

Stanford SOCIAL INNOVATION^{Review}

Case Study
Clean Energy by the People, for the People
By Paul Hockenos

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CASE STUDY

AN INSIDE LOOK AT ONE ORGANIZATION

➔ *The Röhrenpark wind farm in the Black Forest near Gersbach, Germany, is one of EWS's many renewable energy operations.*

Clean Energy by the People, for the People

After the 1986 Chernobyl disaster, the “energy rebels” of Schönau, Germany, launched a grassroots revolution in the Black Forest to take control of their community’s power. Their creation, **EWS**, not only triggered the country’s transition to renewable energy but also demonstrated the need for grassroots democratic control of energy production.

BY PAUL HOCKENOS

Deep in the Black Forest, not far from the French and Swiss borders, the energy collective EWS is one of Germany’s most storied clean-energy enterprises. In its offices and corridors, one term crops up in just about every discussion: “Energiewende” (“energy transition”), the moniker for the country’s historic switch from fossil fuels and nuclear power to sustainable energy. In the 1980s, the Schönau “energy rebels,” as EWS’s founders originally branded themselves, trailblazed Germany’s earliest grassroots initiatives to cut energy consumption and grow renewables. Ever since, EWS has remained an idealistic pioneer and unrelenting advocate of community energy projects, determined to help Germany meet, or even exceed, its climate-protection pledges.

EWS, which stands for Elektrizitätswerke Schönau (Power Company Schönau), is a one-of-a-kind, many-sided cooperative, collectively owned and guided by 6,500 members, that not only distributes and produces green energy but also pushes technical and market innovations. It functions as a multiplier for like-minded, noncorporate clean-energy projects and as a tenacious political lobbyist for the cause of citizen energy in the Bundestag, too. The enterprise also looks beyond Germany’s borders—climate change being, after all, a global phenomenon—to the rest of Europe, to Asia and Africa, and even across the Atlantic to the United States, where in 2011 EWS cofounder Ursula Sladek visited President Barack Obama to tell him about renewable energy in Germany.

EWS members understand the cooperative as a vanguard not just of the Energiewende, which is now German state policy, but also of a specific strain of the renewables revolution that favors highly decentralized, democratic, and community-led energy management. They call it “citizen energy,” in which burghers participate in the generation and supply of renewable energy, usually in their native locality. Its practitioners, of which EWS is first among equals, share a radically progressive vision of the energy transition—one not everyone in Germany holds.

“The Energiewende can succeed only if it’s decentralized and participatory, which is how it began,” explains 40-year-old Sebastian Sladek, Ursula’s son and one of EWS’s four-person board of directors, which also includes his brother Alexander. “Many sizes of energy producers will be needed all across Germany to balance out an energy supply that is composed of different kinds of renewable energies generated at different times and under fluctuating weather conditions,” Sebastian says, listing wind and solar power, biogas, hydropower, synthetic fuels, geothermal power, and maybe hydrogen, too, as primary energy sources.

If citizen-energy proponents have their way, he says, Energiewende will turn Germany into a dense patchwork of energy “prosumers”—producers of energy who are also consumers—connected





to one another through the Internet or high-tech intelligent grids, or both. The technology's mostly there, he says—the government just has to throw its full weight behind it and finally abandon the automobile manufacturers and coal-burning energy conglomerates that still hold sway over energy matters.

PUSHING THE TRANSITION FORWARD

Germany's Energiewende is a work in progress, the ultimate aim of which is to wean the economy off fossil fuels and arrest climate change. The country, including just about the entire political class and most of the private sector, too, has pledged to significantly decarbonize Germany's economy by 2050 while hitting other targets along the way, such as reducing greenhouse gases by 40 percent by 2020 (compared with 1990) and ramping up the supply of renewable electricity to 40 percent by 2030. The Energiewende's main pillars are adopting nationwide efficiency measures that reduce consumption, phasing out nuclear power and dirty fossil fuels,

and expanding renewable energy. Germany currently garners 36 percent of its electricity supply from renewables, primarily wind and solar power, almost all of which have entered the country's power supply in just the past 18 years—a stunningly rapid rollout for an industrial economy of Germany's size. During a few of the early-morning hours of May 1, 2018, the country satisfied all of its power needs from renewables alone—a first. The Energiewende's kudos, for which EWS enjoys a slice of the credit, are now recognized far beyond Germany.

Yet a third of the country's electricity is still generated by coal, and most of its heating relies on natural gas. At the moment, Germany is not on track to hit its 2020 emissions reduction targets as they are iterated in the 2015 Paris Agreement on climate change. By contrast, many other countries, such as France and the United Kingdom, though slower out of the blocks than Germany, are likely to do so. Germany's oil-addicted transportation sector has a prodigious carbon footprint that's actually growing, thanks largely to the

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➔ *Left: EWS cofounders Ursula and Michael Sladek stand in a field of solar panels. Right: Ursula Sladek meets President Barack Obama in the Oval Office on April 13, 2011.*

muscular carmaker lobby financed by the big-ticket brand names familiar to all of us, such as Volkswagen, Mercedes-Benz, and BMW.

This mixed record, say the EWS team and pro-renewables allies, can be laid at the feet of Chancellor Angela Merkel and her recent governments, which have slammed the brakes on the *Energiewende* (after vowing to back it) and steered it away from community-based energy in favor of traditional utilities. But EWS has overcome an array of foreboding obstacles since its founding 25 years ago and is now on the offensive to help snap Germany out of its current lethargy.

Today EWS counts nearly 200,000 customers Germany-wide who pay for the highest-quality green energy. It owns wind and solar parks, as well as electricity and gas grids. Moreover, its philanthropic arm, a support program financed through revenues, has launched many thousands of micro- and small-sized sustainable-energy projects, ranging from household power generation and electricity storage units to other, full-fledged energy collectives like it. The Schönau cooperative prides itself on contributing to the whole range of the *Energiewende*, not just one aspect of it, as do most of its competitors in the field of clean-energy generation. EWS even has a special department devoted solely to strategic innovation, which is currently experimenting with, for example, electricity storage systems, such as nonflammable salt-water batteries that use saline solution, rather than toxic chemicals.

The EWS staff underscore that the company's ambition is not to own ever more of the means of renewable-energy production, such as wind and solar parks or biogas factories. Rather, it invests in new production facilities together with upstart regional energy cooperatives and then, when the co-ops are ready for it, hands over the operation to the locals. "A decentralized *Energiewende* means that out-of-town investors *don't* own and run production from far away and then bring the profits back to wherever they're based," explains Tanja Gaudian, who leads the solidarity program. "The burgher from those localities should own and manage the parks, and also profit from them." EWS's early participation in such projects with capital and know-how can be the extra boost that a small co-op might need to raise the funds for, say, a couple of wind turbines, which require significant startup financing.

Despite facing a highly competitive energy market, EWS turns over €43 million (\$49.8 million) annually and has posted black numbers annually since 1997. Sebastian Sladek explains that EWS's financial health depends on making citizen energy a reality. "But our purpose isn't to accrue profit. It's to invest in more renewable energy," he explains, "to push the *Energiewende* forward."

A DEMOCRATIC REVOLUTION

Michael and Ursula Sladek arrived abruptly to the world of energy in 1986, a time when climate change was nowhere on the horizon. The couple, born in Catholic, southwestern Germany after World War II, had known each other since childhood and moved to Schönau in the early 1970s. Michael was the town's general practitioner, a jovial,

larger-than-life bear of a man with a bushy Grizzly Adams beard. Ursula was a trained schoolteacher, warm and articulate, with intelligent, sparkling eyes. Although counterculture in the 1970s had found a home in many West German towns, the Sladeks were neither leftists nor firebrands.

But in April 1986, news of the meltdown of the Chernobyl nuclear power plant in western Ukraine, then part of the Soviet Union, reached Germany and jolted them into action. The disaster sent a cloud of poisonous gases drifting over western Germany, contaminating farmlands, water supplies, and forests.

"It hit us like a bomb," says Ursula Sladek. "We had no idea that an accident 2,000 kilometers away could affect us in Schönau." And Germany, they quickly realized, had nearly 20 of its own reactors, just a tiny fraction of the fleet across Europe, the closest of which was 200 miles away in France, just across the Rhine.

The Sladeks had five children by then. Like many other German parents, they were furious about the scant information on the calamity and fearful about their children's exposure to radioactivity. Michael, as town doctor, did what he could do to field his patients' concerns, but for him, too, the threat was *terra incognita*. In response, the Sladeks joined other inhabitants of Schönau to form an NGO, Parents for a Nuclear-Free Future, which researched the effects of radioactivity, staged local protests, started a newsletter, and lobbied the local utility to forgo nuclear power in its mix.

By the time of Chernobyl, West Germany already had a vibrant, sporadically militant anti-nuclear-energy campaign that gathered protesters by the tens of thousands and eventually, by applying pressure over four decades, forced the German government to commit to exiting nuclear power. (The last active reactor is scheduled to switch off the lights in 2022.) Schönau and the Sladeks weren't initially part of the countrywide mass social movement, but that changed overnight in 1986, and they quickly became innovators within it.

"We had to do something ourselves, because neither the energy companies nor the government were taking action," says Ursula Sladek. "[The energy companies] had their own vested interests, which didn't include our families' well-being." West Germany, they concluded, had to abandon nuclear energy—it just wasn't worth the risk—and they set out to make it happen, starting in their community.

"We realized that we couldn't just be against nuclear power; we had to be *for* something, too," says Ursula Sladek. Their first inclination was to explore ways to cut their own energy use, figuring that if demand were lower, Germany could get by without nuclear power, which constituted 40 percent of its power supply. They marched door to door to collect and share efficiency tips and held monthly seminars in town. Special meters measured energy usage, and prizes were awarded to those touting the lowest numbers.

By then, elsewhere in the country, freethinking engineers and backyard tinkers had already begun experimenting with DIY solar panels, wind turbines, and combined heat-and-power units. (CHP, also known as cogeneration, is a process that recovers surplus heat



from power generation to use for heating or electricity generation.) But the Sladeks were the first to turn their attention to the means of energy distribution: the electrical grid itself. They had tried to interest the regional utility, the Stuttgart-based regional principal KWR, in renewable energy, as well as in ways to scale back energy consumption. But the company, heavily invested in nuclear power, dismissed the Sladeks and their diminutive NGO as crackpots.

But they would not be denied. Over the course of the next decade, Schönau's 2,500 citizens took the utility to court and prevailed in two popular local referendums, eventually winning EWS the right to operate the grid for 20 years. "We were the only democratically legitimated energy company in the world," Ursula brags.

EWS's end run in traditionally minded Schönau had a lot to do with "the way they linked environmentalism and local patriotism," explains Patrick Graichen, energy expert and author of a book on EWS. "The locals from the region are proud townspeople, conscious of their independence from out-of-town authorities and companies. The idea of doing it themselves, of being independent of KWR from Stuttgart, appealed to them." Graichen attributes the success of the long-shot initiative to a core of about 20 fully committed people from Schönau.

The utility and conservative politicians rolled one boulder after another in their path, including slapping a price tag on the high-voltage transmission hardware of more than eight million German marks—at least double its worth, the activists estimated. But by then the Schönau rebels had turned their campaign into a national, even international, cause célèbre. Experts from Germany's finest engineering faculties volunteered their services, developing professional operational plans for the grid.

"We were all aware of what was happening in Schönau," says Hans-Josef Fell, an early antinuclear activist from Bavaria and former Green Party member of parliament. "We were trying to do much the same, but we didn't pull it off. Schönau did, and achieved a kind of cult status." Donations poured in from across Germany and even abroad, facilitated by the magnetic Sladeks, who hit the road peddling Germany's first-ever all-renewables power company. A nationwide campaign run gratis

by a friendly marketing agency raised millions of marks for buying the grid hardware, attesting to how thoroughly the Chernobyl accident had shaken ordinary Germans. It would be the tip of the spearhead, they insisted, in breaking the monopoly of nuclear-wed utilities.

"The transition from campaign to proper business and management of a public good was rocky at times," says Ursula Sladek, who together with her husband stepped back from the operation in 2014. "Even once we became a company, many of us were still working unpaid and continued to. It was a proper company in terms of legal status but still had a lot of the spirit of an NGO," she says.

"The success of EWS is due in very large part to the Sladeks," says Stefan Adler, director of Freiburg University's Center for Renewable Energy. "They refused to be cowed, even though they went up against large companies with teams of lawyers. They suffered defeats along the way as well. They were laypeople who informed themselves about complex laws and technologies and were unafraid to try things that had never been tried before."

ANYBODY AN ENERGY PRODUCER

The business of EWS was, from the very beginning, citizen energy. But, given the utility-friendly legal framework and still-rudimentary technology, renewable energy of any sort was hard to come by at the time. Initially, EWS even had to purchase electricity from the very same utility that it had just deposed from the grid.

Yet, starting with just five salaried staff, EWS immediately committed itself to developing clean-energy sources by helping finance Black Forest community initiatives, small businesses, and individuals prepared to test the waters of renewable-energy production—at first mostly through solar PV, small hydro plants, and CHP units. A fraction of every pfennig of electricity that the company sold went into a solidarity kitty to support Energiewende-related projects—a practice that continues today. Moreover, EWS topped off the rates that the startup producers received for selling electricity to the grid, thus subsidizing the cost of generation and making certain that the investments paid off.

⬇ Demonstrators march in Berlin on June 2, 2016, holding a banner with the written slogan “Energiewende retten!” (“Save energy transition!”)

Southwestern Germany is the country’s sunniest corner, which made it a natural location for solar energy. Indeed, decades later, in 2018, Baden-Württemberg, the federal state home to Schönau and Freiburg, would boast a supply of solar-photovoltaic generation equivalent to that of about three nuclear power plants. Schönau became known as the town with the densest concentration of solar power in the country, garnering itself the title of Germany’s solar capital.

At the close of the 1990s, the Energiewende movement—not yet official German policy—received unexpected help from the European Union and the German government. In 1998, at the EU’s behest, Germany broke up its energy sector’s rigid monopoly in gas and electricity markets. Since the postwar republic’s founding, Germany’s entire energy market had been dominated by four giant utilities (called the Big Four) and several dozen, much smaller, municipality-owned power companies. Consumers had no choice whatsoever when buying energy; the markets were closed to newcomers. EWS was the exception—and it had taken 10 long years and a war chest of money to do so. Opening up the market to competition dramatically changed Germany’s energy landscape—in a way that played straight into EWS’s hands.

In Berlin that same year, a left-wing coalition of Social Democrats and Greens stormed into the highest halls of power, entering the government in a “red-green” coalition, the first in history. The Greens had emerged from the social movements of the 1970s and ’80s to push renewable energy and an exit from nuclear power. Moreover, global warming was now on the world’s agenda, renewable-energy expansion an integral part of the strategy to slow it.

Two years into the new government’s tenure, the red-green coalition initiated a phase-out of nuclear power—albeit over the course of several decades, and thus not at all what Schönau’s energy rebels had in mind. Also, the Bundestag passed the Renewable Energy Sources Act, a new law promoting clean energy, in 2000. The act stipulated that fixed surcharges on renewable energy, paid by grid operators but passed on to consumers, would enable energy producers to cover investment costs. Moreover, transmission-grid owners now had to accept and remunerate the clean energy from wind, sun, biomass, and water that the new class of producers fed into the system. Last, the act tweaked legal forms to encourage citizen-energy enterprises—by enabling them to apply for concessions, such as grid operations.

These changes tore open Germany’s tightly shuttered energy market and

turned it upside down. Now anybody could be an energy producer, and intrepid investors began to take advantage of new opportunities. The legal developments mainstreamed the energy revolution begun in the Black Forest, setting off a flurry of clean-energy production across the country. While the southern Germans concentrated on solar power, the northerners exploited their windy coasts with ever more sophisticated wind turbines. Farms, homeowners, collectives, and small- and medium-sized businesses began investing in sustainable-energy generation, turning tens of thousands of individuals and small companies into energy producers. In Schönau, the Protestant Bergkirche, a church just off the main square, mounted 421 photovoltaic panels onto its roof, becoming EWS’s biggest single power producer. Where just a year before there had been little more than the Big Four, suddenly there were tens of thousands.

One of the renewable energy act’s founding fathers was the Green Party parliamentarian Hans-Josef Fell. He knew exactly what signals the market needed in order to trigger the growth of renewables, and, with surprisingly little fanfare in relation to the act’s consequences, the Greens made it happen in 2000. “No one in all of Germany was better prepared to take advantage than EWS,” Fell says. The new law “provided the foundation [for renewable-energy growth]; it was up to environmentalists and entrepreneurs to build on it.” Not only was the grid now available to everyone and clean-energy generation handsomely subsidized, but renewables technology, which was in its infancy, now had the support to reach economies of scale and become competitive in price. This happened at the same time that the hardware steadily grew in efficiency and sophistication, thus bringing down the cost of clean energy.



EWS took off. It liberated itself from KWR and began buying and offering renewable power to customers across all of Germany: By 2001, it had 15,000 clients; in 2005, 30,000; and in 2010, more than 100,000. As of 2005, it also offered biogas to German households. As its revenues soared, so did the percentage it donated to citizen-energy projects from its solidarity kitty, breathing life into thousands of new producers; locally owned grids; CHP units; and even green-energy projects elsewhere in the world, including Ghana, the Philippines, and Georgia.

Contrary to some impressions, sustainable-energy clients in Germany—those who sign up with, say, EWS—don't have carbon-free green energy piped into their living rooms. The same electricity comes out of the sockets of renewables clients as does from their neighbors' walls: a mix that the conventional and renewable producers in that region generate. Germany's electrical and gas grids are connected across the country, as well as to other grid systems in Europe. Energy companies like EWS pay producers of renewable power and gas, who feed it into the grid nearest them. In this way, the supply as a whole becomes greener.

EWS wasn't the only one to pounce on the opportunity to sell clean energy, nor was it alone in the field of citizen energy. The *Energiewende* that grassroots activists envisioned was taking off, driven forward not by the prominent utilities—which remained convinced that renewables were unworthy of their attention—but rather, overwhelmingly, by citizen-owned energy enterprises, some very small, others medium-sized businesses, and by individuals, municipalities, and others.

EWS stood out not only because of its historical cache but also because, in addition to generation, it traded in gas and electrical grids, such as the Schönau grid, as well as others in the Black Forest that it bought up. Like-minded outfits with the *Energiewende* at their heart have found it almost impossible to do the same. “There was a small window that we exploited,” says Sebastian Sladek, about obtaining regional grids. “Since then, politicians and the big companies have made it nearly impossible to break into the transmission market.”

But so far experience has contradicted the establishment energy sector's contention: Commercial utilities and independent grid operators simply pocket the considerable profit that grids tend to pull in. “It's a lucrative business, for us, too. But they don't invest the profits,” Sebastian says. “When there's no investment, the transmission hardware gets old and breaks down, just when they need investment most.”

In the first decade after liberalization and the renewable-energy law, solar PV and land-based wind power outperformed the range of other renewables that qualified for subsidies. In 1997, Germany was home to approximately 2,000 solar PV systems—all diminutive operations, some no more than a couple of panels on a barn. But between 1998 and 2002, this number soared to 40,000, owned largely by smaller businesses, communities, farms, or private people. Through the 2000s, the numbers doubled and tripled. In 2010 alone, Germany smashed its own record of the previous years by adding an astounding 250,000 PV systems to its energy mix, thus extending the world lead in PV deployment that the country had grabbed from Japan in

2005. And by 2010, power generated by wind turbines, hydroelectric plants, solar cells, and biogas digesters constituted 17 percent of electricity supply—an achievement that no one anticipated. And, just as flabbergasting, citizen energy accounted for more than half of the renewable-power supply—in total, 10 percent of Germany's electricity.

THE COOPERATIVE BOOM

Until the mid-2000s, citizen-energy ventures took many forms: collective companies (like EWS), privately owned small- and medium-sized businesses, individual private ownership, and the property of farms. Their common denominator, apart from clean energy, was no corporate- or foreign-investor involvement. But a 2006 change in the bylaws of Germany's *Genossenschaften*, or cooperatives, added an intriguing newcomer to the varied landscape.

The form of the cooperative means different things in different countries. But for more than 170 years, Germany has nurtured its own brand of cooperatives, which were first called to life in order to strengthen the failing business prospects of independent craftspeople, traders, and farmers at the height of the industrial revolution. The isolated artisans and traders often lacked access to banking and thus had to rely on private moneylenders. Swamped with debt and without recourse to capital, they often went under. The cooperative rescued these types from destitution by, among other things, increasing their creditworthiness as a group.

In German cooperatives since the 2006 law, decisions are made on the basis of one person, one vote, regardless of the size of a member's investment. Moreover, the business, usually situated in the region, is owned entirely by the cooperative membership, which usually ranges from 10 to several hundred people. The members decide where profits are invested and how new projects are developed. EWS, with more than 6,000 members from across Germany, is exceptionally large and dispersed, and extremely diverse in its investments—unlike most of its peers. Its members meet once per year and elect a board of directors who make the day-to-day decisions.

“It's the most hands-on, democratic form of ownership,” says Andreas Wieg of the DGRV, the Berlin-based federation for German cooperatives. “There's very little administration, and cooperatives can easily accommodate more or fewer members.”

Wieg and the DGRV watched on in amazement from 2006 onward as the number of energy cooperatives in Germany shot up into the hundreds and eventually leveled off at around 850, reaching a total of about 185,000 members by 2014. “We were very surprised,” Wieg says. “The energy cooperative proved attractive to people who didn't themselves have land or rooftops, or simply didn't have enough money to invest on their own but wanted to be part of the *Energiewende*.” Germany's banking cooperatives, many of which are in rural communities, were particularly eager to boost the effort. “The cooperative banks said, ‘Look what's going on in our backyards. Let's get in on it!’”

One of the new cooperatives was EWS, which changed its legal status from a collectively owned company to a cooperative in 2009.

The rationale for the switch had nothing to do with the cooperative's form; even when EWS was a company, every shareholder had one, equal vote. Rather, the original structure didn't allow the enterprise to grow: A new investor could enter only if an existing one left.

"We had many people coming to us who wanted to be involved," says Ursula Sladek. She explains that the amount of capital that a collective business could have was also limited, which was not the case for cooperatives. Instead of the ceiling of several hundred thousand dollars that the collective partnership had to work with, the cooperative had no such limit.

But observers note that EWS is such a huge cooperative that it's impossible for its many members to be involved directly—a key characteristic of both the co-op idea and citizen energy in the first place. EWS could be taken to task for not practicing what it preaches. "It's a valid point," admits Ulrich Drescher, an activist who participated in the transition from collective business to cooperative. The collective's democracy was richer than the cooperative's. In fact, he says, only about 300 of the more than 6,000 members even show up for the annual meeting. "It's those who have the time, money, and desire to come," he says. In practice, the board of directors, who are elected every three years, call many of the shots, and the cooperative's votes are largely unanimous.

Another point of contention, though, is the annual dividend, which is 3.5 percent of profits. The dividend could be much higher, says Drescher, given EWS's black numbers, even as high as 6 percent, he claims. "There are some, a small minority," says Drescher, "who want or need the money. But they're voted down by a substantial majority." Most members, like Drescher, want to see the profits reinvested in the cooperative: in new sources of generation and innovations looking toward the future.

In fact, as a result of its success, the cooperative has begun to limit the shares of new members to only \$1,200 a head. "We started to attract people who were just in it for the money," he says, "and we didn't want that. It's not what EWS is all about."

MAINSTREAMING THE ENERGIEWENDE

During the 2000s, EWS steamed along, as did the Energiewende, though, oddly, the grassroots side of the energy revolution didn't usually garner coverage in the mainstream media. But Germany's energy markets were being revolutionized from below—in the spirit of Schönau's energy rebels. EWS had become one of many clean-energy companies, albeit one of the few that offered "pure renewable energy"—power and biogas that hailed from sources with no connection to nuclear power or coal. In fact, because the German energy market made it extremely difficult to obtain such energy at a reasonable price, EWS began purchasing ever more of its




electricity directly from renewables producers in Norway, Sweden, and Austria. In order to encourage investment in new-generation facilities, EWS maintains that the generation facilities that it buys from, mostly hydroelectric plants, must be new or built in the last six years.

By 2011, the share of renewable electricity Germans used had jumped to 20 percent, which made it impossible to ignore. Renewables were shooting up, while energy supply remained stable and reliable. Farming communities, which suddenly had a second source of income, were among the transition's most enthusiastic supporters, regardless of their political affiliation. The Energiewende created more than 300,000 jobs and kept in local communities millions of euros that otherwise would have landed in the pockets of foreign oil companies. In many parts of the world, Germany was held up as a model for going renewable, and one country after another adopted similar programs.

But it took another nuclear disaster for Angela Merkel, a career physicist, to jump aboard the Energiewende. After Japan's Fukushima Daiichi nuclear power plant melted down in March 2011, Merkel went public underscoring the feasibility and importance of the Energiewende, which in German politics had until then belonged solely to the Green Party. The government reviewed and expanded Germany's renewable-energy targets and stressed its commitment to climate protection, and Merkel was briefly dubbed the "Climate Chancellor" for her forceful backing of renewables in international forums.

Yet, despite the bump in official attention, Merkel's ruling coalitions neglected the Energiewende as the shock of Fukushima faded, even as evidence of climate change's threats mounted. Industry whined that it was too expensive, even though many industrial sectors were exempt from the renewables' surcharge, making the electricity they paid for among the cheapest in Europe. In Merkel's third administration (2013-2017), a conservative Social Democrat government undertook reforms to slow the Energiewende and centralize it, reacting to criticisms that it was all moving much too quickly.

 *EWS employees Frederik Penski (left) and Thies Stillahn install saltwater batteries for testing at EWS headquarters.*

To the detriment of the energy cooperatives and citizen energy in general, the government began auctioning off large quantities of renewable-energy production, prompting bidding wars in which the smaller producers couldn't hope to compete. The number of newly launched renewable cooperatives stagnated, and existing co-ops' investments dropped abruptly—by one-third in 2014.

Even though citizen energy had kick-started the world-renowned *Energiewende*—as of 2016, 42 percent of Germany's renewable-power capacity was in the hands of 1.5 million laypeople and farmers—it looked then as if its heyday was over. While EWS's business hasn't faltered, that of many other, smaller clean-energy enterprises invested only in generation has fallen off, and some have gone under. EWS has fared better because it is larger and more versatile than most energy cooperatives.

Through the solidarity-kitty program run since day one, EWS encourages fledgling renewable-energy enterprises of many diverse stripes, from the Black Forest to the developing world. It counts 2,700 “rebel power units” that it has midwived to life, most of them granted a bonus over five years for every kilowatt of energy produced and sold. The solidarity funds, which totaled more than €1.6 million (\$1.85 million) in 2017, go toward sustainable-energy generation and support for other renewable-energy collectives, as well as energy-efficiency projects, educational programs, clean-energy projects abroad, and developing technologies, such as saltwater storage and hydrogen fuel cells. In line with tradition, EWS steps in where the state is failing. For example, last year it jumped into Germany's slowly changing transportation sector by investing in charging stations for electric vehicles. On all supported projects, applicants who are EWS customers receive priority.

But EWS also seeks out speculative, risky ventures that might bear fruit with a little help. Currently, it is identifying apartment buildings with roof space that could host solar panels. It inquires whether the owners are interested in generating clean electricity that they can then sell directly to their tenants at submarket prices. EWS helps with the financing and guarantees the owners and tenants that it will supply all electricity, at the cut price, that the apartments require, above and beyond that generated by the rooftop panels.

“Our philosophy on financing new technologies is to keep eyes and ears open and not to prematurely exclude options that at that moment are very costly or underdeveloped,” says solidarity-program head Gaudian. “The *Energiewende* has shown us that that can change,” she adds, pointing to the technological advances in solar power in the 2000s, when at the same time prices plummeted. Battery technology is such a field today, wide open and including experimentation with dozens of alternative chemical mediums. “Maybe it will just be by accident that we stumble upon the one that works best,” she says.

EWS's expertise in gas and electrical grids is so rich that it advises and supports other initiatives angling to win concessions to operate their local grids. One of the battlefields is Berlin, where the bid of the cooperative *Bürgerenergie Berlin* is currently tied up in court.

Michael Sladek is on its board, which lends the operation both know-how and credibility, says one of its leaders, Luise Neumann-Cosel. “We're trying to raise 100 million euros,” she says. “It benefits us enormously to have someone on our side who has done it before.”

And in Berlin, EWS's representatives team up with Greenpeace, environmental think tanks, the Greens, and others in the sustainability community who are straining to push Germany back onto the favored path. EWS's lobby arm—which the cooperative didn't approve unanimously, so offensive did some find the concept of lobbying—liaises with Bundestag and regional politicians and keeps the Schönau headquarters informed about the latest legal developments. It is a voice for citizen energy where the decisions are made. “If the big [nuclear and fossil fuel] players are in Berlin, pushing their interests, and we're not there, we lose out for sure,” says Sebastian Sladek.

BACK TO THE BURGHER

In Schönau today, a busy construction site is under way next to EWS's head office, shattering the tranquility of its corner of the wooded Black Forest valley. It has 140 staff—up from 32 in 2008—and is hiring after another year of solid numbers. The new building will house, among other departments, the five-person innovation team, which is toiling over nothing less than the future of the *Energiewende* itself.

“The IT and digital revolutions are made to order for completing the *Energiewende*,” says Thies Stillahn, the project's director. “Eventually we'll have to connect all of the segments of the energy transition: transportation, generation, storage, distribution, and efficiency.” Stillahn says that the individual technologies are mostly ready, but they have yet to be linked together to function as a single system with maximum efficiency. The system as a whole, he says, must be unified but also decentralized, smart, and citizen oriented. “We might not be able to do the whole thing,” he says of EWS, “but maybe we'll get part of it right, and that will be our contribution.”

Perhaps that part will be the technologies that EWS is developing to enable small-scale community producers to sell or trade energy online. In this vein, it is investing in small, promising IT startups from across Germany that will help link individuals in their communities so that neighbors involved in clean-energy generation can sell electricity to one another. Oxygen Technologies is one of the new companies that is working on ways for individual producers to barter energy with one another on a peer-to-peer Internet platform that the company is designing for that purpose. The startups work between the EWS office and a startup incubator in Freiburg, where yet other promising initiatives are located.

Ursula Sladek says that, given the impasse in Berlin, the imperative has returned to the burgher and communities that want to go 100 percent renewable as quickly as possible. “The *Energiewende* stalled,” she says. “Climate change is upon us. I think we're going to have to go back to the grassroots, the way we did after Chernobyl. It's in our [best] interest to make it happen.” ■