

From grassroots to grass tops

By Eve Fisher, Surf Coast Shire

It was always going to be hard returning home to Australia after spending time with the environmentally engaged and motivated masses abroad. That's not to say there are not plenty of inspiring environmentalists down under but we certainly don't have ingrained and instilled societal and political notions of planet first, profit second like our more progressive brethren in Germany, Denmark and even the United States.

The idea was to explore the community renewables options and return home to espouse the findings and encourage a grassroots revolution in towns and cities across the nation. Yes, clearly grand delusions of the uninitiated and inexperienced. Community options are everywhere – investor-owned models like that of the Colorado Clean Energy Collective; solar bulk-buying programs like that of Solarize throughout the US; co-operatives that buy – or aim to buy – town electricity grids such as those in Schönau, Freiamt and Berlin, Germany; and even sweeping change encompassing a host of initiatives like those in 100 per cent carbon neutral island Samsø in Denmark. It's possible to detail every nuance of their brilliance in the hope they could be translated to the Australian experience but sadly there is little that can be done until our laws pave the way for community renewables to be a priority.

While the start of the journey was all about uncovering ways of decentralising power and localising the generation and transmission of electricity through grassroots organising, the end of the journey was marked by the stark realisation that in Australia there is no vital link between the community grassroots and political or legislative grass tops. Germany, with its feed-in tariff for all projects, regardless of size, and the Renewable Energy Act, which gives small players the priority of large corporations, is the global flagship for community ownership. Nearly 50 per cent of the 85 gigawatts of renewables are owned by co-operatives¹. In Australia there are fewer than 50 community projects nationwide and just a few of them are actually generating electricity: Hepburn (wind), Victoria, Tathra (solar), NSW and Denmark (solar), WA, finally have their projects off the ground.

In stark contrast Germany is the world leader of the community model. Germany has around 800 community energy projects² and towns take the notion of locally owned power to a whole new level. Freiamt, in the Black Forest, was one of the early adopters of the community ownership model. In the late 1990s nearly 300 of the town's 4300 people contributed to the purchase of the two 80-metre wind turbines that still sit on an overlooking hill today. An additional 270 families put solar PV on their roofs for heat and power, and three businesses installed old-fashioned water wheels as pumps. One farmer installed a biogas fermenter which uses enzymes to break down agricultural waste like manure and chaff and converts it to gas. It then powers a generator which used the waste heat to power homes. In a similar vein, a dairy farmer installed an exchanger to capture the waste heat created when chilling his milk for transport and use it for heating water in his home. By 2007 Freiamt was generating (and selling to the grid) an additional 2.3 million kilowatt hours above the 12 million they consumed, making it the first 100 per cent renewable town in Germany. **(See Appendix 1 for full story).**

¹ <http://energytransition.de/2012/10/energy-by-the-people/> and <http://www.ise.fraunhofer.de/en/downloads-englisch/pdf-files-englisch/data-nivc-/electricity-production-from-solar-and-wind-in-germany-2014.pdf>

² <http://www.renewablesinternational.net/people-for-wind-power/150/3401/73419/>

There are four gaping holes in Australian and Victorian legislation that make it tough for community projects to get off the ground. There is no community energy feed-in tariff and power purchase agreements are nearly impossible to negotiate without funding already secured; there is no grid priority legislation so community projects can be easily rejected by power companies; virtual net metering is absent from federal energy regulation, and restrictive wind farm laws in Victoria again make it virtually impossible for community projects to move forward. Time is wasted and communities are left wondering if it's worth the effort. In 35 interviews with people in the United States, Germany and Denmark I uncovered a sad truth about the Australian community clean energy landscape – very little is possible until the laws change or are actually introduced. This is not an attack on our current government. This is the result of apathy by successive governments who have not seen the need to empower the renewables sector.

According to the World Coal Association, Australia is the second biggest coal producer and exporter, after Indonesia, making this country one of the world's biggest contributors to climate change. Australians for Coal estimate that coal represents 4.2 per cent of Australia's GDP – about \$60 billion. Nationally, the sector directly employs about 55,000 people and about 145,000 indirectly. With those kinds of statistics, politicians are never going to play political football with such a powerful and valuable industry. As a result, holes in the legislation are left wide open and communities interested in accessing clean energy are left powerless. Bloomberg reports that in the 2013 second quarter global clean energy investment was worth \$US53.1 billion. Annually, renewable startups are worth \$US5 billion in venture capital investments to the US economy (2012), €8.5 billion in export to the Danish (2011) and €16.9 billion as net value add in Germany (2012). According to the Clean Energy Council 13.14 per cent of Australia's electricity came from renewable sources in 2012 (a new record), \$5.2 billion was spent on renewables in 2013 and 21,000 people were employed in the clean energy industry.³

Victoria's legislative inadequacy seems innocuous yet is vital to promoting the community model. The first is the absence of a community renewable energy feed-in tariff (CRE FiT). Currently there is only a FiT for domestic installations. Community groups wanting to generate their own clean energy have to negotiate a power purchase agreement with an electricity company. This usually creates a catch-22 situation. Residents won't invest in a project until they know the rate of return on investment, and power companies won't offer a price on the power purchased until they can see investor money in the bank. The project needs to be fully operational before a price is agreed upon. This is one of the main reasons dozens of community projects in Australia have stalled – there is no set price on community owned power. The ACT recently introduced a price for community initiated energy – 20 cents for solar projects – so this may inspire other states to follow suit. This research inspired me to put a motion forward on behalf of Surf Coast Shire at the MAV State Council meeting in May. The motion urged the state government to introduce a CRE FiT and was passed with 90 per cent in favour. The State Council Resolutions Report released in July recommended the MAV write to the Minister for Energy and Resources and request a meeting to discuss the idea.

In Germany the first feed-in tariff in 1990 gave the solar industry the boost that made the country a world leader. Now a new coalition treaty means the tariff could be at risk. The new government is concerned about the pace of renewables expansion – on track to be 60 per cent of total energy generation by 2035 – and plans to cut incentives for green energy. While guaranteed FiTs for solar PV installations will remain at current levels, onshore wind power is likely to be affected.⁴ Using a feed-in tariff helps protect the business models of the power companies and their infrastructure

³ <https://www.cleanenergycouncil.org.au/policy-advocacy/reports/clean-energy-australia-report.html>

⁴ <http://www.dw.de/german-coalition-treaty-far-from-being-a-pro-business-agenda/a-17257439>

because it encourages people to keep using the grid. The development of battery storage for solar means domestic householders will soon have to rely on the grid less and less. The time is ideal now for the introduction of a FiT in Victoria because it will keep communities connected to the grid for longer. Once batteries are cheap and effective there will be a large-scale move from grid-connected electricity. Keeping communities connected to the grid through even moderately profitable enterprises will benefit the power companies and their infrastructure. Wind and solar power is already cheaper than electricity from new fossil fuel production. A community renewable energy FiT is essential for groups at a local level wanting to generate their own clean energy. The basic rules of thumb from the German experience are: feed-in tariffs should aim towards a payback period of around 10 years when setting the remuneration per kWh; FiTs should decrease over time as an incentive to set installations up now, and to account for technology price drops, and the tariffs should create investment security by guaranteeing a price per kWh for power produced, ideally over 20 years. This also gives the renewable energy industry planning and job security over the longer term. Finally, the tariffs should be differentiated according to technology and installation size to allow for larger community projects.

The tariffs in Germany have helped free small communities from the constraints of centralised power and have emboldened towns to take things further. The Schönau revolution was prompted by the 1986 Chernobyl nuclear disaster after residents started discovering high radiation levels in their vegetable gardens. Residents Ursula and Michael Sladek were driven by their opposition to nuclear power and campaigned to buy back the town's electrical grid. In 1994 a majority of the town's 2300 residents joined forces and successfully acquired the grid. Once the residents owned the grid they turned their attention to generating electricity and EWS (ElektrizitätsWerke Schönau) was born. It transmits clean energy from hydro plants in Sweden, as well as solar, wind and around 20 washing machine-sized co-generation plants in people's homes. The plants generate heat for the houses and power for the grid. EWS supplies clean energy to about 150,000 customers around Germany. **(See Appendix 2 for full story).**

In Australia the second hurdle for all clean energy – not just community projects – is the absence of grid priority for wind and solar. In Germany, the *Act on Granting Priority to Renewable Energy Sources* stipulates that grid operators are obliged to give priority to electricity from renewable sources when purchasing and transmitting electricity. Moreover, those interested in feeding in electricity may demand that the grid operator expands the grid to host the clean power being offered.⁵ In Victoria, no such priority exists and power companies can simply refuse to accept the solar or wind input. Domestic applications for rooftop solar are often refused because there is too much input in the given area. Already Victoria's grid is oversupplied and still coal-fired power stations have priority because of their perceived reliability. Luckily, the rapid growth of the solar storage industry will mean householders won't need to feed into the grid at all but community projects will still have to fight to sell their power to the grid and accept poor rates of return from their power purchase agreements.

When it comes to priority Germany continues to lead the way in terms of communities taking control. Buerger Energie Berlin is a co-op of about 700 members who are bidding for the rights to own and operate the city's electricity grid, which supplies about 2.5 million homes. Although some smaller co-ops have taken control of the grids in small towns around Germany, like Schönau, never before has a bid been made for such a large takeover. The new 20-year lease for Berlin's grid is up for grabs at the end of next year. While success is a long shot it is the sentiment that is proving to be making the difference, showing that community groups have not only the desire but the impetus to take on big organisations and big tasks. The co-op estimates it will need about €200

⁵ <http://www.res-legal.eu/search-by-country/germany/>

million to be a serious contender and has already collected around €8 million from contributions by the 700-odd members who all paid €500 each. **(See Appendix 3 for full story).**

One yawning gap in the Australian legislation is not so much a hurdle as stymied potential. Virtual net metering is a growing system of offsetting electricity bills through ownership of off-site wind and solar infrastructure. VNM is growing rapidly in the US and was put on the map in 2010 in Colorado through the Community Solar Gardens legislation which enabled groups with more than 10 investors to access a metering system that enabled them to offset their bills through share-owned solar farms. This is ideal for people who are renting or simply have roofs unsuitable for solar PV. Oregon, Delaware, Maine and California have all introduced similar legislation. The Clean Energy Collective in Colorado is a business model capitalising on the notion of community ownership. Despite not being a community co-operative model, CEC offers residents in several states the opportunity to invest in individual solar panels in large-scale solar farms. Once the panels have sold, the farm opens and customers receive electricity bill offsets each month. The company uses its own RemoteMeter technology to ensure each individual solar panel is counted towards the customer's monthly offsets. This means people can invest anywhere from several hundred dollars, to several thousand. CEC has 26 solar farms in five states. At the time of the interview company owner Paul Spencer estimated residents owned as much as \$60 million in panels. There are 12 utility companies involved nationwide and CEC provides 15 per cent of Colorado's solar alone. Panels are guaranteed for 50 years and there is a trust fund to protect and maintain individual panels in the event the company goes broke. **(See Appendix 4 for full story).**

Virtual net metering is an ideal option for Victorian councils because solar panels in one place could offset other council-owned buildings. A classic example is the new Surf Coast Shire office in Torquay. The roof has plenty of space and given there are 126 council-owned buildings in the shire there is plenty of demand for power. Many of those buildings house small community groups and are often used at night, rendering them unsuitable for solar without storage. If the shire could access virtual net metering those community groups could have their power bills cut without needing solar on the specific roof. They would be accessing the solar arrays on the main office roof and have the bill reflect the price accordingly. According to the writers of the Institute for Sustainable Futures Virtual Net Metering in Australia report in 2013, there is no reason to not have remote metering in Australia. "It is the authors' understanding that there are no explicit barriers within the National Electricity Rules," the report says.⁶ Virtual net metering is emerging as the most obvious way to integrate the existing electricity grid and associated power companies. Storage is becoming the biggest threat to infrastructure and Australian power companies need to realise that unless they are receptive to global ideas the consumer is simply going to cut them out of the equation. According to Bianca Barth – who is heading up a project on grid integration for the European Union – going off-grid altogether would be a huge waste of resources, particularly for newly built power stations and related grid infrastructure. Integrating clean energy into the grid and developing technology to make the grid a two-way operation is a huge priority for countries such as Spain which has nearly 30 per cent of clean energy going into the grid each year. By contrast, the United States generated just 9 per cent of its power from clean sources in 2013.⁷ Virtual net metering is viewed as one of the leading ways power companies and clean energy suppliers can work together. It originated in the US in 1983 and, as part of the *Energy Policy Act 2005*, all public utility companies must make virtual net metering available to their customers. It is now in 43 states. Outside the US there are at least 10 other countries that have net metering laws.⁸

⁶ <http://cfsites1.uts.edu.au/find/isf/publications/langhametal2013virtualnetmetering.pdf>

⁷ <http://america.aljazeera.com/articles/2014/1/16/spain-becomes-firstcountrytorelymostlyonwindforenergy.html>

⁸ <http://bit.ly/1mKoWbj>

The final fly in Victoria's legislative ointment is the archaic suite of laws around wind farms. In August 2011 the Victorian Government introduced limitations on the development of wind energy facilities within 2km of a dwelling in rural areas unless the owners of dwellings within 2km provide written consent to the proposal. The amendments to the planning scheme prohibit wind energy facilities within 5kms of 21 regional towns and in eight "no go" zones. The current planning framework significantly restricts the opportunities for community initiated wind energy facilities that have strong local support and provide for alternative energy provision. While individuals can't stop a power station or McDonalds being built near their home, a single person can stop a wind turbine being built within 2km. That is a huge restriction and something that has kept wind energy generation to around 1GW in Victoria. Luckily this does include Hepburn Wind, the only community wind project in Australia. There are two turbines and it took nearly a decade for the community to get the project off the ground. It was approved before the new laws came into effect in 2011.

In contrast to Australia's restrictive laws, Denmark's are far more progressive. At least 20 per cent of every onshore wind farm built in Denmark must be sold on a share basis to residents. Wind turbines are visible everywhere and have become synonymous with the Danish experience. Wind turbine manufacturing is the country's biggest industry, with Vestas supplying 60GW in 32 countries. It profits nearly \$2 billion annually and represents 19 per cent of the world market share.⁹ Because Denmark has already reached its EU 2020 goal of 3960MW coming from wind, it has now ramped up its ambition to have 50 per cent of the country's power from wind by 2020.¹⁰ At the moment Copenhagen is preparing to build three more turbines on its waterfront. The privately owned Prøvestenens Vindmøllelaug project will include three turbines, one of which has been divided in 4000 shares and sold to residents. In 2008 Denmark introduced the *Energy Policy Agreement* to increase wind generation. Besides the regulation that 20 per cent of the project must be sold to residents, a number of other schemes were introduced to promote local acceptance, including enabling landowners to claim compensation of for loss of value on their land. A multi-million dollar fund was set up to assist wind farm owner associations to conduct feasibility studies and a green scheme subsidises municipalities who beautify areas around newly constructed wind turbines.¹¹ Denmark now boasts three 100 per cent renewable towns including Thisted, Frederickshavn and Samsø.

Samsø is the renewable jewel of Denmark and has become a global case study for community cohesion and environmental sensibilities. It is the first island in the world to be powered by 100 per cent renewable energy. In 1997 the island won a Danish competition that asked communities to present a realistic 10-year plan to become 100 per cent renewable. Søren Hermansen, who was named a Hero of the Environment by Time Magazine in 2008, was one of the masterminds behind the application to turn his hometown of 3700 year-round residents into an environmental teaching ground. The island now has 10 offshore and 11 onshore wind turbines. Local farmers own nine of the onshore turbines while the remaining two were bought by 500 residents or people with holiday homes there. Five of the offshore turbines were bought by the Samsø municipality, three by Samsø farmers and two by an investment company selling smaller shares to stakeholders. Each 1MW turbine powers 630 homes. There are also four district heating plants, one of which is owned by 240 households, organic farms and the island will soon have a gas-powered ferry to supplement the diesel one.¹² There is also the Energy Academy which functions as an education centre to host the hoards who flock to Samsø to learn its secrets. The next goal for the island is to be completely fossil free by 2030. **(See Appendix 5 for full story).**

⁹ <http://www.vestas.com/>

¹⁰ https://ec.europa.eu/jrc/sites/default/files/ldna26266enn_2013_jrc_wind_status_report_final.pdf

¹¹ http://www.ens.dk/sites/ens.dk/files/dokumenter/publikationer/downloads/wind_turbines_in_denmark.pdf

¹² <http://ecowatch.com/2014/05/01/samsø-renewable-energy-island-sustainable-communities>

There has never been a more important time for Australia to lift its game, particularly when it comes to legislation and regulation. This country is so far behind the rest of the developed world that we are an embarrassment on the global stage. With so much sun, wind and space there is simply no reason why we cannot be world leaders, particularly in the community renewable sector. Only recently 350 people descended on Canberra for the first national Community Energy Congress. The sheer numbers attending the conference are proof there is the desire and passion at the grassroots. Now there just needs to be the political will at the grass tops. Legislation will determine the success and uptake of community renewable ideas. Now is the time to lobby for change and lobby for our future.

Appendix 1

Farmers making the difference for a greener future

The late 1990s was a boon period for renewables in Germany. A high feed-in tariff meant a rapid uptake of solar PV and a revolution for small communities looking to follow a decentralised model of electricity generation and transmission.

Freiamt, in the Black Forest in southwest Germany, was one of the towns to recognise the value of community and shared ownership. Nearly 300 residents in the town of 4300 contributed to the purchase of two wind turbines which still overlook the town today.

Combined with solar on nearly 300 residential roofs, the installation of water wheel pumps at three businesses and the use of a biogas fermenter at a dairy farm the town was soon generating more power than it needed and was exporting 2.3 million kilowatt hours of electricity to the grid. It became the first 100 per cent renewable town in Germany.

On a good day Freiamt generates up to 180 per cent of its power from renewables and investors earn around 7 per cent on their investment.

Josef Pesch, from community renewables development firm FESA, worked with residents and encouraged them to become involved in activities within the town. His passion for changing the power paradigm is evident, as is his dedication to community renewables.

“If you believe the Earth is flat you will not develop ships or instruments to sail around the world. Because it is not in existence in your picture. For the guys who believe the Earth is flat energetically, renewables are some attachment, some disturbance in the system. Because, yes indeed, if you look at that system we are disturbing it. There is no doubt about it,” Pesch says. It’s about changing the status quo and proving naysayers wrong, he says.

“They always say for technical reasons you can’t do it. I remember when I started in northern Germany they told us ‘ah, 3 per cent of wind on the grid, maybe five, that’s it. We cannot maintain grid stability and blah blah blah’ ... we now have over 50 per cent of wind on that system. And when it’s blowing, it’s more than 100,” he says.

The Freiamt project began when a group of farmers realised they had a resource in the wind. The constructed their own met mast to measure the wind speed and frequency and soon realised two wind turbines would be viable. Because of the cost – around €4 million – the group called in FESA to manage the project and develop others.

Around the same time one of the farmers changed from large animals to small ones and installed a biogas digester.

“So she’s now throwing all the grass in there, turning that into power and heat,” Pesch says. That heat and power is used by some houses and a local school.

Turning waste electricity into heat and power is a vital solution that is being used in many countries. Combined heat and power plants, along with district heating, help stem the waste. ‘(Fossil fuels) waste 60 per cent at source,’ Pesch says. “Well, you lose 60 per cent at source,

then you have transport and, of course, the light emission of the 60 watt light bulb is very low. It generates heat, mostly. The efficiency is about 1 per cent.”

Capturing waste energy and using it for heat is popular. One dairy farmer installed an exchanger to capture the waste energy from his milk cooling systems. He now converts that energy to hot water and heat at his home.

“In Freiamt the impulse came because (farmers) suddenly realised that their land has value. The farmers are not very rich. They saw an opportunity there and wanted to realise it. As they do, they set up a local association to support wind power in Freiamt. All the farmers joined and were active locally. It got the community involved.”

Freiamt was not a green town, politically. It was conservative. And Pesch says he understands why the community was so keen to go green.

“If you are conserving in the real sense ... we are conserving creation. If you look at it from the Christian side, that is the argument there. So nature conservancy suddenly meets the conservatives. I always said that conservative doesn't mean reactionary. It comes from the Latin “conservar” which is to keep,” he says.

“That is the root of this word. It is not reactionary. I'm from a conservative community, I mean, in my village 98 per cent are conservative voters. So that is my whole background. The first 20 years of my life.

“(In terms of the liberal tradition of) economics, yes you need a strong state. The idea that the state must be weak or anything like that for me is rubbish because then the market won't work. “The fact that the state very often is weak particularly with regard to the energy suppliers, because we depend on them. And of course we saw that in the 70s oil crisis. If someone turns off the energy, the state is in trouble. Germany is in a very precarious position. We depend on Russian gas.”

Pesch is determined to keep working towards a fossil free future and hopes to keep motivating communities to buy into renewable energy and put the big power companies on the back foot.

“We are still fighting though,” he says. “We'll get them at the end. I just hope I'll live to see it.”

Appendix 2

Village relishes ownership of electricity company

Schönau was just another sleepy German village before the 1986 Chernobyl disaster but residents were soon put on their toes when they started discovering high levels of radiation in their vegetable patches.

Children were no allowed to play outside for weeks and nearly three decades later forest mushrooms are still considered unsafe to eat.

Schönau resident Ursula Sladek started thinking about the implications of Germany relying on nuclear power and started investigating how to decrease the chances of nuclear power coming to her town.

Together with her husband Michael, Sladek formed the community group Parents for a Nuclear Free Future to promote sustainability in the Black Forest region.

In 1991 when the lease to power the Schönau region was up for renewal, the Sladeks began a campaign to raise millions of Euro to buy the grid – which was successful – and by 1994 residents had formed a co-operative and had turned their attention to generating electricity. In 1996 EWS (ElektrizitätsWerke Schönau) was born and in 1997 EWS started supplying power to customers which now number 150,000 all over the country. There are 100 employees and 3300 co-op members.

Communications manager Eva Stegen says the growth of EWS has shown that anyone can motivate a community to want a clean energy future.

“There were just amateurs who came together and thought ‘let’s buy the grid,’” Stegen says. “They call it the culture of winning – they celebrate this culture of winning. They open up their arms and try to bring people together.”

Naturally there were opponents, who questioned the ability of the new utility to provide reliable power, but two referendums in the town went in favour of EWS.

“Today even the former opponents are really proud of their village,” says Tanja Gaudian, who represents EWS on a European Union grassroots renewable energy project that focuses on developing co-ops.

“It’s about getting energy into citizens’ hands,” she says.

“It’s about making citizens become energy producers and learn from each other, to have support.

“It’s important to have a citizens’ movement all over the world.”

Stegen says the Schönau experience helped stop nuclear being taken up in Germany but the world was yet to take notice.

“I really think another Chernobyl or Fukushima is necessary to shut it down,” she says. “The nuclear industry has to go.

“You don’t have to be intelligent to know that nuclear power plants are dangerous.”

Appendix 3

Citizens make bid for city grid

A group of Berlin citizens is trying to do something that has never been done on a grand scale before.

Buerger Energie Berlin is a co-op of about 700 members who are bidding for the rights to own and operate the city’s electricity grid, which supplies about 2.5 million homes.

Although some smaller co-ops have taken control of the grids in small towns around Germany, never before has a bid been made for such a large take over. The new 20-year lease for Berlin’s grid is up for grabs at the end of next year.

While success is a long shot it is the sentiment that is proving to be making the difference, showing that community groups have not only the desire but the impetus to take on big organisations and big tasks.

The co-op estimates it will need about €200 million to be a serious contender and has already collected around €8 million from contributions by the 700-odd members who all paid €500 each. Buerger Energie also has more than 1000 people who are considered supporters because the money they have contributed will be refunded if the bid to buy the grid fails. Sustainable banks are considering helping to finance the operation.

While a Dutch municipal group Alliander looks to be the strongest contender, Buerger Energie is hoping to acquire even a share in the grid – ideally 49 per cent – if it cannot buy the whole thing. It also hopes that the current owner Vattenfall, a Swedish state company that has interests in fossil fuel, will not be successful.

The Berlin grid has 35,000km of powerlines – mostly underground – and is valued at about €1 billion.

The response to the bid has been varied.

“It’s mixed,” says Steffen Walter, who has been with the co-op since the early days and was one of the 30 founding members.

“They say it’s ok that a player comes from outside and just redefines the boundary of what’s possible, to shake the old processes up a bit.

“On the other side, the process might get too restrictive for us to remain in the running until the end.

“We don’t know if our government will remain will be flexible enough to really (do it). In the governing coalition there are mixed feelings about it. The social democrats are more open to us, to a co-operative interest; the Christian Democrats they are rather reluctant. There are disputes and debates going on within the governing coalition.”

The biggest hurdle right now, with about a year until the decision is made, is to determine exactly how the co-op plans to operate its business and find the experts needed to make it all possible.

“We are an initiative with roots in NGOs. We are not energy experts. We need partners with expertise. We need technical expertise. We are not the grid experts,” Walter says.

Buerger Energie also wants to promote renewable energy either through generation or supply but that would require forming a separate legal entity. There are already about 800 renewable energy organisations in Germany. Unfortunately many relied on the high feed-in tariff – it started just below €1 euro, but has fallen to around 12 cents and is too low for many projects to be viable. Now the time has come where co-ops are realising that integrating with the grid is the key to success.

“We want to promote anything to do with a transition to renewables,” Walter says.

“We need to take this one step further – from a strategic point of view it’s not only useful to operate your own power plants or wind power, but to own the grid and modify the grid to prepare it for renewables, to adjust it to the needs of renewables, by integrating storage. A lot of things you can do on a micro level.”

Walter says teaming up with housing co-operatives could be the vital link that makes community owned renewables realistic for more and more people.

“One idea is to go into renewable generation together with housing co-operatives because there is a huge unused potential in Berlin,” Walter says.

“In terms of consumption, or generation, it is only 2 per cent. There are hundreds of thousands of roofs that could be used for solar. There is a lot to be done in Berlin.”

Combined heat and power is another avenue that is garnering support. One co-operative in Berlin that has done that. They converted a former kindergarten to a residential building to about 30 or 40 units. All those people are members of the housing co-operative. They then set up a second co-operative to generate electricity for exclusive use of the members of the housing scheme. They included all the people living there and put a big solar system on the roof. It is split consumption. Some of the electricity is used by the building and part earns money from the feed-in tariff.

Community renewable co-operatives are being developed in different forms to combat legislative and regulatory change and limitations.

Walter says this is the only way the transition to renewables can work without adequate government support.

“There is not clear strategy to push that forward from the government,” he says. “It needs pressure from the bottom.”

Appendix 4

Virtual net metering changing the game

The Clean Energy Collective is one of those organisations where the more you probe the more blown away you are by its brilliance.

CEC is a business. It doesn’t claim to be anything else. But it is in the business of clean energy and its founder Paul Spencer wants nothing more than to see communities all over the United States – and the world – have access to cheaper, cleaner power.

“It wasn’t an ah ha moment,” Spencer says of how CEC started in 2010. It was a period of gradual realisations, starting when him and his wife built an off-grid home in Colorado in 2004.

It started him thinking about other families and their ability to tap into wind and solar power. He soon realised that one third of houses are poorly sited for solar.

"I thought 'what if we build one big solar array'," he says, and the idea for CEC was born.

"If we are going to conquer the need for clean energy one home at a time, it's never going to happen.

"40 per cent of people rent and 75 per cent of sites are unsuitable.

"My initial inspiration was that we had to find out a way for the masses to access clean energy."

The next step was talking to electricity companies and finding ones that would support the notion of accessing power from a solar array and then off-setting customers' electricity bills at the same time.

"They said 'if you can figure out how to do it, we'll let you do it'," Spencer says.

Luckily the 42-year-old is an electrical and software engineer and he set about developing - and later patenting - a software program that enables utility companies to set rates and bill customers while taking into account each person's investment in panels at the relevant solar array.

Remote Meter has become the backbone of the company. Not only does it allow bills to reflect solar input, panel owners can also monitor their panels.

And so CEC was born. It's a simply notion. People can buy anything from one solar panel, to enough panels to offset up to 120 per cent of their usage. Once each array - there are 26 in five states - is sold out, it goes online and customers reap the benefits immediately. Depending on their investment - finance is available through low-interest credit unions and there is also lay-by - their bills are offset accordingly.

Panels are guaranteed for 50 years and there is even a trust fund to protect and maintain individual panels in the event the company goes broke.

In February this year, CEC had just 7 staff at its offices in Boulder, Colorado. Now it has 44 staff.

There are 12 utility companies involved and work has started on the 27th project. It boasts 15 megawatts of facilities, about 70,000

"My goal was to create a quantum leap in adoption," Spencer says.

And it was the Remote Meter software that made it all possible.

"Nearly everything we do uses Remote Meter. It allows us to be efficient while allowing us to keep prices low for the customer. It makes more and more sense every day," he says.

"It's good for the environment but it's also good for their wallet.

"Solar is still a luxury and it is still expensive. You either want to be part of the solution or not.

"I'm a realistic environmentalist - it's about how to make environmental solutions a reality. I always feel it is necessary to be environmentally responsible."

Spencer estimates there are \$50-60 million in panels owned by individuals through CEC. His company provides 15 per cent of the solar energy in Colorado alone. And he's not stopping there.

Appendix 5

Danish island proves anything is possible

Samsø is the renewable jewel of Denmark and has become a global case study for community cohesion and environmental sensibilities. It is the first island in the world to be powered by 100 per cent renewable energy.

In 1997 the island won a Danish competition that asked communities to present a realistic 10-year plan to become 100 per cent renewable. Søren Hermansen was one of the masterminds behind the application to turn his hometown of 3700 year-round residents into an environmental teaching ground.

Hermansen is passionate about instituting change for a brighter future and seeks to inform the uninformed.

“Decision making is very often limited by lack of knowledge,” he says. “The more you know the better decisions you can make. So we need to raise consciousness, knowledge and know-how. That’s both for the practical people and the decision makers in government.

Hermansen is critical of governments who don’t take adequate action to promote sustainability and renewable energy.

“They need to set the target a little bit higher. They shouldn’t necessarily look at the business potential in it; they should look at the national interest of making a sustainable project,” he says.

“This is what is happening here (in Denmark). This is why we have the feed-in tariff, that is why we have minimum state guarantee, that’s why we have net metering arrangement and all these things that are in favour of green technology. (If you don’t have that) then you are in trouble.”

“When you have the politicians making decisions they (say) ‘we want to be 100 per cent self-supplied or we want to reduce the CO2 emissions by 40 or 50 per cent’.

“They have all these visions. We call them toast talks because they are usually kind of a little bit too political and little bit less practical.

“When the administration takes over politicians say, ‘we want to meet these ambitions’. Then the administration looks at it and says, Wow, this is going to be very expensive, very complicated, a lot of changes in society’, and they make the calculation based on what they know already. And the problem is that they do it based on old knowledge.

“We end up working in an old paradigm that is not up-to-date because it’s always based on old knowledge. So we need to educate these guys. Then we need to educate the citizen and the craftsman, the people ...”

For Hermansen, who was named a Hero of the Environment by Time Magazine in 2008, old knowledge was problematic, so he focussed on changing the context and showing his community anything was possible.

Samsø now has 10 offshore and 11 onshore wind turbines. According to EcoWatch local farmers own nine of the onshore turbines while the remaining two were bought by 500 residents or people with holiday homes there. Five of the offshore turbines were bought by the Samsø municipality, three by Samsø farmers and two by an investment company selling smaller shares to stakeholders. Each 1MW turbine powers 630 homes.

There are also four district heating plants, one of which is owned by 240 households, organic farms and the island will soon have a gas-powered ferry to supplement the diesel one.

Importantly, there is the Energy Academy which functions as an education centre to host the hoards who flock to Samsø to learn its secrets. The next goal for the island is to be completely fossil free by 2030.

“There’s a defined difference between what the capacity is and what the potential is,” Hermansen stressed.

“So of course it has to be evaluated. There is so much potential and then the capacity can harvest so much. We need to know these figures otherwise we are talking about apples and pears and comparing things that you cannot compare.”

Not doing adequate due diligence can cripple a project before it begins.

“Otherwise you will end up in kind of a blind alley because you have set your ambitions and targets higher than your potential,” he says.

Hermansen says revealing the potential comes with what he coins community – common and community. It’s a topic he covers in his TED Talk.

“The idea is to start a discussion about the commons and the economy of the commons, meaning what we share. And today the modern commons are maybe wind and solar and stuff like that,” he says.

“The old commons was oil and gas and coal but it’s not commons, it’s all privatized and we have to buy it from somebody and for some reason it’s private companies that own the underground, I mean it’s ridiculous for many reasons. It’s spoiling the balance of earth.

“It’s like in America, the coal industry is still very strong and even the car industry is still very strong. And the car industry and the coal industry are still very closely linked because it’s kind of a fossil fuel-heavy industry. These guys, they stick together, and they only watch Fox News.

“Look at fracking. Who wants fracking? You can drill a hole and you can poke a hole in the water shed and you pollute everything. I mean, Texas polluted most of their drinking water by poking a lot of holes. So it’s heavy polluting and nobody knows the consequence of this. But everybody in America says this is the future.”

Despite facing an uphill battle convincing conservative governments that the Danish experience is one that should be replicated, Hermansen keeps up the good fight.

“I have a very good relationship with the Danish embassy in Washington. And the Washington embassy is really interested. They think we are good guys because we tell the story in an interesting way. We are not dangerous, we don’t have a solemn interest, we are not a company, we are not politically dangerous,” he says.

“So silently we can actually activate people in a constructive way and we are telling Hans Christian Anderson fairytales and this is what we believe actually.

“Fairytales about possibilities, development possibilities, evolutionary adventures where you start with nothing and you end up being the prince or the princess of the castle.”

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