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Lekha Sridhar

Citizen Energy and Public Participa- tion in Germany's Energiewende

Lessons for developing countries

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Background

The conclusion of the 21st Conference of the Parties to the United National Framework Convention on Climate Change in December, 2015 began a new chapter in climate change mitigation and adaptation measures. For the first time, even developing countries accepted a level of responsibility with measures like forest conservation, renewable energy development and energy efficiency. Not only is it extremely important to ensure that developing countries are involved right at the beginning if the world is to remain under 1.5 C temperature rise, but it is clear that developing countries must, at least for some part, take on leadership and fine innovative solutions from the domestic sphere.

In no other sphere than climate finance has this become such an urgent imperative, fomented by the continuing lack of clarity on financial support from developed countries toward this goal. One estimate places the cost of India's Nationally Determined Contribution to be approximately USD 2.5 trillion between 2015 and 2030.¹ With the entirety of the Green Climate Fund amounting to USD 100 billion by the year 2020², it is clear that there is the need for countries like India to attract private investment to achieve their goals.

On this front, the Indian government's policy focus has been on attracting foreign investors through an international solar alliance. On the domestic front, it has further incentivised investment in solar and wind energy through policy measures like accelerated depreciation, renewable purchase obligations, solar auctions and subsidies. However, the one factor entirely missing from these policy measures are 'people'. That is to say, private individuals and citizen groups. While there is a target of achieving 40GW by 2022 from solar rooftops, the measures to encourage this has been minimal. One survey conducted in 2010-11 found that while enthusiasm for renewable energy was high, actual knowledge about its functioning was very low.³ It is clear that there is a need for policy measures that will, not only educated the population about renewable energy and carbon emissions, but also involve citizens in the generation of energy and the larger conversation about the future of energy in India.

This paper will examine what factors can support increased public participation in renewable energy in developing countries, using India as an example by drawing from the case of German energy cooperatives. Specifically, it will look at if and how German cooperatives have been successful contribution to renewable energy and what lessons can be drawn from their experience for India. The paper is based on existing research papers in the field as well as interviews with persons in the solar energy sector.

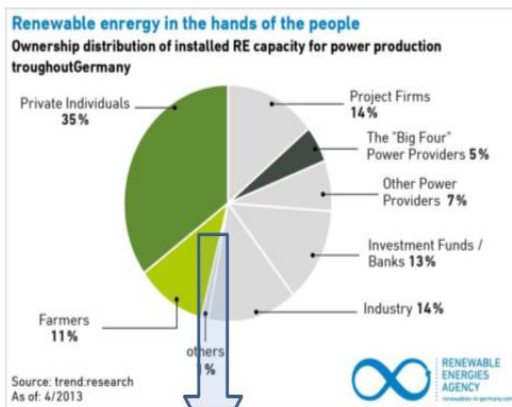
1 See: <http://justclimateaction.org/FAQ.pdf> (last request 12 April 2016).

2 See: <http://www.greenclimate.fund/contributions/pledge-tracker> (last request 12 April 2016).

3 See: <http://mercomcapital.com/MercomIndiaREAwarenessSurvey.pdf> (last request 12 April 2016). It should be noted that even though the survey is well over 5 years old now, it is still relevant as there has been no targeted renewable energy education drive in the country to create a massive change in awareness.

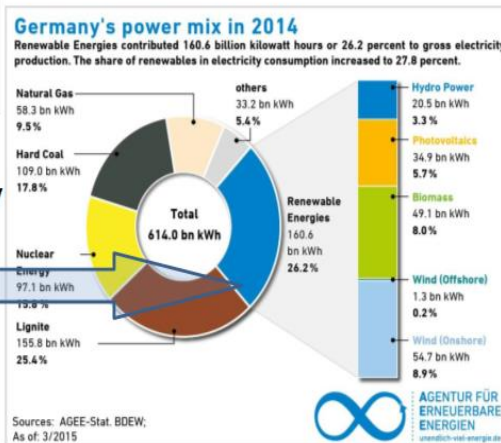
1 German citizen energy groups: A case study

The German Feed-in Tariff system of incentivising renewable energy production and making the so-called “alternative” sources of energy competitive with fossil fuels has been credited with not only spurring a global upswing in renewable energy investment and technical improvements, but has also inspired similar legislations the world over. Today, around 12% of all energy production and 46% of renewable energy production comes from individuals and citizen groups. This does not include other forms of citizen involvement—such as grid operation and funding new technologies that have been taken on by citizen groups. One estimate places climate finance from private households to amount to EUR 9.9 billion (which is 38% of all climate finance)⁴.



By 2010: Private households invested €9.9 billion (38% of total RE finance).

12% of all electricity generated in Germany is citizen energy.



Sources: AGEE-Stat. BDEW (as of: 3/2015)

This is a vast and potentially untapped source of climate finance for developing countries. Undoubtedly, there are major differences between a country like Germany, where the average annual income is higher and the population is more educated about climate change. However, as this case study will show, it is possible to develop a viable model from German citizen energy groups and cooperatives that is not only suited to developing countries, but may also fill the

4 Climate Policy Initiative, *The Landscape of Climate Finance in Germany*, November 2012.

present policy gap in increasing renewable energy uptake (in this specific case, India).

1.1 'Citizen energy' defined

Bürgerenergie, or citizen energy is a phrase used to describe formal, financial and political participation by citizens. The „Definition und Marktanalyse von Bürgerenergie in Deutschland“, a study conducted by the Leuphana Universität covers the various forms that citizen energy takes. This text includes both direct participation (i.e. Cooperatives and community energy parks) which are bottom-up schemes and also indirect participation (i.e. Community shareholding in a solar park) which is top-down as well as municipal body participation (as a representative of citizens). The essential characteristic that is common to all is that citizens are no longer mere consumers, but are participants in the generation and supply of energy. Some examples of the usage of citizen power include (translated from German text)⁵:

- Citizen participation model ([local] citizen participation scheme) and citizen power plant;
- Civil wind farms (citizen-owned wind farms; local citizen windfarms), civil wind farms, solar plants and citizens Citizens Solar Parks;
- Bürgerenergie-, Bürgersolar- or citizens photovoltaic cooperative;
- Participatory Business Scheme;
- Community ownership, community energy or community power, especially with regard to wind energy (wind community, community-owned wind), co-operative ownership and wind cooperatives (co-operative wind);
- local ownership and local investment;
- Grassroots power;
- Employee and customer participation;
- Community facilities;
- Mutual funds.

Of these, one of the interesting forms of participation is the energy cooperative. The term 'cooperative' is used in many senses in different countries. It refers to a specific legal form of a body corporate. AS per the International Cooperative Alliance, it is "an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise."⁶ The primary feature of a cooperative is that, no matter the percentage of contribution by a member, each person only gets one vote. This makes the organisation democratic and suited to ensuring that financial contributions alone do not silence other voices.

In Germany, one of the pioneering countries of the cooperative movement,

⁵ Leuphana Universität, „Definition und Marktanalyse von Bürgerenergie in Deutschland“, 2013: p. 14-15.
⁶ See: <http://ica.coop/en/whats-co-op/co-operative-identity-values-principles> (last request 12 April 2016).

its birth is owed to Friedrich Wilhelm Raiffeisen (1818-1888). The purpose behind the movement was twofold: (1) What one person cannot do, a group can do together; (2) Creditworthiness as a group. Even though the farmers in the region where it began were extremely poor, they did own one thing: land. Using land of all the farmers together as collateral against individual loans, farmers were able to seek credit from banks, as opposed to loansharks. This belief in self-dependency within the village or the region as well as the idea of creating value as a group remains the cornerstone of German cooperatives even today.

1.2 Highlights from the German energy cooperative movement

Feed-in tariffs, along with priority access to the grid (an underrated but hugely important provision) have not only increased the share of renewable energy in Germany's energy mix but have also been responsible for the worldwide reduction of PV prices. Till recently, Germany had been the leader in PV deployment (only to be dethroned by China this year). The most important component of FITs is the democratisation of energy which has always been an oligopoly.

The growth of cooperatives has been attributed to amendments to the Renewable Energy Sources Act in 2004 and 2008 that ensured Feed-in Tariffs (FITs) and priority access to the grid for renewable energy sources, as well as other factors to a lesser extent like a fall in solar PV prices and changes to cooperative establishment laws in 2006⁷. From 2008 to 2014 the number of new cooperatives established has been exponential. There are nearly 900 renewable energy cooperatives in Germany today.

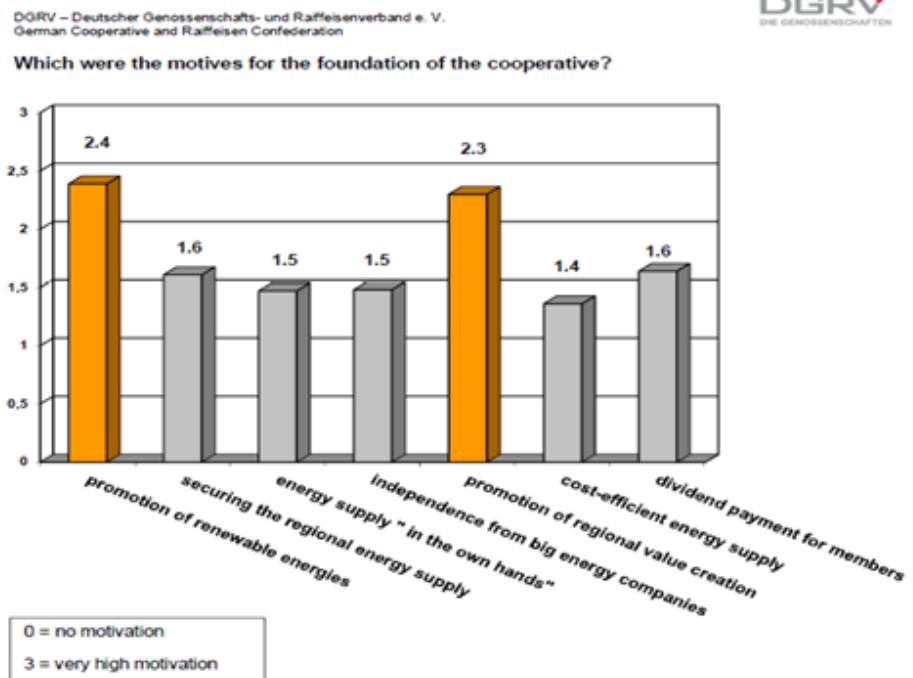


Source: Klaus Novy Institut (as of 1/2014)

⁷ Certain changes to the law were brought about in 2006, including the admission of "investing" members, changes to minimum capital requirements, the simplification of the formal accounting etc. with the aim of increasing ease of doing business for cooperatives.

While the easy explanation for the growth of cooperatives is the Feed-in Tariff policy, it is clear that they do not provide a sufficient explanation. After all, FITs have been in place since much earlier and the necessary legal amendments for ease of doing business for cooperatives came two years before the sudden increase. Instead, a better way of looking at it might be analysing the reasons for people founding new cooperatives.

The Deutsche Genossenschaften und Raiffeisen Verband (DGRV), an umbrella organisation that represents all cooperatives (including non energy cooperatives) that regularly conducts surveys of cooperatives, found in its 2012 study⁸ that the mere idea of making money or ecological considerations were not the primary reason for people founding cooperatives.



Source: DGRV (2012 Annual Study)

Instead, promotion of renewable energy and regional development were the primary reasons for their growth. A look at statistical data of cooperatives makes this obvious. Apart from a few grid operation based initiatives like the Greenpeace coop and the Berlin coop, the backbone of the energy cooperative movement has been from villages and small towns. It is essentially a rural development movement for creation of value, co-benefits and tax returns from renewable energy for the local governments.⁹ It points to the lack of new opportunities in rural areas, combined with the availability of FITs and of course, the well-used form of the cooperative as the primary driver of renewable energy deployment by cooperatives.

8 DGRV 2012 Energy Cooperatives Survey: http://ica.coop/sites/default/files/attachments/DGRV_Kappes_Paper%20on%20RE%20Coops_10_2014.pdf (last request 12 April 2016).

9 See: https://us.boell.org/sites/default/files/downloads/Bilek_EnergyCooperatives.pdf (last request 12 April 2016).

That is not to say that other factors like energy independence and climate change are not good reasons, indeed, the primary motivation for many significant cooperatives have been exactly this as will be enumerated in the following section.

1.2.1 Cooperatives for Regional Development: Friedrich Wilhelm Raiffeisen Energie eG

Started in 2008 in the village of Bad Neustadt in Bavaria, the FWR Energie eG is the quintessential energy cooperative. The concept behind this cooperative is the "church spire" model, i.e. investment in RE projects were sought only from within the village, and if sufficient funds were not collected, then the membership is opened to the surrounding area and then the district. The belief, according to Michael Diestel¹⁰, one of the directors of the cooperative is simply that people who belong to the area should be the ones to invest, as opposed to people in faraway cities or elsewhere, as the local people should have the primary say in where the profits are invested and how projects are developed. While one could easily raise funds from outside the town where pockets may be deeper deeper, he believes that the last word on the use of profits will always end up with the outsiders who will want more dividends rather than creating more value for the village. After all, it is their village and the profits generated from the resources of the village should stay there. He also alludes to the idea of "my" energy, a pride that people have in generating and using the energy they have generated from the village (even though obviously one electron cannot be distinguished from another!) is also a powerful motivating factor.

FWR was among the first cooperatives that were established at the beginning of the cooperative boom in 2008. They experimented with different forms of association before settling on the "eG"¹¹ form. The first project of 1 MW peak had 35 farmers cooperating and was not in the form of the eG, but a "GmbH and CoKG"¹². The lesson learnt from the first project was that it created a 'closed' structure and was exclusionary. As a result, the later form of the cooperative differentiated 'membership' from projects. That is to say, every time a new project was announced, it was open for new members to join in (each project would have differing return on investment and interest rates, depending on size, location, viability). The contribution was divided into a portion going toward membership share and the remaining as a subordinated loan toward the specific project. In this manner, both big and small-sized projects were able to be realised while also ensuring that there was no inequality among neighbours. The cooperative was also able to increase its expertise, both in the business model of cooperatives and also renewable energy. As a result, they were

¹⁰ Interview with Michael Diestel, director of the FWR Energie eG at Bad Neustadt on 11.11.2015. More information about the cooperative can be found here: <http://www.raiffeisen-energie-eg.de/index.php> (last request 12 April 2016).

¹¹ The *eingetragene Genossenschaft* is the form of a registered cooperative society as defined by the law.

¹² The *GmbH & Co.KG* is a limited partnership (KG) in which the general partner (Komplementär) is a limited liability company (GmbH). The GmbH is fully liable for the GmbH & Co. KG's debts and liabilities. The liability of the limited partners (Kommanditisten) is limited to their respective share of the partnership capital. For full description, see: <http://www.gtai.de/GTAI/Navigation/EN/Invest/Investment-guide/Establishing-a-company/Company-forms/Partnerships/gmbh-and-co-kg.html> (last request 12 April 2016).

able to combine projects and use local content and resources to reduce overheads.

In this manner, Diestel estimates that apart from the small profits realised by the individual members, the local government earns around €20000 in taxes per project (dependent on the size). Other villages like Feldheim and Juehnde who have the title of "Bioenergiedorf" have even parlayed this income with tourism from groups across the world.¹³

To Diestel, the success of FWR is partly because of the reliance placed on the Renewable Energy Sources Act and the law on cooperatives, but mostly because it is a local organisation for the local people. Equally, since the German cooperative law allows for separate category of "investing members" (such as banks) whose powers are limited to one vote, regional development can remain the focus of these village-based cooperatives.

1.2.2 Cooperatives for Energy Independence and Climate Action: Berlin Buerger Energie and Greenpeace Energy

The history of citizen energy in Germany is not fully explained with the Feed-in Tariff law alone. Indeed, one of the first movements toward renewable energy started in the small town of Schönau, in Baden-Württemberg. In 1997, in the years after Chernobyl, the residents of the town were tired of the indifference of the energy suppliers so they got together and bought back the grid. Following the liberalisation of the grid, the grid could supply energy across Germany. Today, ElectricitätsWerke Schönau is one of the largest renewable energy suppliers in Germany with around 130,000 users.¹⁴

This anti-nuclear movement proved to be an impetus for renewable energy. While it is not correct to say that renewable energy only grew due to the anti-nuclear sentiment¹⁵ but the attention brought to the safety issues of nuclear and the availability of alternative energies created a strong movement. Schönau was depicted as the "David versus Goliath" of Big Energy.¹⁶

Within a few years, Greenpeace Energy, a cooperative promoted by the environmental non-profit, Greenpeace was established and started supplying energy to its customers by the year 2000. The decision to set up the cooperative was strikingly simple: after the liberalisation of the grid, Greenpeace conducted a campaign to get thousands of people to pledge to "power switch", or, to switch to a supplier of renewable energy. However, none of the existing companies met the criteria of supplying renewable energy. As a result, Greenpeace decided to set up a cooperative to fill this gap in the market. They started small, with only 186 customers, but today, the cooperative has 23000 members, most of whom are also consumers with membership shares costing only €55. Their sub-

¹³ News Report: Germany Struts its Renewable Stuff (13.06.2014): <http://energytransition.de/2014/06/germany-struts-its-renewable-stuff/> (last request 12 April 2016).

¹⁴ See: http://www.ews-schoenau.de/fileadmin/content/documents/Footer_Header/2012-03_presentation__EWS_english_.pdf (last request 12 April 2016).

¹⁵ There were already a few towns exploring renewable energy prior to Schönau; indeed, there were already some policies in place to encourage RE investment.

¹⁶ The Atlantic Times, „Peaceful Rebels: How a Small Town in the Black Forest Opted out of Nuclear Energy“ (Nov 2008): See: <http://brilliant.com/Schonau.html> (last request 12 April 2016).

sidiary, Planet Energy, is involved in energy generation and is also funding research and development of new technologies.

Unlike FWR or even Schönau, Greenpeace does not have a regional focus; they are intent on changing the meaning of energy status quo in Germany. Their discourse is around climate change and social action: as a result, their main membership base comes from Greenpeace supporters and people who are interested in ecological issues.¹⁷ The organisation rests its success on its total transparency in its motivation and financial workings but also its model of marketing to people, i.e. giving people a channel to participate in climate action and passion for being a producer of energy.

While the battle against nuclear energy succeeded in the form of the nuclear energy phaseout in Germany, there are new wars to be fought. Primarily, it is the inertia of Big Energy in making the switch to renewables and the worryingly large share of coal in German's energy mix. A 2015 survey found that an overwhelming 93% of the country believes that renewable energy growth is important and only a third of the country feel that the costs are too high.¹⁸ However, as is already apparent, this sentiment is not reflected by energy suppliers. As a result, the new cooperative Bürger energie Berlin believes that re-municipalisation of the grid is the only way to give the people what they want.

BEB was founded in 2010-11 by its members because there was no public debate about whether Berliners were satisfied with the status quo situation with the electricity grid operator, Vattenfall.¹⁹ Vattenfall is one of the biggest energy companies in Germany (with interests in coal) and has been the status quo grid operator. However, with the contract with the city expiring this year, BEB decided to raise the funds from individuals in Berlin and submit a bid to "re-municipalise" the grid. For BEB, the cooperative form is important, as it gives the citizens a direct voice and ability to participate in their energy future, as opposed to a representative form of participation (through a municipal government). Currently, they believe that there is no transparency and accountability in the electricity supply but people should not have to accept this status quo. There has been huge public support for the campaign, even from some parts of the political establishment. While many of the supporters are from the eco-minded people who want more climate action, there has also been participation from everyone including students and the elderly.²⁰

With the success in Hamburg for re-municipalisation, many people think that this is not an impossible goal. While the decision on the grid operation bid is still to be made (which, in itself is seen as a success by many) the important factor for BEB is that the public eye has been turned to this debate while, a few years ago,

17 Based on Interview with Christoph Rasch, Press Officer for Greenpeace Energy (26.10.2015). More information about Greenpeace Energy can be found here: <http://www.greenpeace-energy.de/genossenschaft.html> (last request 12 April 2016).

18 Energy Transition, „German Support for Renewables High, Low for Nuclear and Coal“ (22.11.2015): <http://energytransition.de/2015/09/german-support-for-renewables-high-low-for-nuclear-and-coal/> (last request 12 April 2016).

19 Based on interview with Arwen Colell, founding member of BEB. More information on BEB can be found here: <http://www.buerger-energie-berlin.de/> (last request 12 April 2016).

20 That said, Colell stated that there is a higher concentration of older, higher-income people. The cooperative is mindful of income inequality and representation issues and have committed to keeping the financial barrier low enough to ensure a diverse representation.

Vattenfall would have had the contract renewed without any discussion or media attention. Now, this debate is happening on an international stage (several media outlets outside Germany are following the discussion) and any decision taken by the city government will be scrutinised accordingly. This is especially significant for India since there is strong support from the government and many sectors of Indian society toward privatisation of public utilities and companies.²¹

Organisations like Greenpeace, EWS and BEB are the next necessary stage in RE development. With the reduction of state-support for renewables and traditional firms doubling down on fossil fuels, cooperative-run grids can create a wider market for RE while also giving citizens a direct voice in energy policy.

1.3 Inherent defects in the cooperative model

There are many defects to cooperatives as a mode of private investment in renewable energy. These defects are especially relevant for developing countries:

- The recent experience in Germany has shown that investment in cooperatives is heavily dependent on a favorable policy climate, as they are not yet competitive. In 2014 there was a sharp drop in the number of new cooperatives formed²², because of the new changes to the Renewable Energy Sources Act that took away some of the benefits to FITs and also because of increased financial regulations. Even investment from existing cooperatives has been much lower than previous years.²³ Furthermore, the new policy of increasing solar PV through tendering rather than FITs has put cooperatives on an unequal playing field. Cooperatives and other small enterprises find it extremely difficult to compete with the tariffs offered by strategic investors. So far, in the three tenders that have taken place in Germany, and cooperatives were successful in the third tender.²⁴ Events like the Prokon aftermath²⁵ have shown that confidence in the market has weakened and there was an increased demand for investor protection which has greatly increased the financial burden on cooperatives. Since 2014, banks also require greater equity capital share from cooperatives before extending credit. The lesson here is that unless the government can guarantee

21 In fact, since the early '90s, several public companies and utilities have been privatised with varying degrees of success due to both internal pressure as well as by international organisations like the World Bank. The current government has promised further privatisation drives: <http://www.bbc.com/news/world-asia-india-29947726> (last request 12 April 2016)

22 According to a press release of the DGRV, new registrations of energy cooperatives fell by 60 percent in 2014. The reason was attributed to EEG amendments and also new regulation costs for financing to protect investors: <http://reneweconomy.com.au/2015/growth-of-energy-co-ops-slows-down-in-germany-43242> (last request 12 April 2016).

23 Willingness to invest has fallen by 70% among coops. See Renewables International, "Chilling Effect on cooperatives", (07.07.2014): <http://www.renewablesinternational.net/the-chilling-effect-on-energy-co-ops/150/537/80120/> (last request 12 April 2016)

24 While two individuals and two cooperatives were successful in the third tender, more than 2/3 of bides went away emptyhanded: See Renewables International, "Third PV pilot auction in Germany completed" (08.01.2016): <http://www.renewablesinternational.net/third-pv-pilot-auction-in-germany-complet->

[ed/150/452/92590?utm_source=newsletter&utm_medium=email&utm_campaign=Newsletter%20RIN%2020160114&utm_content=Third%20PV%20pilot%20auction%20in%20Germany%20completed](http://www.renewablesinternational.net/third-pv-pilot-auction-in-germany-complet-ed/150/452/92590?utm_source=newsletter&utm_medium=email&utm_campaign=Newsletter%20RIN%2020160114&utm_content=Third%20PV%20pilot%20auction%20in%20Germany%20completed) (last request 12 April 2016).

25 Prokon was a German renewable energy developer that sold "profit-participation certificates" to about 75,000 retail investors and later filed for insolvency: <http://www.ft.com/intl/cms/s/0/cbd86008-8394-11e3-aa65-00144feab7de.html#axzz40ftDPPIE> (last request 12 April 2016).

small investor protections and a consistent policy climate for a sufficient period of time to let the sector develop, the entire phenomenon could be a flash in the pan.

- That said, many cooperative in Germany are weathering the storm. Some cooperatives have merged while others are developing consulting expertise.²⁶ There is also a lot of cooperation among cooperatives to have greater political voice. Transformation from passive energy producer will be the key challenge for cooperatives in the coming years.

- Another challenge is that the profile of cooperative members tend to skew toward older male, university educated with higher-than-average income. Even though cooperatives tend to have a low financial barrier to entry, this lack of diversity in the sector shows that there is work to be done in becoming more inclusive.²⁷ Association of RE with people with higher than average income could become a harmful stereotype.

- Renewable energy, but especially decentralized energy rely on superior technology. They require grid stability, inverters, specialized safety mechanisms and an overall shift toward "smart grids". Currently in India, many states experience grid outages which would not only mean that the grid is supplied with lesser energy from RE but also that investors lose out on the money they could be making from supplying energy to the grid. This would mean that the Return on Investment would be very difficult to calculate and would not find any supporters.

- Finally, as with all social enterprises, the cooperative movement relies greatly on charismatic individuals. Many cooperatives are represented by the "face" of their organization who are also able to inspire and take on a large burden of running the organization. While cooperative members do, on average, tend to be engaged individuals, there is a need for leadership within the organization.

That said, the mistake would be to look at cooperatives as a "magic bullet" solution; instead they should be seen as a timely solution for ensuring public participation in the renewable energy discourse while also injecting much-needed private capital into the country's climate finance.

²⁶ Merging to form larger organisations was the coop response in Denmark as well. See: Gotchev B, "Market Integration And The Development Of Wind Power Cooperatives In Denmark Lessons Learned For Germany" IASS Potsdam Platform Energiewende, February 2015.

²⁷ Ö. Yildiz et al. "Renewable energy cooperatives as gatekeepers or facilitators? Recent developments in Germany and a multidisciplinary research agenda" *Energy Research & Social Science* 6 (2015) 59–73 (p. 64).

2 Lessons for Developing Countries: The case of India

Is 'citizen energy' relevant for countries where climate consciousness and renewable energy knowledge are not very high? Could citizen energy be a viable model for developing countries? While it is not possible to generalise across all developing countries, most low income and middle income countries are plagued by similar problems in the energy sector: poor infrastructure, difficulty in access to debt capital, regulatory hurdles (due to administrative red tape and corruption) and low information availability on climate change and renewable energy. That said, India is different from many developing countries in that, there is already a thriving market for photovoltaics (albeit, this is currently restricted to large developers) and there are several policy options floated by the government to encourage solar energy uptake. Thus, any renewable energy policy would not be operating at ground zero. Therefore, while this paper will be limited to an analysis of the relevance of German policies for India, it is possible to draw parallels to other countries to some extent.

2.1 The current Indian energy policy

The Indian government seeks to install 40GW of solar energy from rooftops alone by 2020. The details on how it intends to do so are thin. The budget as of now appears to be approximately €651 million and will primarily take the form of subsidies. Apart from subsidies from the Central government, the policy options are few. Electricity is controlled by the state governments and each state's electricity tariff and purchase of electricity is done by the state's distribution company (Discom). As a result, policy options and ground reality differ from state to state and this is the starting point for rooftop energy in India currently:

- Several state Discoms are heavily indebted and many do not have liquidity to buy sufficient electricity to meet the demand.²⁸ A part of the reason for this is that electricity can be highly subsidised, with the state government paying a significant share instead of passing on the cost to the consumer. As a result of this Feed-in Tariffs, even if introduced within these states would not be successful as the Discoms may be unable to actually repay rooftop owners for the power consumed.
- Most states have in place or about to introduce a rooftop solar policy. However, these policies are not based on the principle of FIT but of net metering (i.e. 'prosumer' concept).²⁹ Only five states in India have FITS (or gross metering

28 Deccan Herald, "Discom debt, a major cause of worry" (31.12.2015):

<http://www.deccanherald.com/content/520416/discom-debt-major-cause-worry.html> (last request 12 April 2016).

29 With net metering, the tariff for a unit of electricity is the same as the cost of buying a unit from the grid. So there is no real incentive to supply to the grid. It only makes sense for a consumer to supply electricity to the grid if the consumption and supply even out over the year. If the rooftop owner is only consuming a small percentage of the electricity supplied back to the grid, it may not make sense to install panels.

as it is called in India).³⁰ This means that the cost of buying and selling electricity is the same and any cooperative scheme would have to factor this into its business model.

- Despite worldwide reduction in solar PV prices, panels can still be very expensive for ordinary Indians. Some estimates place the price of a 5KW panel and system anywhere between €6500 to €9000 depending on the quality and reliability. This prices it outside the bracket of many Indians for whom it is a significant capital expenditure which they might rather spend on an automobile or other household goods.
- Even access to debt capital is difficult. The reason is twofold: first banks generally exhaust available debt capital for the renewable energy sector early in the year (and this too is largely available for strategic investors rather than individuals) and second, since renewable energy is still considered a risky sector, interest rates can be as high as 15-25%. This vastly increases the number of years for a return on investment to become unattractive to investors.
- Apart from the (limited) availability of subsidies, there are few other policy measures in place to encourage domestic, small-scale investors.
- Even if the necessary finance was available, lack of ownership and property title may prove to be a stumbling block.

2.2 Fitting cooperatives into the existing framework

If Indians are interested in investing in renewable energy, the cooperative form may provide the way forward at this juncture, as:

- India already has the benefit of experience with the cooperative model, both in rural and urban areas. Agricultural produce, fertilisers, milk and housing cooperatives are well known in the country.
- The aim of cooperatives is to increase the availability of capital from a large pool of members without the need for accessing debt, or only a small percentage of the capital being raised from debt. In Germany, as per the 2014 survey of the DGRV, 54% of all cooperatives are able to invest using equity alone, while 64% of outside capital comes from cooperative banks.³¹ This would entirely avoid the need to access prohibitively high-interest rate loans.
- While some cooperatives function with a small number of members and each membership share being large, the *average* cooperative share is not relatively high, at EUR 3,298 as per the same 2014 survey. The average shareholding in two thirds of cooperatives is between 1,000 and 6,000 euros. That said, at least three-quarters of cooperatives permit members to participate with a

³⁰ A map of rooftop policy across India, 2016 by the consultancy group, Bridge to India: http://www.bridgetoindia.com/wp-content/uploads/2015/11/BRIDGE-TO-INDIA_India-Solar-Rooftop-Map-2016.pdf (last request 12 April 2016).

³¹ DGRV, "Findings of survey conducted by the DGRV and its member associations" (Spring 2014): <http://energiayhistud.ee/wp-content/uploads/2015/01/Energy-Cooperatives.-Findings-of-survey-conducted-by-the-DGRV-and-its-member-associations.-2014.pdf> (last request 12 April 2016).

minimum shareholding of EUR 500.

- Instead of selling energy to the Discoms, cooperatives could sell directly to consumers (who would benefit from the net-metering).
- The input from the government in terms of subsidies or financial assistance would be zero. Instead, the amount generated from taxation would be a net benefit to the government. Furthermore, profit generated by strategic investors are finances that are lost to the local population—which, if generated by the local people would be spent within the country itself.
- Community energy has other benefits apart from climate mitigation—such as tourism and other sources of income. In addition, research shows that community energy can also be educational to the local population, who become more aware of energy policies, myths about renewable energy, etc. People involved in the project also develop skills and expertise in the subject.³²
- Climate consciousness is not the primary reason for investment. As seen from the previous discussion, while climate consciousness and knowledge about renewable energy are high in Germany, they were not the primary motivational factors for people investing in energy or starting cooperatives. Therefore, even though in-depth knowledge about RE and climate change are low in the country, interest in the technology is high and cooperatives as a business model could still work.
- Finally, relying solely on institutional/ strategic investors cannot achieve India's RE goal. The current policies of Renewal Purchase Obligations alone are insufficient. An analysis of UK's RPO quota system found that while it costs the same as FITs, it has produced only a fraction of the benefits that FITs have produced (in jobs, energy deployment, etc).³³ Similarly, the policy of solar auctions, while it does lower tariff for solar PV relative to fossil fuels, is not sustainable as it destroys competition in the market and solely benefits large companies who can set up projects for smaller profits. For sustained, long-term development in RE, involvement of the people and local communities is critical.

32 Quantum: Community Energy England, "Community Energy: Generating More than Renewable Energy (October 2015): <http://www.greenpeace.org.uk/sites/files/gpuk/CEE-Survey-FITs-Impact-pdf.pdf> (last request 12 April 2016).

33 World Future Council, "Feed-In Tariffs – Boosting Energy for our Future": http://area-net.org/wp-content/uploads/2016/01/WFC_Feed-in_Tariffs_Brochure.pdf (last request 12 April 2016).

Conclusion

For the first time in the history of electricity, individuals have the chance to go beyond the role of consumers and silent shareholders and can generate and sell electricity to the market. For an oligopoly like the energy sector, this cannot happen soon enough. Decentralized energy production not only makes sense technically and economically, but may prove to be the disruptor that puts the final nail in the fossil fuel industry's coffin.

Many countries around the world – across the income spectrum-- have some form of a Feed-in Tariff policy in place or are in the process of doing so. For a public-inclusive renewable energy expansion, this is the most important step. As the case study of Germany shows, FITs alone are insufficient to encourage public participation and in any case, the removal of such market protections can just as quickly dampen growth. For a country however, there is every reason to encourage public participation (even purely from a climate finance perspective) and few downsides. This is especially true for developing countries for whom the current global slump in oil prices makes it the perfect time to expand renewable energy uptake.

About the Author

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Photo: Humboldt Foundation/
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