

Please, in My Backyard:

How renewable energy cooperatives advanced citizen involvement in the German energy transition

by Andreas Wieg



About the Author

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1. Preface

In the last two years I have participated in two public speaking tours through New England and the Midwest of the United States at the invitation of the Heinrich Böll Foundation. In numerous meetings I had the opportunity to speak with politicians and policy makers, representatives from government agencies, public authorities and energy utilities, and with cooperatives and different grassroots organizations. Thus, I have been introduced to the discussion in the United States regarding renewable energy.

During the meetings I was often asked whether I can give advice about how to transform a national energy system. What can the United States learn from Germany's energy transition? Would it work in the U.S.? What would be the right way to do this? To come straight to the point, there is no easy way to copy and paste success stories from Germany, given basic legislative and regulatory differences in the U.S. However, there are some important lessons that other countries can learn from Germany's experience. I believe the most valuable lesson is the importance of citizen involvement as owners of renewable energy production. In the following article I will describe how renewable energy cooperatives have helped German citizens realize the economic benefits of renewables and how cooperatives have fostered public acceptance of the energy transition. I will also address associated cost developments of energy prices and tell the stories of three typical renewable energy cooperatives in Germany that I feel best demonstrate the importance of citizen involvement in a national energy transformation.

2. Energiewende: The meaning of energy cooperatives

The German government has set ambitious targets for the energy sector. Currently, the share of renewables in electricity generation has increased to 23% in 2012, the aim by 2020 is 35% while phasing out nuclear power by 2022. By 2050, the renewables share is planned to surpass 80%. The transformation of the energy system is already a success for a substantial part of the German economy. The switch to renewables has created new market opportunities for many German companies. They have established a strong competitive position in the global market for green technologies in different businesses. Moreover, many craftsmen, small and medium sized service companies, and regional banks benefit from this development. To date, 378,000 Germans have been employed in the renewable energy sector.

The expansion of renewable energies leads to fundamental changes. Wind turbines, photovoltaic systems on roofs or farms with biogas plants are visible indicators of this development. However, the Energiewende is fraught with challenges. One of these is the opposition by residents to renewable energy plants in their neighborhoods, especially to wind turbines and biogas plants. The vast majority of the German inhabitants are in favor of the Energiewende, but if asked directly, most of them would say "please, not in my backyard".

Another challenge is the increase of energy costs due to the switch of the energy system. Currently, private households and small companies cover the costs of the expansion of renewables because the feed-in tariff that supports these projects is financed by

energy consumers. Many energy-intensive companies have been exempted from the apportionment of the renewables' "roll-out costs". For most people it's not the amount of the cost – even if the private consumption of energy is substantially lower than in the United States – it's the fair distribution of costs and benefits of the energy transition. This cost-value ratio and the NIMBY problem as stated earlier are why it is important as a citizen to be involved directly in the energy transition.

The Energiewende is still popular among German citizens. One important reason is the decentralized character of renewables. That gives every citizen the opportunity to make an active contribution to the transformation of the energy system. They can invest in their own facilities or participate in community projects. In recent years, hundreds of thousands of people came together in numerous citizens' groups, local councils and regional businesses to establish common renewable energy projects, especially renewable energy cooperatives.

The main reason behind this development was the Renewable Energy Sources Act, more precisely, the establishment of a feed-in tariff and priority access to the grid for renewables. The law allowed every citizen to invest in one's own renewable energy plant. The grid owner became obliged to purchase electricity

from the owners of solar panels or wind turbines. Private investors received a fixed price over 20 years – guaranteed by the government – which made the investment easy and safe. Important is that 47% of the total investments in green energy were made by citizens, while only 12% came from the big energy utilities¹. That is why the owners – the citizens – care as much about the roll-out of renewables as they do about their energy bill.

To sum up, the broad support for Germany's Energiewende is a result of the wide spread ownership of renewable energy production. Many citizens like to get involved in energy projects, especially in their neighborhoods. But the motivation is not just to earn money (see figure 1). They want to be a part of the whole development. And this possibility is not just confined to wealthy investors. That is the point where cooperatives come into play. That is to say, community energy projects and renewable energy cooperatives give every citizen the opportunity for ownership. In this respect, energy cooperatives organized by citizens, farmers and enterprises play an essential role in winning acceptance for the energy transition.

¹ <http://www.unendlich-viel-energie.de/de/detailansicht/article/4/buerger-sind-treiber-der-energiewende.html>

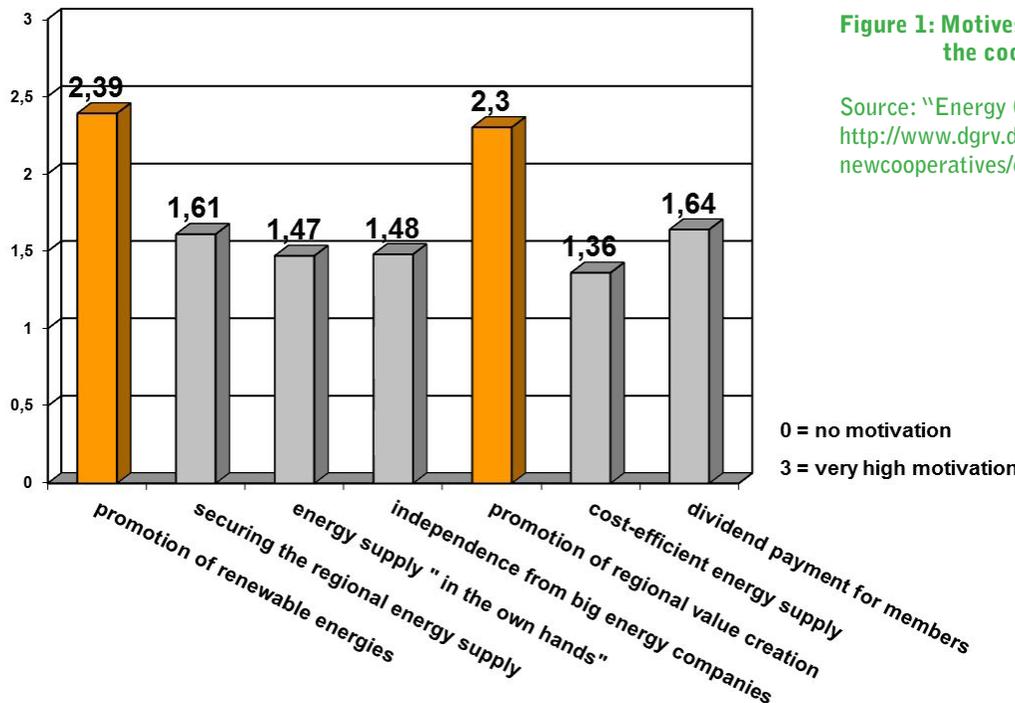


Figure 1: Motives for the foundation of the cooperative

Source: "Energy Cooperatives" by DGRV, <http://www.dgrv.de/en/cooperatives/newcooperatives/energycooperatives.html>

3. Facts and figures

The number of renewable energy cooperatives has increased enormously in recent years². Since 2009 over 100 new cooperatives have been founded each year and the number is still increasing (see figure 2). In the year 2012 alone 150 energy cooperatives were set up. Currently, 150,000 members hold shares in 700 renewable energy cooperatives across Germany. 90% of the members are private citizens. Most of them participate with small amounts [average shareholding 3,000 Euro (\$3,900)]. However, anyone can participate in an energy cooperative with small shares. They have already invested around 1.2 billion euros (\$1.56 billion) in community power plants and they already produce around 580 million kilowatt hours of clean power. This is equivalent to the annual electricity requirements of 160,000 households which means that new energy cooperatives already produce more electricity than is required to supply the households of all their members.

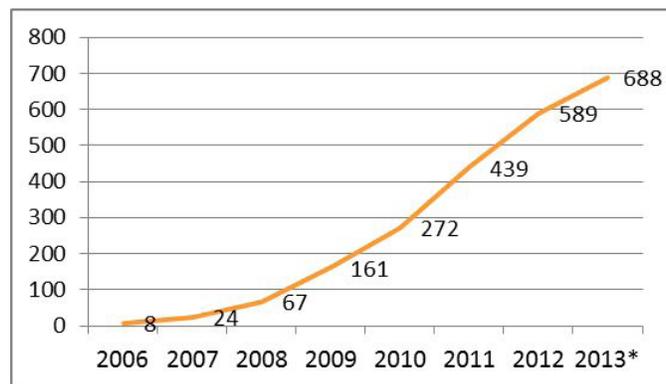


Figure 2: Foundation of energy cooperatives (accumulated)
* Sept. 2013

Source: <http://www.dgrv.de/en/cooperatives/newcooperatives/energycooperatives.html>

New energy cooperatives operate with a high equity ratio of around 50 percent. Citizens are keen to participate in the energy transition with their own money and to support the regional added value. Photovoltaic cooperatives, for example, enable many citizens to make a modest financial contribution to developing renewable energies in their own local

² <http://www.dgrv.de/en/cooperatives/newcooperatives/energycooperatives.html>

area. Solar energy plants are often launched jointly by communities, public institutions, local service companies and regional banks. Cooperatives facilitate the collective commitment of various local players and bring together broader social, business, municipal and environmental interests. Mostly these plants are installed and maintained by craftsmen based in the region. So the regional added value is strengthened too, which increases public acceptance even more. Cooperatives also run district heating systems and electricity grids. In the following chapter three typical cases of renewable energy cooperatives will be presented.³ Their stories tell us how to create regional added value with renewables, how to achieve acceptance for renewables and how to develop a renewable energy system at lower costs.

4. Solar Energy Cooperative: Boosting regional value added

What can we do locally to engage in Germany's energy transition? And how can environmentally friendly and sustainable solutions contribute to regional development? "This is something we have to tackle together at a local level. The best option would be a cooperative", says Michael Diestel, board member of Friedrich Wilhelm Raiffeisen Energie eG (FWR). The founders of the cooperative consciously focused on the self-help approach of the German cooperative movement's pioneer Friedrich Wilhelm Raiffeisen. FWR was founded in June 2008 in the city of Bad Neustadt (Bavaria).

The cooperative provides citizens wishing to support renewable energy through modest financial investments with the chance to link up with like-minded people. This not only accumulates regional capital, but also legal and economic expertise. Not everyone has the necessary expertise and experience required for the construction and operation of such facilities.

An energy cooperative also motivates the owners of suitable rooftops to have photovoltaic systems installed. A farmer may toy with the idea of installing a system like this on one of his barns, but frequently the effort and risk required is too great to consider

³ [http://www.dgrv.de/weben.nsf/272e312c8017e736c1256e31005cedff/41cb30f29102b88dc1257a1a00443010/\\$FILE/Energy_Cooperatives.pdf](http://www.dgrv.de/weben.nsf/272e312c8017e736c1256e31005cedff/41cb30f29102b88dc1257a1a00443010/$FILE/Energy_Cooperatives.pdf)

going it alone, especially if the project is likely to entail considerable investments additionally to his farming ones. The investment would also involve administrative and insurance costs. These responsibilities are more easily and more effectively handled in a cooperative context. In this respect cooperatives offer a major advantage in that they can tap into the potential of sites to which private individuals would never gain access on their own. "In rural areas there are plenty of unused rooftops. Lots of churches, supermarkets, farm or community buildings could be fitted out with solar systems", Diestel says.

The owners of these rooftops can either allow the FWR to use these areas for free, or rent them to the FWR, even if they themselves do not wish to be financially involved. The FWR's first photovoltaic system was installed on roofs belonging to the Bad Neustadt municipal works yard in November 2008. Its peak capacity is 270 kilowatts and it will be producing an estimated 235,000 kilowatt hours of electricity per annum. The average annual electricity needs of 60 private households can be covered by a facility of this size. With a service life of 20 years, the system will save approximately 4,150 tonnes of carbon monoxide (CO₂).

Those who invest 4,000 euros (\$5,200) in the facility contribute directly to the production of green electricity in an amount approximate to that which they consume annually in their own home. Overall nearly 1.1 million euros (\$1.43 million) have been invested in the project. Two thirds have been financed by loans and one third by equity. Every resident is entitled to be involved in the energy project, the minimum share in the investment being 2,000 euros (\$2,600). Based on a conservative estimate of electricity yield, the effective interest rate of this investment will be 5.5 percent per annum.

The production of renewable energy is also intended to support the region. "Our motto is to use local resources and feed the profits generated back into the local community and for the benefit of residents", explains Diestel. Accordingly, local craftsmen are responsible for installing and maintaining the technical facilities. A regional bank provided the loan. The shares in the solar system too were offered first to Bad Neustadt residents, then to residents in the outlying area, and only then to investors from outside the region. The community also benefits from additional trade tax income.

Boosting the region's profile is also central to a project in Großbardorf, a town in northern Bavaria, where a photovoltaic facility is financing the roof of the local soccer team's home playing field. The German Football Association (DFB) requires covered seating in the stadiums of the teams in its upper divisions. The home team, TSV Großbardorf, faced a dilemma when it qualified for upper division play: Who will pay for the roof over the stands? The solution came from a local energy cooperative, who offered to rent the rooftop after it was built and use it as an energy-generating location by installing solar panels. Even after paying the rent for the rooftop, the cooperative is able to make a financial return on its investment, which is in addition to the season tickets each member of the cooperative receives in return from the team. So, in the end, the entire community wins: the fans, the team and the environment.

5. Wind Energy Cooperative: Solving the NIMBY (Not-in-My-Backyard) problem

In Germany, many people support the expansion of renewables. But whenever an energy project is planned right outside someone's front door, consent can start to disintegrate. Wind power in particular is unpopular with residents in many regions. In southern Hesse a cooperative was founded to counter the NIMBY problem.

"If you've got to look at it, you might as well get the benefit", says Micha Jost, board chairman of the Starkenburg eG energy cooperative. Jost had long been committed to the idea of using a cooperative to run wind turbines, which entail a lot more financing, planning and construction effort than solar systems. The first cooperatively owned wind turbine was a chance affair: financing was still needed for a wind farm which had already been approved near the community of Seeheim-Jugenheim.

Two wind turbines had been planned on a small hill called "Neutscher Höhe" for some time. "Public opinion in the direct vicinity was clearly against the project and the local newspapers too were very lukewarm", explains Jost. But as soon as the residents of the neighboring communities – Seeheim-Jugenheim, Modautal and Mühlthal – got the opportunity to invest in the new wind energy cooperative, acceptance for that project began to increase: 230 residents from the region have since invested in the wind turbine. Almost

half of them are people who live in its direct vicinity. Finally, the wind turbine was entirely financed by equity, that is to say, by the money of the residents.

The energy cooperative was founded in December 2010. "In the first place, we are keen to involve the people who live close to the project sites", continues Jost. "We particularly want to target those residents who either didn't own their own property or had no funds to install a system of their own. Since the focus from the outset was on wind energy – which requires a comparably high level of equity – we deliberately opted for a regional approach. The idea was to reach as many people as possible in many different villages. "We were extremely surprised by how much private capital there proved to be in the region and by the willingness of people to invest in their own new cooperative", reveals Jost. The funding volume for the wind turbine is 3.5 million euros (\$4.55 million).

On 30th July 2011 on the Neutscher Höhe, a ground-breaking ceremony was held for the first wind turbine. Every year the turbine will generate some five million kilowatt hours of electricity. Statistically speaking this is enough to supply 1250 households with their annual electricity needs. The facility will save some 2,800 tonnes of CO₂ per annum.

Another aspect of the cooperative's philosophy is the conservative nature of its calculations: Jost says, "we would rather guarantee people a little less than disappoint them later – if the return on investment doesn't turn out to be as high. Since we all live in the area, that's really the only option anyway." The cooperative is not the place to make a fast buck. Any involvement represents long-term and sustainable investment in renewable energy – while being an incentive for members to address the topic at a local level. To become a member, you only need to purchase two shares at 100 euros (\$130) each.

A short summary of coming energy projects is published on the cooperative's website.⁴ Interested parties can request a brochure featuring a comprehensive description of the project. Those who are serious about investing can then register their interest, stating how much they wish to invest. If there is sufficient interest, the paperwork – that is, the membership application and loan contract – is dispatched to make involvement in the project official. "This enables us to attract interested parties to our projects step by step. We want

people to track the projects and their progress over years", Jost sums up.

6. District heating system: Low energy costs through cooperation

Autumn 1997: In Lieberhausen, a satellite of Gummersbach in the Rhineland, the board of the village association was holding a meeting. The community was planning to update its sewage system. The discussion centered on whether the opportunity could also be used to install a new heating system based on renewable sources. But how do you get from a freshly dug ditch to an energy supply for the entire village? Where do you start with such a project?

"The first step was to approach our regional utility" recalls Bernd Rosenbauer, chairman of the Lieberhausen eG energy cooperative. "We asked how much the construction of an environmentally friendly heating system would cost each resident. When we heard the price, we dismissed the idea immediately." Each household connection would cost approximately 12,000 euros (\$15,600). Another way had to be found if the original vision was not to simply disappear. So it was important to get the residents of the community of Lieberhausen actively involved.

A feasibility study was conducted – and the project was approved at the very next annual meeting of the village association. At least 40 households would need to take part for the system to pay off. To the surprise of the initiators, 42 households agreed to be involved, although the calculated energy price was more than the current cost of their own oil heating. But even then, it was obvious that the price of fossil fuels was going to continue increasing. "Our neighbours reached a very rational decision. All those involved agreed that this wasn't about a political debate, but about the common future of our village", explains Rosenbauer. These days, 92 of a total of 108 houses in Lieberhausen are connected to the local heating network.

In April 1999 the Lieberhausen eG energy cooperative was founded as the body responsible for the heating plant and district heating system. "The villagers themselves needed to have a direct say – after all we wanted to get everyone actively involved. A project by residents for residents, where no-one could come from outside and tell us what to do", continues Rosenbauer. Thanks to the villagers' own initiative, they saved

themselves a great deal of money during the planning, construction and operation of the plant.

The bio-heat is generated by a woodchip-fired heating plant, fed by material from local forests. The idea was Rosenbauer's, who had asked himself ever since he was an apprentice forester whether it wouldn't be possible to change from oil to wood as a source of energy. Lieberhausen has proved that this is possible. In the run-up, several residents were worried that the local forest would have to be felled to provide enough wood for the plant. But that is not the case: enough wood is made available from the region's forests by regular forestry maintenance.

The members bought shares in the cooperative to the tune of 90,000 euros (\$117,000). The cooperative fee for each member was set at 1,050 euros (\$1,365), and an additional network fee of 1,500 euros (\$1,950) also had to be paid. Each house connection cost approximately 3,000 euros (\$3,900), meaning that each household had to invest a total of 5,500 euros (\$7,150) in the project. The network enables a family living in an older property to save approximately 1,000 euros (\$1,300) a year in energy costs – by the sixth year, the plant has already started to pay its way.

Thanks to the dedicated involvement of the Lieberhausen residents, it was possible to complete the project swiftly and affordably. They spent more than 5,000 hours assisting voluntarily in the construction of the plant, and dug the ditches for the pipeline connections to the houses themselves. Much of the plant operations and accounting are also in voluntary hands. In addition, the furnace needs to be cleaned every three months – this work is also done by the members. This keeps running costs down and strengthens the sense of community within the village.

And now the villagers of Lieberhausen receive visits from other interested villages and interest groups. The transfer of knowledge and the preparatory planning for other villages represent additional sources of income for the cooperative. The village guesthouse and B&Bs are delighted by the influx – almost 600 groups of visitors have been recorded to date.

7. A brief summary

There are many challenges facing Germany's Energiewende – issues like legislation, financing, adjustment of energy supply and demand, supply security, or affordability. On the other hand, many opportunities are presented by a sustainable, decentralized renewable energy system. The move to a new energy era is always a learning process, during which it is important to involve and integrate the people on-site. The energy transition is not just a complex change in technical and economical issues. It always presupposes a change in the behavior of the people, too. This change in behavior is the proof of the cooperative concept's impact. The self-help principle of the cooperative and the benefits of ownership to each member have bred the popular acceptance of renewables in Germany and motivated individuals to change their behavior. It's not just the financial benefit. People get to own a piece of the energy system and be a part of the whole project. That's why members of renewable energy cooperatives are no NIMBYs. They welcome the energy transition into their backyards.

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