- **The CHP has an installed electrical capacity of 716 kW**
- About 5,000,000 kWh of electricity is generated annually.
- About 4,500,000 kWh of heat is fed into the village heating grid annually.
- About 3,500,000 kWh is used in the households annually.
- **The woodchip-fired boiler has an installed thermal capacity of 550 kW**
- Heat produced in a year: about 850,000 kWh from October to April, which corresponds to 20 % of the yearly heat demand.

# Bioenergy Village Jühnde

- **Village heating grid**
- Heat supply in a year: about 4,500,000 kWh with a water temperature of about 80 °C and a pressure max. 4 bar.
- About 5,500 m of pipes (4,000 m main pipes)
- 144 households connected.





# Community based RE in Thailand

- Ownership
  - Inclusion of local people: planning, finance, operation, maintenance,...
  - Local interests, business...
  - Local responsibilities
  - Proud of local energy production
  - Capacity building
  - Local infrastructure: electricity, heat grids, streets
- Local planning
- Sustainable plant operation
- Local finance
  - Often challenging
  - Support by several institutions, see <http://biowaste-to-biogas.com/>

# Conclusions

- The energy transition in Germany shows that RE can be the basis for energy production within a decade
- Community based RE are key to the energy transition
  - Involve many stakeholders
  - Creation of local added value
    - jobs
    - business
    - rural development
    - finance => participation in value chains
  - Acceptance and motivation by the citizens
  - Energy independency

Thank you for your attention!

