

Going Solar in a Hurry: The Perks and Pains of Lebanon's Rushed Energy Transition

Tripoli, Lebanon.

by Camillo Stubenberg



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Nour (name changed) is a sociology professor at Beirut Arab University. I met her in her office in Tariq el-Jdideh in the fall of 2022, while conducting interviews for my dissertation on solar energy in Lebanon. I had come not for advice on academic life, though I probably needed it. Instead, I came to ask about the solar system she had recently installed at her home in Antelias, a suburb north of Beirut.

Like hundreds of thousands of Lebanese, Nour had recently turned to the sun for electricity. I wanted to understand not only why, but how this shift was reshaping her everyday life.

Electricity has been a contentious topic in Lebanon for decades. Since the outbreak of the civil war in 1975, the state utility, Electricité du Liban (EDL), has failed to provide continuous power. Electricity was rationed through rolling blackouts, load shedding that structured daily life across the country.

The gaps in state power were filled by private backup generators. Since the 1980s, neighborhood diesel generators, known as *ishtirak* [إشتراك] (meaning subscription in Arabic), provided backup electricity for a monthly fee to those who could afford them. Lucrative and

often politically connected, these operators ran local monopolies, sometimes referred to as a “generator mafia.” For decades, this uneasy coexistence proved remarkably stable. This combination of a weak and loss-making state utility and a lucrative private backup system were so emblematic of Lebanon’s political arrangement as a whole, that people often simply refer to EDL’s electricity as “dawle” [دولة] (meaning state). The all too familiar moment when the lights go out is thus often followed by a laconic “the state has left...” [الدولة ترحل].

This dual energy system was disrupted in the summer of 2021. A financial crisis led to severe fuel shortages that affected both EDL’s power plants as well as the private backup generators. The result was a near-total blackout. What followed was not just an energy transition. It was a relocation of infrastructure, from the state into the household.

Turning to the Sun

As electricity supply gradually reduced to a trickle – first to a few hours a day, then eventually not coming for days on end – people became desperate. Food spoiled in warm fridges, and hot nights without air conditioning and fans felt like a continuous fever dream. Nour explained that she first tried to cope by stockpiling power banks, hoping to bridge the gaps between the few remaining hours of electricity. But as the outages became longer and longer, this strategy became untenable.

“I was constantly carrying power banks from the living room to the kitchen and back to my bedroom, it was chaotic.” Electricity, she explained, was like water or food: “I cannot live without it, not even for an hour.” She did what many others did: she bought a solar home system.

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companies were overwhelmed. George, an entrepreneur, explained that he was swamped with requests: “We started working day and night shifts and I arranged for my engineers to sleep in the office so they would not have to commute back home,” he explained to me in his office in Antelias close to Nour’s apartment. Nour was one of his many new customers – a relative of hers had recommended George’s company. For \$8,000 USD – Nour explained that she got a 10% friend-discount – the company installed an 8-kilowatt-peak system. The sixteen panels were installed on her apartment building’s roof while the batteries and inverter sit in the laundry room, next to the washing machine.

Solar did not just restore electricity. It reorganized how electricity was lived with, managed, and valued.

Rewiring Everyday Life

Solar electricity is abundant when the sun shines. It is scarce the moment it sets. This basic fact reorganizes daily life for those who depend on it.

“Now we only wash on sunny days,” Nour explained when I asked her how her daily life had changed since. Energy-intensive activities are timed after the sun. On evenings and cloudy days restraint is required in order to preserve the weakest and often most expensive part of the system: the batteries. Electricity was also scarce in Lebanon’s old energy system, however, the erratic coming and going of state and generator electricity encouraged people to maximize their electricity consumption: EDL’s electricity was incredibly subsidized and generator operators largely sold electricity by flat-rate subscription rather than by kilowatt-hour (analogous to most internet subscriptions billed by bandwidth rather than by actual use). Decentralized solar reversed this logic of maximization. Instead solarized households turn into managers of scarcity and knowledge about the energy efficiency >

ratings of fridges and air conditioners has moved from niche to mainstream.

Electricity had become something to monitor, anticipate, and control, even from afar. This new visibility also reshaped social relations in the household. Laughing, Nour explained that her two sons moving out had an unexpected silver lining: “Now I don’t have to worry about them draining the battery at night.” The larger one’s system is and the fewer members living in a household, the fewer such in-house energy crises. In other cases it is often chores that are in a traditionally female-dominated sphere – washing and ironing are energy intensive activities – that have to be conducted when the sun is out.

Some 100 kilometers to the north-east of Beirut, in Baalbek, Ali and his household of six live at the other end of this spectrum. Their small two-panel system often runs out of power long before the night ends. With six people and different schedules it is also much harder to discipline the household’s energy consumption. As a result of constant over-use, the home system’s inverter frequently announces a drained battery with a long intermittent beeping. Most often this happens in the small hours between two and four in the morning, when Ali or his wife get up to make their way through the dark apartment to turn the system off.

In-house energy shortages are particularly frequent during the winter months when days are shorter and cloudier. This is not only annoying in the short run, but such deep discharges also shorten the battery’s lifespan. Careless electricity use thus not only leads to moments of darkness; it accelerates the slow breakdown of the infrastructure itself. To deal with the limitations of solar power in winter, those who can afford it, remain tied to either EDL’s grid, or a private backup generator for the rainy days. The domestication of energy infrastructure also brings into the home

what had previously been a collective energy crisis. In the past, a power outage during an important football game would likely lead to everyone cursing politicians and the government for mismanaging the country. When electricity is made on the roof and stored in one’s own battery, the culprit for the outage might well be sitting on the sofa right next to you.

Exacerbating Inequality

The smaller a household’s solar system, the more frequent such in-house energy crises become. Ali’s nightly alarm is one such example: a small system stretched too far. For poorer households, this is not the exception but the rule.

By contrast, households like Nour’s operate under different conditions. With financial support from relatives abroad, she was able to install a larger system and replace inefficient appliances. These investments reduce strain on the system and extend its lifespan. For less affluent households, the opposite is the case. Small systems with overused batteries are more prone to failure. Most importantly, a large segment of poor households cannot afford any system – the smallest setup costing around \$1,000 USD.

This contrast becomes particularly stark at the margins. Mohammad, a Syrian refugee who in 2023 was working as a farm hand near the town of Deir El Ahmar in the northern Bekaa, relies on a notebook sized solar panel to light a single LED in his makeshift shelter. The little solar lamp – donated by the UN’s refugee agency – is barely enough to enable his two daughters to do their homework before its battery dies.

Since 2021 a quick look from above is surprisingly revealing of people’s socioeconomic status. Where you might have asked for the make of a car in the past, you can now also ask: how many panels do you have on your roof?

Photo: © shutterstock

Beirut, Lebanon, August 12, 2021:
Protest against power shortages.



New Connections: Diaspora, Local Patronage, and East Asian Supply Chains

Off-grid solar power reduces dependency on the power of state and private backup generators. For people like Nour, this emancipation from a dysfunctional state and a “corrupt” backup has come as a relief. However, Lebanon’s rush towards decentralized solar energy is not just a story of energy independence of the affluent and isolation of the poor. It also comes with new connections.

The first of these was economic. Since a financial crisis had not only wiped out people’s purchasing power (the Lebanese Lira lost over 98% of its value vis-à-vis the dollar) but also their savings (the banks quite literally welded their doors shut to fend off furious customers demanding access to their savings) most could not afford a solar power system out of pocket.

As a result, people turned to two familiar sources of financial support: family abroad or local networks of patronage.

Nour’s solar system was paid for by her family. Her brother, a doctor in the United Arab Emirates, worries constantly about his sister who is determined to stay in Lebanon. For him, the solar power system became a compromise of sorts: a way for him to make sure that his sister had at least secure access to electricity as the country was falling apart.

For those without such connections, other channels come into play. In the absence of a functioning banking sector,



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the more intimate and predictable alternative. It is made on one's roof, stored in batteries next to the washing machine, and used more carefully.

This is both empowering and deeply unfair. Lebanon's solar transition has created new forms of competence, autonomy, and pride. It has also turned households into miniature utilities and made inequality visible from the sky. The question Lebanon leaves us with is not whether solar power works. It does. The harder question is what kind of society emerges when the work of keeping the lights on is handed back to people themselves.

The current war has added another layer to this question. Lebanon's solar transition has made electricity more dispersed, more visible, and, for some, more controllable. But dispersion is not the same as protection. A panel on a roof may be harder to switch off from a ministry, a power plant, or a fuel terminal, but it remains embedded in fragile homes, villages, farms, supply chains, and conflicts.

For the rest of the world, Lebanon is not a model to copy. It is a reflection of what energy transitions can become when they happen under pressure: fast, inventive, unequal, and full of unintended consequences. The sun may be abundant, but living by it is not all sunshine.

Camillo Stubenberg is a Social Scientist and Development Practitioner whose work focuses on the intersections of technological, environmental, and societal change. His current projects include a comparative study of crisis-driven energy transitions and an applied research initiative on the role of Syrian diaspora entrepreneurs in post-conflict reconstruction. He holds a PhD from Cornell University, a Magister from the University of Vienna, and a BSc from BOKU Vienna.

religio-political organizations stepped in to fill the gap. The most important such institution was Hezbollah's microfinance organization and de facto bank, Al Qard al Hassan (AQAH). Recognizing the sudden rise in demand for solar power, the organization offered a special solar loan where monthly payments were set to reflect the previous cost of a generator subscription.

Firaz, a farmer I met near Ain, another village in the Bekaa Valley, was one of their new clients. He did not consider himself a big fan of Hezbollah. But since he did not have relatives abroad who could help him out, he put his political concerns aside. The loan program, he told me, was simply a good solution. Using his wife's gold jewelry as collateral, it allowed him to install solar panels when no other option was available.

The second major component of Lebanon's rushed transition was the availability of cheap but good solar kit from China (a 550 Watt PV panel costs only about 85 Euros on the Lebanese retail market). The massive price drops (90 percent in the last decade) make solar the most economically feasible avenue to energy security. This availability of affordable technology on the world market was complemented by the rapid development of a fiercely competitive local market. As one manager of an established solar energy company put it to me in

2023: "Now anybody who knows how to climb a roof is a solar technician."

The war between Israel and Hezbollah has revealed another, more brutal dimension of this new energy landscape. Decentralized solar systems are harder to shut down through a single power plant, substation, or fuel depot. But they are neither invisible, nor invulnerable. In southern Lebanon, solar panels both on private houses, as well as the larger systems often used to power municipal water pumps and irrigation systems have been damaged or destroyed in Israeli attacks.

Lessons from a Rushed Transition

When I last spoke to Nour, she no longer described her solar system as a temporary fix. She talked about it with the confidence of someone who had learned a new way of living with electricity. She knew when to run the washing machine, when to save the battery, when to trust the weather, and when not to. Her roof, laundry room, and phone screen had become part of an energy system she could finally control.

That predictability is one of the unexpected consequences of Lebanon's crisis. For decades, electricity arrived, disappeared, and returned as a sign of a state that was both present and absent. Today, for those who can afford solar, power has become