Arab Reform Initiative

POLICY BRIEF

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Regulating a Pluralistic and Decarbonized Electricity Supply through Public Service Principles of Equity and Solidarity

by
Alix Chaplain*
Eric Verdeil**

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Introduction

"Chaos", "individualism", "waste of resources": while some experts see the boom in Lebanon's solar market — now exceeding 1.3 GW of installed capacity — as an opportunity for "energy transition", others denounce the unequal, uncontrollable, and erratic nature of this phenomenon.[1] Promoted by public authorities until 2020, then driven by the collapse of Électricité du Liban's (EDL) production and the rising cost of diesel for generators, decentralized photovoltaic (PV) systems are accessible in Lebanon only to a privileged minority of the population.

The public authorities currently insufficiently regulate this electricity service commodification. Indeed, the Decentralized Renewable Energy (DRE) Law 318/2023 provides electricity exchange mechanisms in a horizontal market and facilitates the development of renewable energies by encouraging private actor investment.[2] The reform is based on the assumption that lower costs will ultimately automatically benefit all households. However, this seems unrealistic, leaving social justice out of reach in the current state of affairs.

This policy brief aims to reflect on the development of a structurally pluralistic and decarbonized electricity supply, where public infrastructure is the main tool for mutualization and equity. To be effective, it requires the definition and implementation of public service principles. The great heterogeneity in electricity supply — combining the grid, generators, and renewable energies — requires a rethink in public service. It can no longer be based on the principles of a uniform service and equal user treatment that characterize conventional grid-based services.[3] Instead, it should be based on universal and equitable access to a diversified and increasingly decarbonized service. In supplying a public service, solidarity between users is key. Solidarity is socio-technical, involving pooling, sharing, and regulating between a wide range of systems that optimize national supply from an economic, technical, and environmental perspective. But solidarity above all is socio-political, with public services theoretically embodying equity and socio-spatial integration

* Alix Chaplain is Assistant Professor at Sciences Po Saint-Germain-en-Laye and member of the Sociological Research Centre on Law and Criminal Institutions (CESDIP)

** Eric Verdeil is a University Professor, Sciences Po Paris

1 Laury Haytayan, "Renewable Energy in Lebanon: Chaos, Individualism, and the Drive for Survival", Arab Reform Initiative, 11 October 2024, https://tinyurl.com/y24wn38bs

2 Sorina Mortada, "Improving the Framework for Renewable Energy in Lebanon: Innovative Policies for Wheeling, Decentralized Energy Markets, and Carbon Offsetting", Arab Reform Initiative, 4 September 2025, https://tinyurl.com/4y8f23c4

3 Gilles Jeannot, "Les Usagers du Service Public", *Politiques et Management Public* 16, no. 4 (1998) pp. 171–173, https://tinyurl.com/5n7udnhe

among citizen-users, thereby giving substance to fundamental rights inherent to national solidarity and citizenship in Lebanon. Our proposal is therefore to rethink these principles of public service, considering the electrical transformations currently underway in Lebanon. This work is based on the doctoral thesis defended by Alix Chaplain in 2023 and comparative research carried out as part of the Hybridelec project coordinated by Eric Verdeil and Sylvy Jaglin, updated with recent data.[4]

Context Analysis and Public Service Principles

1. Four Major Shortcomings Engendered by the Current Development of PV regarding Socio-Technical Integration and Social Justice

While decarbonization is a positive development, the rapid growth of decentralized PV systems has also contributed to exacerbating inequalities when accessing electricity. Indeed, the gap is widening between consumers who are captive of an increasingly failing public grid and those who have the means to invest in PV systems, such as industrial, commercial and agricultural companies, universities, hospitals, and wealthy households. This development is all the more problematic given that the country has experienced a dramatic increase in poverty, one of the symptomatic difficulties in accessing electricity. An Institut Français du Proche-Orient (IFPO) survey estimates that 21.3% of Lebanese households have PV panels installed, but these are, in the main. These are mainly found among the most affluent socio-professional categories, for example, 59% of liberal professions, compared to only 12% of contractual, daily, or seasonal workers.[5] Alongside the development of PV, if 74% of Lebanese households said they had 24-hour electricity in April 2021 (through EDL and generator subscriptions), only 11% said so in July 2022, as the electricity crisis worsened and costs rose.[6]

Moreover, aid distribution has reinforced these inequalities through political — national or international — and religious organizations, for example, with direct or indirect subsidies and grants to purchase solar panels. These interventions are, in some cases, territorially selective, targeting places and groups according to political allegiances.[7] Therefore, while renewable energy represents for many Lebanese a form of emancipation from the State's failing infrastructure on the one hand, and from the generator "mafia" on the other, it would be naïve to believe that these systems are free from power relations and domination.

Beyond its unequal economic, political, and

4 Alix Chaplain, "Désintégration Sociotechnique et Territoriale au Liban. Le Cas de l'Électricité", Doctorat Études Urbaines, Institut d'Études Politiques de Paris, 2023, https://theses.hal.science/tel-04910353 [Chaplain, "Désintégrativon Sociotechnique"]; Alix Chaplain and Éric Verdeil, "Governing Hybridized Electricity Systems: The Case of Decentralized Electricity in Lebanon", *Journal of Urban Technology* 30, no. 2 (2023) pp. 57–78, https://doi.org/10.1080/10630732.2022.2105587; Éric Verdeil and Sylvy Jaglin, "Electrical Hybridizations in Cities of the South: From Heterogeneity to New Conceptualizations of Energy Transition", *Journal of Urban Technology* 30, no. 2 (2023) pp. 1–10, https://doi.org/10.1080/10630732.2023.2172301

5 Nizar Hariri et al., Étude Transversale des Précarités au Liban (1922-23), Institut Français du Proche-Orient (IFPO), 2024. The study found that the worker average monthly income was $690. Liberal professionals (professions libérales réglementées), who represent about 4% of the employed population, had an average income of $2,215. It did not provide income estimates for the households.

6 United Nations Office for the Coordination of Humanitarian Affairs (OCHA), Escalating Needs in Lebanon: A 2023 Overview, 2023, https://reliefweb.int/report/lebanon/escalating-needs-lebanon-2023-overview

7 Alix Chaplain, "Quand les Défaillances Infrastructurelles Recomposent les Solidarités Politiques : Les Fragmentations Libanaises au Prisme de l'Accès à l'Électricité", Flux 1–2, no. 139–140 (2025) pp. 61–79, https://doi.org/10.3917/flux1.139.0061

territorial dimensions, this uncontrolled individualization of electricity supply risks, above all, further destabilizing the economic public utility model in the long run, which is already failing, particularly in penalizing the poorest users who benefit from subsidized tariffs. Indeed, the gradual empowerment of large consumers — coupled with reducing consumption or even seceding by canceling their EDL subscriptions[8] — will make it difficult for the utility to balance tariffs — a progressive system that has been in place since 1974 — between different levels and types of consumers. This empowerment is often seen as an opportunity because it reduces demand on a grid strained by shortages. However, it also means a loss of revenue for EDL from large, non-subsidized consumers, and leaves fixed transport and distribution infrastructure costs to be borne by less consumption per subscriber. These costs can only be borne if fixed charges increase, which means that the total cost per consumer is likely to rise — on average, punishing EDL's less well-off consumers. This revenue loss for EDL comes on top of past and persistent difficulties to collect bills and to curb hook-ups.

Another flaw in Lebanon's new solar landscape is the squandering of energy it causes. Until 2020, the vast majority of PV systems installed were hybrid and could still operate on the grid, thanks to adapted inverters. However, the systems installed since the crisis have been designed to operate off grid, often with batteries, as EDL imposes drastic rationing. This choice, made in an emergency situation, will have long-term repercussions, since even when EDL's situation is restored, consumers of PV systems will not have the appropriate inverters to reconnect to the grid. However, a large proportion of installed PV devices, particularly by households, have been designed to ensure energy self-sufficiency through a combination of PV and batteries. They have been calibrated for maximum consumption, meaning that some of the time, households and even businesses have excess energy that cannot be shared via the national grid. This results in wasted energy and oversized investments, which leads to financial losses. There is, therefore, potential for optimization through reconnection that deserves to be considered.

Admittedly, DRE Law 318/2023 represents an important step forward. However, it is important to consider its less discussed possible consequences. Indeed, it does not remedy some of the problems identified above and may even exacerbate them. Firstly, promoting a peer-to-peer electricity market between producers and consumers risks aggravating the segmentation of the market between large and small consumers. Those who benefit from access to cheap, carbon-free electricity are likely to be large customers, particularly businesses, who have both the information and the bargaining power to make bulk purchases. For sellers, it will be easier to sell their production to a limited number of customers than to manage a portfolio of a large number of customers with limited consumption. These mechanisms, therefore, risk making it very difficult for households, particularly the less well-off, to access this service and thus benefit from the lower energy costs it will bring. These users will remain dependent on EDL, whose tariffs will remain higher in the long term, particularly because its electricity will continue to be largely produced from fossil fuels (fuel, oil, and even gas).

Furthermore, and more generally, the DRE law does not include any mechanism to encourage local consumption sharing, despite significant advantages that could offer – particularly in terms of limiting transmission and distribution losses – whether at the level of a building, through optimizing the use of roofs, or at the level of a business park or village, via sharing a village power plant, as was promoted in the Kabrikha project, for example.[9]

8 Mario Doueiry, "Thousands of Lebanese Households Unsubscribe from EDL", *L'Orient Today*, 13 March 2023, https://tinyurl.com/vfy-wb9t9

9 The aim of this EU-funded UNDP CEDRO "community net metering" project was to test a mechanism for feeding energy produced by a photovoltaic station (owned by a group of residents) into the local generator and EDL grids, thereby reducing both bills. United Nations Development Programme (UNDP) and CEDRO, Sustainable Energy for Lebanese Villages and Communities: The Village 24 Initiative, Sep-

Finally, even if we hope for the fastest possible return to 24/7 operation of EDL's grid, the country must be prepared for the possibility that this restoration will not happen imminently and that intermittent but interdependent operation between the conventional network and palliative measures will remain a major constraint for users. The social justice issue should be taken seriously, precisely because the current situation is a heterogeneous network of different sources, unconventional or non-state actors, and fluctuating prices for all. From this standpoint, one can argue that the transition to green will not in itself lead to social justice. For this to happen, clear policies and actions are needed.

2. Public Service Principles that Promote Fair and Efficient Operation for a Pluralistic Electricity Supply Model

Although discredited due to more than thirty years of failure, the public grid infrastructure is nonetheless governed by public service principles. Indeed, since President Fouad Chehab's mandate, the electricity infrastructure was a tool intended to contribute to economic development, as well as territorial unification and solidarity between regions and social groups. In turn, the state drew its legitimacy from this. Several regulations reflect these principles of public service: public funding of investments to extend the grid to peripheral regions, universal tariffs across the territory, and tariff equalization mechanisms between different categories of users.

In recent years, governments have accepted the essential role of diesel generators, as at least temporary substitutes for the EDL network. To this end, they have gradually defined two regulatory principles: the issuance of a recommended tariff, revised monthly, accounting for variations in input costs to generate and distribute this alternative service, including certain geographical conditions that increase the cost (mountainous areas, low-density areas); and a principle of transparency regarding electricity consumption, through an obligation to equip subscribers with meters to measure the electricity injected and the electricity consumed. Although the ministerial tariff is only a recommendation, it is intended to act as an incentive and provides municipalities with an argument to encourage generator owners to comply with it, in exchange for the use of public space for private network passage and engine installation.

Support for solar water heaters is another example, showing that it is possible to integrate public service principles into public energy policy, with the dual objective of making demand solvent and regulating supply. Financed by the Global Environment Facility since 2009 with Lebanese government support, as well as donations from the Chinese, Greek, Turkish, and Dutch governments, this public policy supporting solar thermal energy has led to spectacular growth in the market.[10] From the outset, the residential sector has been defined as the target of this public policy. As a result, several measures were put in place to make these potential consumers solvent and to guide them: green loans, purchase subsidies conditional on choosing a Lebanese Center for Energy Conservation (LCEC)-certified supplier ($200 per household), awareness campaigns, promotion of standards and product testing, and training for suppliers. It is thanks to an integrated approach combining financial instruments, guarantees, awareness-raising, and regulation that the solar thermal market has been able to take off in Lebanon, benefiting a large number of households that would otherwise be considered insolvent by banks.

In the current context, the EDL grid is now just one of several access solutions alongside commercial and

tember 2018, https://tinyurl.com/44fb57dj

10 Lebanese Center for Energy Conservation (LCEC), "Lebanese Solar Water Heater Market Study: Update 2017 – 2020", 2022, https://lcec.org.lb/node/4430; Chaplain, "Désintégration Sociotechnique".

less collective solutions (generators, solar panels, batteries, etc.). DRE Law 318, which encourages the involvement of private producers, further accentuates EDL's withdrawal from the supply of renewable electricity. The law merely establishes a principle of access to the grid (at a tariff) for PV producers but does not define any public service principles concerning geographical coverage or pricing, particularly for poor households or essential services. As mentioned above, the DRE law risks promoting market segmentation that excludes part of the population from the benefits of renewable energy.

We assume that a variety of suppliers have and will be providing electricity services in the future in a pluralistic manner using a range of technologies: the conventional grid and individual or collective systems, which are increasingly based on renewable energies and storage devices. In this context, it is up to the State, via the regulatory authority, to ensure that public service principles are upheld, guaranteeing access for all households to solar technologies and their benefits, while enabling the system to function optimally through complementarity and mutualization.

Recommendations

In this section, our objective is to transpose the principles of public service into a system where electricity is provided by a variety of actors and technological options, and to identify the technical, fiscal, and financial mechanisms that will enable them to become operational. The public authorities, in particular the electricity regulatory authority (ERA), will have to ensure the implementation and compliance of these various principles, in close collaboration with the Ministry of Energy and Water and EDL.

1. Principle of Balanced Territorial Coverage

The first objective is to encourage complementarity between sparsely populated rural areas and densely populated areas.

Firstly, by promoting the creation of solar power plants in rural areas where land is abundant, with energy ideally distributed via the local EDL grid or mini-grids. This would enable savings on the transmission grid by concentrating network reinforcement investments on transmission lines to urban areas. In rural areas, in addition to their essential role in providing political legitimacy for these projects, local authorities can become involved by making municipal land and the roofs of public buildings available for use in these projects. The public authorities or international donors could finance these investments, coordinated by ERA with the aim of achieving territorial balance. Access to international funding would justify supporting local entrepreneurs, conditional on price controls, based on the project's cost parameters over the duration of the concession.

In densely populated areas, a key objective would be to promote a policy of sharing roofs for solar installations, instead of the inefficient juxtaposition of devices that prevails today. This would require an amendment to the building committee law and the rules governing the use of shared spaces and equipment (roofs, lifts, communal lighting).[11] Municipal standards or standards set by the Ministry of the Interior could provide for this.

Furthermore, as in rural areas, solar electricity production sharing in local areas should be encouraged in order to avoid transmission costs. Inspiration for this can be drawn from the rules governing what are known in France as collective consumption schemes, for example, for industrial

11 See Zeina Abla, Dana Abi Ghanem and Muzna Al-Masri, I am, as You Can See, the Local Government, the Electricity Company and Much More: Building Committees as Spaces of Social Organizing in Beirut, Ebla Research Collective, February 2024, https://eblaresearch.org/2024/03/read-our-research-report/

or commercial zones, or public facilities:[12] surplus energy not consumed by prosumers can be distributed on a preferential basis to local users, possibly selected on social criteria.

2. Principle of Inclusive Access

In general, it is not conceivable to impose a single tariff on the peer-to-peer market, as prices depend heavily on technologies and installation periods, and suppliers compete to offer the best costs. Nevertheless, promoting more inclusive access to renewable electricity can be achieved through subsidies for solar system installations, particularly for households eligible for the EDL-subsidized tariffs (while ensuring that these are not second homes). By targeting low-consumption households, we can combine a social function with a reduction in the financial cost of the subsidy for EDL. A subsidy rate of 30% could be envisaged, backed by loans from the Housing Bank, as is the case in Tunisia (PROSOL program).[13] A fund to encourage renewable energy could be financed by donors.

As for the operators of local solar mini-grids integrated into the national grid, they could be subject to standards of equal treatment of users — obligation to connect all residents who wish to be connected — and inclusive access — tariff subsidies for the least well-off households. Mini-grid project developers could access international concessional funding if they implement a reduced tariff for low-income households (e.g., on the first 100 kWh of consumption), especially since the least well-off consumers are more dependent on mini-grids, as they cannot afford to invest in an individual system.

3. Quality Control Principle

Subsidy mechanisms would not only make it possible to meet part of the demand (for the least well-off households), but could also impose regulations on the technical and environmental quality of the devices. This issue has been particularly highlighted by the recent boom in the solar market (underperformance, fires, panels flying off, etc.). Installation financed by public subsidies could be made conditional on compliance with quality standards. This would involve, on the one hand, defining norms and standards, which the LCEC had already begun to do in collaboration with the Industrial Research Institute, and, on the other, implementing a supplier certification policy. Recipients of public and international subsidies would then be required to work with companies approved by the Ministry or a standard-setting body.

4. Principle of Energy Sharing

Finally, the current deployment of PV in Lebanon has encouraged self-sufficiency, one consequence of which is wasted energy in the absence of sharing. To remedy this problem and to encourage households and businesses equipped with systems that are unable to exchange energy, it is possible to take advantage of the rapid obsolescence of first-generation batteries and overused inverters and encourage their replacement with hybrid inverters that would enable net metering and grid connection. To do this, subsidies must enable the reconfiguration/replacement of inverters in individual battery-powered systems. At the same time, the creation of solar cooperatives in buildings can also be encouraged by providing grants for system renovations, for example, by helping the

12 François-Mathieu Poupeau and Blanche Lormeteau (eds.), *Emergence de l'Autoconsommation Collective d'Électricité en France : Modèles et Perspectives, Plan Urbanisme Construction Architecture*, https://shs.hal.science/halshs-04296075v1

13 See the presentation of National Agency for Energy Conservation (ANME), "PROSOL ELEC", https://anme.tn/index.php/fr/project/raccorde-en-bt consulted on the 9th of October 2025; Laurence Rocher and Eric Verdeil, "Dynamics, Tensions, Resistance in Solar Energy Development in Tunisia", *Energy Research & Social Science* 54 (2019) pp. 236–244, https://doi.org/10.1016/j.erss.2019.04.010

most disadvantaged households, but in the end benefiting all users in the building.

Conclusion

The implementation of these four main principles would thus mark the commitment of public authorities to an energy policy that combines the imperatives of decarbonization and environmental sobriety, justice accessing an essential service, and the preservation, or even reconstruction, of a national system to its original vocation of solidarity and national unity. The measures suggested are by no means exhaustive and must naturally be studied in greater detail to determine how they can be funded and applied.

About the Arab Reform Initiative

The Arab Reform Initiative is an independent Arab think tank working with expert partners in the Middle East and North Africa and beyond to articulate a home-grown agenda for democratic change and social justice. It conducts research and policy analysis and provides a platform for inspirational voices based on the principles of diversity, impartiality, and gender equality.

contact@arab-reform.net
Paris - Beirut - Tunis

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