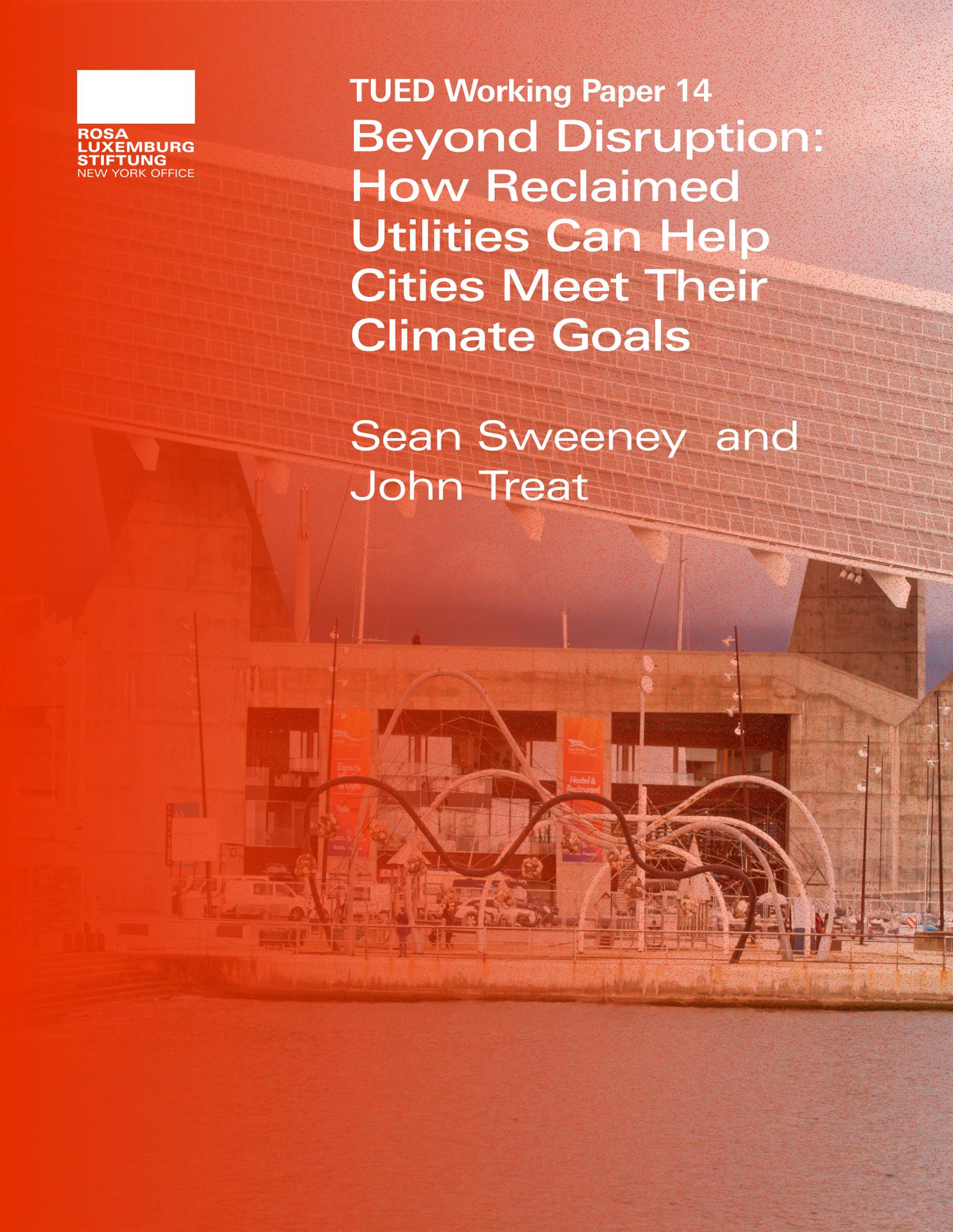


# TUED Working Paper 14 Beyond Disruption: How Reclaimed Utilities Can Help Cities Meet Their Climate Goals

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# Beyond Disruption: How Reclaimed Utilities Can Help Cities Meet Their Climate Goals

By Sean Sweeney and John Treat



Huge construction of a pergola with solar panels in the Barcelona shoreline. Catalonia, Europe. March 14th of 2015 (Photo by Artur Debat/Getty Images)

Over the past decade, cities have become central to debates on energy transition, climate protection, and for sustainable forms of living. While cities occupy just 2% of the Earth's surface, they consume more than two-thirds of global energy, and account for more than 70% of CO2 emissions.<sup>1</sup> Recognizing the need to respond to the threat of climate change and to reduce their dependence on fossil fuels, hundreds of cities have adopted ambitious targets for generating or acquiring electricity from renewable sources, for energy efficiency and conservation, and much more.

By the end of 2018, more than 230 cities globally had adopted targets for achieving 100% renewable electricity in at least one end-use sector (power generation; heating and cooling; transport), with more than half of those

<sup>1</sup> C40, "Why Cities? Cities have the power to change the world," [https://www.c40.org/why\\_cities](https://www.c40.org/why_cities)

having targets for two or more sectors.<sup>2</sup> These commitments are based on the widely held view that meeting decarbonization targets will involve widespread electrification of nearly all services and activities that are currently dependent on fossil-based fuels: transportation, heating and cooling, and much of industry.<sup>3</sup>

As a result of the pledges and commitments, a narrative has taken shape in recent years — one built around claims that cities are not just central to the transition to a low-carbon future, but are, in fact, *already showing the way forward*.<sup>4</sup> In the words of the influential renewable-energy think tank REN21, city-level commitments to reach climate targets have put cities “at the forefront of the rapidly expanding renewable energy movement.”<sup>5</sup>

## Why This Paper?

This working paper will not try to answer questions that pertain to the progress cities are making, or not making, in terms of reaching their respective renewable energy or decarbonization targets. Rather, the goal of this paper is to draw attention to two very related issues, both of which have, we believe, escaped the kind of attention their importance warrant.

The first issue concerns how cities can meet their 100% renewable energy and decarbonization targets. The adoption of ambitious targets raises many questions about the role that inside the city decentralized generation might play. As we will see, these questions have political implications for trade unions, the left, and the broader progressive community. If cities can, as is often suggested, meet a significant or large portion of their electricity needs by way of distribution generation, then it is appropriate for progressive municipalities to develop strategies that can both maximize this potential and to harness it in ways that can serve social and environmental objectives.

The second issue raised in this paper concerns the current and future role of the incumbent energy companies or utilities. Across the environmental movement and the broader left, these companies are routinely regarded as social dinosaurs and the primary obstacle to effective climate action. This bad guy characterization reinforces the idea that anything that disrupts the operations of these companies will help clear the path to a faster and more

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2 REN21, Global Status Report 2019, p. 184, [https://www.ren21.net/wp-content/uploads/2019/05/gsr\\_2019\\_full\\_report\\_en.pdf](https://www.ren21.net/wp-content/uploads/2019/05/gsr_2019_full_report_en.pdf)

3 Intergovernmental Panel on Climate Change (IPCC), Special Report: Global Warming of 1.5 °C: Summary for Policymakers, October 2018, <https://www.ipcc.ch/sr15/chapter/spm/>

4 REN21, GSR2019, p. 179

5 *ibid*

citizen-centered transition. This perception has led to a narrative overlap whereby the neoliberal green growth vision of disruption becomes difficult to distinguish from the kinds of disruption that is often endorsed by progressive forces.

In this paper, we attempt to show that there are multiple problems with the disruption approach. It is not remotely progressive. Rather, it is socially regressive, ecologically ineffective, economically unviable, and technically uninformed. We argue that the incumbent energy companies will not be disrupted out of existence; rather, they will remain dominant as market players and, under the current neoliberal framework, they will help perpetuate an energy for profit regime. If this is not changed, then cities will not be able to reach their energy and decarbonization targets. There is a need, therefore, to develop an alternative approach, one that goes *beyond disruption* (in a political sense).

The alternative approach that is offered shifts attention away from disruption of the incumbent companies toward the need to focus efforts on reclaiming these companies to public ownership. The advantages of this approach will be explained in more detail below.

## The Limits of Decentralized Generation in Cities

In activist circles, city self-generation is considered an important part of the decarbonization effort, and is normally embraced with some degree of enthusiasm. TUED's Working Paper 13, *Transition in Trouble? The Rise of and Fall of Community Energy in Europe* showed how some environmental groups and activist networks remain committed to a model of energy transition that situates behind the meter distributed generation, driven by citizens and communities, in the forefront of the transition to a decentralized, renewables-based system. We also showed that, as a result of policy changes, community energy projects are struggling to survive in major European countries (Germany, the UK, etc).<sup>6</sup> But in Europe and elsewhere, behind-the-meter distributed generation is losing ground to larger utility scale projects.

But distributed generation also faces a number technical of challenges and constraints. Drawing on recent research, we show that the capacity of cities

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<sup>6</sup> TUED Working Paper 13, March 2020, *Transition in Trouble? The Rise of and Fall of Community Energy in Europe*, <http://unionsforenergydemocracy.org/resources/tued-publications/tued-working-paper-13/>

to generate their own electricity is often quite limited from a technical standpoint. However, many in the broad progressive movement appear to be insufficiently aware of this reality, and this has led to a number of political miscalculations that are based on the perceived capacity of cities and communities to achieve some form of energy independence or sovereignty.

## Decentralized and Centralized Power

It is important to note that there is no clear dividing line between decentralized power and centralized power.<sup>7</sup> Clearly, a coal-fired power station is different from a large solar array in terms of size and capacity than by several orders of magnitude. But, by a similar measure, a large solar array is also different (often massively so) from a small solar system or micro grid located in a town or village. Similarly, an offshore wind farm is not the same as a gas-fired power station, but neither is it the same as a single wind turbine situated close to a small community. In the context of cities, distributed generation normally refers to smaller systems of the kind that can be situated in towns and cities themselves or (in the case of wind) in close proximity to them. As we will see, the distinction between small renewable energy systems and larger ones lies at the heart of the energy transition debates and the role cities might play.<sup>8</sup>

Of course, for many city-based activists, conceptions of what is termed energy sovereignty do not begin and end with distributed generation of electricity. Sovereignty also involves energy-related decision-making with regard to pricing, efficiency, conservation, access, and the rights of end-users. But cities' capacity to *generate power* remains a particularly important feature of the current thinking on energy sovereignty, one that cultivates and shapes aspirations regarding the struggle to have more local control over energy systems.

The evidence presented below suggests that, while it may be possible for cities to take important steps forward in terms of improving (and electrifying) public transport, introducing regulations on energy efficiency and

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7 Decentralization, regionalization and power lines

[https://renewables-grid.eu/fileadmin/user\\_upload/Files\\_RGI/Studies/Metastudy\\_decentralization\\_regionalization\\_and\\_power\\_lines.pdf](https://renewables-grid.eu/fileadmin/user_upload/Files_RGI/Studies/Metastudy_decentralization_regionalization_and_power_lines.pdf) “The issue of decentralization – which is often handled very vaguely and (too) often features rather crude narratives – requires a nuanced, differentiated analysis.” P3

8 Size is not the only consideration. A 2018 report points out, from a spatial and technical perspective, “proximity to consumption is a much more significant descriptive dimension for the characteristics of an energy system than the purely technical characterization of small or large or the type of grid connection.” Decentralization, regionalization and power lines

<https://renewables-grid.eu/publications/meta-study-on-decentralisation.html>

[https://renewables-grid.eu/fileadmin/user\\_upload/Files\\_RGI/Studies/Metastudy\\_decentralization\\_regionalization\\_and\\_power\\_lines.pdf](https://renewables-grid.eu/fileadmin/user_upload/Files_RGI/Studies/Metastudy_decentralization_regionalization_and_power_lines.pdf). Page 13

building codes, etc., the capacity of cities to generate electricity by way of distributed generation is technically constrained and may be quite limited in terms of its overall contribution to the process of city-level decarbonization.<sup>9</sup>

If this is the case, then the political implications for progressive forces are likely to be very significant. We do not propose abandoning efforts to control and manage energy at the city level, but such efforts must be guided by realistic expectations with regard to self-generation.

## The Role of Reclaimed Utilities

It was noted above that the incumbent utilities are routinely regarded as social dinosaurs and the primary obstacle to effective climate action. This bad guys characterization reinforces the idea that anything that disrupts the operations of these companies will help clear the path to a faster and more citizen-centered transition.

In our assessment, this view overlooks or downplays the impact of neoliberal policy on the incumbent companies, and is insufficiently mindful of the effects of a four-decade global push to privatize and liberalize energy systems. Neoliberal policy ensured that once public or heavily regulated companies were required to become (or attempt to become) for-profit concerns. The reforms also led to an energy war that forced different entities to compete against each other, not just for investment capital, market share, and revenue streams, but also for government subsidies and incentives. This set of policies is, we believe, a far more formidable obstacle to decarbonization than the fact that energy companies are still tied to fossil fuels, or that they remain large in terms of both their operations and their market dominance.

In previous working papers, we have suggested that the connection of these companies, both historical and current, to coal, gas and nuclear sources of power is *not the main problem*. Along with large hydroelectric systems, these sources of energy shaped profoundly the modern world. Incumbent energy companies did not choose dirty energy over “clean” alternatives, and the evidence suggests their current resistance to renewables cannot, as is often suggested, be attributed to their desire to preserve their market dominance regardless of the social and ecological consequences. We will discuss this in more detail in Part One when we consider the impacts of neoliberal policies.

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<sup>9</sup> This capacity depends to some extent on a city’s geographical location as well as other factors. In terms of solar power, Madrid is better endowed than Helsinki. And wind potential also varies across different regions. But, for the purposes of this discussion, geography is a secondary concern.

Either way, transitioning to low carbon energy is sure to span several decades, regardless of the policies used to promote decarbonization. Given this technical reality, centralized and fully integrated power systems will be an indispensable feature of both city-level and also economy-wide decarbonization. According to the IEA, “Despite the expected growth in decentralized generation and storage in more developed energy markets, the majority of electricity systems are likely to remain largely based on centralized generation and a robust transmission and distribution network for the foreseeable future.”<sup>10</sup>

It would be a serious mistake, therefore, to regard the incumbent companies as a political “lost cause.” Our examination of the debates and the data around cities reinforces our belief that a clear and unambiguous commitment to public ownership if the incumbent companies is necessary because it provides what is perhaps the only plausible means of addressing some of the challenges, both technical and market related, posed by economy-wide electrification and decarbonization. Put differently, the decarbonization of cities (and whole economies) will to a large extent depend on what role the incumbent utilities will play in future and for what purpose.

The data presented in this paper supports the view that the path to both energy sovereignty and to a full transition to non-fossil based energy will require a *system-wide* approach. Thus the need for a *comprehensive reclaiming* (full public ownership) of electricity generation, transmission, distribution systems, as well as critically important technology suppliers, operation and maintenance services, and R&D operations that are not already public institutions.

If cities are indeed responsible for 70% of global emissions<sup>11</sup>, and electricity generation is the leading single source of energy-related CO<sub>2</sub> globally, then the capacity of cities to be the drivers of decarbonization will to a large extent rest on the ability of cities to use their considerable political weight to try to shape the electricity systems at the national and, in some cases, the continental and even hemispheric level.

## The Structure of this Paper

This paper is divided into four sections:

**Part One: Transition Narratives and the Politics of Electricity** examines three narratives that have emerged around cities and their role in the energy

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10 <https://www.iea.org/reports/digitalisation-and-energy> p. 98

11 C40, “Why Cities? Cities have the power to change the world,” [https://www.c40.org/why\\_cities](https://www.c40.org/why_cities)

transition and the effort to address climate change. For convenience, we have named these narratives green growth, energy citizenship and progressive municipalism. We show how these narratives differ from each other, but also where they share common assumptions with regard to the current role of the incumbent energy companies and the importance of the disruptive impact of distributed generation.

This narrative overlap has, in our view, sometimes led to a degree of political confusion across the political left. By suggesting that the main obstacle to the transition is the dirty energy companies and their obstructionist behavior, the overlap obscures what actually needs to be done to decarbonize electricity systems, both at the city level and more broadly.

**Part Two: Small is Limited.** Here we look at the role of distributed generation in cities, and the extraordinary and expansive influence of Germany's *Energiewende* in promoting the idea of a people-led energy transition based on the prosumer model. We show how this perspective was not empirically robust, and several recent studies have drawn attention to the technical as well as market-related constraints facing city-level generation. We summarize the findings of studies that looked at distributed generation in Amsterdam and Barcelona.

**Part Three: Smart Cities and Distributed Energy Resources.”** In recent years the policy debates around the role of cities in the energy transition has increasingly gravitated towards the idea of smart cities and various Distributed Energy Resources (DER). Distributed generation remains an important part of this discussions on DER, but DER refers to a broader suite of technologies, such as storage batteries, digital systems and microgrids.

Here we will show how the neoliberal discourse around DER and smart cities perpetuates illusions in a disruptive consumer-driven energy transition. Embedded in the dominant DER narrative is a vision of change that is deeply regressive and, if it is pursued, will do little to help cities reach their renewable energy and decarbonization targets.

**Part Four: A Public Partnership: The Role of Reclaimed Utilities in Meeting Cities' Targets.** Here we show how the prospects of cities reaching their decarbonization targets would be greatly improved if the incumbent utilities were reclaimed to public ownership and issued a new pro-public mandate. In the context of discussions on energy transition and the role of cities, comprehensive reclaiming builds on the approach developed by progressive municipalism, while shifting the focus of political attention towards the incumbent companies themselves. The point of departure for

comprehensive reclaiming is this: cities may consume roughly 70% of the world's electricity, but incumbent companies currently control most of the world's electricity infrastructure. For as long as the electrical power they provide is needed—and that period could span decades—these entities will not disappear even if, on a capitalist basis, they become financially unviable.

## Part One: Crossed Wires: Transition Narratives and the Politics of Electricity

The debate on the role of cities in driving the energy transition has been shaped by a broader policy context, one that has for more than 20 years been dominated by the neoliberal green growth perspective. *But other narratives are also having an impact on the political discourse on cities and their role in the transition. For convenience, we have named these narratives energy citizenship and progressive municipalism.*

All three narratives are distinct from each other in several important respects. However, they often reflect common assumptions regarding two core issues. These are, first, that distributed renewable energy generation will play an important, perhaps central, role in the energy transition. Second, each of the narratives see large incumbent energy companies (that mainly source energy from gas, coal, and nuclear power) as the main obstacle standing in the way of the transition to a low carbon future.

This narrative overlap has, in our view, led to confusion across the political left. It reinforces the idea that the disruption of incumbent utilities by new market actors is positive in terms of advancing the energy transition in cities and elsewhere. Therefore, the disruption should be supported by policy. Combine this with an inflated view of the potential of distributed generation to meet energy needs (an issue we discuss in Part Two) and it is not difficult to see how the incumbent utilities have also come to be viewed as redundant or expendable.

As a result, not enough attention has been directed at how neoliberal privatization, marketization and liberalization changed the role and function of incumbent utilities across the OECD countries and in many countries of the global South. These companies make for an easy political target, but the main obstacle to the energy transition is not the incumbent companies; rather, it is the neoliberal policy framework and the chaos that it has brought to bear on energy systems in nearly all the major economies.

This failure to identify the main obstacle has had a major impact on progressive thinking regarding the best way forward for municipalities and local groups who want to play a role in building a different energy system.

## Business Opportunities: Green Growth and Urban Neoliberalism

The dominant green growth narrative has its roots in global discussions on sustainable development that emerged in the early 1990s. In 2001 the European Commission noted that “sustainable development seeks to turn the usual thinking on the environment on its head. It transforms environmental objectives into business opportunities, rather than just bringing heavy burdens to business and consumers, and it acts as a motor to drive economic performance.” The Commission pledged to “break the old link between economic growth and environmental damage.”<sup>12</sup>

In the context of climate policy, the term green growth became commonplace among global institutions following the financial crash of 2008. In its 2011 document *Towards Green Growth* the Organization for Economic Cooperation and Development (OECD) confidently asserted that addressing climate change need not come at the expense of economic growth.<sup>13</sup> The World Bank, the United Nations Environment Program (UNEP) and the various processes and platforms around the UN’s Sustainable Development Goals (SDGs) concurred.<sup>14</sup> Observing the “increasing trend of business sector influence in UN agenda-setting,” Barbara Adams and Kathryn Tobin, in a 2014 paper, explained how the “intergovernmental processes toward sustainable development (and by extension, the UN) affirm the neoliberal paradigm and its emphasis on market-led growth, rather than challenging the structures that create and perpetuate under-development in the first place.”<sup>15</sup>

Consistent with neoliberal thinking, one of the main tenets of green growth was the idea that the private sector should “provide leadership” and be “drivers of change” and, more recently, “invest in pursuit of the goals of the [2015] Paris Agreement.”<sup>16</sup> The influence of green growth narrative on the international labor movement has also been considerable, and this has been

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12 EU Commission, 2001. Environment 2010: Our Future, Our Choice. [https://ec.europa.eu/environment/air/pdf/6eapbooklet\\_en.pdf](https://ec.europa.eu/environment/air/pdf/6eapbooklet_en.pdf)

13 OECD, *Towards Green Growth*, 2011 <https://doi.org/10.1787/9789264111318-en>.

14 See for instance: World Bank Group, *Inclusive Green Growth: The Pathway to Sustainable Development*, World Bank, 2012, <https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=690&menu=35>

15 <https://rosalux.nyc/confronting-development/>

16 UNFCCC, Talanoa Call for Action, 2018 <https://unfccc.int/sites/default/files/resource/Talanoa%20Call%20for%20Action.pdf>

the subject of previous TUED Working Papers.<sup>17</sup>

Today, the term green growth is less widely used, but the basic thinking remains intact: dealing with climate change presents a massive economic opportunity for companies and entire economies, and the private sector has the capacity to show political leadership; can unleash a wave of technological innovation and, in the case of the large investors, has the capital to commit to a transition to a low carbon future.

As a hegemonic narrative, green growth has clearly influenced the policy discussions on the role of cities and is part of a broader approach that progressive scholars have called urban neoliberalism.<sup>18</sup> On this view, cities provide another important space for the kind of pro-business policy options favored by neoliberals, such as public private partnerships (P3s) and investor-focused incentives and guarantees. In terms of the energy transition, green growth is unequivocal regarding the need to create new markets and to limit the direct role of the public sector.

## **Power Sector Privatization, Distributed Generation, and Utilities**

As previous TUED papers have documented in considerable detail, the green growth narrative was (and remains) an attempt on the part of the policy elite to deal with the threat of climate change and the broader ecological crisis in a manner consistent with the broader neoliberal agenda.

The neoliberal approach to electricity systems began to take shape in the early 1980s and resulted in a global wave of privatizations; the liberalization of electricity markets, and the marketization of remaining public and/or regulated companies. Significantly, one of the arguments used to promote and then implement this agenda was the need to promote consumer choice and the need to encourage new market actors to challenge the dominance of the incumbent energy utilities.

In many countries, for decades utilities were originally tasked to meet electricity demand and to provide universal access. The financial cost of meeting these two goals was just one factor among many, such were the obvious

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<sup>17</sup> For example, see Working Paper 11, Trade Unions and Just Transition: The Search for a Transformative Politics (2018) <http://unionsforenergydemocracy.org/resources/tued-publications/tued-working-paper-11-trade-unions-and-just-transition/>

<sup>18</sup> Cumbers, A. and Becker, S. (2018) Making sense of remunicipalisation: theoretical reflections on and political possibilities from Germany's Rekommunalisierung process. *Cambridge Journal of Regions, Economy and Society*, 11(3), pp. 503-517. (doi:10.1093/cjres/rsy025) page 11. In other instances, these writers use the term "urban neoliberalism."

benefits of electricity and electrification across the economy. But even where utilities were expected to raise capital, they often did so on the basis of extremely low investor risk but modest returns. In the 1980s and 1990s, utilities were marketized. In other words, they were required to operate as for-profit commercial enterprises. Neoliberal guidelines insisted that sales of electricity should, at a minimum, cover all of the costs involved (in IMF and World Bank terminology, full cost recovery) and this would unleash a wave of investment, innovation, improvements in productivity and efficiency. This would, in turn, generate higher profit margins and that would attract still higher levels of investment.

## “Out of Market” Protections and the Death Spiral of the Incumbent Utilities

However, concerns about climate change and the need for power sector decarbonization led to a series of policy modifications. During the early 2000s, market liberalization had created a situation where wind and solar energy could not compete on a pure market basis with electricity generated by incumbent companies using fossil fuels and nuclear power. Policy makers concluded that renewable energy needed to be protected from market competition by way of various subsidies, including Feed-in Tariffs and, more recently, long-term Power Purchase Agreements (PPAs).

The landmark policy paper *The Stern Review: The Economics of Climate Change* published in late 2006 (a project led by Nicholas Stern, a former chief economist of the World Bank) captured what was then an evolving policy narrative, and its relevance to the current discourse around cities cannot be overstated. Describing climate change as “the greatest market failure the world has ever seen,”<sup>19</sup> the *Review* stated that “Tackling climate change is *the* pro-growth strategy for the longer term, and it can be done in a way that does not cap the aspirations for growth of rich or poor countries.”<sup>20</sup> [Emphasis added]

According to the *Review*, “The private sector is the major driver of innovation and the diffusion of technologies around the world.” However, it concluded that government interventions were necessary, principally in the form of pricing CO<sub>2</sub> and other greenhouse gas emissions (GHGs), accompanied by policies “to support innovation and the deployment of low-carbon technologies.”<sup>21</sup> The *Review* singled out electricity generation, as a sector where “new technologies can struggle to gain a foothold.” Importantly, it

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19 The Stern Review: The Economics of Climate Change, 2006 <https://doi.org/10.1111/j.1728-4457.2006.00153.x> xxvii

20 Ibid

21 Ibid

recommended that “the scale of existing deployment incentives worldwide should increase by two to five times, from the current [2006] level of around \$34 billion per annum. Such measures will be a powerful motivation for innovation across the private sector to bring forward the range of technologies needed.”<sup>22</sup>

But deployment incentives would not be confined to the power sector. As we discuss in Part Three below, incentives would eventually extend to other low-carbon solutions, such as storage batteries, electric vehicles (EVs), smart meters and other technologies. In the case of renewables, out-of-market protections not only ran counter to the main competitive markets thrust of 1980s and 1990s neoliberal policy, it had a highly detrimental effect on the incumbent utilities, particularly in the OECD countries, but also in the global South (for examples, South Africa and Mexico).<sup>23</sup>

As documented elsewhere, the policy of protecting renewables from competition has triggered what has been termed a utility death spiral, one marked by falling market share, lower profit margins, and capital scarcity because of a loss of investor confidence in the incumbent companies to produce satisfactory returns. A combination of falling profits and high levels of debt have led to the downgrading of many utilities’ credit ratings, particularly in Europe where the penetration of wind and solar energy has been particularly disruptive for the incumbent companies.<sup>24</sup> What has transpired is an energy war that has pit renewable energy interests against the incumbent companies. This war has produced collateral damage that has made the energy transition more complicated, more chaotic, and much more expensive than it might have been had the wave of privatization and liberalization not occurred.

Another factor that contributes to the death spiral of the utilities is the system costs (sometimes called network costs) that accompany variable renewable energy (VRE).

According to the IEA, when VRE penetration ranges from 15% to 25% of annual generation, countries and regions can expect to encounter “the first

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22 Ibid

23 See especially, Sean Sweeney and John Treat, “TUED Working Paper #10: Preparing a Public Pathway: Confronting the Investment Crisis in Renewable Energy, November 2017, <http://unionsforenergydemocracy.org/resources/tued-publications/tued-working-paper-10-preparing-a-public-pathway/>

24 Vera Wehmann, *Going Public: A Decarbonised, Affordable and Democratic Energy System for Europe*, PSIRU, University of Greenwich, July 2019, <https://www.epsu.org/article/going-public-decarbonised-affordable-and-democratic-energy-system-europe-new-epsu-report>; Financial Times (12 March 2018) Germany’s €43bn energy shake-up wins market favour. <https://www.ft.com/content/d020a052-25e4-11e8-b27e-cc62a39d57a0>

really significant integration challenges, as the impact of variability is felt both in terms of overall system operation, and by other power plants.”<sup>25</sup> At this point there needs to be an increase in system flexibility (grid reinforcement and interconnections, storage, etc.), without which the effort to decarbonise power generation in these countries with renewables “will confront serious technical roadblocks.”<sup>26</sup>

Removing these roadblocks means that incumbent companies will incur significant costs. The IEA has estimated system costs add an additional 10%-15% over the costs of a unit of installed wind and solar capacity. Another study noted, “These system changes and technology upgrades represent an extensive investment on the part of electric utilities, rate payers, and equipment manufacturers, and a huge change in the way the power system is operated and designed.”<sup>27</sup>

However, the death spiral facing many utilities does not spell the end of coal, gas or nuclear in power generation. In the case of Europe, the record level of renewable power generated by wind and solar Europe-wide on any given day has never exceeded 30.1% (on July 30, 2017). Three weeks later, during the evening of August 25, 2017, wind and solar provided only 5.5% of the region’s power, and the remainder—94.5%—was provided by coal, gas, nuclear and large hydro systems.<sup>28</sup>

Here it is important to note that large hydro systems are classed as sources of renewable power but, in most instances, the systems in the EU were built decades ago and have relatively little scope for expansion. As of 2018, wind and solar together provided just over 16% of the EU28’s electrical power on an annual basis.<sup>29</sup> If the power generated by large hydroelectric systems is included, then the annual average for power generated by renewables is currently around 28%. Therefore, Europe’s power system remains dependent on coal, gas and nuclear. Taken together, these sources supply nearly

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25 IEA, *Getting Wind and Sun onto the Grid*, March 2017, <https://www.iea.org/reports/getting-wind-and-solar-onto-the-grid>

26 IEA, *Renewables 2017*, 4 October 2017, <https://www.iea.org/publications/renewables2017/>

27 Energy Policy Research Institute, “Power Generation Technology Data for Integrated Resource Plan of South Africa—Technical Update, April 2017,” p 293 <http://www.energy.gov.za/IRP/irp-update-draft-report2018/EPRI-Report-2017.pdf>, p 293. See also, Darius Corbier, Frédéric Gonand, Marie Bessec, “Impacts of decentralised power generation on distribution networks: a statistical typology of European countries,” Working Papers from Chaire Economie du climat, <https://econpapers.repec.org/paper/cecw-paper/1509.htm>

28 Bruno Lajoie, “Europe’s interconnected electricity system: an in-depth analysis,” *electricityMap*, 8 June 2018, <https://medium.com/electricitymap/what-does-it-take-to-decarbonize-europe-d94cbcd80878>. For daily data see: <https://jsfiddle.net/iovio/o8e94z6j/>

29 Eurostat, “Electricity production, consumption and market overview,” [https://ec.europa.eu/eurostat/statistics-explained/index.php/Electricity\\_production,\\_consumption\\_and\\_market\\_overview#Electricity\\_generation](https://ec.europa.eu/eurostat/statistics-explained/index.php/Electricity_production,_consumption_and_market_overview#Electricity_generation)

three-quarters of the EU28's electricity.<sup>30</sup>

But because coal, gas and nuclear plants are not operating at full capacity under the current market design, they often struggle to cover operating costs, at the same time as they are expected to invest in the kind of upgrades needed to handle rising levels of variable wind and solar power. According to one source, "the paradox is that these [power] plants are still needed operationally to ensure security of supply and to mitigate intermittency of renewables: the market is not supporting the assets that we need.... New investment has stalled and the players normally relied on to supply it are carrying the weight of previous unrecovered investments."<sup>31</sup>

Concerned that these death spiral dynamics would bankrupt the incumbent companies at a time when the power they generate remains essential, governments have introduced some form of supplementary capacity mechanism into their domestic energy markets. These were, and remain, insurance payments to electricity generators in order to keep their capacity available for those times when it may be needed.<sup>32</sup> Capacity payments have led to a transfer of public funds to coal, gas and nuclear interests.

For the foreseeable future, then, the power generated by gas, nuclear, and coal will still have an essential role to play in meeting energy needs. Although growing quite rapidly, currently there is not enough renewable energy to replace fossil-based and nuclear power any time soon. Globally, solar accounts for less than 3% of electricity supply, and wind is under 7%.

All of this may seem very far removed from the discussion on cities and how they might reach their renewable energy targets. But although the dark side of the moon is never visible, it is nonetheless very real. Put differently, any left or progressive discussion on cities needs to be cognizant of issues that are coming into view at the system-level. How the energy transition is navigated will have a direct bearing on the future of cities. We will return to this issue later in this report.

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30 Eurostat, "Electricity production by source, EU-28, 2018 (%)," [https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Electricity\\_production\\_by\\_source,\\_EU-28,\\_2018\\_\(%25\).png](https://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Electricity_production_by_source,_EU-28,_2018_(%25).png)

31 Arnaud Coibion and John Pickett, "Capacity Mechanisms Reigniting Europe's Energy Markets," *Linklaters*, 1st July 2014, <https://www.linklaters.com/capacitymechanisms>

32 The UK government calculated that £100 billion of capital investment would be needed over a 10-year period needed to replace aging generation capacity and to meet the UK's carbon targets. According to the national regulator, OFGEM, increased risk across the power sector was a barrier to mobilizing investment at such high levels. See: OFGEM, "Press Release: Action Needed to Ensure Britain's Energy Supplies Remain Secure," 3 February 2010, <https://www.ofgem.gov.uk/ofgem-publications/76371/ofgem-discovery-phase-ii-draft-v15.pdf>; See also: <https://www.gov.uk/government/publications/2010-to-2015-government-policy-uk-energy-security/2010-to-2015-government-policy-uk-energy-security#appendix-5-electricity-market-reform-emr>, and EMR Settlement Limited, Capacity Markets, <https://www.emrsettlement.co.uk/about-emr/capacity-market/>; accessed 3 May 2021

## Urban Neoliberalism

Meanwhile, the green growth discourse at the city level has, at least until very recently, often displayed an unshakable confidence in private companies and the “market disruption” model. Distributed generation as part of a suite of changes needed to decarbonize cities. This is based on the belief that anything that promotes competition, diversifies energy markets, or forces the incumbent companies them to change their business model in ways that support “consumers” is overwhelmingly positive.

The green growth approach to city-level transformations is represented by visible and well-resourced networks like C40 (a global network of cities committed to tackling climate change), the Global Covenant of Mayors for Climate & Energy, the Coalition for Urban Transitions, and others.<sup>33</sup> The connection between the broader neoliberal discourse and the debate on the role of cities comes in the form of a variety of institutional connections. For example, the president of the Board of C40 is former New York City Mayor Michael Bloomberg, and the initiative has close ties to the Clinton Foundation.<sup>34</sup> The Coalition for Urban Transitions has ties to the New Climate Economy think tank, which is led by former World Bank chief economist Nicholas Stern. According to Stern, cities should embrace the green growth approach as a means to unlock decades of economic prosperity: “Low-carbon investments in cities could yield returns worth US\$24 trillion over the next 30 years – equivalent to the GDP of the United States and Japan combined.”<sup>35</sup>

But the policy commitment to green growth has almost always highlighted the need for governments to provide the right terms and conditions to engage private investors—and that normally entails subsidies and incentives of various kinds. The OECD’s 2014 report titled *Green Growth in Cities* notes that the success of market-driven energy transitions depends on three pre-conditions: “a market for green urban investment projects, good returns on investment and limited risk.”<sup>36</sup>

In other words, city governments will (alongside national governments) be expected to play their part in ensuring that private investors make

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33 Andrew Steer, “Green Growth for the Commonwealth: Ready for Phase Three,” WRI, April 18, 2018, <https://www.wri.org/blog/2018/04/green-growth-commonwealth-ready-phase-three>

34 [https://www.c40.org/board\\_of\\_directors](https://www.c40.org/board_of_directors)

35 Coalition for Urban Transitions, 2019. Climate Emergency, Urban Opportunity: How National Governments Can Secure Economic Prosperity and Avert Climate Catastrophe by Transforming Cities. <https://urbantransitions.global/en/publication/climate-emergency-urban-opportunity/> The quote is from Nicholas Stern

36 OECD, Green Growth in Cities, 2013, <https://doi.org/10.1787/9789264195325-en>, <https://www.oecd.org/cfe/regionaldevelopment/cities-green-policies-can-contribute-to-growth.htm>, p. 86.

satisfactory returns, and these same governments must ensure projects that are both plentiful enough and large enough to attract investor interest. In the words of the OECD, to stimulate such interest from investors, “urban green infrastructure projects need to be marketable and promising with regard to returns and risk, involving high potential yields or limited risk, or both.”<sup>37</sup>

In Part 3 we will examine what “high potential yields or limited risk” implies—and why it is important to offer an alternative, pro-public approach based on a “comprehensive reclaiming” of energy systems, which is explained in Part Four of this report.

Meanwhile, in June 2020, the OECD’s *City Policy Responses (to Covid 19)* warned that “without coordinated and substantive action, the COVID-19 crisis will put low-carbon investments at risk...economic uncertainty tends to induce firms to reduce or postpone investment and innovation activity, which is particularly important for investments in the energy sector.” Furthermore, “low fossil-fuel energy prices provide weaker incentives for investment in low-carbon and energy efficiency technology at all stages.”<sup>38</sup>

But what does the OECD mean by “coordinated and substantive action”? Again, it entails governments “designing conditional subsidies, preferential loans and fiscal incentives for green investment projects and business practices..[.]”<sup>39</sup> Political pressures to weaken climate policies should at all costs be resisted, because any weakening “increases uncertainty for firms, discouraging them from investment and job creation. Such effects are particularly pronounced for firms in policy-sensitive sectors such as electricity production.”<sup>40</sup>

Thus we see that the main emphasis of green growth policy in the post-pandemic period is, in the power sector at least, no different than it was in the years that immediately preceded the COVID crisis: governments, using public money, should continue to guarantee returns on investments for for-profit interests on a more or less indefinite basis.

## Disruption vs. Obstruction

A distinct feature of the green growth approach at the level of cities is a tendency to view consumers and businesses—and local authorities themselves—as agents of market disruption.

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37      Ibid

38      <https://www.oecd.org/coronavirus/policy-responses/cities-policy-responses-fd1053ff/>

39      <https://www.oecd.org/coronavirus/policy-responses/cities-policy-responses-fd1053ff/p49>

40      <https://www.oecd.org/coronavirus/policy-responses/covid-19-and-the-low-carbon-transition-impacts-and-possible-policy-responses-749738fc/>

In the green growth literature on cities, the incumbent utilities are often barely visible. And yet, these companies provide most of the energy cities currently consume. Meanwhile, in the wider discourse, it is often stated that the slower than necessary deployment of renewables can be attributed to “electricity system inertia” and “the utility-driven risk of carbon lock-in and asset stranding.”<sup>41</sup> In other words, the utilities are often singled out for being responsible for the slowness of the energy transition in many parts of the world. They are frequently referred to as entities that, because they were for many years vertically integrated (and frequently publicly owned) monopolies, they are both unaccustomed to competition and impervious to the need for innovation and change. This, it is suggested, explains why incumbent companies are inclined to obstruct citizens, communities, and cities that wish to develop distributed generation projects.<sup>42</sup>

This negative depiction of the incumbent companies was reinforced in *The Stern Review* of 2006. Energy systems based on centralized generation are, it stated, “resistant to the technical change that will be necessary in a shift to a low-carbon economy.”<sup>43</sup> One of the “co-benefits” of climate change policy is that it “may be a lever for reforming inefficient energy systems” and “removing distorting energy subsidies.”<sup>44</sup> It is important to note that the vocabulary used in *The Stern Review* almost invariably refers to subsidies in the context of fossil fuels, and most of these subsidies, if measured in dollar terms, consist of price controls designed to protect users from global market prices. In contrast, the subsidies to the renewables sector are referred to as incentives or policy supports, the beneficiaries of which are *producers*, not consumers.<sup>45</sup>

Either way, the *Stern Review* reinforced the neoliberal view that policies and practices that disrupt the incumbent companies—companies that are situated at the center of the current system—will somehow make a positive contribution to decarbonization efforts in cities and elsewhere. Municipal governments are encouraged to see themselves as facilitators of disruption and as advocates of market diversification and prosumerism.

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41 Alova, G. A global analysis of the progress and failure of electric utilities to adapt their portfolios of power-generation assets to the energy transition. *Nat Energy* 5, 920–927 (2020). <https://doi.org/10.1038/s41560-020-00686-5>

42 See European Renewable Energy Council, “RE-thinking 2050; A 100% Renewable Energy Vision for the European Union.” European Renewable Energy Council. European Renewable Energy Council, 04/2010. Web. 14 Jan 2014. <[http://www.rethinking2050.eu/fileadmin/documents/ReThinking2050\\_full\\_version\\_final.pdf](http://www.rethinking2050.eu/fileadmin/documents/ReThinking2050_full_version_final.pdf)>.

43 The Stern Review: The Economics of Climate Change, 2006 <https://doi.org/10.1111/j.1728-4457.2006.00153.x> page 355

44 The Stern Review: The Economics of Climate Change, 2006 <https://doi.org/10.1111/j.1728-4457.2006.00153.x> page xvi

45 Sean Sweeney, Weaponizing the Numbers: The Hidden Agenda behind the Fossil Fuel Subsidy Reform, New Labor Forum, February 2020

<https://newlaborforum.cuny.edu/2020/02/01/weaponizing-the-numbers-the-hidden-agenda-behind-the-fossil-fuel-subsidy-reform/>

## The Impact of Marketized Energy

The negative view of the incumbent companies has tended to obscure the fact that privatization, marketization and liberalization changed the mandate and mission of the incumbent utilities from one consistent with a public service and/or national development model to one more in keeping with neoliberal doctrine and its unwavering commitment to weaken everything public and to enhance the political and economic power of the private sector.

Whether the CEOs of utilities embraced the neoliberal reforms in the 1980s and 1990s enthusiastically or reluctantly is today largely immaterial, although it is well known that governments pursuing neoliberal policies routinely position supporters of those policies at the head of public energy companies in order to oversee the unbundling and privatization process.<sup>46</sup> Either way, the rules were changed. Incumbent companies then had to abandon their public service mission in order to look after their own interests on a capitalist basis—including protecting their market share, sustaining revenues, and attracting investment.<sup>47</sup>

As we have seen, the policy decision to extend incentives and subsidies to renewable energy interests was implemented in such a way that, in the context of market liberalization, could only inflict economic harm on the incumbent companies, especially in the OECD countries where demand for electricity has been flat or even falling for roughly two decades.

In some instances, incumbent utilities are prohibited by law from developing their own renewable energy generation capacity (known as Utility Owned Generation, or UOG). According to the New York state agency NYSERDA: “If New York permits utility ownership, third parties [read: private developers] may choose not to enter the New York markets because of competitive risks. Allowing utilities as owners to reduce near-term costs may chill the market and the effect will be less rather than more competitive efficiency.”<sup>48</sup> In other words, UOG of renewables may be cheaper and more competitive in the short term due to economies of scale, but this would drive private investors away from the power sector—which would (apparently) make the sector less competitive!

In our view, the claim that incumbent companies are motivated by the desire to maintain their market domination; that they are happy with the status

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46 The recent hiring of Andre de Ruyter as CEO of South Africa’s national power utility, ESKOM, is a good example of this kind of appointment. See National Union of Metal Workers of South Africa, NUM-SA CONCRETE RESPONSE TO ESKOM CRISIS, 12 January 2020

47 World Bank, 2018 -global south reform – cited later

48 <http://documents.dps.ny.gov/public/Common/ViewDoc.aspx?DocRefId=%7B930CE8E2-F2D8-404C-9E36-71A72123A89D%7D>

quo, or they are committed to coal, gas and nuclear, stuck in an antiquated market model, etc., is not sufficiently analytical. It misses or understates the significance of the impact of the neoliberal reforms of the 1980s and 1990s has had, and continues to have, on the behavior of these companies.

## Energy Citizenship

Another narrative that has shaped the discussion around cities can be termed energy citizenship. For the purposes of this paper, energy citizenship includes community energy projects and initiatives.

As documented in TUED's Working Paper 13, *Transition in Trouble: The Rise and Fall of Community Energy in Europe* (February 2020), many activists have come to see cities as important focal points for advancing "energy citizenship," where individuals or groups can own, generate and manage their own electricity, become less dependent on large energy companies, and also make a contribution to the energy transition.<sup>49</sup>

The energy citizenship narrative has been built on three broad arguments. These are technical, economic and social. The *technical* argument holds that decentralized generation has enormous untapped potential, due to the ability of wind turbines and solar panels to convert the energy generated by the wind and the sun into electrical power promises to deliver unlimited renewable energy with no fuel costs. Unleashing the potential to produce abundant renewable energy from these sources, this argument goes, will make a massive contribution to meeting climate targets.

The *economic* argument holds that renewables are, or soon will be, cheaper than electricity generated by burning fossil fuels or by nuclear power stations. Therefore, distributed generation will bring economic benefits to citizens and communities and not, as has traditionally been the case, to large energy companies.

The *social* argument for energy citizenship is based on the idea that individuals and communities can participate at a grassroots level in the energy transition and thus widen its political support.<sup>50</sup> Almost by definition, energy citizenship is people-centered and can reflect the desire of local people to be more fully and consistently engaged in energy-related decisions.

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49 TUED Working Paper 13, *Transition in Trouble: The Rise and Fall of Community Energy in Europe*  
50 Laurie Laybourn-Langton, *Community and local energy: Challenges and opportunities*, Institute for Public Policy Research, June 2016, <https://www.ippr.org/publications/community-and-local-energy-challenges-and-opportunities>

These arguments have frequently been accompanied by a number of bold claims, whereby energy citizens are considered crucial to meeting ambitious climate targets, promoting democracy, redistributing wealth and power, and helping redress historical injustices. Community energy is therefore often presented not merely as a viable alternative, but perhaps the *only* equitable alternative, to dirty, centralized energy. According to the European federation of renewable energy cooperatives, (RESCOOP), “A socially fair energy transformation means putting renewable energy into the hands of communities and people – taking back power from the fossil fuel industry, which has consistently blocked action that threatens its own financial interest, at the expense of people and the planet...Community energy has the power to achieve an energy transformation more quickly, fairly and with added social benefits.”<sup>51</sup>

In some parts of the world, the political movement behind energy citizenship has been considerable in terms of its strength and influence. But its relationship to the green growth narrative is conflicted. On the one hand, the energy citizenship perspective holds that city-level decarbonization—indeed decarbonization more broadly—can be led by individuals and communities. Advocates of energy citizenship regard policies that promote large renewable energy projects as misguided and unnecessary.<sup>52</sup>

This “small is beautiful, big is ugly” binary has led some in the energy citizenship movement to take a positive view of liberalized energy markets, in that they have created space for citizens and local groups and to undermine the large energy interests. In Europe, political representatives of this perspective applauded the EU’s Clean Energy Package that was adopted in 2019, even though it is based on more privatization and liberalization. This is because the Package recognized, for the first time, “citizens or communities as distinct market actors.”<sup>53</sup>

The energy citizenship perspective presents a clear view of the problem (large energy companies) and an equally clear view of the solution (distributed generation in the hands of the people). A 2021 report from the US-based Institute for Local Self Reliance (ILSR) titled *How Big Utilities Are Impeding Clean Energy, and What We Can Do About It*, argues that, whether privately

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51 Friends of the Earth Europe, Greenpeace EU, REScoop.eu, Energy Cities, and Friends of the Earth Spain and Hungary, “Unleashing the power of community renewable energy,” 14 February 2019, <https://www.foeeurope.org/unleashing-power-community-energy>

52 John Farrell and Matt Grimley, “Public Rooftop Revolution,” June 2015, Institute for Local Self-Reliance (ILSR), <https://ilsr.org/public-rooftop-revolution/>. See also: <https://energycentral.com/c/cp/john-farrell-why-it-costs-more-utilities-sell-power>

53 Friends of the Earth Europe, Greenpeace EU, REScoop.eu, Energy Cities, and Friends of the Earth Spain and Hungary, “Unleashing the power of community renewable energy,” 14 February 2019, <https://www.foeeurope.org/unleashing-power-community-energy>

or publicly owned, utilities “dominate how electricity is generated, transmitted, and distributed or sold to the customer.” The solution to this “concentrated power,” the report states, lies in “embracing decentralized ownership and generation.”<sup>54</sup>

## Progressive Municipalism

This brings us to our third narrative—progressive municipalism. This approach has its roots in the broad political left and the rich legacy of municipal socialism. But it also interfaces with the much more recent “new municipalism” political current, the aim of which is to “democratically transform cities to resist growing inequalities, democratic deficits and social injustices.”<sup>55</sup>

Progressive municipalism is sustained by organizers and activists who have campaigned to improve and extend public services at the local level, and to strengthen democratic governance and participation. For many currently involved in this work, cities are seen as crucial to building the kinds of organizations, political power and decision-making capacity that are needed to shape and bring about a radically different future.

The progressive municipalism approach has been instrumental in shifting both public debates and, to some extent, the policy landscape in a number of large cities, particularly in Europe.<sup>56</sup> Beginning in the mid 2000s, many European cities began to push back against the tide of privatizations and outsourcing, and a significant number brought essential services that had previously been privatized back into public ownership, or expanding new services under public ownership that might otherwise have been outsourced to private contractors: water, public transport, etc.<sup>57</sup> While mostly in the global North, cities in the global South have also taken similar measures.<sup>58</sup> Largely as a result of a number of significant political victories, cities are today recognized as places where the left can be effective in generating real change and achieving meaningful outcomes.<sup>59</sup>

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54 John Farrell, “How Big Utilities are Impeding Clean Energy, and What We Can Do About It,” January 2021, [https://cdn.ilsr.org/wp-content/uploads/2021/01/SLPG\\_Electricity.pdf](https://cdn.ilsr.org/wp-content/uploads/2021/01/SLPG_Electricity.pdf)

55 Barcelona en Comú et al., 2019, cited in Thompson, M. (2020) What’s so new about new municipalism? *Progress in Human Geography* Early online version available at: <https://doi.org/10.1177/0309132520909480>

56 Bruno Estrada López, “Energy transformation under the pressure of austerity: the case of Spain,” in Béla Galgóczi, ed., *Europe’s energy transformation in the austerity trap*, European Trade Union Institute, 2015; <http://www.etui.org/Publications2/Books/Europe-s-energy-transformation-in-the-austerity-trap>

57 David Hall, “Re-municipalising municipal services in Europe,” May 2012, PSIRU, University of Greenwich.

58 David Hall, Sandra van Niekerk, Jenny Nguyen, Steve Thomas, *Energy Liberalisation, privatisation and public ownership*, Public Service International Research Unit, September 2013

[https://www.world-psi.org/sites/default/files/en\\_psiwu\\_ppp\\_final\\_lux.pdf](https://www.world-psi.org/sites/default/files/en_psiwu_ppp_final_lux.pdf)

59 Lavinia Steinfert, “The Future is Public: Working Paper 13,” Transnational Institute, December

Needless to say, progressive municipalism is distinct from green growth in a number of important respects. Advocates of green growth maintain that addressing climate change amounts to a massive business opportunity (particularly for the private sector), whereas those coming from a progressive municipalism perspective believe that the threat of climate change can and should be met in ways that can advance equality, social and racial justice, and local democracy.

Progressive municipalism is also quite distinct from energy citizenship thinking in that it views quality public services to be crucial in realizing the potential of cities to play an important role in the energy transition. Municipal authorities have the kind political weight to exert greater control over generation, distribution, supply and management of electricity that citizen-based initiatives almost invariably lack. Cities can exert more influence over energy choices (normally to advance renewable energy and energy efficiency), build democratic participation, improve customer service, and protect individuals and communities from energy poverty.

Nevertheless, advocates of progressive municipalism have been inclined to take a positive view of electricity generation by individuals or community projects by way of a prosumer model, and many progressive municipal authorities have been active in promoting distributed generation and have encouraged community energy projects and cooperatives. Several have established public electricity retail companies, and there have been many examples (in Germany at least) of cities reclaiming distribution grids to municipal ownership.

During the past decade municipal-level processes and commitments have generated a solid body of quantitative and qualitative research that has been extremely useful to trade unions. Transnational Institute authors Kishimoto and Steinfert have documented 374 cases of energy-related remunicipalizations (as of 2019).<sup>60</sup> According to Becker, Germany has seen 284 energy-related remunicipalizations since 2005—or roughly 76% of the global total.<sup>61</sup> These efforts have resulted in attempts to share knowledge and promote best practices between activists and networks so that other municipalities

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2019, <https://www.tni.org/en/futureispublic>.

60 Kishimoto, S., Steinfert, L., and Petitjean, O. (2020), *The Future is Public: Towards Democratic Ownership of Public Services*. Amsterdam: Transnational Institute.

Cumbers, A. and Becker, S. (2018) Making sense of remunicipalisation: theoretical reflections on and political possibilities from Germany's Rekommunalisierung process. *Cambridge Journal of Regions, Economy and Society*, 11(3), pp. 503-517. (doi:10.1093/cjres/rsy025) page 11. In other instances, these writers use the term "urban neoliberalism."

61 Sören Becker, *Our City, Our Grid: The energy remunicipalisation trend in Germany* [TNI] Becker has adequately explained why Germany has been able to lead in terms of the number of remunicipalizations, but this need not concern us here.

can be encouraged to either reclaim vital services to public ownership or improve the governance of existing services.<sup>62</sup>

On the one hand, these data reinforce the view that progressive municipalities are disrupting the current energy order. Cumbers and Becker note that Germany's experience signals "a broader rescaling of political governance towards the local level in terms of ownership structures, and the overall responsibility for climate and energy policy."<sup>63</sup> In other words, cities are attempting to take more control, have more say, and increase both their ownership stake and that of their citizens. They write, "City authorities and local governments are using remunicipalization as a route to secure control over key resources and assets to regain control of key policy levers and revenues in the context of climate change and austerity."<sup>64</sup>

But progressive municipalism advocates, while stressing the positive aspects of cities' attempts to be important players in the energy transition, are also aware of the obstacles that stand in the way of cities that aspire to play this role.<sup>65</sup> Cities may be major consumers of energy, but municipal authorities have, in most instances, limited control over how it is generated or consumed.<sup>66</sup> Progressive municipalism therefore provides a platform for a more far-reaching discussion on the need to exert full public control over energy systems in a manner consistent with a comprehensive reclaiming approach. We will return to this discussion and its importance for the options facing cities in Part Four.

## Part Two: Small is Limited

In Part One we noted how different energy transition narratives share a positive view of distributed generation based on the prosumer or community energy model, and there is a widely held belief that cities can make considerable progress toward meeting their renewable energy targets by way of this approach. Advocates of energy citizenship believe that the technical

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62 Catalan Network for Energy Sovereignty and Transnational Institute: Municipal Actions for Building Energy Democracy and Energy Sovereignty: Municipalist Manifesto from 2020 Onwards.

63 Cumbers, A. and Becker, S. (2018) Making sense of remunicipalisation: theoretical reflections on and political possibilities from Germany's Rekommunalisierung process. *Cambridge Journal of Regions, Economy and Society*, 11(3), pp. 503-517. (doi:10.1093/cjres/rsy025)

64 *ibid*

65 Helen Traill, Andrew Cumbers and Neil Gray, The state of European municipal energy transition: an overview of current trends, Adam Smith Business School, University of Glasgow May 2021

66 Xse, We've Got Energy, May 2018, p. 10 According to Xse, "Secure access to energy is vital for us to develop a decent quality of life. However, its control does not lie in the hands of the population, but in the hands of a small number of transnational companies which prioritise making profits from energy supply over guaranteeing universal energy access." See also Cumbers A. (2016) Remunicipalization, the Low-Carbon Transition, and Energy Democracy. In: Worldwatch Institute, State of the World, 2016, Island Press, Washington, DC. [https://doi.org/10.5822/978-1-61091-756-8\\_23](https://doi.org/10.5822/978-1-61091-756-8_23).

potential of distributed generation is more or less unlimited, and cities can and should do more to ensure that this potential is realized.

In Part Two we will highlight some of the factors that affect the ability of cities to generate electricity from renewable sources. As incomplete as the picture is currently, the available evidence suggests that there is normally an extremely large gap between the *decarbonization targets* cities have adopted and the *potential* of cities to achieve those targets by scaling up their own renewable generation. On the other hand, there is also a gap between the *potential* of cities to generate electricity from renewable sources and *what cities are actually generating* from those sources today.

## Powerless? Options for Cities

Under the current policy framework that operates in many countries, cities that are striving to meet their renewable energy targets have several options. City authorities can promote distributed generation. They can also purchase electricity from energy providers by way of municipal power purchase agreements (M-PPAs) where a city can then sell that power to city businesses and residents in the traditional way. Or a city can enter into a long-term franchise that allows the utility to serve a municipality on pre-agreed terms. Those terms can include energy efficiency and decarbonization measures demanded by the municipality.<sup>67</sup> However, today most cities appear to be relying on national or regional regulations that mandate utilities to procure power from renewable or low-carbon sources. (In the US, these mandates are known as renewable portfolio standards, or RPS). These are, of course, not mutually exclusive options. Cities can, in principle, promote or pursue a number of these options simultaneously. But to the extent that cities are relying on regional or, more likely, national policy to decarbonize supply, then the likely outcome is that, given the current policy framework, most renewable energy will come into the system via capacity auctions and power purchase agreements (PPAs) that are designed for larger projects.

But while each of these options can help a city reach its climate and energy targets, none of them, either singularly or in combination, can put a municipality in full control of the electricity it needs to function. Cities can own, control and operate power distribution systems, and many cities in Germany, for example, have reclaimed these systems from private companies (remunicipalization). The reclaiming of distribution systems can give municipal authorities more control over the terms by which electricity is

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<sup>67</sup> Wait, cities can do what? Achieving city energy goals through franchise agreements Crossref DOI link: <https://doi.org/10.1016/j.enpol.2020.111619>

purchased and used. But a city would not, in any practical sense, be able to operate in a way that is independent of the wider system of energy generation and transmission.

To illustrate the point, we might imagine a city of 50,000 inhabitants that imports 100% of its food. The same city could take measures to distribute the food more equally, ensure less food waste, compost what is not eaten, procure food from organic producers that respect the rights of farm workers, and much more besides. But none of this would alter the fact that the city is dependent on growers and farmers from outside of the city (or outside the country) for its 50,000 inhabitants to survive. Such a city would never be able to declare “food sovereignty” if those arrangements remained in place.

## Small-system Solar PV: Accelerating at the Margins

Turning the question of city-level self-generation, it is worth considering the current status of distributed solar at the global level—which is mostly rooftop photovoltaics (PV). Small solar PV systems have in recent years grown quite spectacularly in a number of key countries and regions. However, the available data suggests that its contribution to global electricity generation is currently very small. According to both the IEA and the International Renewable Energy Association (IRENA)—a recognized authority on renewable energy with close ties to renewable energy industry interests and think tanks—rooftop solar PV accounts for roughly 1% of global power generation. IRENA notes, “distributed generation is growing at an accelerated pace.” Maybe so, but 1% is still tellingly marginal.

Small-scale distributed solar is expected to grow, but it is also likely to trail behind the installation levels achieved with larger solar systems. According to one major report, “More than four-fifths of investment in renewable energy capacity in 2018 took the form of utility-scale projects of more than 1MW in size.” In other words, less than 20% of investment was dedicated to “small-scale solar systems of less than that [1MW] capacity – some of it in the hundreds of kilowatts, serving businesses or small localities, and some of it in the single-digit or tens of kilowatts, serving individual households.”<sup>68</sup> Another report shows that investment in small scale solar systems peaked in 2011 at roughly \$75 billion. In 2018, investment was less than half the 2011 level, at roughly \$37 billion.<sup>69</sup>

68 Frankfurt School-UNEP Centre/BNEF, Global Trends in Renewable Energy Investment 2019, <https://www.unenvironment.org/resources/report/global-trends-renewable-energy-investment-2019>.

69 BloombergNEF, “Late Surge in Offshore Wind Financings Helps 2019 Renewables Investment to Overtake 2018,” January 16, 2020, <https://about.bnef.com/blog/late-surge-in-offshore-wind-financings-helps-2019-renewables-investment-to-overtake-2018/>

Bloomberg New Energy Finance (BNEF) assures us that decentralized PV has a bright future, because businesses and homeowners will see the economic advantages in self-generation. According to BNEF, “Consumers are likely to play an increasingly central role in the future electricity system, with 7% of global generation in 2050 being done behind-the-meter by PV installed by households and businesses...From around 2025, small-scale battery systems start to get deployed alongside PV as the additional battery capex [capital expenditure] is paid off by greater self-consumption, in turn allowing people to get more value from their PV systems.”<sup>70</sup> Of course, 7% of global electricity generation is not insignificant, but it hardly qualifies as paradigm changing or transformative.

As noted above, the fact that larger projects appear to be capturing a growing portion of the solar PV market has been a source of some concern among advocates of energy citizenship. It is a trend they often attribute to, among other things, a predisposition on the part of large energy interests to favor large projects over small ones. Advocates also believe it reflects the political influence of the utilities (“regulatory capture of vested interests”<sup>71</sup>) and their desire to protect their sources of revenue from the disruption instigated by citizens and small businesses.<sup>72</sup>

But it is not just the incumbent companies that prefer large projects; solar developers also prefer them. Because sales and subsidies-related revenues and profits are realized through selling electrons, a 50MW project located in a handful of locations makes more sense economically than dealing with hundreds if not thousands of would-be prosumers.

The phasing out of the Feed-in Tariff subsidy and the transition toward capacity auctions, first in Europe but also in the US, China and elsewhere, has given further impetus to large projects and the policy shift has, in most cases, removed some of the financial incentives to homeowners and small businesses to install small systems.<sup>73</sup>

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70 <https://about.bnef.com/blog/henbest-power-system-will-dance-tune-wind-solar-batteries/?link=desc>

71 <https://www.odi.org/sites/odi.org.uk/files/resource-documents/10569.pdf>

72 Farrell points out that larger projects incur significant transmission costs, where distributed PV is close to the point of consumption. Farrell, J., 2019. Is Bigger Best in Renewable Energy? Institute for Local Self-Reliance.

<https://ilsr.org/report-is-bigger-best/>. <https://cdn.ilsr.org/wp-content/uploads/2016/09/ILSRIsBigger-BestFinalSeptember.pdf> See also: <https://energyathaas.wordpress.com/2016/05/09/the-distribution-grid-has-room-for-more-solar/>

73 TUED Working Paper 13, March 2020, *Transition in Trouble? The Rise of and Fall of Community Energy in Europe*, <http://unionsforenergydemocracy.org/resources/tued-publications/tued-working-paper-13/>

## Blinded by the Light? The Long Shadow of a Solar Energy Visionary

The fact that small solar systems generate just 1% of the world's electricity draws attention to some of the claims that were once made about the capacity of distributed generation to meet energy needs. In the case of solar, it is true that the removal of the Feed-in Tariff (FiT) has slowed the growth of small solar systems, but without the FiT it seems unlikely that these systems would have reached the 1% in the first place.

In the late 1990s and early 2000s, advocates of distributed generation—and solar PV in particular—firmly believed that it had almost unlimited potential. The work and legacy of Hermann Scheer, an influential German social democratic politician and long-serving member of the German parliament, was pivotal in terms of cultivating this idea. Scheer pointed to the unique characteristics of renewables-based generation technologies to drive the energy transition. From the original publication in 1994 of his ground-breaking, *A Solar Manifesto: The Need for a Total Solar Energy Supply... and How to Achieve It*, to the posthumous publication in 2011 of his final major work, *The Energy Imperative: 100 Percent Renewable Now*, Scheer's writings laid out a bold, expansive vision for a future based on a complete transition to renewable energy.<sup>74</sup>

In *The Energy Imperative*, Scheer writes:

Allowed to develop freely, renewable energy technologies will inevitably become the determining force [in the energy transition] because of the manifold, autonomous ways in which they can be applied. Current and future technologies for harvesting, transforming and using renewable energy, from the smallest to the largest and with differing degrees of autonomy, are simultaneously the catalyst for more social wealth distribution, production and economic structures. In comparison, conventional large-scale power plants are inefficient and inflexible outdated models; even new large-scale power plants are a form of technological underdevelopment.<sup>75</sup>

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<sup>74</sup> In addition to being an elected official, Scheer was also a major solar industry lobbyist. He played a central role in founding and/or leading a number of political and industry advocacy organizations — including the European Association for Renewable Energy (now EUROSOLAR) in 1988, and the World Council for Renewable Energies (WCRE) in 2001 — and he was the recipient of numerous awards on the basis of his advocacy of renewable energy.

<sup>75</sup> Hermann Scheer, *The Energy Imperative: 100 Per Cent Renewable Now*, New York: Earthscan, 2012.

Elected in 1980 and serving until his death in 2010, Scheer was one of the main architects of Germany's *Energiewende* (energy revolution) — and specifically of the flagship feed-in tariff policy. The global influence of the *Energiewende* on climate policy is well known. It consolidated the idea that distributed generation—and ordinary citizens—would together drive the energy transition. In 2002, Scheer was named by *Time Magazine* as one of several “Heroes for the Green Century.”<sup>76</sup>

What was the basis for Scheer's confidence in the potential of renewable energy to transform the world's energy systems? Scheer often pointed out that wind and solar are “free of charge,” “available wherever it is needed,” “inexhaustible” and “pollutant-free”—about which, he further claimed, “no one could object.” Scheer believed that renewable energy in the hands of the people would consign existing, centralized power systems to history, and “Energy debates which fail to recognize this are sham debates.”<sup>77</sup>

Scheer argued that certain characteristics of renewable energy *technologies*—small, easy to install, and increasingly inexpensive—meant that almost anyone could participate in the energy revolution. On this view, vast numbers of autonomous producers—individuals, communities, cooperatives—would seize the opportunity to participate as producer-consumers (prosumers) and thus drive the energy transition. A transition that, he argued, was inevitable since nature has “already determined that renewable energies will win through in the end.”<sup>78</sup>

Cities, too, could make great strides toward reaching what he termed energy autonomy. To even suggest that the large-scale deployment of renewable energy might come up against technical challenges amounted to, in his words, “an insult to the creativity of physicists, chemists and engineers. And if there are any scientists who assert this, they are only discrediting themselves...In any event, the basic assumption of an insufficient technological potential is untenable.”<sup>79</sup>

Scheer also recognized the need for municipal distribution networks to be publicly owned. Owned and managed by municipalities, the networks had the potential to connect thousands and, in large cities, millions of prosumers living in close proximity to each other. For the large energy utilities, the

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76 Margot Roosevelt, “Solar Crusader: Hermann Scheer,” *Time Magazine*, Monday, Aug. 26, 2002, <http://content.time.com/time/magazine/article/0,9171,1003146,00.html>.

77 Ibid.

78 Hermann Scheer, *The Energy Imperative: 100 Per Cent Renewable Now*, New York: Earthscan, 2012.

79 Hermann Scheer, *Energy Autonomy*, Translated by Jeremiah M. Riemer, Earthscan, 2007, ISBN: 978-1-84407-355-9, pp. 52-53.

cost of maintaining increasingly redundant transmission systems would no longer be covered by electricity sales as more electricity is produced and consumed locally.

Scheer predicted that the incumbent utilities would need to raise electricity charges to recover these system costs, thus giving further momentum to the transition to distributed energy as more end users looked to self-generation as a less expensive alternative. As Scheer notes, "This is yet further proof that the fastest route to energy change is through decentralized power generation; the processes are manageable, and municipalities have a greater interest in decentralizing electricity production than do centralized network operators or power producers."<sup>80</sup>

Today, it seems reasonable to conclude that the public discourse on the energy transition, both scholarly and popular, to some degree still reflects Scheer's confidence in distributed generation and a citizens-led energy transition.<sup>81</sup> But Scheer seldom offered any precise quantifications to support his claims. Even today, beyond a handful of technical journals, there have been relatively few studies that have sought to quantify the potential contribution of distributed renewable energy to a renewables-based future.<sup>82</sup> Given the level of political interest in the energy transition during this period, the lack of empirical data is quite bewildering and difficult to explain.

## Ambition Over Implementation

The scarcity of empirical data found in the writings of figures like Scheer and those influenced by his vision is also evident in more recent publications from important and influential international institutions.

One such example is the global network of megacities committed to taking action on climate change, C40. As noted above, cities belonging to C40 have committed themselves to aggressive climate targets: As of the end of 2019, 24 of the 97 C40 cities had committed to achieving 100% renewable electricity by 2030.<sup>83</sup> Many smaller cities have done the same. According to

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80 Scheer, 127ff:

81 A. Barragán & J. Terrados, Sustainable Cities: An Analyses of the Contribution Made by Renewable Energy Under the Umbrella of Urban Metabolism, *Int. J. Sus. Dev. Plann.* Vol. 12, No. 3 (2017) 416–424 SSN: 1743-7601 (paper format), ISSN: 1743-761X (online), <http://www.witpress.com/journals> DOI: 10.2495/SDP-V12-N3-416-424. This paper is part of the Proceedings of the 11th International Conference on Urban Regeneration and Sustainability (Sustainable City 2016) [www.witconferences.com](http://www.witconferences.com)

82 Peter Droege, *The Renewable City: The Future of Low-Carbon Living*, Liechtenstein Institute for Strategic Development Vaduz, Liechtenstein, 30 October 2018, <http://www.lowcarbonlivingcrc.com.au/news/news-archive/2018/12/renewable-city-future-low-carbon-living>

83 C40, *2019 Annual Report*, available via: *C40 2019 Annual Report - Message by Mark Watts*, April 23, 2020, [https://www.c40.org/blog\\_posts/c40-2019-annual-report-message-by-mark-watts](https://www.c40.org/blog_posts/c40-2019-annual-report-message-by-mark-watts)

the Sierra Club, 170 US cities have made the 100% commitment.<sup>84</sup> In a 2012 publication, *Why Cities are the Solution to Global Climate Change*, C40 summarized its bold, city-centric vision for transformation.<sup>85</sup> Also in 2012, C40 set up a Clean Energy Network, in order to make visible what large cities are doing to advance the energy transition.<sup>86</sup> But in the roughly 15 years since the network's formation, the potential for cities to generate their own electricity has, until very recently, received scant attention. It is quite remarkable that a highly visible and well-resourced project like C40, which has cast large cities in the role of unrivalled champions in the global effort to protect the climate, apparently sees no pressing need to address—let alone answer—key questions regarding the capacity of cities to generate their own electricity from renewable sources.

Similarly, IRENA has produced several reports on the role of cities in reaching climate goals and renewable energy targets. A 2016 publication, titled *Renewable Energy in Cities*, IRENA noted that rooftop solar power capacity more than tripled worldwide in the four years to 2014, from 30 GW to 100 GW, and installed rooftop solar could rise to 580 GW globally.<sup>87</sup> In 2018, IRENA's *Scaling Up Renewables in Cities: Opportunities for Municipal Governments* noted that "Cities are responsible for 65% of global energy demand. Their contribution will therefore be crucial in accelerating the world's transition to a sustainable energy future."<sup>88</sup> But neither of these two reports provided actual data on deployment levels of renewables in cities.

## The Search for Data

Recognizing the need for more robust empirical data, the authors of a 2018 study published by Netherlands-based CE Delft set out to "produce estimates for the potential number of energy citizens [in the EU 27 countries] and their contribution to the energy system."<sup>89</sup> The authors' claim that their study was the "first assessment of the potential of energy citizens in the

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84 Sierra Club, <https://www.sierraclub.org/ready-for-100/commitments>. The Sierra Club also urges municipalities to pressure utilities to source more renewable energy; to consider power purchase agreements with renewable energy companies.

85 C40, "Why Cities are the Solution to Global Climate Change," 2012, <https://www.c40.org/ending-climate-change-begins-in-the-city>

86 C40, "Clean Energy: Network Overview," <https://www.c40.org/networks/clean-energy>; accessed 21 December 2020. [is this necessary? We would need to do it for all FNs]

87 IRENA, Renewable energy in cities, 2016, [www.irena.org/publications/2016/Oct/Renewable-Energy-in-Cities](http://www.irena.org/publications/2016/Oct/Renewable-Energy-in-Cities)

88 IRENA, "Scaling Up Renewable Energy in Cities," December 2018, published by IRENA in collaboration with ICLEI and the German Agency for International Cooperation (GIZ), <https://irena.org/publications/2018/Dec/Scaling-up-Renewables-in-Cities>; introduction, p. 1.

89 CE Delft, "The potential of energy citizens in the European Union," September 2016, [https://www.cedelft.eu/publicatie/the\\_potential\\_of\\_energy\\_citizens\\_in\\_the\\_european\\_union/1845](https://www.cedelft.eu/publicatie/the_potential_of_energy_citizens_in_the_european_union/1845) Conclusion, p25

EU” is, we believe, highly credible based on the evidence presented above.<sup>90</sup>

It is important to note that this study did not focus exclusively on electricity *generation*; it also attempted to quantify what role individuals could play in adding “demand-side flexibility” to grids through the purchase and use of stationary batteries, electric boilers, electric vehicles, etc. And the study considered the potential role of *all* residents, and not just city dwellers.

Nevertheless, the findings of the study provided some much-needed empirical evidence and plausible estimates. It also produced conclusions that supported the view that distributed generation, driven by tens of millions of energy citizens and collective initiatives, could play an important role in the transition to a renewables-based system. The study concluded that, by 2050, “About half of all EU households, around 113 million, may produce energy, either individually or through a collective.” If public buildings, schools and hospitals also became “energy citizens,” then renewable electricity generated could, by 2050, be able to meet “45% of their energy demand.”<sup>91</sup>

But the data from the study could reinforce a quite different set of conclusions. The same data show that half of EU citizens are *not* expected to be generators of wind or solar energy. These “non-citizens” (in terms of self-generation) will therefore need to rely on electricity produced by other means. And of the 113 million energy citizens that could potentially become producers of renewable energy, more than half of *their* electricity needs—55%, according to the study—will also have to be met through some other means.

Taking a geospatial approach, a September 2020 paper on the findings of a study conducted by the European Commission’s Joint Research Centre (JRC) concluded that the EU’s “untapped” rooftop potential could amount to 560 GW of installed capacity.<sup>92</sup> By way of comparison, in 2018 the EU27’s total installed generation capacity—including coal, gas, nuclear, hydropower, etc., was around 930GW. Therefore, the estimated potential of rooftop solar would be close to 60% of current generation capacity, which is a quite staggering statistic.<sup>93</sup>

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90 Ibid

91 Ibid

92 Bódis, K.; Kougias, I.; Jäger-Waldau, A.; Taylor, N.; Szabó, S. A high-resolution geospatial assessment of the rooftop solar photovoltaic potential in the European Union. *Renew. Sustain. Energy Rev.* 2019, 114.

93 Eurostat, [https://ec.europa.eu/eurostat/statistics-explained/images/7/75/Maximum\\_electrical\\_capacity%2C\\_EU-27%2C\\_2000-2018\\_%28MW%29.png](https://ec.europa.eu/eurostat/statistics-explained/images/7/75/Maximum_electrical_capacity%2C_EU-27%2C_2000-2018_%28MW%29.png)

However, the study notes that total installed solar PV power capacity in the EU27 + UK since the introduction of the first European Renewable Energy Directive of April 2009 exceeded 134 GW by the end of 2019.<sup>94</sup> Residential and commercial rooftop installations represented about 60% of this capacity, or roughly 80GW.<sup>95</sup> Given the spatial potential calculated, rooftop solar PV could—suggests the study—grow sevenfold, from the current 80GW to 560GW. The study notes, “Several municipalities are currently discussing, or have already introduced, mandatory requirements to install renewable energy systems in new buildings.”<sup>96</sup>

At first glance, the JRC’s data appear to substantiate the idea that distributed generation has the potential to realize Scheer’s vision of a citizen-led transformation of energy systems and, in so doing, render the current business model of the incumbent energy companies increasingly unviable. But, as with the CE Delft study, the data from the study could reinforce a quite different conclusion. According to Eurostat, utility scale and small-scale solar systems together contributed just 4.1% of the EU27’s electricity in 2018.<sup>97</sup> Therefore 80GW of residential and commercial rooftop installations probably generated around 2.5% of the EU27’s electricity (60% of all PV installations). This means that a 7-fold increase in residential and commercial PV capacity might be able to reach close to 18% of the EU27’s electricity needs. But in order to make such a contribution, *every rooftop in the EU27 region that is solar compatible would need to have a PV system installed.*

Meanwhile, an EU-funded study that examined the state of prosumerism (or prosumption) in eight EU countries (including Germany, France and Spain) produced data that drew attention to the distance between the *potential* for distributed solar generation and the current levels of deployment. The study reported that the amount of electricity generated by solar PV ranged from 1.5% of total electricity demand in Italy to 7.3% in Germany.<sup>98</sup>

However incomplete, the numbers presented above tell a clear story:

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94 Ibid.

95 Ibid., citing Szabó, S.; Jäger-Waldau, A.; Szabó, L., Risk adjusted financial costs of photovoltaics. *Energy Policy* 2010, 38, 3807–3819. Jäger-Waldau, A. Snapshot of photovoltaics-February 2020. *Energies* 2020, 13, 930. ]

96 Bódis, K.; Kougias, I.; Jäger-Waldau, A.; Taylor, N.; Szabó, S. A high-resolution geospatial assessment of the rooftop solar photovoltaic potential in the European Union. *Renew. Sustain. Energy Rev.* 2019, 114.

97 Eurostat (online data code: nrg\_105m) [https://ec.europa.eu/eurostat/statistics-explained/images/d/d6/Electricity\\_production\\_by\\_source%2C\\_EU-28%2C\\_2018\\_%28%25%29.png](https://ec.europa.eu/eurostat/statistics-explained/images/d/d6/Electricity_production_by_source%2C_EU-28%2C_2018_%28%25%29.png), also: <https://ec.europa.eu/eurostat/documents/3217494/11478276/KS-DK-20-001-EN-N.pdf/06ddaf8d-1745-76b5-838e-013524781340>

98 [https://www.pvp4grid.eu/wp-content/uploads/2018/12/D2.1\\_Existing-future-prosumer-concepts\\_PVP4G-1.pdf](https://www.pvp4grid.eu/wp-content/uploads/2018/12/D2.1_Existing-future-prosumer-concepts_PVP4G-1.pdf); <https://www.statista.com/statistics/497340/installed-photovoltaic-capacity-germany/>

Distributed generation has the potential to play an important role in a decarbonized electricity system, but its contribution is unlikely to come anywhere close to the levels imagined by Scheer. Any political calculations that are today tied to notions of city-level control over electricity, including energy sovereignty, must therefore be adjusted accordingly.

The limits of distributed generation are today becoming more clearly defined and more widely understood, and the direction of policy is increasingly cognizant of the technical realities. Larger projects are becoming more significant both in terms of policy and in terms of their presence in the energy mix. But utility-scale projects such as those in onshore and offshore wind, MW-size solar arrays and storage systems, as well as industrial-scale biomass combustion are, both physically and politically, not consistent with either Scheer's vision or current notions of energy citizenship. Current trends point to a very different kind of energy transition, one based on large projects with large for-profit corporations dominating the renewables sector.

## A Tale of Two Cities: Amsterdam and Barcelona

We will conclude this section of the report by referring to three concrete examples of cities that have conducted serious work aimed at quantifying the potential of distributed renewable generation and, where the data are available, how much of this potential has already been realized. These cities are: Amsterdam and Barcelona. Despite their differences, these studies reinforce the point made above: distributed generation can help cities meet their targets, but in most instances—even if the potential for distributed generation were fully realized—the contribution is likely to be less significant than is widely believed to be the case.

### Amsterdam

In February 2020, Amsterdam released its *Climate Neutral Roadmap 2050*. In the Foreword to the report, the city's Alderperson for Spatial Development and Sustainability, Marieke van Doorninck, writes:

Thousands of Amsterdam's citizens are already involved in initiatives and projects to save energy or generate clean energy, or to share things. People are keen to become the owners or co-owners of solar panels, independent of large energy companies. More than in the past, we will generate our energy collectively, closer to home. This will create opportunities for participation and profit-sharing.<sup>99</sup>

<sup>99</sup> New Amsterdam Climate, "Amsterdam Climate Neutral Roadmap 2050, February 2020, City of Amsterdam, <https://www.amsterdam.nl/en/policy/sustainability/policy-climate-neutrality/>

According to the report authors, the installation of rooftop solar panels “is not complicated from a technical perspective,” and in most cases “is a profitable investment.” Based on this assumption, the city has “chosen an approach whereby we ensure that there are opportunities for all and the municipality sets a good example. We want to inspire everyone in the city, remove obstacles, and create a climate in which opportunities for large-scale solar power generation are utilised more efficiently.”<sup>100</sup>

The city is also creating space for solar cooperatives that can work alongside the municipality. To facilitate this, the city has launched a *Zonplatform* (solar platform) to “help Amsterdam’s citizens to get started with generating solar energy”:

People can do this directly by installing panels on their own roof or a hired roof, but they can also join projects organized by solar cooperatives... The Municipality of Amsterdam is working to make more roofs available for cooperative projects.... Via the *Zonplatform*, we are linking citizens without roofs of their own to cooperative initiatives.<sup>101</sup>

Looking at the *Roadmap* through a wider lens, the municipality considers the transformation of the city’s electricity sector, which is responsible for 39% of the city’s emissions, as one of four transition paths, with the other three being the built environment, mobility, and “harbour and industry.” Regarding electricity, the report goes into considerable detail with regard to how much wind and solar electricity the city is capable of producing. In 2017 wind and solar together contributed just 1.5% of the city’s energy use. However, the city’s rooftop solar capacity is estimated to be around 1.1 GW. At the end of 2019, the city of Amsterdam had 73 MW of solar installed. By the end of 2022, it hopes to reach 250MW. By 2030, the municipality aims to have half of Amsterdam’s rooftop solar potential utilized, installing 550MW. By 2040, “all suitable roofs should be used for the generation of renewable energy.”<sup>102</sup>

Amsterdam also expects to grow its wind capacity. In mid-2019, 66 MW had been installed. Because of space limitations, the growth of wind is expected to be less spectacular than that of solar. By 2030, the city hopes to have 127 MW installed. The city is also aware of the fact that electricity demand will rise until 2050, as a result of “Increasing digitization, extra data use, and growth in the number of electric vehicles.” The increase in

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100 Ibid., p. 126

101 Ibid.

102 Ibid., p. 122

distributed generation will, says the report, require “having sufficient capacity in the electricity...In some parts of the city, the current electricity grid is reaching its limits.”<sup>103</sup>

But it is important to consider, should everything go according to plan, what this level of deployment will amount to. In this respect, the report is quite clear: “We believe that in future, we will be able to produce a maximum of 30% of the electricity that we need sustainably, on our own territory.”<sup>104</sup> Put differently, if Amsterdam uses all of its rooftop solar potential, and doubles its wind deployment by 2030, it will still need to source roughly 70% of its energy from outside of the city. This 70% could be met by large renewable energy projects or, as is likely, fossil fuel and nuclear power.

## Barcelona

The municipal government of Barcelona has gone further than most city governments in terms of developing and implementing its energy and climate ambitions. In 2010, Barcelona adopted a Sustainable Energy Action Plan and, in 2008, became an early signatory to the Covenant of Mayors.<sup>105</sup> In 2015, the city<sup>106</sup> made a commitment to reach 100% renewable energy (although no target date was proposed). Barcelona has set itself two objectives: reducing its greenhouse gas emissions by 40% by 2030 (compared to 2005) and producing enough energy locally to meet municipal needs. In order to reach these targets, the municipality is promoting low energy use and energy efficiency.<sup>107</sup>

In January 2019, the city established a public entity, Barcelona Energia (BE). Its stated mission is to help the city achieve energy sovereignty and combat energy poverty.<sup>108</sup> BE buys and sells energy, offers advice to end users and drives citizen participation through the platform *Decidim Barcelona Energia*. For BE, energy sovereignty means driving energy efficiency and “achieving maximum local energy generation using own resources, whether renewable (such as sunlight) or waste, and to ensuring a basic supply for all city residents.”

But what does “maximum local energy generation” amount to in this instance? BE notes that “Barcelona enjoys many hours of sunshine

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103 Ibid

104 Ibid.

105 [https://mycovenant.eumayors.eu/docs/2\\_1405407795.pdf](https://mycovenant.eumayors.eu/docs/2_1405407795.pdf)

106 Here we are referring to the city, not the province of Barcelona. The latter has 311 municipalities which are extremely diversified: from really small and rural villages to quite large towns.

107 [https://energy-cities.eu/wp-content/uploads/2018/11/publi\\_100pourcent\\_final-web\\_en.pdf](https://energy-cities.eu/wp-content/uploads/2018/11/publi_100pourcent_final-web_en.pdf)

108 <https://energy-democracy.net/barcelona-energia-public-power-to-tackle-energy-poverty-and-achieve-energy-sovereignty/>

throughout the year. We have enormous energy potential in Barcelona if we harness solar energy.”<sup>109</sup> According to the BE website, the city’s rooftops could generate 1,191 GWh of solar photovoltaic energy per year, “a quantity that is equivalent to roughly 60% of the electricity consumption of Barcelona’s domestic [residential] sector.”<sup>110</sup>

However, BE is alert to the challenges associated with its commitment to become a 100% renewable energy city. If the city’s available surface area were *fully* utilized—which, as with other cities of comparable size, would be a massive endeavor—solar PV would meet 50% of residential electricity needs (1,191 GWh/year). This is a very substantial amount of electricity generation, and for this reason the city currently helps citizens and businesses install solar PV, and is installing solar PV on public buildings.<sup>111</sup> Through the Barcelona Sustainable Energy Mechanism the city aims to commit 50 million Euro to increase renewable energy generation in the city by 66%.<sup>112</sup>

Again, it is useful to view these numbers alongside Barcelona’s overall electricity consumption, which, in 2019, was almost exactly 15,000 GWh/year (including non-residential consumption). This means that, at current levels of demand, if the city was fully solarized, the power generated would meet just 8% of the city’s electricity needs. And while the commitment to increase renewable energy generation by 66% is large in percentage terms, currently just 1% of Barcelona’s current consumption is met by renewables. A 66% increase would therefore mean that less than 2% of the city’s electricity will be generated from renewable sources.

Given these realities, the city has invested a lot of effort towards advancing energy efficiency and reducing the levels of consumption (currently 9.25 MWh per inhabitant), and to supplement the energy generated within the city limits, the municipality plans to cooperate with the wider metropolitan area.

As with the other cities discussed above, it is safe to conclude that Barcelona has adopted ambitious goals and has thus far made serious efforts towards meeting them. But even in a city as sunny as Barcelona such efforts can only go so far.

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109 <https://energia.barcelona/en/incentive-programme-generating-solar-energy>

110 <https://energia.barcelona/en/map-how-much-energy-can-you-generate>; accessed 18 March 2021

111 <https://energia.barcelona/en/incentive-programme-generating-solar-energy>

112 [https://energia.barcelona/en/noticia/fifty-million-euros-in-investment-to-speed-up-the-energy-transition-in-the-city\\_1014185](https://energia.barcelona/en/noticia/fifty-million-euros-in-investment-to-speed-up-the-energy-transition-in-the-city_1014185)

## What the Research is Telling Us (and Not Telling Us)

We have shown how early contributions (roughly 1995-2010) to the debate on cities and their role in the energy transition emphasized the “vast potential” of distributed generation to meet electricity needs. The nature of emerging wind and solar technologies—small scale, and fast in terms of deployment time frames—supported the view that distributed energy could power the energy transition, shifting ownership and control to ordinary people who would soon be generating their own electricity. This, it was believed, would quickly render the incumbent energy companies obsolete and situate cities and their immediate vicinities as the main platform for the renewables revolution.

This level of confidence in the vast potential of distributed renewable power also fueled political interest in cities’ being able to achieve “energy autonomy” or “energy sovereignty.” Although not universally accepted, some influential policy voices posited that solar and wind power could provide a pathway to energy independence and a means for municipal authorities to use their legal power and political mandate to promote and consolidate a major shift away from centralized energy systems.<sup>113</sup> This undoubtedly contributed to lofty statements and commitments on the part of cities to become 100% renewable and/or zero carbon in less than two or three decades.

However, in recent years efforts to quantify the potential contribution of distributed generation (in cities, but also more generally) have made visible a serious gap between the physical capacity of cities to generate their own electricity and their ambitious decarbonization targets. Therefore, the role self-generation by individuals, community energy projects, or municipal governments might play in achieving this transformative objective is likely to be small.

But just as the distance between ambition and potential capacity was becoming clear, so too was the challenge of realizing the electrical generating capacity that has been identified. Put differently, if there are physical limitations that make it difficult for cities to generate enough power to meet their climate and energy targets, there are another set of limitations—political and policy-related—that are preventing cities from developing the capacity that could be utilized.

The vast distance between achievement and aspiration partially explains why, in recent years, the policy mainstream—while continuing to insist that

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<sup>113</sup> See for instance, OECD, *Green Growth in Cities*, 2013, <https://doi.org/10.1787/9789264195325-en>, <https://www.oecd.org/cfe/regionaldevelopment/cities-green-policies-can-contribute-to-growth.htm>, discussed below.

cities are the driving force behind the energy transition and decarbonization—has shifted towards utility-scale renewable energy projects where a relatively small number of for-profit companies dominate.

Meanwhile, many cities have shifted their attention away from distributed generation towards a much broader set of options known as distributed energy resources (DER) which includes digital technologies, battery storage, demand response and other means of advancing decarbonization.

## Part Three: Smart Cities and Distributed Energy Resources

In recent years the idea of smart cities has, along with the presumed potential of distributed energy resources, moved to the forefront of green growth thinking on the energy transition.

In this section of the report we will show how the neoliberal discourse around smart cities perpetuates illusions in a disruptive consumer-driven energy transition. Embedded in the dominant DER narrative is a vision of change that is deeply regressive and, if it is pursued, will do little to help cities reach their renewable energy and decarbonization targets.

The term smart cities surfaced roughly two decades ago and was, at that time, not anchored in any particular energy transition narrative.<sup>114</sup> The smart cities debates reflected the influence of forward-looking urban planners and a broad range of progressive voices that were inspired by the prospect of turning cities into clean, efficient, and sustainable spaces that are fully digitalized.<sup>115</sup>

### Disruption 2.0: Distributed Energy Resources

In recent years the idea of smart cities has been infused with references to a set of technologies and technology-based configurations known as distributed energy resources, or DER.

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114 The idea of “smart cities” has its root in the “smart communities” movement of the 1990s. Mary Anne Moser, “What is Smart about the Smart Communities Movement?” *University of Calgary EJournal*, Volume 10-11 Number 1 (March 2001), <http://www.ucalgary.ca/ejournal/archive/v10-11/v10-11n1Moser-print.html>, archived at <https://web.archive.org/web/20041223204243/http://www.ucalgary.ca/ejournal/archive/v10-11/v10-11n1Moser-print.html>

115 Deloitte Insights: Renewables (em)power smart cities: Wind and solar energy best enable the goals of people-centered smart cities (2019) <https://www2.deloitte.com/us/en/insights/industry/power-and-utilities/smart-renewable-cities-wind-solar.html>

DER goes beyond wind and solar generation technologies to include stationary batteries, smart meters, electric vehicles (EVs), microgrids, and a range of digital control technologies that connect them. Digitalization in this context refers to a range of telecommunications and internet-related technologies and their deployment in energy systems. Digitalization and decentralization are closely related, due in part to the expansion of the internet of things. For example, a stationary storage battery (digitally enabled battery storage) is both a source of decentralized or distributed energy, but it is also smart in that it can be connected to the internet and communicates with other similarly connected devices (including smart phones and laptops).

Today's narrative around DER is dominated by green growth thinking. In our view, the green growth approach to DER perpetuates several illusions, and it misrepresents what is going on in terms of the energy transition. First, it is anchored in the idea of a "consumer driven" transition, one that further disrupts the dominance of the incumbent companies and can help cities reach their renewable energy and other decarbonization targets. DER-endowed smart cities are expected "transform the urban landscape," reshaping architecture, infrastructure and work, and carry with them the potential to "deploy technology in the service of people-centered strategies," enabling (among other things) an increasingly active role for "ordinary citizens" in generating and managing electricity from renewable sources.<sup>116</sup>

Second, it is suggested that DER is changing energy markets in ways that can make money for a wide range of stakeholders; thus the momentum behind the (disruption-driven) transition is sustained by self-interest. Third, the only losers in this consumer-driven transition are the large energy interests; everyone else is a potential winner. Fourth, by deploying DER, cities can play a major role in both addressing and solving some of the technical challenges that accompany the growth of renewable energy and its inherently variable nature, challenges that present the need for extensive grid upgrades, large amounts of battery storage and system flexibility by way of "demand response" measures.<sup>117</sup>

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116 MIT Technology Review Insights, in partnership with Cisco, "Smart City Living Transforms the Urban Landscape," *MIT Technology Review*, July 19, 2016 <https://www.technologyreview.com/2016/07/19/158768/smart-city-living-transforms-the-urban-landscape/>

117 In this context flexibility, according to the IEA's definition, refers to "the ability of a power system to reliably and cost-effectively manage the variability and uncertainty of demand and supply across all relevant timescales, from ensuring instantaneous stability of the power system to supporting long-term security of supply."

IEA, 2019. Status of Power System Transformation 2019: Power system flexibility. International Energy Agency, Paris. Available at: <https://webstore.iea.org/status-of-power-system-transformation-2019-power-system-flexibility>. See also: <https://ec.europa.eu/energy/en/topics/technology-and-innovation/energy-storage>

There is currently no space in the green growth approach for a public goods approach to the deployment of DER, which rests on the extension of commodification. In Part Four we will offer the outlines a different approach to DER, one that is anchored in the idea of *comprehensive reclaiming* of power systems and incumbent companies.

## Bold Claims

In some respects, contemporary discussions on the potential of DER in cities repeat the kind of bold claims of the kind that were once associated with Herman Scheer and his co-thinkers. Just as the proliferation of wind and solar generation technologies was expected to drive the energy transition, similar claims are today being made about DER. According to the IEA “power system transformation” (PST) is being driven “by the increasing availability of low-cost variable renewable energy (VRE), the deployment of distributed energy resources (DER), advances in digitalization, and growing opportunities for electrification.”<sup>118</sup>

Also reminiscent of Scheer-era thinking is the claim that DER is helping situate citizens, businesses, even schools and hospitals, in the driving seat of the energy transition. This view continues to make a clear imprint on energy policy. For example, the EU’s recently adopted *Clean Energy Package* formally recognizes the right of “active customers” to own and operate DER.<sup>119</sup> According to a 2017 report from the Jacques Delors Institute, “People are increasingly becoming active consumers, prosumers, crowdsourcers and crowdfunders of the energy transition. We witness the shift from a situation where energy policy was driven by ‘decisions by a few’, to one where it is driven by ‘actions by all.’”<sup>120</sup>

However far the actions by all claim is from reality, governments at all levels are being urged to adopt policies that are consistent with empowering consumers to take control of both energy markets and energy provision. According to the influential London-based NGO Third Generation Environmentalism (E3G), “We need a regulatory framework [in the EU] that encourages citizens and energy communities to participate in the energy transition through the right to self-produce and consume electricity...

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118 [https://iea.blob.core.windows.net/assets/00dd2818-65f1-426c-8756-9cc0409d89a8/Status\\_of\\_Power\\_System\\_Transformation\\_2019.pdf](https://iea.blob.core.windows.net/assets/00dd2818-65f1-426c-8756-9cc0409d89a8/Status_of_Power_System_Transformation_2019.pdf)

119 Under EU law, these same rights are also extended to private interests of all shapes and sizes, and this has legitimized the idea of private companies (such as Google or Amazon) entering into PPAs with renewable energy companies.

120 Thomas Pellerin-Carlin et al, Making the Energy Transition a European Success: Tackling the Democratic, Innovation, Financing and Social Challenges of the Energy Union, Report 114, September 2017, <https://institutdelors.eu/en/publications/making-the-energy-transition-a-european-success/>

Thousands of local governments in the EU stand ready to make their contribution.”<sup>121</sup>

This thinking is not confined to the EU. A report from the South African government stated, “Demand patterns are changing with the availability of more affordable self-generation, energy efficiency and storage technologies...Large, unwieldy and rigid institutions such as Eskom [the public energy utility] struggle to adapt to conditions in a dynamically changing market.”<sup>122</sup>

A June 2018 US Council on Foreign Relations (CFR) study recently stated that, “A fully transactive grid of the future could empower prosumers to trade electricity at the edges of the grid, recording their transactions on the blockchain. In this way, a gradual evolution could culminate in a full-blown revolution.”<sup>123</sup>

There is no shortage of reports of this nature. However, most of them provide little or no empirical data to back up the claims that are being made. The above-mentioned report from the government of South Africa provides no evidence to demonstrate “the emergence of a dynamically changing market.” The CFR study presents no data that might provide a sense of how many people or businesses are currently engaged in peer-to-peer energy transactions, or how many could potentially do so in future.

## Megatrend Myths

Claims about DER are central to another set of bold claims that are more global in nature. Some analysts and think tanks see DER as a key driver of three *megatrends*, namely decarbonization, decentralization, and digitalization.<sup>124</sup> Again, these purported megatrends are routinely described as “transformative” or “paradigm changing.”<sup>125</sup> According to IRENA and others,

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121 Philipp Thaler (policy advisor at E3G), It is high time to localize the energy transition, <https://www.euractiv.com/section/climate-environment/opinion/it-is-high-time-to-localise-the-energy-transition/>

122 Roadmap for Eskom in a Reformed Electricity Supply Industry, page 8. [https://www.gov.za/sites/default/files/gcis\\_document/201910/roadmap-eskom.pdf](https://www.gov.za/sites/default/files/gcis_document/201910/roadmap-eskom.pdf)

123 A Survey of Digital Innovations for a Decentralized and Transactive Electric Power System Lidija Sekaric. In Sivaram, Varun. Digital Decarbonization: Promoting Digital Innovations to Advance Clean Energy Systems. Council on Foreign Relations. Kindle Edition.

124 Di Silvestre, Maria Luisa & Favuzza, Salvatore & Sanseverino, Eleonora & Zizzo, Gaetano. (2018). How Decarbonization, Digitalization and Decentralization are changing key power infrastructures. Renewable and Sustainable Energy Reviews. 93. 483-498. 10.1016/j.rser.2018.05.068.

[https://www.researchgate.net/publication/327991565\\_How\\_Decarbonization\\_Digitalization\\_and\\_Decentralization\\_are\\_changing\\_key\\_power\\_infrastructures](https://www.researchgate.net/publication/327991565_How_Decarbonization_Digitalization_and_Decentralization_are_changing_key_power_infrastructures) In some accounts, the three megatrends are “electrification, decentralization and digitalization.” [IRENA]

125 IRENA (2019), Climate Change and Renewable Energy: National policies and the role of communities, cities and regions (Report to the G20 Climate Sustainability Working Group

“DER are at the heart of the ongoing power-sector transformation” that, it believes, is unfolding at the global level.<sup>126</sup>

Talk about megatrends could be dismissed as simply green growth hyperbole. But the evidence suggests that such claims serve an ideological purpose. They reinforce the idea that the energy transition is moving forward, spurred on by the innovation and entrepreneurial energy that only the private sector (and active citizens) can deliver. On this view, there is no need to develop an alternative to the green growth path to decarbonization because a “new climate economy” is already well on its way to becoming a reality.<sup>127</sup>

However, the data show that all three megatrends—decarbonization, decentralization, digitalization—are not very mega at all. As previous TUED working papers have explained, the world is not decarbonizing; that is, if decarbonization is understood to mean moving away from fossil fuels or reducing CO2 emissions. Quite the opposite is true. In 2018, CO2 emissions were at their highest point in history.<sup>128</sup> Annual emissions in 2019 remained at record levels, and more than 80% of total primary energy demand came from fossil fuels: oil, gas and coal.<sup>129</sup> Oil consumption in early 2015 was 95 million barrels per day (mbd). By early 2019 it has surpassed 100 mbd—an increase of over 5.2%.<sup>130</sup> Meanwhile, the growth of renewable energy is struggling to keep pace with the rising demand for electricity globally (which, prior to the COVID-19 pandemic, had averaged between 2% and 3% a year). According to Spencer Dale, BP’s research director, “Even if renewables are growing at truly exceptional rates, the pace of growth of power demand, particularly in developing Asia, limits the pace at which the power sector can decarbonize.”<sup>131</sup>

But what about decentralization? It is claimed that DER is also giving impetus to this megatrend, which is expressing itself in the growth of solar PV, behind-the-meter battery energy storage systems, smart thermostats, heat

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(CSWG)), International Renewable Energy Agency, Abu Dhabi. P27

126 *ibid*

127 See New Climate Economy, 2018, *Unlocking the Inclusive Growth Story of the 21st Century: Accelerating Climate Action in Urgent Times*. “The evidence today shows that climate action is even more attractive than we imagined then [in 2006 when the Stern Review was published]. This remarkable new growth opportunity is now hiding in plain sight.” Investors, warns Stern, risk missing a massive economic opportunity. “The train is fast leaving the station. Leaders are already seizing the exciting economic and market opportunities of the new growth approach.... Over US\$26 trillion and a more sustainable planet are on offer, if we all get on board. The time to do so is now.” p. 23

128 <https://blogs.worldbank.org/opendata/chart-co2-emissions-are-unprecedented>

129 IEA and CCFI, *Energy Investing: Exploring Risk and Return in the Capital Markets*, March 2021, <https://www.iea.org/reports/energy-investing-exploring-risk-and-return-in-the-capital-markets>, page 8

130 [https://www.eia.gov/outlooks/steo/report/global\\_oil.php](https://www.eia.gov/outlooks/steo/report/global_oil.php)

131 Presentation by Spencer Dale, British Petroleum chief economist, *Energy in 2018: an unsustainable path*, London, 11 June 2019

pumps, micro wind turbines, and plug-in electric vehicles.<sup>132</sup> The deployment and use of these technologies is certainly increasing. But we have already seen how, in terms of generation technologies, behind-the-meter solar installations currently contribute barely 1% to the world's electricity supply (and all solar energy contributes less than 3%)<sup>133</sup>

In 2020, wind and solar together amounted to less than 10% of global electricity generation. As we will see, the presence of battery storage is today extremely small when viewed in the context of global energy systems.

## Digitalization and Prosumerism 2.0

Meanwhile, the energy-related discourse around the third megatrend—digitalization—is also replete with references to its transformative potential. In this context digitalization refers to a range of telecommunications and internet-related technologies and their deployment in energy systems.

In the pages that follow, we will show how green growth policy sees digitalization and DER more broadly as a means of promoting a new form of prosumerism. In a 2017 report the IEA asserts that “digitalization is blurring the distinction between generation and consumption” and is opening the door to individuals and “local energy communities” to be market players. This is “helping to accelerate the transformation of the electricity system and the establishment of new business models” because it presents an opportunity for “millions of consumers as well as producers to sell electricity or provide valuable services to the grid...In the residential sector alone, 1 billion households and 11 billion smart appliances could actively participate in interconnected electricity systems, allowing these households and devices to alter when they draw electricity from the grid.”<sup>134</sup> According to the Coalition for Urban Transitions, “Digital energy businesses are already managing and controlling electricity on some levels – devices, homes, offices, schools, buildings, microgrids, neighborhoods and cities.”<sup>135</sup>

## A New Market? Demand Response Services

These and other sources tell us that digitalization is creating a market for

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132 Webb, M., Scott, A., Gen.sü, I. and Broekhoff, D. 2020. Urban energy and the climate emergency: Achieving decarbonisation via decentralisation and digitalization. Coalition for Urban Transitions, London and Washington, DC. <https://urbantransitions.global/publications>, page 11

133 IEA (2021) Global Energy Review 2021, <https://www.iea.org/reports/global-energy-review-2021>.

134 International Energy Agency, 2017 Digitalisation and Energy: Technology Report <https://www.iea.org/reports/digitalisation-and-energy>, page 83, and page 90

135 Webb, M., Scott, A., Gen.sü, I. and Broekhoff, D. 2020. Urban energy and the climate emergency: Achieving decarbonisation via decentralisation and digitalization. Coalition for Urban Transitions, London and Washington, DC. <https://urbantransitions.global/publications>, page 11

“demand response services” that, according to one source, “will provide multiple electricity package options” to consumers “which will give them more control over their electricity bill.”<sup>136</sup>

According to Deloitte, electrification of the building and transportation sectors with distributed wind and solar power will “unlock new possibilities for customer engagement.” Consumers will benefit, but so will cities by becoming more “economically competitive.”<sup>137</sup>

It is important to note that, in this context, consumers or customers includes businesses of various sizes. Large industrial and retail operations are therefore also classed as consumers alongside individual tenants or homeowners. The evolution of smart grids will allow commercial operations to become more efficient. According to UNEP, smart buildings equipped “with solar panels and/or micro wind turbines, potentially with energy storage, creates distributed energy resources (DER) that can be used for self-generation but can also potentially feed power into a microgrid or central grid.”<sup>138</sup>

Electric vehicle (EV) owners can also hope to be active in the electricity markets, including owners of entire fleets of electric buses or electric taxis. Battery-owning consumers can also be, in a phrase, “passively active” by connecting with a “demand-side response aggregator,” a private company that intermediates electricity market transactions at larger scale.<sup>139</sup> According to the European Commission, “Consumers can also themselves (or through aggregators) place bids on power exchanges and thereby agree to change their demand for electricity at a given point in time. In practice, consumers would be asked to decrease their consumption when the power system is facing a stress or peak and incentivized to consume in periods of low demand or overcapacity.”<sup>140</sup>

136 Bhatti, H.J. and Danilovic, M. (2018) Business Model Innovation Approach for Commercializing Smart Grid Systems. American Journal of Industrial and Business Management , 8, 2007-2051. <https://doi.org/10.4236/ajibm.2018.89134>

137 Deloitte Insights: Renewables (em)power smart cities: Wind and solar energy best enable the goals of people-centered smart cities (2019), page 21 “[R]enewable power is a starting point for smart cities. It behooves both cities and utilities to be bold in their SRC [Smart Renewable City] journeys, as growth is not guaranteed. Cities are competing with one another, while utilities may risk losing business and other opportunities to nontraditional electricity providers. The first cities and utilities to achieve 100 percent renewables may reap the most reward as they attract a growing number of like-minded stakeholders.”

138 But as UNEP notes, “buildings do not need to become completely ‘smart’ to save energy. There is a tendency to increase the use of technology to try and make buildings more energy efficient, when sometimes ‘less is more’. Digital applications can help to optimize the energy performance and thermal comfort of a building – but they cannot replace good building design.”

139 Laurie van der Burg and Shelagh Whitley,

Rethinking Power Markets, Capacity Mechanisms and Decarbonization, Overseas Development Institute, May 2016

<https://www.odi.org/sites/odi.org.uk/files/resource-documents/10569.pdf>. Page 22

140 The European Commission points to the use of “investment support schemes.” Under these

These and innumerable other accounts all situate consumers, businesses, and even cities themselves, at the center of the renewables-based energy system of the future. On this view, the barriers to who might become a market actor are, thanks to DER, rapidly crumbling.

## Commodifying Flexibility and Fair Remuneration

Embedded in this thinking is the idea that policy must commodify or monetize important new system functions, such as providing flexibility services to the grid. This would create space for stakeholders to profit from being a flexibility service provider.

This brings us to what can be termed the fair remuneration problem. In its *Status of Power System Transformation 2019*, the IEA states: “given that VRE [variable renewable energy] resources are commonly remunerated on a volumetric basis for the energy they produce, and may in some cases provide flexibility services, which in turn require reductions in energy production, it may be necessary to ensure that VRE generators are remunerated fairly for providing flexibility services.”<sup>141</sup> The IEA is suggesting that for-profit wind and solar companies will need to be paid to provide flexibility services because it will help solve the variability problem that was, in one sense, created by wind and solar companies in the first place.

But the fair remuneration problem does not end there. As more VRE come into the grid, owners of stationary batteries, as well as owners of electric vehicles, are also expected to be able to make money by providing flexibility. Owners of smart grid systems in large buildings can also provide flexibility, if, of course, the right incentives are in place. Consumers can also become active in electricity markets in a peer-to-peer system of exchange, perhaps utilizing blockchain technology.<sup>142</sup> Clearly, if so many market actors are looking to make money, the question is: who will be paying the market actors?

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schemes, “renewable producers must submit offers to the market operator. If the revenues collected from the market are not sufficient to cover their costs plus a fair return, then a subsidy will be given in €/MW on a yearly basis in order to ensure that the predetermined level of profitability will be achieved.” See: European Commission, Energy Economic Developments Investment perspectives in electricity markets, page 49 [https://ec.europa.eu/info/sites/info/files/file\\_import/ip003\\_en\\_2.pdf](https://ec.europa.eu/info/sites/info/files/file_import/ip003_en_2.pdf)

<sup>141</sup> IEA, *Status of Power System Transformation*, 2019

[https://iea.blob.core.windows.net/assets/00dd2818-65f1-426c-8756-9cc0409d89a8/Status\\_of\\_Power\\_System\\_Transformation\\_2019.pdf](https://iea.blob.core.windows.net/assets/00dd2818-65f1-426c-8756-9cc0409d89a8/Status_of_Power_System_Transformation_2019.pdf)

<sup>142</sup> <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/what-every-utility-ceo-should-know-about-blockchain> According to McKinsey, “Blockchain technology’s relatively low transaction costs allow smaller energy producers to sell excess energy, thereby increasing competition and grid efficiency. Smart contracts facilitate the real-time coordination of production data from solar panels and other installations, and execute sales contracts that allow for two-way energy flows throughout the network.”

Under the prosumer system, money has traditionally been transferred to private interests through end users' electricity bills, tax breaks, lower borrowing costs, and out-of-market protections like PPAs.

It is important to note that some policy makers imagine consumers playing the market to reduce their energy costs or to make money selling battery-stored electricity. Digital systems are expected to allow consumers to avoid using electricity when the system becomes more dependent on base-load capacity supplied by coal, gas, nuclear and large hydro systems.<sup>143</sup> According to IRENA, "Consumers can contribute to system flexibility by shifting demand to times of low prices. This requires, firstly, the adaptation of regulations (to expose consumers to the hourly fluctuations of market prices) and, secondly, the deployment of infrastructure (e.g. smart meters and appliances) for consumers to be able to react to such signals."<sup>144</sup> According to one source, "Common examples of demand-side response include dimming lighting, avoiding air conditioning...Even smart-home systems can be used to turn up demand in response to energy generation, for example by operating washing machines and dishwashers at off-peak hours. With digital capabilities, the sophisticated optimization of assets in a building (or coordination across multiple buildings) is possible without any noticeable change in performance."<sup>145</sup>

But it is difficult to get a clear sense of the energy arbitrage opportunities offered by price variability alone. Such a system would depend on extreme price fluctuations. However, the more customers engage in transactive energy the less pronounced (and lucrative) energy arbitrage is likely to be.

Some policy makers therefore see flexibility as a *product* that is quite separate from electricity. In plain language, the potential economic and social impact of an unstable grid and the loss of reliable power means that flexibility services could be a very valuable commodity and thus a lucrative business for those who are able to provide restore stability. These same policymakers therefore strongly oppose any effort to regulate electricity prices, because this would dampen or eradicate the impact of the scarcity price on consumers. In June 2019, the EU Parliament and Council determined that "[electricity] prices shall be formed on the basis of demand and supply; market rules shall encourage free price formation and shall avoid actions which prevent

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143 A power plant that runs all or most hours to meet minimum electricity needs is referred to as 'baseload'. An operation that runs for short periods during times of high demand or resource scarcity is referred to as 'peak load.'

144 <https://www.irena.org/publications/2018/Feb/Renewable-energy-prospects-for-the-EU>

145 Webb, M., Scott, A., Gen.sü, I. and Broekhoff, D. 2020. Urban energy and the climate emergency: Achieving decarbonisation via decentralisation and digitalization. Coalition for Urban Transitions, London and Washington, DC. <https://urbantransitions.global/publications>, page 18

price formation on the basis of demand and supply; [and] market rules shall facilitate the development of more flexible generation, sustainable low carbon generation, and more flexible demand.”<sup>146</sup>

Either way, if the monetary gains are sufficient to provide flexibility, then some other part of the system will be paying for the flexibility that has been provided in return for monetary gain. If the gains are not a sufficient incentive for these market actors, then the system could become unstable. Unless it is solved, the remuneration problem has system-wide implications.

## The Story of Storage

The green growth approach to battery storage provides a vivid illustration of the current policy predicament. The IEA remains concerned that policy makers have yet to solve the remuneration problem, and are still grappling with the challenge of unlocking flexibility, which means finding ways for storage and other companies to make money. For the IEA, the answer is simple: governments must provide remuneration mechanisms to the private sector, and that includes the storage companies.<sup>147</sup> But exactly what these mechanisms might look like remains unclear.

The perceived need to commodify flexibility in ways that benefit investors and consumers is currently driving policy—and it is generating more subsidies for private interests. If these subsidies were helping cities to make significant strides toward their renewable energy and decarbonization targets, then the policy might be justified. But there is little evidence to suggest that such strides are being made.

Meanwhile, the viability and availability of battery storage is almost universally considered to be a crucial factor in the large-scale deployment of renewable energy generation. In the case of solar PV, stationary batteries allow electricity generated during peak periods to be available during nighttime hours. Having electricity stored in batteries also opens the possibility of battery owners being able to sell electricity back into the grid when the stored energy is not otherwise being used. The same principle applies with batteries in electric vehicles (EVs).<sup>148</sup> Both stationary and EV batteries are considered to be critical in terms of providing grid flexibility.

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<sup>146</sup> Article 3, Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity, OJ L 158, 14.6.2019, p.54–124

<sup>147</sup> IEA Status of Power System Transformation 2019, page 23

[https://webstore.iea.org/download/direct/2782?fileName=Status\\_of\\_Power\\_System\\_Transformation\\_2019.pdf](https://webstore.iea.org/download/direct/2782?fileName=Status_of_Power_System_Transformation_2019.pdf)

<sup>148</sup> <https://www.forbes.com/sites/jamesmorris/2020/08/01/evs-are-not-a-problem-for-the-electric-grid-they-are-the-solution/?sh=259a376d71f8>

In terms of stationary batteries, mainstream voices believe that the technology is taking off. It is also getting cheaper. Because of this, consumers are driving the deployment of batteries, and the growing market for batteries will lead to innovation. IRENA notes that in Germany 40% of small-scale solar PV systems have been installed with batteries.<sup>149</sup> Deloitte reports that, in 2017, solar-plus-storage in Germany accounted for 50% of installations, and Australia it was 40%.<sup>150</sup> The US-based Solar Industries Research Association (SEIA) notes, “Homeowners and businesses are increasingly demanding solar systems that are paired with battery storage...By 2025, more than 25% of all behind-the-meter solar systems will be paired with storage, compared to under 5% in 2019.”<sup>151</sup>

But these factors do not explain the recent growth of behind-the-meter battery storage. As with wind and solar technologies, the battery market is being driven by generous subsidies, a fact that does not always appear in reports such as those cited above. In May 2014, the German development bank KfW began issuing loans based on a 30% subsidy on battery systems. The subsidy is financed by Germany’s Federal Environment Ministry with a reported grant fund of \$65 million. In Australia, under the Home Battery Scheme, batteries have each been subsidized up to AUD\$3,000. \$100 million was budgeted for the scheme, along with an additional \$100 million in low interest loans to help households pay for the balance of the subsidized battery and new or additional solar if required.<sup>152</sup>

The current situation can therefore be summed up as follows: where there are no subsidies, there are no batteries. Where batteries are subsidized (such as Germany and Australia), they are being deployed in large numbers. But in many countries that have already reached a 20% share of renewable energy without subsidizing storage, batteries are not being subsidized and are almost non-existent.<sup>153</sup> Globally, the amount of stationary battery storage capacity that is currently operational is extremely small.<sup>154</sup>

Aware of the challenges facing the industry (such as the lack of remuneration mechanisms) battery storage and other clean tech companies have joined ranks with for-profit wind and solar companies in calling for risk

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149 IRENA, 2017. Electricity storage and renewables.

150 <https://www2.deloitte.com/us/en/insights/industry/power-and-utilities/global-renewable-energy-trends.html#endnote-sup-10>

151 <https://www.seia.org/solar-industry-research-data>

152 <https://www.homebatteryscheme.sa.gov.au/about-the-scheme>

153 International Energy Agency (IEA). Getting Wind and Sun onto the Grid: A Manual for Policy-Makers. Technical report, 2017

154 See: IRENA (2017), Electricity Storage and Renewables: Costs and Markets to 2030, International Renewable Energy Agency, Abu Dhabi. And: [https://ec.europa.eu/energy/sites/ener/files/energy\\_storage.pdf](https://ec.europa.eu/energy/sites/ener/files/energy_storage.pdf)

negation of their investments.<sup>155</sup> Storage industry groups note how the EU's *Clean Energy Package* "does not address all of the issues that are holding back storage deployment", principally the need for "investment certainty in the form of long-term contracts for storage services."<sup>156</sup> The European Commission concurs: "Above all, the main challenge for energy storage development is economic... Today, development is very slow due to the poor economic/business case and related uncertainties."<sup>157</sup> In simpler terms, batteries are only a good choice for consumers because the subsidies have made them so.

The same is true of batteries in electric vehicles (EVs). The EVs are heavily subsidized, which means the batteries are also subsidized. The extent to which grid stability will rely on the mass deployment of EVs is today the subject of considerable debate.<sup>158</sup> In 2019, EVs accounted for just 2.6% of global car sales and about 1% of the global car stock.<sup>159</sup> At first glance, these numbers suggest that the market for EVs (and charging infrastructure) would need to grow exponentially if EV batteries are to provide the grid flexibility that might be needed if VRE levels grow as expected.

We have seen how behind-the-meter stationary batteries have lagged far behind the growth in solar PV installations, and the story is similar with EV charging stations. As a result, governments have heavily subsidized the deployment of charging stations.<sup>160</sup> Global EV charging stations recently surpassed the 1 million mark. Europe leads in the expansion, increasing its EV charging infrastructure fivefold between 2017 and 2020. Over the same period, China's growth expanded by 158% and U.S. growth was 65%.<sup>161</sup> EVs are expected to grow exponentially, but for the foreseeable future both the growth in EVs and charging stations will also depend on subsidies.

The main message that emerges from the unfolding story of storage is this: without battery storage the flexibility challenge posed by VRE is likely to be

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155 Institute for Policy Integrity, *Managing the Future of Energy Storage*, April 2018. [https://policy-integrity.org/files/publications/Managing\\_the\\_Future\\_of\\_Energy\\_Storage.pdf](https://policy-integrity.org/files/publications/Managing_the_Future_of_Energy_Storage.pdf)

156 <https://www.pv-magazine.com/2019/02/13/the-reform-of-the-european-electricity-market-is-imperative-for-the-pv-revolution/>

157 EUROPEAN COMMISSION, DIRECTORATE-GENERAL FOR ENERGY, DG ENER, Working Paper *The future role and challenges of Energy Storage* (pdf undated). In December 2019, the European Commission approved a €3.2 billion plan to create a "pan-European" battery ecosystem via a coordinated research effort involving storage companies

158 <https://www.forbes.com/sites/jamesmorris/2020/08/01/evs-are-not-a-problem-for-the-electric-grid-they-are-the-solution/>

159 <https://www.iea.org/reports/global-ev-outlook-2020>.

160 Dvořáček, L.; Horák, M.; Valentová, M.; Knápek, J. Optimization of Electric Vehicle Charging Points Based on Efficient Use of Chargers and Providing Private Charging Spaces. *Energies* **2020**, *13*, 6750.

161 K. Stock, "Global Electric Vehicle Cords Top 1 Million," Bloomberg News, August 5, 2020. Available: <https://www.bloomberg.com/news/articles/2020-08-05/global-ev-charging-points-hit-1-million-threshold>

formidable, perhaps even insurmountable. And yet, current levels of operational storage are nowhere near sufficient.

The main reason for the low levels of storage deployment is insufficient profitability, and insufficient profitability will not attract private investors.

It therefore needs to be emphasized that, under the current policy, the only way consumers are likely to become active in the electricity markets is because public money has created an incentive for them to do so.<sup>162</sup> There is every possibility that the story of solar and wind—where public money was made available via a Feed-in Tariff (FiT) to make profitable what would not otherwise be profitable—will be repeated for battery storage and other DER.<sup>163</sup> And just as the costs of the FiTs were passed on to those who were unable to take advantage of the subsidy (such as renters; those without the upfront capital to install solar PV, or farmers whose land was not situated in a wind tunnel), then it seems highly probable that those who benefit economically from providing flexibility services will generate costs for working class people that do not have the same opportunity, or who do not own an EV.

By now it should be clear that the DER-rich smart city discourse is an extension of a prosumer model, one that is heavily subsidized in a socially regressive way. If the experience with behind-the-meter generation of the past two decades is any guide, it is a model that is ineffective in terms of cities reaching renewable energy and decarbonization targets.

Importantly, the smart city discourse perpetuates the belief that the future survival of the incumbent energy companies will be contingent on their ability to “offer new services to the energy consumers...These services include integrating with renewable energy sources, electric vehicle services, and demand response services to create more value for the consumers and in return gain more profit for each actor.”<sup>164</sup> In other words, the entities that today provide the overwhelming majority of the world’s electricity must adapt to the wishes of those who produce hardly any electricity at all. This makes no sense from either a social or ecological standpoint.

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162 <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/what-every-utility-ceo-should-know-about-blockchain>

163 The European Commission points to the use of “investment support schemes.” Under these schemes, “renewable producers must submit offers to the market operator. If the revenues collected from the market are not sufficient to cover their costs plus a fair return, then a subsidy will be given in €/MW on a yearly basis in order to ensure that the predetermined level of profitability will be achieved.” See: European Commission, Energy Economic Developments Investment perspectives in electricity markets, page 49 [https://ec.europa.eu/info/sites/info/files/file\\_import/ip003\\_en\\_2.pdf](https://ec.europa.eu/info/sites/info/files/file_import/ip003_en_2.pdf)

164 Bhatti, H.J. and Danilovic, M. (2018) Business Model Innovation Approach for Commercializing Smart Grid Systems. *American Journal of*

*Industrial and Business Management*, 8, 2007-2051. <https://doi.org/10.4236/ajibm.2018.89134> page 1

Cities under progressive administrations should therefore reject the widely held assumption that disruption of the incumbent energy companies will help cities decarbonize. And the idea that consumers are seizing the economic opportunities created by DER is both fictitious and propagandistic. Rather, cities should use their political weight to help reverse the neoliberal reforms of several decades ago, reforms that have turned the energy sector into a battleground of competing interests, including competition for subsidies. To be socially as well as environmentally effective, such a reversal would entail a comprehensive reclaiming of energy companies into a new public system.

## Part Four: The Role of Reclaimed Utilities in Meeting Cities' Targets

In Part One of this paper we discussed how the energy transition at the level of cities had produced three distinct narratives, namely green growth, energy citizenship and progressive municipalism. We noted that all three narratives consider the incumbent energy companies to be impeding the energy transition because they remain tied to an increasingly antiquated business model that is based on centralized generation. For this reason, each of these narratives view the disruption of energy markets by the actions of citizens (normally as prosumers), communities and businesses in a positive light.<sup>165</sup>

We also noted in Part One how what we are calling the progressive municipalism approach has been instrumental in shifting both public debates and, to some extent, the policy landscape in a number of large cities, particularly in Europe.<sup>166</sup> Beginning in the mid 2000s, many European cities began to push back against the tide of privatizations and outsourcing, and a significant number brought essential services that had previously been privatized back into public ownership, or expanding new services under public ownership that might otherwise have been outsourced to private contractors.<sup>167</sup> Largely as a result of a number of significant political victories, cities are today recognized as places where the left can be effective in generating real change and achieving meaningful outcomes.<sup>168</sup>

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<sup>165</sup> In the case of the “progressive municipalism” narrative, the emphasis has leaned more towards public energy cooperatives and companies, mostly in the electricity retail sector.

<sup>166</sup> Bruno Estrada López, “Energy transformation under the pressure of austerity: the case of Spain,” in Béla Galgóczi, ed., *Europe’s energy transformation in the austerity trap*, European Trade Union Institute, 2015; <http://www.etui.org/Publications2/Books/Europe-s-energy-transformation-in-the-austerity-trap>

<sup>167</sup> David Hall, “Re-municipalising municipal services in Europe,” May 2012, PSIRU, University of Greenwich.

<sup>168</sup> Lavinia Steinfort, “The Future is Public: Working Paper 13,” Transnational Institute, December

While stressing the positive aspects of cities' attempts to be important players in the energy transition, activists at the center of the progressive municipalism are aware of the obstacles that stand in the way of cities that aspire to play this role.<sup>169</sup> As noted by the Catalan Network for Energy Sovereignty (XSE), "We need to take power from the energy oligopoly so that it will be us, the communities, who decide for ourselves which [energy related] needs we prefer to meet and how."<sup>170</sup>

Progressive municipalism provides a platform for a more far-reaching discussion on the need to exert full public control over energy systems in a manner consistent with a comprehensive reclaiming approach.

## Comprehensive Reclaiming

The goal of the remainder of this paper is to offer a political approach that recognizes the need to bring the large incumbent companies into public ownership as part of a comprehensive reclaiming of energy systems. Any idea that consumer-driven or citizen-led disruption can provide some kind of alternative approach is simply not supported by the facts. The dominant green growth vision of disruption is highly regressive, and the community energy version of disruption is ineffective from a system change perspective.

In order to explain what is meant by comprehensive reclaiming, we offer this definition:

By *comprehensive* we mean extending public ownership to include electricity generation (and, progressively, over the supply chains of key technologies), transmission and distribution systems, as well as customer service or retail operations.

By *reclaiming* we refer not just to a private-to-public *ownership shift* (indeed, many companies are still formally owned or part-owned by governments); we are also referring to the need to also *demarketize* the incumbent companies by reconstituting them as public concerns operating under a new pro-public mandate. This *mandate shift* is as critical to the reclaiming project as is the ownership shift.

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2019, <https://www.tni.org/en/futureispublic>.

169 Helen Traill, Andrew Cumbers and Neil Gray, The state of European municipal energy transition: an overview of current trends, Adam Smith Business School, University of Glasgow May 2021

170 Xse (2014), «Defendiendo la soberanía energética», *Ecologistas*, n. 81, June 2014. See Xse, We've Got Energy! Challenges of the Transition Towards Energy Sovereignty

## The Role of Cities Revisited

Comprehensive reclaiming shifts the focus of political attention away from various forms of disruption toward the incumbent companies themselves. Its point of departure is this: cities may consume roughly 70% of the world's electricity and generate the majority of energy-related GHG emissions, but incumbent companies currently control most of the world's electricity infrastructure. For as long as the electrical power they provide is needed—and that period could in some countries span decades—these entities will not disappear even if, on a capitalist basis, they are disrupted to the point where they become financially unviable.

Comprehensive reclaiming provides a clear alternative to urban neoliberalism and its delusional green growth platitudes and facts-averse speculation about active consumers. At the same time, it can redefine notions of energy citizenship which, despite its progressive appearance, is currently anchored in a socially regressive prosumer model. Comprehensive reclaiming reinforces the primary objectives of progressive municipalism, which has generally supported cities' reclaiming distribution grids to public ownership and situates public services at the center of its vision for change.<sup>171</sup>

## Decommodification of Electricity

In broad terms, comprehensive reclaiming allows for the decommodification of electricity. This stands in complete contrast to the green growth and energy citizenship approaches, both of which rely on commodification in order to incentivize the kinds of disruption that were discussed above. Decommodification has the potential to create avenues of cooperation between reclaimed utilities, municipal authorities, and end-users of all kinds.<sup>172</sup> This will allow for issues of equity to be effectively addressed while decarbonization goals are pursued. Importantly, reclaimed companies can help bring into balance the need to decarbonize supply, promote efficiency, and reduce energy demand. Under the system of commodified electricity, demand reduction amounts to economic hardship or potential insolvency for for-profit companies (including marketized publicly owned operations).

The main advantages of comprehensive reclaiming include:

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171 Kishimoto, S., Steinfert, L., and Petitjean, O. (2020), *The Future is Public: Towards Democratic Ownership of Public Services*. Amsterdam: Transnational Institute; Cumbers, A. and Becker, S. (2018) Making sense of remunicipalisation: theoretical reflections on and political possibilities from Germany's Rekommunalisierung process. *Cambridge Journal of Regions, Economy and Society*, 11(3), pp. 503-517. (doi:10.1093/cjres/rsy025) page 11. In other instances, these writers use the term "urban neoliberalism."

172 UNISON. *Power to the People* (author Matthew Lay)

- The opening up of avenues of cooperation between reclaimed utilities, municipal authorities, and end-users of all kinds, thus allowing issues of equity to be properly addressed while decarbonization goals are pursued. Whereas public partnerships (sometimes called public-public partnerships, or PUPs) have emerged as a means of survival for financially fragile public companies (mostly water utilities), public partnerships could provide some of the institutional superstructure of a new public energy system
- Relieved of the need to sell electricity by volume (volumetrically) reclaimed utilities can work alongside municipalities and large commercial and industrial users to promote efficiencies and reduce demand. Distributed energy resources (DER) such as batteries, sensors, etc., could be introduced by way of a suite of regulatory standards, no longer leaving the deployment of these technologies to consumer choice or as a side-business in energy arbitrage.
- Reinstating evidence-based deliberations on decarbonization options and trade-offs. Economy-wide decarbonization will present unprecedented challenges. It is expected to increase demand for electricity (and also generation capacity). There will need to be a protracted period of public debate regarding which electrification and decarbonization options be prioritized immediately and over the longer term. These debates already exist, at least to a point. But the debates are currently distorted by the profit motive, in the same way as debates about the need for seat belts or the dangers of cigarette smoking were, in the 1950s and 1960s, distorted by, respectively, some of the major car companies and the tobacco industry. Situated at the heart of the process of economy-wide electrification, public energy systems can ensure that the principle of public goods and long-term planning take precedent over the commercial priorities of private interests.

## Reversing Neoliberal Reforms

However, implementing this approach will be contingent on a full reversal of the neoliberal reforms of the 1980s and 1990s. It bears repeating that these reforms had a global reach; in fact, key countries of the global South were often targets for energy privatization as part of the structural adjustment wave of the 1980s and 1990s. Reversing the neoliberal reforms will be a monumental political task, and will probably begin in one or two key countries, along the lines of the reforms that began in 1978 in Chile under the Pinochet dictatorship and a few years later in the UK under the Tory administration of Margaret Thatcher.

The impact of these reforms was discussed in Part One, and need not be repeated here, other than to again emphasize that, in the words of the World Bank, “The core elements of the 1990s reform model entailed restructuring the incumbent utility; creating an independent regulatory entity; introducing private sector ownership (or at least commercial orientation); and opening to competition where relevant.”<sup>173</sup> The reforms were radical and relentless in the way they were pursued.

Developed first in the early 1990s and elaborated in depth by *The Stern Review*, the policy of protecting renewables from competition grew out of an effort to address concerns about climate change without impeding the neoliberal privatization, liberalization and marketization agenda. This has triggered what has been termed a “utility death spiral” marked by the incumbent companies experiencing shrinking market shares, lower profit margins, and capital scarcity as a result of a loss of investor confidence. A combination of falling profits and high levels of debt have led to the downgrading of many utilities’ credit ratings, particularly in Europe.<sup>174</sup>

Interestingly, having spearheaded the early reforms, the World Bank today considers them to be problematic. According to Riccardo Puliti, the World Bank’s Global Director for Energy and Extractive Industries, “The 1990s model alone will not be sufficient to deliver on global energy objectives. We also need complementary, targeted policies to reach the 840 million people who live without access to electricity today and to rapidly increase the share of clean energy in the global energy mix.”<sup>175</sup> But what, then, are the targeted policies that will achieve global energy objectives? According to the Bank, “There is no one-size-fits-all framework, and the particular needs and challenges of low-income and fragile environments deserve special consideration.”<sup>176</sup>

In other words, the World Bank no longer has a coherent policy. According to Riccardo Puliti, Global Director, Energy and Extractive Industries at The World Bank, “Key environmental and social objectives did not figure into the 1990s paradigm of power sector reform” and “technological trends

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173 Foster, Vivien, and Anshul Rana. 2020. Rethinking Power Sector Reform in the Developing World. Sustainable Infrastructure Series. Washington, DC: World Bank. doi:10.1596/978

-1-4648-1442-6. License: Creative Commons Attribution CC BY 3.0 IGO, pp 45-48

174 Vera Wegmann, *Going Public: A Decarbonised, Affordable and Democratic Energy System for Europe*, PSIRU, University of Greenwich, July 2019, <https://www.epsu.org/article/going-public-decarbonised-affordable-and-democratic-energy-system-europe-new-epsu-report>; Financial Times (12 March 2018) Germany’s €43bn energy shake-up wins market favour. <https://www.ft.com/content/d020a052-25e4-11e8-b27e-cc62a39d57a0>

175 Foster, Vivien, and Anshul Rana. 2020. Rethinking Power Sector Reform in the Developing World. Sustainable Infrastructure Series. Washington, DC: World Bank. doi:10.1596/978-1-4648-1442-6. License: Creative Commons Attribution CC BY 3.0 IGO, pp 45-48

176 *ibid*

are disrupting frontier markets where some are even calling into question the need for a traditional, centralized utility.” Therefore, “It is only natural that the reform approaches will need to be updated to support these changes.”<sup>177</sup>

Furthermore, as noted in Part One, the policy of protecting renewables from competition has triggered what has been termed a “utility death spiral,” one marked by falling market share, lower profit margins and capital scarcity as a result of a loss of investor confidence in the incumbent companies to produce satisfactory returns. A combination of falling profits and high levels of debt have led to the downgrading of many utilities’ credit ratings, particularly in Europe.<sup>178</sup>

But the challenges posed by variable renewable energy (VRE) means that, for the foreseeable future, power generated by gas, nuclear, and coal will still have an essential role to play in meeting energy needs. However, the economic impacts of distributed generation on the incumbent companies are such that these same companies, confronting low-to-zero profit margins and investor disinterest, can demand—and frequently receive—subsidies (known as capacity payments) to stay in business so that they can continue to provide back-up power.

In plainer language, the incumbent companies will not be disrupted into non-existence. Most governments would today rather subsidize *both* the incumbent companies and the renewable energy companies rather than take either into public ownership. They would rather continue to use public money to “de-risk” private power producers than to build new capacity themselves.

But under these circumstances, the incumbent companies will be unable to play the kind of leading role in driving decarbonization that is eminently possible because they will be starved of investment, exposed to risk, and—in many countries—they will continue to lose market share. This reality means that the prospects of cities reaching their decarbonization targets become less likely than would be the case if the incumbent utilities were reclaimed to public ownership and issued a new pro-public mandate.

But how, exactly, will reclaiming electricity generation, transmission and distribution systems, as well as customer service or retail operations help

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177      *ibid*

178      Vera Wehmann, *Going Public: A Decarbonised, Affordable and Democratic Energy System for Europe*, PSIRU, University of Greenwich, July 2019, <https://www.epsu.org/article/going-public-decarbonised-affordable-and-democratic-energy-system-europe-new-epsu-report>; Financial Times (12 March 2018) Germany’s €43bn energy shake-up wins market favour. <https://www.ft.com/content/d020a052-25e4-11e8-b27e-cc62a39d57a0>

cities decarbonize? This is a question we begin to address in the final pages of this report, but it is an approach that will require more space than is available here.

## Achievable Tasks

We will highlight three areas where reclaimed companies can help cities reach their renewable energy and decarbonization targets, and do so in ways that are likely to be more socially equitable and ecologically effective. For convenience, we will call these achievable tasks.

These achievable tasks are:

End the energy war between competing for-profit interests. Transition instead to a planned approach that strikes a functional balance between large-scale and small-scale renewable energy projects.

End the subsidies forever scenario. Today all energy sources and key technologies are subsidized in a way that makes profitable what would not otherwise be profitable.

Use a public goods model to drive efficiency and conservation in cities (and elsewhere). This would include using DER in ways that stand in complete contrast to the current “all stakeholders can make money” customer driven model. Decarbonization does not need more market actors; it does not even need a market. Rather, it needs a planned approach that is liberated from the calculations of private profit.

## Ending the Energy War

Comprehensive reclaiming provides a way to end the energy war between the incumbent companies and behind the meter interests. It is important to note that this is today not a clearly defined war between clean and dirty energy; it increasingly resembles a war between utility-scale renewable energy and small scale systems.

As noted above, we pointed out that more than 80% of investment in renewable energy capacity in 2018 took the form of utility-scale projects of more than 1MW in size. However, the utilities’ preference for larger projects is driven in part by the technical challenges posed by VRE. From a grid-balancing standpoint, utilities can better manage the power that comes online than is the case with smaller systems that are more technically disruptive

and add costs to the utility. Power from utility-scale projects is brought in via transmission networks, whereas small behind the meter systems (known as embedded generation) feed power into distribution grids and become what grid operators call hidden load. This is not a trivial issue, either technically or politically. On the technical side, grid operators need to know the location and connection status of all of the sources of power coming into both the transmission and distribution grids. In the words of one report:

Imagine an entire neighborhood investing in rooftop [solar] kits. Mid-day, the sun beats down on those solar panels, but no one is home using the energy. The utility's transformer feeding the neighborhood, which had initially been architected for a load of "X" MW going down, now sees a load of "2X" pushing back into the grid. The machinery wasn't built for that. Finally, voltage profiles which used to decrease alongside a feeder, from feeder head to feeder end, now start to feature much more varied profiles, going up and down and up again depending on where new embedded generators or storage devices are injecting power. In some countries, there is now more power being injected directly at the distribution level than there is flowing from the transmission level. Still, transmission remains responsible for ensuring that enough power is running on the grid to match instantaneous consumption.<sup>179</sup>

If utilities are to be the ones responsible for balancing grids, then any growth in behind the meter distributed generation will incur costs (known as system costs) that contribute to the death spiral discussed above. This means that any contribution distributed generation might make to meeting cities' renewable energy targets is obscured by the pressures imposed by neoliberal marketization.

To illustrate the political implications of the energy war, which includes the war between utility scale and small-scale renewables, we will look briefly at cities in the US State of Utah, where 23 cities and counties—among them the capitol Salt Lake City—have adopted a "100% net renewable energy by 2030" target that, in 2019, became State Law.

## Twenty-Three Cities, and One Utility

Utah draws attention to the kind of system level issues that are brought into play when cities consider how to reach their decarbonization goals. It also

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<sup>179</sup> According to one report, "Power used to be predictably top down with the utility at the center of the producer consumer relationship. Now electricity can come from the bottom, and erratically, with flow tied to how the wind blows and the sun shines, as well as based on how prosumers wants to consume/generate/store energy for its related service." See: General Electric Digital, 2020: Rising to the Challenge of Renewables and DERs: Orchestrating Across the Electric Grid and Its Prosumers.

illustrates the contradictions embedded in the current disruptive approach endorsed by current neoliberal climate policy; it shines light on the counterproductive effects of the ensuing energy war, waged on this occasion between the utility and advocates of customer generation. However, Utah’s recent experience provides a glimpse into an alternative future based on a comprehensive reclaiming of incumbent companies guided by a public goods mandate.

Through a series of city council resolutions adopted from 2014-2019, Salt Lake City, Park City, Moab and others made commitments to reach “100 percent net-renewable electricity (from solar, wind, geothermal, hydro-electric, and demand management)” by 2030. By early 2019, 23 Utah cities and counties had signed on.

City officials and activist groups had earlier expressed frustration at the slow rate of renewable energy deployment in Utah, and attributed this to the obstructive stance of the regulated power utility, Rocky Mountain Power (RMP). RMP’s parent company, PacifiCorp, owns the largest fleet of coal-fired power stations in the western US. The bulk of the electricity Pacific Corp and its subsidiary RMP provides is generated by fossil fuels.<sup>180</sup> In the case of Utah, 60% of electricity is consumed by industrial and commercial interests, whereas just 20% is consumed by residencies.<sup>181</sup>

Importantly, in August 2016, Salt Lake City and RMP co-signed a cooperation statement whereby both the City and RMP would work together to achieve “100% net renewable energy by 2030.”<sup>182</sup> The growth in the number of participating communities—accounting for about 37% of Utah’s electricity consumption (or load)—broadened the scope of the potential cooperation with RMP. A group of officials representing the 23 cities and counties entered into two years of (apparently secret) discussions with RMP on how they could work together in order to reach the 100% target.<sup>183</sup> Together the parties drafted and then presented to the Republican-dominated State Legislature the Community Renewable Energy Act (CREA). As a result of the partnership between RMP and the 23 cities and counties, the bill was passed into law in early 2019.<sup>184</sup>

The CREA legislation authorized RMP to procure renewable electricity resources and create a renewable electricity bulk-purchase program for the 23

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180 <https://www.eia.gov/state/analysis.php?sid=UT>

181 [https://yourutahyourfuture.org/images/Vision\\_PDFs/Energy\\_YUYF\\_Vision.pdf](https://yourutahyourfuture.org/images/Vision_PDFs/Energy_YUYF_Vision.pdf)

182 <http://www.slcdocs.com/slccgreen/Climate%20&%20Energy/CooperationStatement.pdf>

183 <https://www.sierraclub.org/sierra/2019-4-july-august/feature/utah-way-achieving-100-percent-clean-energy>

184 <https://le.utah.gov/~2019/bills/static/HB0411.html>

participating communities. CREA stipulated that all customers in the participating communities be automatically enrolled to receive renewables-generated electricity and to incur any additional costs. However, customers within those jurisdictions could also opt-out of the program if desired.<sup>185</sup>

RMP's willingness to collaborate with the 23 cities and counties bears the markings of a pragmatic accommodation to political pressure aimed at getting the utility to increase the share of renewables in its energy mix.<sup>186</sup>

But there are signs that RMP also saw this as an opportunity to launch a preemptive strike behind the meter disruption. Significantly, the cooperation statement co-signed by Salt Lake City and RMP in August 2016 stipulated that the City "will not implement Community Choice Aggregation [CCA] as an option" as long as the cooperation lasted. RMP also managed, in October 2020, to have the Public Service Commission approve the utility's request to cut by roughly a third the amount per kilowatt hour the utility paid individual households for self-generation. Earlier, in 2017, RMP persuaded the Commission to allow it to end its net metering service.

Local environmental NGOs and residential solar installation companies strongly opposed both Commission's ruling, warning that ending net metering and reducing the kilowatt hour price would have "a dire impact on the entire rooftop solar industry...unfairly preventing people from realizing a fair compensation."<sup>187, 188</sup> These advocates also argued that the health and climate benefits of distributed generation were such that the amount per kilowatt hour paid to individual households should instead be *increased*, and not reduced.<sup>189</sup>

The CREA legislation passed by the State ensured that any commitment to utility-scale wind and solar projects any additional costs associated with renewable energy projects would be passed on to consumers living in the cities and counties that had made the "100% by 2030" commitment.

RMP then began to solicit bids from private sector renewable energy companies.<sup>190</sup> In late 2020, the PSC approved RMP's request to move forward

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185 <https://www.liebertpub.com/doi/10.1089/sus.2020.0045>

186 RMP had always denied that it was "resistant" to the cities' "100 net renewable energy by 2030" proposals, but it was concerned about the costs of procuring renewable energy would be passed on to its entire customer base. RMP had stated, "A long-standing regulatory principal in utility policy is that individual customers (or customer groups) whose energy requirements or actions introduce additional costs to serve them should pay those costs in their rates."

<https://www.liebertpub.com/doi/10.1089/sus.2020.0045>

187 <https://www.sltrib.com/news/environment/2020/03/06/utahs-largest-power/>

188 <https://www.sltrib.com/news/environment/2020/09/29/future-utahs-rooftop/><https://pv-magazine-usa.com/2020/10/30/utah-psc-decides-to-lower-the-export-rate-impact-a-recovering-rooftop-solar-industry/>

189 [https://votesolar.org/wp-content/uploads/2020/12/17-035-61\\_Phase\\_2\\_Affirmative\\_Testimony\\_of\\_Briana\\_Kobor\\_3-3-20\\_Kobor.pdf](https://votesolar.org/wp-content/uploads/2020/12/17-035-61_Phase_2_Affirmative_Testimony_of_Briana_Kobor_3-3-20_Kobor.pdf)

190 Wait, cities can do what? Achieving city energy goals through franchise agreements Crossref

with an 80MW solar project involving a private developer.<sup>191</sup> Scheduled to be completed in 2023, the project will benefit from a Schedule 34 Renewable Energy Tariff.<sup>192</sup> RMP's owners, PacifiCorp, had already signed a 25 year PPA with the US Solar Fund (a for-profit developer) for a 128MW solar project elsewhere in the State. The company stated that the 25-year PPA "will provide stable long-term infrastructure cash flows to our investors."<sup>193</sup>

The Utah story involves a partnership between cities and counties collectively adopting an ambitious renewable energy target (100% net renewables by 2030) and an incumbent utility in a way that takes advantage of the administrative and technical expertise of the utility. According to a research team at the US-based National Renewable Energy Laboratory (NREL) "This can be a more favorable approach as compared to community choice aggregation or municipalization, where the city would have to build its own technical expertise in energy procurement...these partnerships can allow the city to look beyond behind-the-meter generation options that may not be enough to achieve ambitious clean energy goals."<sup>194</sup>

For NREL, franchise agreements such as the one struck between RMP and the 23 cities and counties in Utah present an important option for cities as they try to meet their climate and energy targets. But they do not guarantee success: "The [incumbent] utility must agree to the terms of the agreement, which influences what a municipality may be able to achieve via this pathway." It is also relatively easy for a utility "to underdeliver on their clean energy commitments throughout the agreement." And the PPA model (based on 20-25 year contracts) allows for no modifications that a city, or group of cities, might wish to introduce as a result of (currently unknown) changes in the energy sector.

But the potential problems do not end there. If incumbent utilities continue to promote projects involving private developers seeking returns on investment for investors, then the energy transition will continue to be a massive money-making project for private interests where the profits are guaranteed by a combination of generous public subsidies (Federal Tax Credits and Production Tax Credits in the case of the US) and long term PPAs that are structured in ways that guarantee additional returns. Far from being a

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DOI link: <https://doi.org/10.1016/j.enpol.2020.111619> Utah PSC, Docket No. 18-035-47 2018

191 <https://slcgreenblog.com/2020/11/24/rocky-mountain-power-contracts-to-deliver-renewable-energy-for-six-large-customers/> The developer is: D. E. Shaw Renewable Investments (DESRI).

192 [https://www.rockymountainpower.net/content/dam/pcorp/documents/en/rockymountainpower/rates-regulation/utah/rates/034\\_Renewable\\_Energy\\_Purchases\\_for\\_Qualified\\_Customers\\_5000kW\\_and\\_Over.pdf](https://www.rockymountainpower.net/content/dam/pcorp/documents/en/rockymountainpower/rates-regulation/utah/rates/034_Renewable_Energy_Purchases_for_Qualified_Customers_5000kW_and_Over.pdf)

193 <https://www.pv-tech.org/usf-completes-acquisition-financing-of-128mw-pv-project-in-utah/>

194 Wait, cities can do what? Achieving city energy goals through franchise agreementsCrossref

DOI link: <https://doi.org/10.1016/j.enpol.2020.111619>

citizens-led transition, the benefits will accrue to an ever-smaller group of developers and renewable energy companies.

Liberated from pressures to sustain or expand market share, revenues and profits for investors, reclaimed companies can work with municipalities to strike a functional balance between large-scale and small-scale renewable energy projects. Tensions between prosumers and utilities can be avoided. Instead of providing opportunities for individuals and businesses to make money at the expense of the wider public, the efficacy of distributed generation can be assessed based on social and ecological criteria, and a clear understanding of its impact on the entire system of energy provision.

## Ending “Subsidies Forever”

The second achievable task for reclaimed public companies is to apprehend what can be described as a “subsidies for all, indefinitely” scenario. Today all energy sources and key technologies are subsidized in a way that makes profitable what would not otherwise be profitable.

This would correct a major flaw in neoliberal policy, one that was not clearly visible when its prescriptions were first devised. In Part One of this paper, we noted how the 2006 *Stern Review* urged governments to provide incentives to the private sector so that low carbon technologies would be developed and deployed. But the *Review* failed to anticipate that the incentives would become a permanent arrangement. Globally, the growth in wind and solar installations has been almost entirely dependent on subsidies. The for-profit renewables industry has gone to great lengths to convince policy makers and the broader public that the subsidies will soon no longer be necessary, and wind and solar is about to reach a “tipping point” in terms of being able to compete with fossil fuels. As we have discussed in considerable detail elsewhere, this claim is very misleading.<sup>195</sup>

As we have seen, the current subsidies regime amounts to a massive transfer of public money to private interests in order to secure returns on investment. Private interests demand incentives, remuneration mechanisms and

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<sup>195</sup> Sean Sweeney and John Treat, *The Energy Transition Myth*, Transnational Institute, Forthcoming. See also: Stukalkina, A. and Donovan C. (30 October 2018) “The dangers of subsidy-free renewable energy,” Imperial College Business School. Available at: <https://www.imperial.ac.uk/business-school/knowledge/finance/dangers-subsidy-free-renewable-energy/> (retrieved 23 June 2020). “While it’s accurate to say renewables have become much cheaper over the last few years and no longer require outright subsidy, the idea of a pure market for electricity is a mix of ignorance and willful fallacy. Pushing renewable energy to compete with fossil fuels in wholesale electricity market may, in fact, undo much of the progress made over the last decade in developing investment-ready climate policies...We are not the only ones seeing a looming crash in renewables investment if the current trend of pushing renewables towards merchant price risk continues

long-term contracts for storage, energy efficiency, EV charging stations and flexibility services. If the subsidies were unlocking adequate levels of private investment, then the policies might be (to a point) validated. But this is not the case. According to the IEA's 2019 assessment, "There are few signs of the major shift of capital towards efficiency, renewables and innovative technologies that is needed to turn emissions around.... Investment and financing decisions are shaped by policies: today's frameworks are not yet equipped to avoid multiple risks for the future."<sup>196</sup>

Today all energy sources and key technologies are subsidized in a way that makes profitable what would not otherwise be profitable, and there is a growing number of voices in the policy mainstream who understand that the current policy framework is simply not compatible with meeting climate targets. As we have seen, the current subsidies regime amounts to a massive transfer of public money to private interests in order to secure returns on investment.

Reclaimed companies will have the capacity to help end the subsidies regime. The discontinuing of the capacity auctions—which themselves must be set up and administered by governments at some considerable cost to the public purse—will mark a significant step away from subsidies that are embedded in power purchase agreements (PPAs). PPAs both protect private power producers and developers from competition from other energy sources, and while this allows for renewables to be deployed it means that subsidies are passed down to end users. And because PPAs undermine other for-profit companies in coal, gas and nuclear, these interests are often subsidized in order to keep them viable.

If public funds were used to deploy new generation capacity, transmission upgrades, DER, etc. then this should be done on the basis of a cost plus procurement model. The discontinuing of the capacity auctions will coincide with a return to a more traditional public procurement model. With government help, reclaimed companies can purchase technologies as needed, with an eye on establishing production facilities either in house or within the reach of a new public energy system.

Under this simple procurement model, reclaimed companies will have no need to purchase electricity; rather, they can use direct public financing to purchase the electricity-generating technologies. The private supplier can mark-up the price based on a reasonable return. But the advantage of this approach is that key components or whole ready-to-operate systems will be owned by the public company and will thus become public property.

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<sup>196</sup> IEA, *World Energy Investment 2019: Webinar*, 14 May 2019, <https://youtu.be/ZuVjHW7n5k>.

From a public perspective, a cost-plus approach is still far from ideal. It reflects the current lack of public capacity that is an outcome of the neoliberal period. Replenishing this capacity will inevitably take some time, likely several years. Nevertheless, a cost-plus system means that electricity sales, which can be structured in ways that ensure full access to electricity for reasonable levels of consumption, can produce revenues that can cover the initial outlay, if necessary. For example, if a 30MW wind farm costs \$30 million to install, the \$30 (in fixed dollars) million can be recovered over the life of the project (say, 25 years). This would be cheaper than a PPA that guarantees a 10-12% annual return to private companies for each MWh of power over a (perhaps) 25-year period—after which the private companies will still own the infrastructure. Of course, all of this assumes such initial costs are not simply absorbed by the state, as with military expenditure.

Given the importance of the need to scale up deployment of low-carbon generation capacity, governments would be fully justified in taking decisive action in order to plan and develop the levels of production that are required. This could be achieved by way of governments taking the major technology providers into full public ownership via nationalization if, that is, the technology supplier serves to local market and is located close to that market.

All over the world governments have promoted PPA contracts as the policy of choice because they were part of the neoliberal public-private partnership (P3) logic: private corporations secure the up-front project financing and public entities avoid debt obligations. But private sector borrowing incurs higher capital costs — essentially interest rates. Add to this the need for investors to make satisfactory returns, the cost of competition, and the costs of developing new generation capacity becomes much higher than if projects were publicly financed.

As things stand currently, cities will attempt to reach their targets by way of purchasing electricity from utilities that will involve long term PPAs with independent for-profit interests who are themselves subsidized. To the extent that behind-the-meter systems are encouraged, then prosumers will also be subsidized. Any combination of utility-scale or small-scale deployment leads under a for-profit system still produces the same outcome: subsidized private power, the benefits of which will accrue to private interests.

## Public Digitalization: Working with Cities to Drive Efficiency

The third achievable task is perhaps the most important one from a decarbonization perspective: reclaimed companies could be the main drivers of energy efficiency in cities. This would include using DER in ways that stand in complete contrast to the current “all stakeholders can make money” customer driven model, which, as we have seen, is a model that mostly exists in theory. As noted above, decarbonization does not need more market actors; it does not even need a market. Rather, it needs a planned approach that is liberated from the calculations of private profit.

The 2017 IEA study on digitalization describes how:

during the hours when supply is scarce or electricity networks are congested, connected devices such as smart electric heaters and air conditioners, industrial boilers and smart home appliances can be switched off or run at lower load automatically. These connected devices can reduce or shift consumption to other periods when supply is abundant, for example, when the sun shines, the wind blows or when there are no technical problems with the electricity grid.<sup>197</sup>

Of course, under a decommodified public system, digitalization allows for these same technologies to be programmed by utilities to do more than shift consumption; they can also reduce consumption in situations where coal and gas are the main sources of supply. Advanced Metering Infrastructure (AMI) technologies allow for calculation, display, storage and communication with a central server. Data recordings are made every hour (or even more frequently) and the data is used for monitoring and billing. Two-way communication between the meter and the central system run by the service provider is done via cellular telecommunication technologies and makes remote reporting and problem solving easier.

According to a June 2018 US Council on Foreign Relations (CFR) report:

Utilities can ensure that internet-connected electrical devices can be set to shift grid energy consumption to hours of the day with lower demand, reducing the peaks in the network’s demand profile. Software tools allow for a much more precise analysis of

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197 <https://webstore.iea.org/download/direct/269?fileName=DigitalizationandEnergy3.pdf>, page 88

power supply and demand interactions, and having real-time grid operational information, both technical and economic, would help a utility reduce electricity consumption, at least in non-industrial, residential, and small commercial settings.<sup>198</sup>

Thus it would appear that the benefits of digitalization can accrue at all points in the system—and power stations, utilities, transmissions systems, distribution networks—are increasingly using smart interconnected technologies in order to reduce operating costs and make their current operations more efficient. In other words, digitalization can be pursued centrally, or it can be pursued behind the meter in form of storage batteries and smart meters. Either way, demarketized and reclaimed utilities are better placed to deploy DER than consumers, and the results are likely to be more equitable and effective in terms of promoting efficiency and reducing demand.<sup>199</sup>

The importance of a public goods approach to efficiency cannot be overstated, and reclaimed companies can take the lead in this effort. The IPCC, the IEA and others have estimated that energy efficiency and conservation (for convenience, efficiency) can potentially contribute up to 40% of the reductions in energy related emissions required by 2050.<sup>200</sup> However, under the current market framework, these potential emissions reductions will not be fulfilled. In 2020, the *Global Commission for Urgent Action on Energy Efficiency* noted: “A range of policies exists to drive demand for energy efficient products and services, yet market uptake is still far from where it needs to be.”<sup>201</sup> According to the IEA, “Future projections reveal that under existing policies, the vast majority of economically viable energy efficiency investments will remain unrealized.”<sup>202</sup>

Such statements are a clear indictment of the current market-based approach to efficiency. Whether in cities or elsewhere, efficiencies are not being pursued because there are few opportunities for private interests to make money. Neoliberal policymakers assumed that pricing CO2 would

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198 Sivaram, Varun. *Digital Decarbonization: Promoting Digital Innovations to Advance Clean Energy Systems*. Council on Foreign Relations. (Kindle Edition)

199 See also: Gert Brunekreeft, Julia Kusznir, and Roland Meyer, *The Emergence of Output-Oriented Network Regulation*. Oxford Energy Forum, September 2020: ISSUE 124, page 34

200 IEA/IRENA *Perspectives for the Energy Transition: Investment Needs for a Low Carbon Energy System*, <https://www.irena.org/publications/2017/Mar/Perspectives-for-the-energy-transition-Investment-needs-for-a-low-carbon-energy-system>. See also: Akashi et al. (2014) <https://link.springer.com/article/10.1007%2Fs10584-013-0942-x>; Arnulf Grubler, et. al., A low energy demand scenario for meeting the 1.5 °C target and sustainable development goals without negative emission technologies, *Nature Energy*, Vol 518 3, June 2018, 515–527, [www.nature.com/natureenergy](http://www.nature.com/natureenergy)

201 IEA, “Recommendations of the Global Commission for Urgent Action on Energy Efficiency,” June 2020, <https://www.iea.org/reports/recommendations-of-the-global-commission-for-urgent-action-on-energy-efficiency>, p. 12.

202 IEA, 2014. *Capturing the Multiple Benefits of Energy Efficiency*, International Energy Agency, Paris

accelerate efficiency improvements. A price on carbon was expected to provide an incentive to companies to invest in efficiency to reduce what they might have to pay for emissions permits. It was also hoped that a price on carbon price would create a market for efficiency-enhancing technologies. But neither has happened to any significant degree.<sup>203</sup>

When considering the potential role of reclaimed companies in driving efficiency, it is necessary to make a distinction between what is *technically* possible, and what the current policies have been able to deliver. For buildings, the IEA has estimated that *renovation of a quarter of existing stock in the advanced economies would reduce total CO2 emissions from space heating by a third. In the global South, where the building stock is expanding rapidly, up to 60% of buildings that will be in use in 2030 are not yet built, which presents opportunities to establish building codes to ensure that new buildings are as efficient as possible.*<sup>204</sup>

Decommodification will allow reclaimed companies to pursue strategies to advance efficiency in an integrated and planned way. In addition to helping to reduce emissions, higher levels of efficiency could reduce the amount of new generation capacity that will need to be installed in the coming decades.

In terms of job creation, the global South presents many examples of the potential connection between workers who need employment and the potential to create socially and ecologically necessary work. Clearly, reclaimed energy companies can partner with municipal and local authorities to address these problems by developing the kind of direct-hire public works programs that were commonplace as far back as the 1930s under the original New Deal in the United States. Effective public works programs have a long history and have been used to address social problems caused by capitalism that markets were unable to address.

In this regard, the World Bank has repeatedly stated that those who provide environmental services should be compensated through payments from beneficiaries of these services, and that the social and ecological benefits far outweigh the cost of paying for the services.<sup>205</sup> UN Habitat has echoed this approach and has emphasized the crucial role of the private sector,

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203 Parrique T., Barth J., Briens F., C. Kerschner, Kraus-Polk A., Kuokkanen A., Spangenberg J.H., 2019. Decoupling debunked: Evidence and arguments against green growth as a sole strategy for sustainability. European Environmental Bureau. [eeb.org/decoupling-debunked](http://eeb.org/decoupling-debunked)

204 IEA, "Recommendations of the Global Commission for Urgent Action on Energy Efficiency," June 2020, <https://www.iea.org/reports/recommendations-of-the-global-commission-for-urgent-action-on-energy-efficiency>, p. 12.

205 World Development Report 2020.

institutional investors, and the value of public-private partnerships in advancing sustainable urban development.<sup>206</sup>

Again, there is no space in the neoliberal model for direct-hire public works efficiency programs that could be publicly financed. Such programs would not only create jobs in the short term, the beneficiaries of emissions reductions will be children alive today or those who will be alive in future. To suggest, as the World Bank does, that beneficiaries of energy efficiency— young children and the unborn—should pay for what is, in effect, a more stable climate the moral bankruptcy of the current for-profit model.

Much more can and should be said about the potential role of reclaimed energy companies. In terms of cities, we have argued that ambitious targets will not be reached if the current energy-for-profit policy framework aimed at securing returns on investment is, in reality, a subsidies for all arrangement that benefits private concerns.

## Disrupting Disruption: Cities Can Drive a Public Energy Future

It was stated at the outset that the attention to the role of cities in the energy transition has promoted the idea that, by adopting ambitious renewable energy and decarbonization targets, cities are leading the fight against climate change.

This paper has attempted to show that the emphasis on distributed generation—which has been a common feature of different energy transition narratives—has turned out to be misplaced. Cities simply cannot reach their targets without partnering with the incumbent energy companies that, now and for the foreseeable future, continue to dominate energy systems. However, those same companies are, whether willingly or reluctantly, unable to serve a public mission because of the current energy for profit policy framework.

For the political left, trade unions and progressive social movements, the incumbent energy companies are not a political lost cause. They cannot be left to their fate because, their fate is in many respects our fate. Rather, they

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206 Dahiya B., Gentry B. (2020) Public-Private Partnerships to Improve Urban Environmental Services. In: Cheema S. (eds) Governance for Urban Services. Advances in 21st Century Human Settlements. Springer, Singapore. [https://doi.org/10.1007/978-981-15-2973-3\\_4](https://doi.org/10.1007/978-981-15-2973-3_4)

must become the focus of political attention. They must be reclaimed in ways that go beyond the boundaries of formal ownership. Reclaiming also means a mandate shift anchored in decommodification, demarketization, and deprivatization.

This will require the reversal of neoliberal laws—and the ending of the subsidies regime that transfers public money into the hands of private interests. It will also require ending the illusion of a customer-driven transition, one that celebrates disruptive market actors and prosumers. A new pro-public framework can facilitate the restoration of energy planning, cultivate cooperation between energy providers municipalities, drive energy conservation and efficiency, manage variable sources of energy, and deploy DER in ways that serve the public good. Such a framework offers the most plausible means for cities to play an important role in the effort to decarbonize the economy. □



