



ENERGY DEMOCRACY IN GREECE

SYRIZA's Program and the Transition to Renewable Power



Cornell University
ILR School

THE WORKER INSTITUTE
ADVANCING WORKER RIGHTS AND COLLECTIVE REPRESENTATION



**ROSA
LUXEMBURG
STIFTUNG**
NEW YORK OFFICE



Table of Contents

Energy Democracy in Greece

SYRIZA's Program and the Transition to Renewable Power.....1

By Sean Sweeney

Introduction.....	1
SYRIZA's Program and Energy Democracy.....	1
Another Energy Is Possible	2
Greece and the EU's Neoliberal Energy Policy.....	3
Fossil Fuel Dependence and Greece's Changing Climate.....	3
The EU's Neoliberal Approach to Energy.....	4
Electricity Privatization in Greece.....	5
Green Colonization.....	6
EU policy at an Impasse	7
Resisting "Resource Nationalism".....	7
Developing and Implementing Energy Democracy.....	8
Short- and long-term goals.....	8
1. Re-Establish Control over Energy.....	9
2. Develop and Implement a National Energy Transition Plan.....	10
3. Promote Energy Independence.....	11
4. Decentralize Energy Production.....	13
The International Experience	14
Energy Cooperatives	17
A Reformed and Restructured PPC.....	18
Centralized or Decentralized Renewables?.....	18
Municipalization in Germany.....	18
Job Creation in Renewables.....	20
How to Finance the Transition?.....	21
Conclusion.....	22
References.....	24

Published by Trade Unions for Energy Democracy (TUED), in cooperation with the Rosa Luxemburg Stiftung—New York Office and the Global Labor Institute at Cornell University, January 2015

With support from the German Federal Ministry for Economic Cooperation and Development (BMZ).

Disclaimer: This paper represents the views of its author, Sean Sweeney. The opinions expressed here may or may not be consistent with the policies and positions of unions participating in TUED. The paper is offered for discussion and debate.

Trade Unions for Energy Democracy (TUED) is a global, multi-sector initiative to advance democratic direction and control of energy in a way that promotes solutions to the climate crisis, energy poverty, the degradation of both land and people, and responds to the attacks on workers' rights and protections.

www.energydemocracyinitiative.org



Energy Democracy in Greece

SYRIZA's Program and the Transition to Renewable Power

By Sean Sweeney

Since the financial crisis of 2008 and the subsequent "Great Recession," governments have mostly scaled back or deemphasized their climate protection and "green" commitments.¹ Lack of public funds and concerns about growth, competitiveness, and unemployment are frequently cited as explanations for this apparent loss of both ambition and urgency. The "green growth" narrative that colored various countercyclical "stimulus" spending packages from 2009-10 has been largely abandoned. This has in turn slowed the deployment of renewable energy and thrown the UN climate negotiations into paralysis. During the recent talks in Lima (COP 20) it became clear that a global climate agreement seems very unlikely to emerge from the "deadline COP" in Paris in late 2015.

The goal of this paper is to show how economic crisis and austerity, which today serves as the perfect cover for inaction and reversals on climate protection and ecological sustainability, could actually spur a radical departure from the slow and stuttering progress of the recent past.² The paper looks at the opportunities for such a departure in Greece, a country mired in debt, high unemployment, and on the receiving end of a full-blown austerity program. But Greece is also a country where the radical Left could soon be in power led by a party, SYRIZA, that's committed to nothing less than the "ecological transformation of the economy."³

But how can such a transformation be carried out? How can a country like Greece—facing enormous challenges—be an ecological lead-

er and perhaps an exemplar for a new course? Can a SYRIZA or SYRIZA-led government break new ground in terms of fusing a viable left-green project in the face of crushing odds?

SYRIZA's Program and Energy Democracy

The paper is divided into two parts. Part One attempts to take stock of the present impasse of the neoliberal approach to energy and climate protection being pushed by the European Union (EU). Part Two pays attention to possible programmatic options for SYRIZA and the Greek Left, offering ideas for a plan of action on energy and climate change that could provide the basis for a new approach anchored by the concept *energy democracy*.

Energy democracy is entirely consistent with SYRIZA's existing programmatic commitments, in several important respects. The party aims to work toward "the development of a new paradigm of social, environmental and economic development."⁴ SYRIZA's program also acknowledges the challenge of climate change, and the need to pivot away from extractivist energy policies that serve to make the problem of climate change and ecological degradation worse than it already is. Importantly, it also commits to a "planned transition to renewable energy." SYRIZA has also pledged to "set the banking system under public ownership and control" and to "cancel the planned privatizations and the looting of the public wealth, restore public control on—but at the same time

reconstruct fully—strategically important enterprises that have been privatized or are under privatization” and to build a public sector of a “new type.”⁵

These commitments have set the stage for energy democracy in Greece, and with it the need to *chart a clear path*, which can take Greece towards a renewables-based energy economy that is under the direction and control of the Greek people, one that is designed in a way that puts human, societal, and environmental needs before private profit. Such an approach will begin to address seriously Greece’s dependence on fossil fuels and its disproportionately large contribution to air pollution and global warming and to create more resilient communities.

Another Energy Is Possible

The approach to energy and climate suggested here does two things: first, it steers clear of the neoliberal framework being driven by the EU and, second, it pivots away from the centralized power generation model that was built around fossil fuels several decades ago. This approach can be called *energy democracy*.

Energy Democracy is a public sector approach. It can lead to a rapid development of renewable sources of power in Greece, primarily wind and solar (but perhaps also geothermal and small hydro)⁶ while gradually and equitably phasing out fossil fuels for the production of electrical power. It allows space for generation that is community-owned and/or operated, decentralized, or “on site.” Energy democracy can demonstrate the true potential of renewable energy when it is liberated from the constraints of price competition and when “return on investment” (profit) is no longer the primary concern.⁷ Energy democracy is grounded in energy sovereignty and self-determination but it is *transformative*, not static. In the case

of Greece, which has ample supplies of coal in the form of lignite, the task is to move in a carefully planned and democratic way to a renewables-based system over a period of two to three decades.

Not everyone on the Left, in Greece or internationally, realizes that renewable energy technologies—particularly solar PV—have the potential to completely transform the global energy system by 2030 and also change the political and class relations around energy production and consumption. But if left to the corporations and their political allies, such a transformation is not going to happen in the time frame required by climate science as established by the Intergovernmental Panel on Climate Change (IPCC). It has stated that an 85% reduction in greenhouse gases (GHGs) is necessary by 2050 (below year 2000 levels) to stay below 2-2.4 degrees Celsius of global warming.⁸

Consistent with the neoliberal model, renewable energy is deployed in ways that are exploitative, chaotic, and wasteful and that simply reinforce the class and other inequalities of the present system. The neoliberal approach to energy transition and climate protection has been a monumental failure both in Greece and internationally. It has reinforced the inequalities and injustices of capitalism and failed to make significant progress in terms of the required decarbonization of the energy system.

Another energy system is not only possible, it is crucial to civilizational survival. And Greece can be on the cutting edge of the renewable energy revolution and the fight against climate instability, a fight that is driven *by the public sector* in partnership with communities, unions, and small companies.

A program of energy democracy does not, however, possess magical powers. The transition from the ageing, centralized, and fossil-based

power generation system that presently exists to a new system that is mainly decentralized, low-carbon, equitable, and truly democratic will confront many obstacles and take two or three decades to complete. Many questions

remain unanswered. Charting a pathway and developing a political process to oversee the transition leaves little space for naïve assumptions and misconceptions. A rigorous and facts-based approach is therefore essential.

Greece and the EU's Neoliberal Energy Policy

Austerity and liberalization has set in motion powerful forces that could result in Greece completely losing control of its energy future. The proposed dismantling and sell-off of 30% of the assets of the Public Power Corporation (PPC), which controls 75% of Greece's energy generation and almost all of its electricity generation, is proceeding at considerable speed in accordance with the conditions laid down by the Troika.⁹ This includes the privatization of the electricity grid. Upon completion of this phase, the government proposes to sell 17% of what will remain of the PPC to private interests by 2016. Of course, regaining energy sovereignty—or national economic sovereignty in general—will be difficult because of Greece's relations with the EU. Meanwhile, energy costs are rising faster in Greece than in any other EU country (a 21% increase in 2012), a situation that is leading to growing fuel poverty and serious hardship. An increase in energy costs of over 60% has been recorded in Greece during the last six years of the financial crisis (2008-2013).¹⁰

SYRIZA and its supporters, along with the workers in the sector, have led the resistance to the privatization of the PPC and are also fully aware of the impact of fuel poverty on the lives of ordinary people.¹¹ But a SYRIZA-led government could do more than merely protect energy sovereignty. Consistent with SYRIZA's program, such a government could begin the process of a planned restructuring of the

energy sector, and to move steadily towards a democratic, renewables-based system that is friendly to people and the climate.

Fossil Fuel Dependence and Greece's Changing Climate

Two things will need to be addressed by a SYRIZA-led government more or less simultaneously: Greece's dependence on fossil fuels, both domestic and imported, and the undeveloped state of the country's capacity to generate renewable sources of power. Greece is a country that is highly dependent on fossil fuels and has a relatively weak (and privately owned) renewable energy industry. Presently about 64% of the energy consumed is imported (considerably higher than the EU average of 46%). Greece imports gas from Algeria, Turkey, and Russia, as well as oil and other petroleum products to serve its rapidly expanding fleet of motor vehicles. Roughly 93% of Greece's energy consumption comes from fossil fuels while the corresponding average in the EU countries is 75%. For electricity generation, 27% of power generated comes from imported oil and gas.

Domestic lignite (or "brown coal") produces 70% of Greece's electricity.¹² Lignite is a particularly dirty form of coal. A typical power station using lignite emits 37% more carbon dioxide per unit of power output than a power station using black coal. Lignite use is one of the

main causes of Greece's disproportionately large contribution to global warming.

Greece emits more GHGs per capita than the European Union average, 11.3 tons carbon dioxide equivalent (CO₂ Eq.) per capita, per year, compared to 10.1 tons for the EU15 average, according to the European Environment Agency (2008 figures).¹³ In terms of carbon intensity, Greece (along with Malta) is the highest in the EU27.¹⁴ Greece's use of lignite and its fast growing vehicle fleet are major contributors to both Greece's emissions and carbon intensity. Fully 41% of Greece's CO₂ emissions come from the generation of electrical power.

The need for an energy transition of this nature is reinforced by climate change. Projections for changes in temperature and precipitation over the next 50 years in the Greek territory show a temperature increase of 3-4.5 degrees Celsius and a decrease in rainfall of 5-19%. According to the Greek government's national submission to the UNFCCC in 2007:

The long-term predictions of climatic models for the Mediterranean region are alarming. All model simulations agree that the temperature in Greece will increase in the range of 1 C to 2 C by the year 2030, despite the conflicting estimates of the magnitude of this increase. Concerning the future precipitation regime most of model estimations offer conflicting evidence over how precipitation may change over the area. There are serious indications, however, for a remarkably severe decline in summer precipitation over the Mediterranean region as a whole.¹⁵

The economic impact of this level of warming on Greece will be serious. Rising temperatures will result in an increase in energy needs for cooling, the reduction of tourism due to the increase of extremely high temperatures, reduced biodiversity, and an increased risk of forest fires.¹⁶

Renewable energy—mostly wind and solar—has made some headway during the past de-

cade, but it remains on the margins in terms of electrical power generation (around 7%) and overall consumption. Greece is rich in wind and solar "resources" but if the present policies are allowed to continue, wind and solar energy will either be underutilized or utilized in a way that benefits mostly non-Greek private corporations. Consistent with SYRIZA's program, the task is to turn these resources into abundant and clean energy for the benefit of all—under public and community control.

The EU's Neoliberal Approach to Energy

The EU's neoliberal approach to energy and climate protection has been shaped by two policy priorities. The first priority is energy market liberalization—ostensibly to promote "choice" and "efficiency." This priority was expressed in the Internal Market in Energy directive passed down to member states in 1996. The second "climate" priority are the "20-20-20" targets under the 2009 EU Directive that mandate a 20% reduction of GHG emissions, a 20% share of renewable energy sources, and a 20% savings in energy consumption by the year 2020 (based on 2005 levels). Under this directive, member states were required to develop a National Renewable Energy Action Plan (NREAP) that would include information on sectoral targets.¹⁷ The targets are also designed to "provide certainty" for private investors and to encourage continuous development of technologies that generate energy from all types of renewable sources.

In the eyes of neoliberal policymakers, the first two priorities—liberalization and climate protection—both complement each other and are inseparable from each other. The dominant EU policy discourse (broadly consistent with that of the World Bank and the IMF) asserts that liberalization and market competition are the pre-requisites for an energy transition to a low-carbon future. Because the old

fossil-based centralized systems were often publicly owned, regulated, and monopolistic, the public ownership and high levels of emissions are (conveniently) presented as part of the same problem. Reducing greenhouse gas emissions and promoting renewable energy is thus viewed to be synonymous with, and therefore inseparable from, a “contestable” market for electricity and privatization.¹⁸

Electricity Privatization in Greece

The liberalization of Greece’s electricity sector has thus far been a 16-year process. Liberalization started with the enactment of Law 2733/1999¹⁹ when the process of privatizing Greece’s Public Power Corporation (PPC) was initiated. In accordance with Presidential Decree 333/2000, the PPC became a public limited company in January 2001. The electricity transmission system was “unbundled” under the provisions of 2733/1999, which transferred the responsibility for operating the electricity transmission system to a new independent company called the Hellenic Transmission System Operator (HTSO). The early 2001 liberalization of the Greek electricity market opened the door to any company (or individual) to produce electricity. In 2007 individual consumers were gradually granted full “rights” to choose their energy supplier. These changes were followed by a law (3468/2006) giving renewable energy companies special access to distribution and transmission systems. New feed-in tariffs (FITs) were defined and introduced in 2007 and permits for offshore wind parks became possible.

If these were the main measures designed to advance liberalization, the EU’s 20-20-20 climate protection directive required Greece to increase its share of renewable energy use from 6.9% in 2005 to 18% by 2020. In June 2010 both the directive and the NREAP became national law, raising the country’s renewable energy commitments to 20% of final energy consump-

tion and to 40% electricity generation from renewable sources by 2020.²⁰ According to the NREAP for Greece, the installed wind energy capacity will reach 7.5 GW by 2020, which translates into annual installations of approximately 600 MW between 2011 and 2020. This amounts to a six-fold increase in wind generation and a twenty-fold increase in solar by 2020.²¹

The energy market liberalization that began in the late 1990s led to an array of subsidies and incentives to help renewable energy companies gain a significant foothold in the EU energy market. This combination of liberalization and subsidies saw the wind and solar industries make some headway over the past decade across the EU. Member states’ wind power’s share of installed power capacity had increased five-fold since 2000 to 11.3% in 2012, although Germany (31.3 GW) and Spain (22.8 GW) have the largest cumulative installed wind energy capacity in Europe, and these two countries represented 52% of the EU’s wind capacity in 2012. Solar power has grown also, but Germany’s progress is exceptional—and can be attributed largely to the process of municipalization of power generation taking place there (see below).

Greece’s progress can be measured by a four-fold increase in wind capacity (1.8 GW in the decade to May 2013). The Greek Association of Photovoltaic Energy Producers (SPEF) estimates that 950 MW of solar PV capacity had been installed by 2012 under the country’s Feed in Tariff (FIT) introduced in 2007, including 200 MW on the Greek islands.²² This was sustained in the first half of 2012, when Greece added 243MW. But governments across the EU were soon to withdraw their support for renewable energy, due in part to the falling prices in solar PV manufacturing and wind installation costs, the marked shift in manufacturing capacity towards China, and a sense that in times of austerity and falling costs, generous FiTs were no longer necessary.

In tandem with Spain, Italy, and others, the Greek government announced a 44.7% cut in the FiT in June 2013, and the rush to solar in Greece ground to a halt. New wind installations plummeted dramatically in Greece during 2013, and industry sources believe this will continue for at least another 1-2 years.²³ This policy reversal was triggered by the fact that the Renewable Energy Sources Fund (which pays renewable energy companies and small producers via the FiT) had run up substantial debts—€331.5 million at the end of 2012, which is expected to rise to €1.16 billion by the end of 2014, and up to €1.43 billion in May 2015.²⁴ The PPC had committed to buying renewable-source energy from independent producers at five times its selling rate until 2034.²⁵ Moreover, in November 2012 the Greek government introduced a retroactive tax on revenues earned by solar companies, which has led to an industry complaint (led by SPEF) to the European Commission (filed January 2013).²⁶ The government also stopped issuing building permits for PV power plants in 2013.²⁷

The march to renewables across the EU has also slowed, albeit less dramatically than in Greece. Countries like the UK and the Netherlands are way behind schedule in terms of meeting their renewable energy targets under the 20-20-20 directive.²⁸ In the case of wind, the NREAP forecasts for the 27 member states are not being reached. According to wind industry sources, installed wind is trailing by 2 GW. Eighteen of the 27 member states are behind on their wind energy trajectories—and Greece is among a group of countries (along with Slovakia, the Czech Republic, Hungary, France, and Portugal) that are far behind.

Green Colonization

As the Greek government has withdrawn FiT support, it has nevertheless continued to state that it will invest up to €20 billion in re-

newable energy (mostly solar) by 2021, and has unveiled a number of “fast track” schemes to develop solar parks. Asserting that the sun and wind resources in Greece are key to the nation’s economic recovery, the Samaras government has unveiled high-profile plans like Project Helios that would see the country expanding its solar power capacity to 10 GW by 2050 through financing by international investors. The plan involves leasing out land to investors to build solar installations as a way to generate revenue. This and similar projects face only one problem, namely “liquidity,” and it is hoped that the private sector will come to the rescue.²⁹

Such projects have indeed attracted the attention of EU companies and governments who may resort to importing renewable energy from Greece as a means of meeting their own renewable energy targets and a likely new set of targets for 2030. This poses a possible win-win situation for companies (profits) and governments (reaching mandatory EU targets) but the benefit to Greece is at best questionable.

Until the adjustment of the FiT, a proliferation of small companies who import and install PV panels reinforced the “foreign” character of renewable energy. These companies have been known to advertise German products (taking advantage of their reputation for quality and reliability) but then proceed to install low-cost Chinese panels which require more maintenance work (happily performed by the installer for a fee).

The withdrawal of the FiT in Greece has led to the bankruptcy of many small and medium-sized companies—and these have become targets of larger foreign multinationals who can, so to speak, weather the immediate storm and position themselves for the longer term. Non-Greek renewable energy companies, mostly German (but also Spanish and Chinese) have opened offices in Greece in anticipation of €5

billion in renewable energy investments in the coming years (according to an estimate made by the Ministry of Development).³⁰

The sense of being colonized by multinationals has been reinforced by Troika's conditions and the proposed privatization of the PPC and other public assets in order to meet debt repayment obligations. The likely buyers for the most lucrative parts of the PPC are foreign companies from Russia, China, and elsewhere.

EU Policy at an Impasse

Today it is clear that the neoliberal approach to climate protection and the deployment of renewable energy is not working in Greece and is facing major challenges across the EU. The main message here is that it takes a large amount of liberalization and, paradoxically, subsidies and government intervention, to generate a relatively modest amount of renewable energy. And in Germany, where renewable energy has made real headway, it is unfolding as a result of an explicit rejection of neoliberal energy policy and an expansion of municipal control and public investment (see below).

Far from being mutually reinforcing and inseparable, the EU's dual priorities of energy market liberalization and climate protection are, in fact, *incompatible* with each other. Liberalization has led to an oligarchic situation where just five energy companies are dominant (EDF, RWE, EOn, GDF Suez, and ENEL), consumer choice is mostly fictitious, and renewable energy companies rely on power purchasing agreements, "capacity mechanisms," and subsidies to survive. In the case of the UK (the flagship of EU energy privatization), the government is attempting to re-introduce a "Single Buyer" mechanism (read: government control over prices) because of the failure of the liberalized market to either benefit consumers or reach renewable energy targets.³¹

Meanwhile, the main policy mechanism to reduce emissions and promote renewable energy—the EU Emissions Trading Scheme (EU ETS)—is not doing its job. The EU ETS was supposed to make fossil fuel use, especially for power generation, more expensive, but the price of carbon is today too low—often less than €5 per ton even at its highest point—to have even a minimal impact. The price had been expected to reach around €30 per ton by 2012.³² According to one assessment, "power generation from coal even at currently high prices and a cost of €40 per ton of emissions, remains cheaper by 15% from any other fuel for base units."³³

Resisting "Resource Nationalism"

SYRIZA's programmatic commitments to develop renewable energy and to a new ecological and economic paradigm will therefore require a new course. However, the combined effect of the failure of the EU ETS to price carbon in a way that can change energy investments and technologies, along with availability of cheap lignite, poses a major challenge to the energy transition in Greece. In the context of economic recession, rising prices of imported oil and gas, it may appear as though Greece has no better option than to continue with lignite, which is cheap, abundant, and still mostly publicly owned. Greece still has a 51% stake in the PPC, but a 0% stake in German, Spanish, and Chinese renewable energy companies.

For SYRIZA, the Greek Left and social movements, the pressures of lignite-based "resource nationalism" will be considerable. Note the similar phenomena in Argentina, Bolivia, Brazil, South Africa, and Venezuela where left and center-left governments are in power, but which all make the argument that domestic fossil fuels are needed to fight poverty and develop a strong economy, albeit to varying degrees and with accompanying qualifiers. Senti-

ments towards resource nationalism are likely to be reinforced by the fact that private-sector renewable energy companies in Greece today demand more liberalization, deregulation, privatization, and subsidies to make further progress (for the good of the environment, of course). They lament the fact that the PPC has only been partially privatized and that the union (GENOP-DEH) is too militant. The industry calls for “cost reflective rates” for fossil based power (read: higher prices) in order for renewables to yield better profits. These companies are also calling on the government to pay for the transmission infrastructure up-

grades and extensions that are required to facilitate the deployment of renewables. As militant neoliberals, renewable energy companies can be cast in the role of a Fifth Column or Trojan horse, serving foreign interests in the name of greening the economy. Such arguments and sentiments are understandable, but they are ultimately grounded in a thinking that is both simplistic and short term. Energy democracy provides a framework in which SYRIZA can pursue and fulfill its programmatic commitments and chart a new course not just for Greece, but for other countries in the region, and perhaps beyond.

Developing and Implementing Energy Democracy

Part One showed how EU policy offers nothing in terms of a serious and equitable approach to climate protection or renewable energy deployment. Part Two attempts to take the discussion forward in two distinct ways. First, it offers some potential programmatic guidelines or options for discussion and, second, it identifies and begins to address some important issues with respect to navigating the transition to a renewables-based energy system.

Short- and Long-Term Goals

Regarding *energy democracy* proposals for Greece, four broad and overlapping political goals can be identified. Greece must take actions to:

1. Re-establish control over energy (energy self-determination): The privatization of the PPC must be stopped and the neoliberal approach to renewable energy deployment soundly rejected. Greece needs to follow its own path—based on energy democracy;

2. Develop and implement a national energy transition plan: The transition to a new renewables-based energy system will present both challenges and opportunities. The Greek people must be in charge of the process in order to ensure flexibility, diversity, resilience, and equity;
3. Promote energy independence: Fuel costs for renewable energy are zero. Climate change and the rising social and environmental costs of the continued use of coal, oil, and gas make a transition to a renewables-based energy system an imperative. Greece has the potential to produce enough renewable power to meet its needs from within its own borders, and to do so in a way that will generate jobs and savings.
4. Decentralize Energy Production: The public sector must drive the development of renewable energy. Renewable energy technologies (RETs) open the door to community-based municipal control over electrical power generation and signal the end of an over-reliance on centralized generation. Greece’s next energy system can be a pillar of popular power.

The first goal (re-establishing control) is a short-term political challenge, an essential first step that provides the foundation for pursuing and reaching the other three goals. The second goal involves establishing a political process for driving an energy transition, a process grounded in and informed by democracy, transparency, and accountability. The third and fourth goals are the main planks of a multi-decade transition that can bring Greece to a point where 100% of its energy comes from renewable sources of power by 2040-2050 and where its carbon emissions have been reduced according to a science-based pathway. Even though goals three and four are necessarily long term, there is some value in SYRIZA endorsing these goals immediately as a declaration of both principle and intent.

1. Re-Establish Control over Energy

Re-establishing control over energy will require an intense political and legal struggle that will begin almost immediately after SYRIZA has formed a government. It is important to emphasize *energy sovereignty and self-determination* as key SYRIZA commitments: Greece has the right to *control its energy future* and reduce its dependence on imported energy and thus its vulnerability to the effects of decisions made outside of Greece. Sovereignty and self-determination will help ensure that many of the benefits of a renewables-based system will be directed towards the Greek people, not private multinationals.

Re-establishing control is therefore an essential first step. Without domestic governmental and popular control the other goals will be much harder and perhaps impossible to achieve. As the broader EU and global experience has shown, when governments are forced to give guarantees to the private sector—or to rely on incentives—then the transition is at best slow and uneven and the benefits to the

broader public are less pronounced and may be erased altogether. Science-based emissions reductions targets are seldom if ever achieved.

Given the importance of lignite and the availability of solar resources (300 days of sunshine per year, on average), Greece has the potential to establish a considerable level of control fairly quickly. But total control is out of the question in the short to medium term. Oil dependence is a particularly large challenge, and one that can only be addressed over the longer term with vehicle electrification, fuel efficiency standards, “modal shifts” in transportation, and an overall reduction of vehicle miles travelled (VMTs). Furthermore, any transition to renewable energy for electrical power generation must deal with the fact that today many of the products essential for wind and solar generation are being manufactured in just a handful of countries, and Greece is not one of them. This issue is revisited below. Greece’s level of control can thus be considerable in the short term, but it will not be complete for obvious reasons.

SYRIZA’s actions regarding the PPC are crucial to Greece’s capacity to control its own energy future and the transition to renewable energy. The PPC remains by far the largest company in Greece. It owns 93% of the country’s installed power capacity (generated by lignite, oil, hydroelectric, and natural gas power plants.) The total installed capacity of PPC’s 98 power plants is estimated at 12,760 MW. The PPC also runs solar energy parks. At the same time, PPC owns the country’s two large lignite mines in Ptolemais and Megalopolis, generating approximately 56% of the required power supply. Regarding the PPC, SYRIZA needs to take the following actions:

- ⇒ Stop further privatization of the PPC’s assets;
- ⇒ Revisit and selectively repeal the liberalization measures and laws introduced over

the last decade. The PPC needs to be fully reclaimed by the Greek people.

- ⇒ Reform and restructure the PPC, along with the majority state-owned gas company DEPA. Its role will need to be redefined in accordance with a national energy transition plan.

2. Develop and Implement a National Energy Transition Plan

The fight to keep the PPC under public ownership, and the struggle for energy self-determination more generally, will require mass popular engagement. The privatization of the PPC has not gone smoothly. Potential buyers (large Russian, Czech, and Chinese companies are known to be interested in parts of the PPC) do not want to take on pension payments of retired workers that amount to €710 million per year.³⁴ Worker resistance has also been quite determined.

A SYRIZA government could quickly begin a broad-based and inclusive process for both developing and implementing a *national energy transition plan*. Preliminary proposals for the fossil-to-renewables transition can be offered as a starting point for a national debate and discussion around broad goals, fully aware that the transition to a new renewables-based energy system will present many technical and political challenges.

A program for *energy democracy* must strive to be as specific as possible in terms of the short- and longer-term benefits of such a transition (cleaner air, improved public health, lower costs for energy over time, less dependence on fuels from abroad, climate stability and resilience, significant job creation, etc.). It must also attempt to show how such a plan could strengthen community-based control and constructive autonomy. A facts-based approach is always better than vague statements that will

inevitably be scrutinized and challenged by energy companies and the political Right.

The main aspects of the process for developing a national energy transition plan will require careful thought and a broad and inclusive consultation process, but a first step might involve identifying who should be at the table and what their role might be. Unions, small businesses presently engaged in renewable power, representatives of social movements, and progressive research institutions might constitute the core of a commission of representative groups convened to develop the plan.

Engaging the union GENOP-DEH in the energy transition and the restructuring of the PPC is clearly important, as concerns about jobs will be uppermost. However, the privatization scenario that is presently unfolding is hardly a better option for workers in the industry. As has been documented in numerous studies, energy privatization has almost invariably led to underinvestment and falling quality of service. It has also led to a loss of jobs, reductions in wages and union coverage, and worsening working conditions. And where privatizations have taken place, public control has normally been replaced by oligarchies. In the UK, six private corporations—just one of them British—dominate the power generation sector, and 57% of fuel used to generate electricity is imported.³⁵

The workers in the industry can be integrated into the new ownership and oversight structures and can be given a large degree of responsibility for operating and maintaining the systems, something they do every day. Sections of middle management can also be constructively engaged.

The full legal implications (namely Greek law, the EU, WTO, etc.) of moving to build energy democracy by first restoring energy sovereignty and self-determination will need to be con-

sidered. It is well known that the entire legal architecture pertaining to international trade and investment that has emerged since the early 1990s favors and protects the private sector's assets and profits. Therefore it seems inconceivable that a government committed to a new economic and ecological paradigm will be able to avoid clashing with this architecture sooner if not later.

A national transition plan will nevertheless need a legal framework to facilitate and consolidate its development. A number of domestic laws (for example, Law 2773/1999) have been passed in order to comply with the EU's 1999 directive on developing a free and "contestable" energy market. As noted above, these laws will need to be repealed, and new laws introduced that can democratize the energy system and help drive the transition.³⁶

Similarly, laws have been passed to comply with the EU's 2009 20-20-20 commitments. The liberalization laws and the 20-20-20 climate protection laws have one thing in common: they assume a larger role for private companies and a smaller role for the public sector. But these two sets of laws can be handled differently. There is no obvious reason why SYRIZA will need to renege on existing 20-20-20 commitments, but the NREAP will need to be amended in order to provide a different road to these targets.

3. Promote Energy Independence

As is well known, Greece is today dependent on fossil fuels both domestic (lignite or brown coal) and foreign (oil and gas). Its renewables sector is small and presently privately owned. To embark on a road towards ecological and economic sustainability, fossil fuel use must be reduced and eventually phased out altogether. The development of a national energy transition plan will involve different stakeholders

wrestling with the pros and cons of various energy options, but SYRIZA can also make its own proposals and play a leadership role in terms of shaping the debate. These proposals might include the following:

Reduce Levels of Imported Gas and Oil for Power Generation

Greece must consider ways to decrease the amount of electrical power generated by imported natural gas (and also oil) by expanding the levels of electricity generated from renewable sources of power. Greece presently imports large volumes of gas from Russia, Turkey, and Algeria. Greece's current contract with Russia's Gazprom expires in 2016, and the Samaras government has already complained that Greece pays the highest price for Russian gas in Europe—at roughly 35 Euros per megawatt hour (December 2013 prices).³⁷

In 2010, Greece consumed a total of an estimated 3,809 million cubic meters (mcm) of natural gas, 8% more than the previous year. In 2009, Germany (several times bigger than Greece in both GDP and population size) consumed a smaller amount, 3,528 mcm. In 2009, Greece used 2,181 mcm for electricity generation, covering 15% of electricity generation.³⁸ Gas makes up roughly 9% to Greece's total energy use.³⁹ Reducing gas imports would allow Greece to take important steps towards energy sovereignty and self-determination.

An energy transition plan must therefore examine the role of the mostly state-run gas company, DEPA, and the projects it is presently developing (usually with foreign multinationals). The Greek government has a 65% share of the company, with the remainder controlled by the Hellenic Petroleum Group. In recent years, DEPA has committed large sums of money to upgrade its Liquid Natural Gas import facilities. DEPA has also partnered with Russia's Gazprom and the Italian ENI around the "South

Stream” project that is expected to transport gas from Russia to Italy via Greece.⁴⁰

From the perspective of reducing GHG emissions, it would of course be better to first substitute renewables for domestic lignite and then reduce natural gas use later on. This is due to the fact that “burner tip” emissions from gas are much less than those generated from lignite or black coal.

The EU’s troubled Emissions Trading System has been deployed as an incentive to switch from coal-fired generation to gas, but this fuel switching in Greece may not be the best option politically or economically in the short term. Importantly, gas-fired power generation is the domain of a handful private Independent Power Producers (IPPs) that have become present in Greece during the liberalization period. The IPPs presently advocate for more privatization and liberalization.⁴¹ Reducing gas imports will therefore increase the portion of Greece’s energy that is under public control. And a fully “reclaimed” PPC will ensure that the benefits of domestic lignite use are at least retained in Greece, rather than distributed as a source of profits for what is likely to be a Chinese, Czech, or Russian corporation.⁴²

As noted above, domestic lignite produces 70% of Greece’s electricity (2008 figures).⁴³ Furthermore, Greece has plentiful supplies of domestic lignite and the infrastructure in place to continue using it for the foreseeable future. Therefore during the first phase of Greece’s energy transition (perhaps a decade or so) the strategy should, as far as possible, entail a straight swap: domestic renewable energy should replace imported natural gas (and oil, which generated 5% of Greece’s electricity). If renewable energy generation can increase at a level of several GWs per year (Germany installed 7.6 GW of new solar capacity in 2012 alone⁴⁴) then the annual reductions in gas-based generation should be more or less comparable. The fast-

er the deployment of renewables, the faster Greece’s bill for imported gas will be reduced.

However, gas-fired power stations will be impacted, and the new renewable energy coming into the system must therefore be situated in locations that can compensate for this loss of generation. This could pose a series of secondary challenges—and this may require modifications and deviations from time to time, without compromising the overall goal of substituting gas-fired generation with renewable energy.

Greece also uses imported oil—diesel and crude—for around 5% of the country’s electricity generation. However, oil-based generation has thus far served island communities or thermal power stations near Athens as a means of avoiding lignite-related air pollution. Therefore any reduction in oil-based electricity generation will need to address these specific challenges.⁴⁵

The renewables-for-gas (and oil) option needs to be fully explored, and there are many factors to consider. But when energy is generated for public need and not simply private profit, then social and environmental considerations can be fully examined and decisions made that best serve the people and the planet.

Cap Levels of Lignite Use for Power Generation

Lignite is important to Greece. And although the unimpeded use of lignite for power generation may be consistent with energy sovereignty and self-determination, it is certainly not consistent with any serious commitment to a new economic and ecological paradigm. The ecological effects of lignite use are deeply negative. Lignite is a particularly dirty form of coal. A typical power station using lignite emits 37% more carbon dioxide per unit of power output than a power station using black coal. Lignite use has made a major contribution to Greece’s disproportionately large contribu-

tion to global warming and negatively impacts public health.

During the first phase of the energy transition it is therefore important to announce a cap on lignite use in order to protect against the temptation to replace imported gas with more lignite production and lignite-fired generation. A supplementary cap on GHGs from lignite could also serve a purpose, and retiring the oldest lignite-fueled power plants and introducing pollution control technologies where appropriate could complement such a policy.

Declare a Moratorium on New Lignite-Fired Power Plants

Greece must also take care to avoid “carbon lock in,” where new lignite-powered generation is built in order “to meet demand.” The International Energy Agency has issued dire warnings regarding the dangers of building the infrastructure for more coal-fired and gas-fired generation. Globally, there are approximately 280 GW of new coal-fired generation under construction at the present time.⁴⁶ Greece is not currently in a position to do much about this alarming level of coal-driven carbon lock in, but it can officially declare its intention to separate itself from the global coal rush and thus signal a strong commitment to a new economic and environmental paradigm. This can be accomplished by announcing a moratorium on the construction of any new lignite-fired power plants.

Clearly, this will require a careful assessment of the environmental, social, and economic implications of projects presently approved or under construction. These include five major PPC-led developments, among them a 800 MW natural-gas fired unit to be installed in Megalopolis, a 450 MW lignite-fire unit to be installed in Meliti, a 450 MW lignite-fired unit using fluidized bed technology to be installed in Kozani-Ptolemaida, a 700-800 MW hard-

coal-fired unit to be installed in Aliveri, and a 700-800MW hard-coal-fired unit to be installed in Larymna.⁴⁷

Establish a Timeframe to Phase-out Lignite Use

Lignite reserves in Greece are plentiful and could last many decades, but the existing lignite-powered generation facilities presently operational in Greece will not last forever and an effective moratorium on new construction will mean that the fleet of lignite-fired facilities will eventually become dilapidated and will have to be decommissioned. The trajectories for the phase-out of lignite use will, however, depend on how fast renewable energy can be scaled up in Greece, and how technical and financial challenges are met and obstacles negotiated.

Given the significant number of workers engaged in lignite mining, transportation, and power generation, workers and communities that depend on lignite need to be reassured that the transition away from lignite is not taking place without their active involvement and that it will not happen soon. Firing workers is not on the agenda, under any circumstances. No worker or community will be asked to pay a disproportionate price for the energy transition while others in Greece (and globally in the form of reduced emissions) reap the benefits. A set of robust protections and guarantees need to be given priority in order to avoid alienating the workers and communities likely to be affected by a shift away from lignite—however far in the future that shift may actually be.

4. Decentralize Energy Production

The proposals outlined above amount to a steady phasing out of fossil fuels between now and 2040 to 2050, first by prioritizing reductions in imported gas and then (over time)

domestic lignite. This will require the rapid deployment of renewable sources of power, principally solar and wind, to replace lost capacity. Energy conservation can also play a role—and needs to be given serious attention both for its capacity to create jobs, reduce costs, and avoid the development of unnecessary generation capacity in the future.

The remainder of this paper will focus on offering for discussion some options and strategies for developing renewable power in Greece in the “public sphere.” The public sphere includes “prosumers,” cooperatives, municipal-level entities, as well as a reformed and perhaps restructured PPC.

The international experience of developing renewable energy shows the limits of private markets and the importance of government actions and interventions, but it is nonetheless important to know why the dominant policy choices are incompatible with either energy democracy or SYRIZA’s commitments.

The International Experience

What can be learned from the efforts of other countries to develop renewable energy? Countries that have made the most significant gains have established a robust set of regulations to incentivize renewable energy. Two policy options stand out: the Feed in Tariff (FiT) and the Renewable Energy (or Portfolio) Standard (RES/RPS). The international experience suggests that these policies can drive renewables, but there are problems with respect to the speed and scale of the deployment—and the fact that the benefits of renewable energy are not shared equally by all.

Nevertheless, renewable energy is growing rapidly on a global scale. Fully two-thirds of current global solar PV capacity have been installed since January 2011. By 2015, the indus-

try is expected to install another 100 GW, nearly doubling today’s global capacity. These impressive levels of deployment are nevertheless inadequate from the perspective of climate stabilization. According to the IPCC, in order to reach the required levels of emissions reductions in power generation, the deployment of renewable energy needs to proceed at a much faster pace.⁴⁸

Feed-in Tariffs / “Prosumer” Approaches

Among regulatory policy instruments, *feed-in tariffs (FiTs)* are the most popular type of policy, though particularly so in high-income and upper-middle income countries.⁴⁹ FiTs provide incentives for property owners and small and large businesses to invest in solar PV. These consumers use the power of installed PV systems for their own use, but the surplus power generated is then purchased by the utility at a favorable and stable rate, thus generating income for those who participate in the FiT programs. The idea of individuals and businesses playing a dual role—as energy consumers, but also producers—has led to the emergence of the term “prosumers.”

FiTs produced 61% of all solar PV capacity installed in 2012 and accounted for nearly 72% of all solar PV installed worldwide.⁵⁰ Under a FiT policy, eligible renewable electricity generators are guaranteed a standard purchasing price for the electricity they produce, and electric utilities are required to purchase all available electricity from renewable energy sources. FiTs have been adopted in a total of 99 jurisdictions worldwide as of early 2013.⁵¹

As noted in Part One, in Greece and elsewhere government support for FiT programs has been scaled back significantly in the last year or two. This has slowed the growth of both wind and solar power. In Greece, solar PV installations essentially stopped in late 2013 after several years of impressive growth.⁵² As of

this writing, the future of FiTs is in question—but falling costs in solar PV in particular means that solar could grow quickly without the support of FiTs.

Renewable Portfolio/Energy Standards

A national Renewable Portfolio Standard (RPS), sometimes referred to as a Renewable Energy Standard (or RES), is another policy option. An RPS/RES obliges power companies to produce a specified fraction of their output from renewable energy sources by a given target year. Such policies have been introduced, either at the national or the state/provincial level, in 76 jurisdictions, though most prominently in high-income countries. RPS/RES policies are more prominent on the sub-national level, and their numbers were boosted in 2004, when a significant number of U.S. states and Indian provinces adopted such standards and quotas. The years since 2008, however, have seen only limited additional momentum.⁵³

Problems with FiTs and RPS/RES

It is important to be fully aware of the problems inherent in these two presently most utilized policy options, FiTs and RPS/RES, so that Greece can try to avoid these problems either by changing the design of these policies or by avoiding them altogether.

Regarding an RPS/RES for Greece, if this were adopted in the same way as it has in other countries, it would require the PPC to generate a growing share of its electricity from renewable sources, such as 20% renewable energy by 2020, or some similar target. This option could sustain the PPC as the main actor in Greece's electricity system, but perhaps to the exclusion of others—including unions, communities, and local decision makers. Absent strict conditions regarding the actual sourcing of renewable power, an RPS/RES will probably open the door to public-private partnerships,

or P3s, and thus more IPPs and Power Purchase Agreements (PPAs) that protect private companies from risk (unloading the risk on to the public) and a bias towards large-scale renewable energy projects. It will also leave the major decisions on how to grow renewable energy to the PPC. Indeed, news sources (December 2013) have speculated that the Greek Ministry of Environment, Energy, and Climate Change (MEECC) will propose a “new deal” between renewables producers and the state to further cut project FiTs in exchange for benefits such as longer PPAs.⁵⁴ Such a policy would halt the growth of Greek “prosumers” while delivering guaranteed profits to private energy companies.

Regarding the FiT, the problems are more complex. FiTs are considered to be a good mechanism for getting solar PV off the ground, and for engaging ordinary people—homeowners and small businesspeople—in the transition to renewable energy. FiTs have also “seeded” the market and allowed small companies and their suppliers to develop. This can broaden the base of support for renewable energy among a certain layer of people who benefit from the tariffs directly and also indirectly (such as installers and the companies making basic components used in installations).

However, FiTs remain problematic in a number of respects. FiTs are known to benefit property owners and small to medium businesses, but most people—the propertyless and low-income people—fall outside these categories and therefore neither see nor receive any immediate or obvious economic gain. This problem has been partially addressed in Germany and a number of other countries where there have been efforts to build energy cooperatives that can pool both the capital and commitment of a group of individuals to develop solar PV generation in public or other spaces so that people without either property or substantial amounts of personal capital to invest can

come together and produce power and thus take advantage of existing FITs or other incentives (see below). But this does not address the cost of the subsidies—which are often considerable—that are in effect passed on to those without property or businesses in the form of higher electricity prices.

In many countries the utilities have used the “cost of subsidies” argument as a way of pushing back against the off-site distribution stimulated by FITs. Many are trying to quarantine the impact of FITs, because the more FIT-led deployment, the smaller the utilities’ traditional customer base becomes. This means the costs of investment and operation and maintenance of the centralized system are shouldered by a decreasing number of paying customers as revenues fall. Even if profit for investors is taken out of the equation, a system based on energy democracy will need to be grounded in a stable financial model, which means finding a way to cover investments in the system, operation and maintenance costs, and perhaps generating surplus revenue for upgrades and new investments. The typical prosumer arrangement, where individuals, small businesses, and even cooperatives become partially independent of the grid means the costs to maintain and renew the system are shifted to those who are *not* prosumers—with potentially serious consequences. Furthermore, the rapid deployment of renewable energy raises the problem of intermittency (the wind does not always blow, nor does the sun always shine), which will require the development of new “smart” grid options and technologies that can integrate and coordinate many different feed-in points. The problems posed by rapid development of renewables without the necessary upgrading of the grid have already become evident in Greece.⁵⁵

This issue is too complex to be discussed in detail here, but the need for a public entity, or a number of public entities working together in

a cooperative manner, seems unavoidable and in many respects preferable.

In Greece, the solar PV that emerged as a result of the FiT has also led to a number of additional problems that will need to be tackled by a SYRIZA government. One problem stems from the 25-year contracts with prosumers that were agreed before the FiT was scaled back. These contracts have provided an annual untaxed income of €7,200 per year for a 10 kW/h development at the February 2012 price, decreasing to €6,840 with the August 2012 price. These levels of income exceed the average agricultural wage, which prompted many landowners to “grow PV” instead of traditional crops, the markets for which has atrophied dramatically in recent years. The contracts also amount to a kind of “solar lock in” whereby land must be dedicated to solar power generation, taking agricultural land out of circulation—which could have serious implications for SYRIZA’s commitment to revitalize local agriculture. The FiT also created much needed employment for local people who have trained as mechanics and electricians in what is an almost completely unregulated segment of the labor market.⁵⁶

The shift in the use of agricultural land, the gain—and then loss—of jobs that are dependent on global supply chains (solar PV from Germany, China, etc.), and the debts accrued by the Renewable Energy Sources Fund—which may soon exceed €1 billion—are the legacy of the neoliberal approach to renewable energy in Greece. But it is a legacy that SYRIZA will nevertheless inherit when it is elected to government.

Policy Considerations

The development of a national energy transition plan will require a full examination of the impact of FiT in Greece and elsewhere in order to see if it still has a role to play in what should

be a more ambitious scale-up of renewable generation. Could a policy be designed that provides some income for prosumers but is nevertheless sustainable in terms of its costs and impacts on other sections of the economy? Can a more regulated labor market in renewables—the creation of a “climate jobs” corps hired by the PPC—still allow for people who need work to have access to installation and maintenance jobs, particularly in solar PV? However, if the benefits of the FiTs are ultimately destined to accrue to relatively few and the costs continue to be incurred by many then this is obviously a major concern that casts doubt over the wisdom of using FiTs as a primary policy option in the years ahead.

As noted above, the scaling back of the FiT in Greece has meant that solar PV installations have ground to a complete halt in late 2013.⁵⁷ But the falling price of solar PV—driven by overcapacity, learning-by-doing, economies of scale and reducing installation costs—means that solar PV probably does not need an FiT in order to grow, although the same may not be true of wind power at this point in time. It is certainly possible that private markets could drive an exponential increase in solar PV both in Greece and globally, but this could lead to a renewables-based economy that merely reproduces the inequalities of the old fossil-based system, albeit in a different form. And even an acceleration in the levels of deployment are unlikely to decarbonize power generation in the time frame demanded by climate science. Last but not least, a neoliberal approach will mean that non-Greek producers will benefit and small installation businesses in Greece will operate outside any popular oversight or regulation.

The international experiences of the RPS/RES and FiTs actually reinforce the conclusion that, in the case of Greece, there is a need for government, the PPC, municipalities, unions, and communities to work together to drive the transition to renewable energy in a way

that is sufficiently ambitious in order to meet emissions reduction targets and is equitable in terms of the benefits generated by renewable power. The PPC already has a presence in renewable energy and therefore some experience to offer, particularly with regard to larger installations. A reformed and reoriented PPC could play the role of buyer and installer or PV and do so in a way that creates stable work based on local hire systems.

Energy Cooperatives

For many on the Left, cooperatives imply popular power and local and sometimes worker control. Food cooperatives, for example, are hugely important globally and are a major counterforce to the large capitalist food conglomerates. However, many renewable energy cooperatives are distinct in the sense that, at least in the Global North, they tend to resemble a traditional investment rather than a process involving ongoing management and social interaction. For example, once installed, a solar PV project requires little by way of maintenance and will produce power for up to thirty years. A wind turbine requires more attention in terms of maintenance, but not on a day-to-day level.

The act of purchasing and even installing renewable energy capacity may therefore be cooperative in the sense that a distinct community may come together and decide to pool resources, but the “cooperation” part of the cooperative mostly ends once the project is operational. Furthermore, as noted by the Folk Center in Denmark “profit is not reinvested to increase the supply of renewable energy for the common good but instead to private consumption.”⁵⁸

Renewable energy cooperatives have been viewed favorably in some circles because they have been seen to undermine large fossil-comfortable utilities committed to the tradition-

al business model of selling as many kilowatt hours as possible, and they therefore shift economic and political power downward and outward. In the many instances where public utilities have become marketized and profit-driven in accordance with the neoliberal agenda, the growth of cooperatives can be seen as a positive development. Moreover, Germany's 700 renewable energy cooperatives have provided a launch pad for remunicipalization of power generation in more than 40 cities.⁵⁹

Cooperatives (along with the wider "prosumer" community) have also helped solidify popular support for Germany's relatively impressive shift toward renewable power. Cooperatives therefore have a consciousness-raising role. Finally, cooperatives have made a contribution in decarbonizing electrical power, which is also a positive outcome.

In terms of a SYRIZA policy based on energy democracy, it is perhaps prudent to avoid any definitive statement on energy cooperatives until more research has been done and discussion has taken place among representatives of social movements, unions, and municipalities. Falling prices mean that solar PV is likely to become attractive for homeowners and small businesses even without subsidies, FiTs, or some other form of incentive. Similarly, community-based projects ("collective prosumerism") will also become more viable in the years ahead largely for the same reasons. Therefore cooperatives can potentially play a significant and perhaps important role in Greece's transition to renewable energy.

A Reformed and Restructured PPC

Perhaps the most effective and equitable way of expanding Greece's renewable energy capacity will require a radical change in the role of the PPC. Like many public entities, the forces of liberalization and marketization have re-

shaped the PPC. However, a reformed and de-marketized PPC can (in principle) be a driver of renewable energy deployment in Greece.

The international experience is again informative. As noted above, in many countries and regions the centralized utilities have resisted policies that incentivize on-site generation because it threatens their customer base, reducing revenues and profits.⁶⁰ When forced to use renewables as a result of an RPS/RES, utilities have often partnered with private for-profit IPPs in order to meet the required targets. In rare instances, utilities have actually pioneered on-site generation, often as a preemptive measure, moving into and enclosing an emerging and otherwise disruptive market.⁶¹ Such occasional shifts have been based on the understanding that the long-term economics of renewable power are favorable and could spell the end of centralized generation's preponderant role.⁶²

These examples show that utilities can change their role. In the same way as the utilities moved from essentially serving the needs of the public, the nation, and industry to a period of neoliberal-type profit maximization, utilities can be instructed to play a role in helping, rather than hindering, the deployment of renewable energy and aggressive end-use energy conservation.

Centralized or Decentralized Renewables?

A national energy transition plan will provide the political vehicle to transcend the present interest-driven debate about centralized versus decentralized generation, where utilities and prosumers are seemingly locked into an antagonistic relationship. Those engaged in the plan may come to realize that the speed and scale of the required deployment of renewable energy may require utility-sized renewable energy (10

MW or larger) to grow *alongside* small on-site generation. Presently, utility-sized projects are dominating the deployment of solar PV globally. By early 2013, about 90 plants in operation had capacities in excess of 30 MW, and some 400 had a capacity of at least ten MW. The world's 50 biggest PV generating plants have a cumulative capacity of more than four GW, or more than 80 MW on average.⁶³ However, this may say more about the bias of the utilities for large-scale projects, and the strength of the large IPPs in shaping energy policy—such as P3s—than it does about the inherent advantages of big projects over on-site decentralized generation.⁶⁴

A similar tension is evident in the discussion around wind power generation and the differences between onshore and offshore wind production. Offshore wind power is more expensive than onshore per unit of energy generated, but it has been proposed as a means of overcoming public resistance to the presence of wind turbines. However, several public opinion polls suggest that public ownership of wind power is the most effective way of handling public resistance. Because the benefits are shared by all, the public is more willing to accept the presence of wind turbines. A 2012 poll in the UK is among several to suggest this. According to *The Guardian*,

*49% of people would support a wind turbine being erected within two miles of their home, with 22% against. But if the project were community-owned, support rose to 68% and opposition plummeted to 7%. In Germany, where 65% of its huge renewable energy capacity is community-owned, opposition is much rarer than in UK where community ownership is less than 10%.*⁶⁵

When the benefits line the pockets of a few, resistance grows. In the case of Denmark the privatization of wind has seen resistance levels rise, which has had the effect of pushing less visible, but much more expensive, offshore wind. Preben Maegaard writes:

*Instead of overpaying for projects, such as the 40MW offshore wind farm near Anholt, the same volume of wind energy might be supplied at below half the cost by onshore wind turbines that are democratically owned and run by local not-for-profit companies.*⁶⁶

Municipalization in Germany

As part of the effort to build energy democracy in Greece, municipal-based power could be situated at the center of a new energy system, with a reformed PPC playing a coordinating and technical role. In the 1980s and 1990s, German municipalities ceded control of power generation, but in recent years many have decided to reclaim their local grids.⁶⁷ Germany has thus seen a major expansion of direct municipal provision of energy services.

A recent report by Public Services International Research Unit (PSIRU) notes how, between 2007 and mid-2012, over 60 new local public utilities (*Stadtwerke*) have been set up and more than 190 concessions for energy distribution networks—the great majority being electricity distribution networks—have returned to public hands. According to PSIRU, “about two thirds of all German communes are considering buying back both electricity generators and the distribution networks, including private shareholdings in some of the 850 *Stadtwerke*. The new and re-municipalized *Stadtwerke* are able to operate as supply companies, either buying or generating the mix of electricity they want.”⁶⁸ The city of Munich, for example, has simply decided that all its energy will come from renewables by 2025, and all of it will be generated by the public sector—because the private sector cannot be relied on. This was powerfully articulated in 2011 by Dieter Reiter, a Munich city councilor, when addressing an international conference of economists:

Energy supply was one of the key sectors affected by privatization of formerly public enterprises. To-

day, energy supply is characterized by oligopolies of private energy suppliers. There is practically no competition on price. The transition to renewable energies is made rather reluctantly and only as a consequence of massive state subsidies and regulatory requirements. The example of Munich shows how the transition process can be sped up if a city owns a utility company. By 2025, our utility company aims to produce so much green energy, that the entire demand of the city can be met. That requires enormous investments—around 9 billion euros by 2025—and can only be successful if the long-term goal is sustainable economic success rather than short-term profit maximization.⁶⁹

Those who refer to Germany's successes in advancing renewable energy often appear unaware of, or perhaps reluctant to acknowledge, the role of public authorities in challenging privatization and intervening on behalf of the broader public.

Job Creation in Renewables

An ambitious deployment of renewable energy can create significant numbers of jobs in Greece.⁷⁰ Global wind power-related employment has expanded more than eleven-fold in the past 15 years, while solar PV employment has soared close to 290-fold during the same time period.⁷¹ The jobs in Greece will be created in the renewable energy sector itself, and eventual reductions in the cost of electricity will redirect spending to other goods and services—thus creating additional jobs across the economy.

The prospects of manufacturing PV panels or wind turbines in Greece are, however, presently not that good. The collapse in solar PV panel prices is forcing a consolidation of the industry, with the loss of tens of thousands of manufacturing jobs in Europe, North America, and China.⁷² Consolidation is also taking place in the solar inverter industry, with production shifting away from Europe toward China and the United States.⁷³ Wind power production ca-

pacities (80 GW) also exceed market demand (44.7 GW installed during 2012) by a substantial margin, which has led to job losses in turbine manufacturing.⁷⁴ This consolidation puts a limit on the renewable energy manufacturing employment that any country may expect.

Jobs can, however, be created in the production of basic components and in the construction, installation, and maintenance of renewable energy projects. The production of solar modules amounts to about 25% of the cost of solar, and labor costs are a small portion of that share (perhaps 10%). Invertors add a further 10% of the cost of solar. But solar PV also needs mounting structures such as extruded aluminum rails (the modules are connected by these rails) that can be produced by existing metal fabricators in Greece. "Follow-the-sun" single-axis and double-axis tracking systems are also needed.⁷⁵ Large-scale deployment will stimulate demand for cables, connectors, and other electrical components. Array planners are needed as well.

It is conceivable that module or inverter manufacturers could set up operations in Greece—but in each instance this would probably entail a five-year commitment at a minimum of 200 MW of capacity per year. Clearly, the scale and speed of the planned deployment will have an impact on the prospects of manufacturing gaining a foothold in Greece and also its chances of future expansion. Publicly-owned manufacturing facilities or cooperatives are not inconceivable but may involve "joint venture" arrangements in order to allow for the transfer of skills and knowledge.

As noted above, the FiT experience in Greece has shown that jobs in the installation of solar PV systems are significant. A Böll Foundation study of the solar industry in Germany claims that as manufacturing has shifted to China, the cost of solar has decreased, leading to higher installation rates, presently at 7.5 GW of new

capacity per year on average. This has, in turn, created employment in installation, components, and project development.⁷⁶

It is possible to imagine the installation and related work being performed by PPC employees earning decent wages. The PPC could also be the primary purchaser of solar modules, inverters, and other components. Public buildings such as schools and hospitals could be assessed in order to see if they are suited for solar PV, and a plan developed to install PV systems over the course of the next decade or two. In Greece, the largest single classification for buildings are public schools. Already the Centre for Renewable Energy Sources (CRES) has explored possibilities of photovoltaic systems development on the rooftops of schools, in partnership with Greece's School Buildings Organization (SBO).⁷⁷ A 2011 study on the bioclimatic design of new schools in Greece concluded, "not only do passive solar schools contribute to energy consumption reduction, but they also contribute to the conservation of natural resources and the reduction of greenhouse gases emissions [sic] to the atmosphere."⁷⁸ A national energy transition plan could involve developing an inventory of public buildings and spaces in order to assess their capacity for on-site power generation.

How to Finance the Transition?

The political Right around the world has perpetrated the idea that renewable energy and climate protection measures are luxuries the economy cannot afford, especially with the impact of a deep recession still being felt across the global economy. Alternatively, if renewable energy is going to happen, it is argued that only the private sector can do the job—thus the emphasis on "public private partnerships" or P3s, power purchase agreements (PPAs), and other guarantees that have repeatedly led to overcharging and corruption.⁷⁹ Clearly, private

sector involvement is not "free" for governments and the public sector: the examples of Vietnam and Indonesia show how World Bank loans worth billions of dollars are used simply to enable the existence of private companies in a market and how private involvement only responds to long-term power purchase agreements, a system which is notoriously vulnerable to corruption and over-charging.⁸⁰

The transition to renewable energy in Greece will require commitments of capital. However, so will fossil-based business as usual in the form of imported oil and gas along with the considerable health-care costs that are caused by air pollution. Greece's air pollution is higher than the OECD average, and the air pollution levels in Athens are today 15 times higher than the EU's alert level as a result of unaffordable heating fuel leading to more wood burning.⁸¹ And the costs of climate instability in the years ahead are seldom if ever considered as part of the costs of burning fossil fuels. Furthermore, as coal-fired power stations do not last forever, they will either need to be replaced with new ones or the investment needs to be redirected to renewable sources of power.

The public sector's annual electricity bill is also a cost that can be calculated over 20 years based on recent trends. This cost can then be compared to the cost of major solar PV deployment in those facilities. The price of globally sourced PV, along with installation and maintenance costs, are today such that PV systems can pay for themselves within five years thereafter the electricity supply to these facilities will be virtually free. There is every likelihood that the electricity costs to sustain the public sector—including schools, hospitals, and other government buildings—will actually fall quite dramatically over a 20-year period.

Once taken back into public ownership, Greece's banks can lend capital to municipal and other public authorities at socially fair and

reasonable rates of return. And even if these authorities need to borrow from commercial banks, the cost of capital is cheaper for these authorities than it is for private businesses. As PSIRU notes:

The cost of capital is cheaper for the public sector... The myth of 'leveraging' private investment has already been exposed in the water sector as an empty promise, and should not be re-used to distort the development of renewable energy.

The public sector provides not only a means of financing investment in renewables, but also a collective resource of knowledge embodied in workers who are securely employed, paid a decent wage, and working in conditions that prioritise safety for both workers and the public. It also has the flexibility to develop renewables on a large scale, or support small-scale, decentralised, off-grid local operations.⁸²

Capital could also be sourced by other means. In 2012 the PPC made a pre-tax profit of €276 million. A "reclaimed" PPC would provide the option of redirecting capital to renewables. Another option is for the PPC to issue bonds against its future revenues. These can be is-

sued domestically rather than internationally and provide a tried and trusted mechanism for financing public services. One additional source of revenue for renewable energy installations is the profits from user payments. Another option is for the PPC to issue bonds against its future revenues. These can be issued domestically rather than internationally and bonds of this type provide a tried and trusted mechanism for financing public services.

Another possibility is a carbon tax. There are numerous options for designing a carbon tax, such as imposing it on major industrial emitters in Greece, or through a charge on petrol. Greece consumed an average of 343,000 barrels of crude oil per day in 2011, of which almost half (46%) was used for transportation.⁸³ According to the IEA (2009 data), compared with other OECD Europe countries, Greece has a relatively low tax on gasoline and diesel. A small carbon tax of a few cents on a liter of petrol would generate significant revenue that could, in turn, be dedicated to investments in renewable energy.

Conclusion

Energy democracy is entirely consistent with SYRIZA's existing programmatic commitment to work toward "the development of a new paradigm of social, environmental and economic development," and the need to build a public sector of a "new type."⁸⁴

This commitment has set the stage for both energy democracy and a deep restructuring of Greece's economy. The options presented here are not offered as a manifesto or tightly integrated program; instead, they are intended to be a contribution to the debate on the ener-

gy future of Greece in a time of climate change and what today appears to be "austerity without end." There remain many unanswered questions and many formidable challenges. The international Left has a responsibility to help in any way it can, with technical expertise and other skills that may initially be in short supply during the period of energy transition.

A successfully developed and implemented program of energy democracy in Greece could be important to the Left in other parts of Eastern Europe in particular, where many battles

against fossil fuels companies and extractivist policies are presently being waged. In Southern Europe and North Africa, renewable energy has enormous potential as well, but—as is the case elsewhere—the social and economic potential will only be realized if these resources are developed in a democratic way and stay within the public sector. Cooperatives and small producers can and should play a role, but the multinational companies' domination of the energy and climate protection agenda must end.

As of this writing, the UN climate negotiations are corporate-dominated and going nowhere. The EU's neoliberal energy policy is not delivering the levels of emission reductions required by climate science. Global emissions continue to climb and CO₂ levels are presently 60% above where they were in 1990, a statistic that

is truly staggering in terms of its planetary implications.⁸⁵ The emission reductions scenarios presented by the IPCC⁸⁶—a needed 85% reduction by 2050 based on year 2000 levels to remain between 2 and 2.4 degrees Celsius of global warming—are today as far removed from political reality than at any point since the UN climate talks began over 20 years ago.

SYRIZA's commitment to a planned transition to renewable energy and its intention to pursue a new paradigm of social, environmental, and economic development therefore has planetary significance. If Greece can demonstrate that another energy is possible, then it shows that a different climate future is possible. The alternative that neoliberal capitalism has to offer—ecological degradation and out-of-control global warming—is simply not acceptable.

Other TUED Studies

The Great Inaction

New Trade Union Perspectives
Sean Sweeney - September 2014

Global Shale Gas and the Anti-Fracking Movement

Developing Union Perspectives and Approaches
Sean Sweeney and Lara Skinner - June 2014

References

- 1 I am grateful for the input and suggestions of several comrades: Anastasia Romanou at NASA's Goddard Institute for Space Studies, New York, and a member of SYRIZA New York; and also David Hall and Steve Thomas at the University of Greenwich, London.
- 2 The discussion here will focus on electrical power generation while acknowledging that the energy economy is not just about electrical supply; it is also about demand. Similarly, it is not just about electricity, but impacts fuels for transportation and industrial and residential use as well. The transition to a clean, truly sustainable, and low-carbon economy therefore requires actions around transport, energy conservation, and land use changes—but these are beyond the scope of this short paper.
- 3 "The political resolution of the 1st congress of SYRIZA and the great social and political movement of subversion," LEFT.gr, Aug. 5, 2013.
- 4 Ibid.
- 5 Ibid.
- 6 Greece has some potential in terms of new small hydropower capacity. It could also take advantage of considerable geothermal resources, especially near Mylos island, where measured temperatures rise up to 325° C at a depth of 1000 m, and Nisyros, where measured temperatures rise up to 325° C at a depth of 1500 m.
- 7 A successful energy transition in Greece may also require the decommodification of electricity, whereby electricity is no longer regarded as a "thing" to be sold at a certain (varying) rate per kilowatt hour. The business model that has operated in most countries for decades is no longer suitable to a world that needs to *reduce* consumption and *conserve* energy. Electrical power must be viewed as a public service where costs of generation and transmission are recovered in a multitude of ways. This is presented more as a concept here, but decommodification (which is not the same as "free") flows from the recognition that both access to energy and emissions reductions and climate protection are equally essential and should be treated as public goods.
- 8 B. Metz, et al., ed., *Climate Change 2007: Mitigation of Climate Change: Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, 2007.
- 9 "The Economic Adjustment Programme for Greece Fourth Review – Spring 2011," European Commission Directorate-General for Economic and Financial Affairs, 2011. On June 26, 2013, the government said that about 30 percent of PPC's resources would be spun off to create a rival company, while the company-owned transmission operator, Admie, would also be sold. The government's proposals will mean that PPC will transfer to its privately-run spin-off about 1,400 MW of coal capacity and 500 MW each of water and gas-fired. Paul Tugwell and Tom Stoukas, "Greece Details Plans for Public Power Privatization," Bloomberg, May 15, 2013.
- 10 Daphne Tsagari, "Greece, Champion of Electricity Hikes," Greek Reporter, Oct. 31, 2014.
- 11 Katerina Nikolas, "Fuel consumption drops dramatically in Greece as taxes rise," Digital Journal, Nov. 19, 2012.
- 12 N.E. Koukouzas, et al., "The lignite electricity-generating sector in Greece: Current status and future prospects," *International Journal of Energy Research* 28.9 (2004): 785 - 798.
- 13 "GHG trends and projections in the EU-15." European Environment Agency, 2011.
- 14 "EN08 Emissions (CO2, SO2 and NOx) intensity of public conventional thermal power (electricity and heat) production," European Environment Agency, European Environment Agency, Jan. 11, 2008.
- 15 *3rd National Communication to the UNFCCC*, 2011.
- 16 Positive effects include reduction of energy requirements for heating the winter and an increase the growing season.
- 17 "Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the Use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/EC and 2003/30/EC," *Official Journal of the European Union* 140 (2009).
- 18 It is possible to formulate a "pathway towards a 100 per cent renewable energy supply system by 2050" for "electricity, heating and cooling as well as transport" throughout all member states of the European Union. The challenge lies not in a lack of available technologies but in how to make the right "enabling" policy changes: reducing demand; expanding renewable energy capacity tenfold; properly mixing hydropower, wind, photovoltaics, biomass, geothermal, concentrated solar power, and wave power; phasing out all subsidies for fossil and nuclear energy; introducing an EU-wide carbon and energy tax; and *liberalizing the energy market* (emphasis added). Zervos, et al., "RE-thinking 2050: A 100% Renewable Energy Vision for the European Union," European Renewable Energy Council, 2010.

- 19 "Law 2773/1999, 2837/2000, 2941/2001, 3175/2003, 3377/2005, 3426/2005," International Renewable Energy Agency (IRENA), 2013.
- 20 "Law 3851/2010," IRENA, 2013.
- 21 A new Ministry for the Environment, Energy and Climate Change (MEECC) was established in 2009 in order to bring the bodies involved in the licensing of power together under a single administrative structure. In 2010 a new legal framework to accelerate deploying renewable energy was created (Law 3851/2010) along with the Renewables Investment Facilitation Service, which was formed to accelerate the licensing procedure.
- 22 "Association of Photovoltaic Power Generation," Spef.gr, 2009.
- 23 "Wind in power 2012 European statistics," The European Wind Energy Association, Feb. 2013.
- 24 Ilias Tsagas, "Greece: PV installation rates plunge in second quarter as RES fund debt rises," PV Magazine, Jul. 15, 2013.
- 25 Chris Webb, "Greece: Going Green - Cleaning up its act: the changing face of Greece's power sector." Power Engineering International, Feb. 2010.
- 26 Ilias Tsagas, "Greek PV Association to oppose government levy on parks," Power Engineering International, Jan. 2013; Becky Beetz and Petra Hannen, "Approvals for Greek PV systems stopped, drastic cuts introduced," Power Engineering International, Aug. 2012; Ilias Tsagas, "Greece prepares for more retroactive PV cuts." Power Engineering International, Feb. 2013.
- 27 "Greece Infrastructure Report Q3 2012," MarketResearch.com, Jun. 2012.
- 28 "An Outlook for Renewable Energy in The Netherlands; The Next Investment Wave," Rabobank Industry Note 320, June 2012.
- 29 Ilias Tsagas, "Greece reveals 724.162 MW of licensed 'Fast Track' PV projects," Power Engineering International, Jan. 2013.
- 30 Daniel M. Knight and Sandra Bell. "Pandora's box: Photovoltaic energy and economic crisis in Greece," American Institute of Physics Journal of Renewable and Sustainable Energy 5 (2013).
- 31 For an excellent summary of the problems facing the EU's energy policy, see: Steve Thomas, "Progress with Energy Markets in Europe: A critical appraisal of the European Commission-Communication 'Making the internal energy market work' (2012)," PSIRU, May 2013.
- 32 Ewa Krukowska, "EON's Teyssen Urges Fix to 'Bust' EU CO2 Plan, Energy Rules," Bloomberg News, Feb. 7, 2012.
- 33 "Greece," Renewable Energy Sector Compass, 2009.
- 34 "Greek Government Passes Austerity Bill But PPC Privatisation Faces Obstacles," IHS Economics & Country Risk, Jan. 2011.
- 35 Juliet Davenport, "From the Power of Six to the Power of Thousands," The Guardian, Jun. 14, 2012.
- 36 Among the companies currently active in Greece are: Hellenic Petroleum, Motor Oil, Public Gas Corporation (DEPA), Prometheus Gas, Public Power Corporation (PPC), Public Power Corporation (PPC) RES, Mytilineos Group, Terna, Global Energy, Energy Solutions, Solar Cells Hellas, Next Solar, Enova, EDF, Edison, Conergy, EGL, Acciona, Enel, Eurus Energy, Gamesa, Rokas-Iberdrola, Endesa, WPD, Atel. These companies are involved in mainstream electricity production, gas distribution, and the expanding field of renewables.
- 37 "Samaras asks Putin to help lower gas prices," Ekathimerini.com news. Aug. 2013.
- 38 "Country Gas Profiles, Greece," Energy Delta Institute, 2011.
- 39 Knight and Bell, "Pandora's box."
- 40 Balkanalysis.com 3 (2011).
- 41 Hellenic Association of Independent Power Producers, haipp.gr, 2010.
- 42 "Greek Government Passes Austerity Bill."
- 43 EURACOAL European Association for Coal and Lignite, euracoal.be, 2010.
- 44 "Germany Installed Record Amount of Solar Power in 2012, 7.6 GW of New Capacity," Clean Technica, 2014.
- 45 Balkanalysis.com 3 (2011).
- 46 "The Toll on Coal," Financial Times, Oct. 1, 2013.
- 47 Balkanalysis.com 3 (2011).
- 48 Ralph E.H. Sims, et al., "Energy supply" *Climate Change 2007: Mitigation*. B. Metz, et al., eds., New York: Cambridge University Press, 2007.
- 49 FITs are typically focused on electricity, although a small number of countries have also enacted FITs for heat markets.
- 50 "Trends in Photovoltaic Applications." International Energy Agency Photovoltaic Power Systems Programme, n.d.
- 51 Peter Poschen, et al., "Working Towards Sustainable Development: Opportunities for decent work and social inclusion in a green economy," International Labour Organization, 2012.
- 52 Ilias Tsagas, "Greek PV market shrivels to just 6 MW per month," PV Magazine, Nov. 2013.
- 53 Dennis McGinn, et al. "Renewables 2013 Global Status Report," REN21 Renewable Energy Policy Network for the 21st Century, 2013.
- 54 Tsagas, "Greek PV market shrivels to just 6 MW per month."
- 55 Knight and Bell, op. cit. This has put significant strain on the national grid in mainland Greece (the islands have separate grid systems). Connecting photovoltaic developments to the grid interferes with the flow of current and pushes the grid system towards its capacity. In some regions, the program has been "frozen" in order for local authorities to process the backlog in applications and allow technicians to work on

- optimizing grid integration.
- 56 Ibid.
- 57 Tsagas, "Greek PV market shrivels to just 6 MW per month."
- 58 Preben Maegaard and Jane Kruse, *Time for Energy Democracy. How new strategies and forms of ownership may help to implement solar, wind and biomass energy*, Nordisk Folkecenter for Vedvarende Energi, 2010.
- 59 David Hall et al., "Re-municipalisation in Europe," PSIRU, Nov. 2012.
- 60 Diane Cardwell, "On Rooftops, a Rival for Utilities," *The New York Times*, Jul. 27, 2013.
- 61 Stephen Lacey, "Under Threat, Germany's Second-Biggest Utility Says It Will Create a New 'Prosumer Business Model'," *Greentech Media*, Oct. 23, 2013.
- 62 Jesse Jenkins, "Electricity Utilities Must Evolve or Die: Are They Up to the Task?" *The Energy Collective*, Aug. 19, 2013.
- 63 McGinn et al., "Renewables 2013 Global Status Report."
- 64 "Utility-scale installations lead solar photovoltaic growth," U.S. Energy Information Administration. Oct. 31, 2012.
- 65 Patrick Kingsley, "Windfarms: is community ownership the way ahead?" *The Guardian*, Nov. 5, 2012; Damian Carrington, "Giving power to the people can solve the wind farm stand-off," *The Guardian*, Jun. 4, 2012.
- 66 Maegaard and Kruse, *Time for Energy Democracy*.
- 67 Matthias B. Krause, "Thousands of German Cities and Villages Looking to Buy Back Their Power Grids," *Greentech Media*, Oct. 11, 2013.
- 68 Hall et al., "Re-municipalisation in Europe."
- 69 Dieter Reiter, "Welcome Address," 10th Munich Economic Summit, May 19–20, 2011.
- 70 Max Wei et al., "Putting renewables and energy efficiency to work: How many jobs can the clean energy industry generate in the US?" *Energy Policy* 38 (2010).
- 71 McGinn et al. "Renewables 2013 Global Status Report."
- 72 "Asia Report: China Gets Serious About Culling its Solar Herd," *Renewable Energy World*, Jan. 8, 2014.
- 73 Sneha Shah, "Solar Inverter Market," *Wall St. Sector Selector*, Oct. 23, 2013.
- 74 O'Sullivan et al., 2013.
- 75 "Trends in Photovoltaic Applications," International Energy Agency Photovoltaic Power Systems Programme, 2013.
- 76 Craig Morris, "German Solar Bubble? Look Again!" *Heinrich Böll Stiftung*.
- 77 P.A. Patargias et al., "School Buildings in Greece: The Bioclimatic Challenge and a Photovoltaic Pilot Project," Programme on Educational Building, 2007.
- 78 Agisilaos Economou, "Passive solar design in schools for the protection of the environment Greece: a case study," *World Renewable Energy Congress*, Linköping, Sweden, May 8-13, 2011.
- 79 David Hall, "Corruption and public services," PSIRU, Nov. 2012.
- 80 David Hall et al., "Renewable energy depends on the public not private sector," Jun. 2013.
- 81 "Athens air pollution found at 15 times above EU alert level," *Ekathimerini.com*, Feb. 28, 2013.
- 82 Hall et al., "Renewable energy depends on the public not private sector."
- 83 "Greece, Oil & Gas Security, Emergency Response of IEA Countries," International Energy Agency, 2010.
- 84 "The political resolution of the 1st congress of SYRIZA."
- 85 "Global carbon emissions set to reach record 36 billion tonnes in 2013," *Tyndall Centre for Climate Change Research*, 2013.
- 86 Metz et al., op. cit.