

Chapter 1

The Politics of Nuclear and Solar Energy

In *Urban Sprawl, Global Warming, and the Empire of Capital*, I explain how and why urban sprawl arose as a lead strategy/means to stabilize the U.S. economy in the 1930s, and later as a lynchpin for the world economy in the post–World War II period, and remains as such.¹ In addition to growing the world capitalist economy, urban sprawl also greatly pushes up energy demand because it creates an energy-intense transportation infrastructure (i.e., automobile dependency) and an energy-intense housing stock (low-density urban development expands energy use to heat/cool and power the appliances that fill the relatively large multiroom households that are characteristic of such development). Whereas the thrust of *Urban Sprawl, Global Warming, and the Empire of Capital* concentrates on why the United States consumes so much energy, in this book I emphasize the supply side of the U.S. energy equation.

The United States, of course, meets its massive energy demand mostly through fossil fuels, which in turn leads to massive greenhouse emissions (roughly 20 to 25 percent of the world's total anthropogenic climate change gasses).² There is another important component to U.S. energy consumption: nuclear power (with about 20 percent of its electricity coming from this source).³ The U.S. development and political sponsorship of nuclear power is the focus of this book. During the 1950s, the U.S. government made the strategic decision to support nuclear power as the energy of the future, neglecting the promise of solar energy (i.e., passive solar, photovoltaic, wind, and wave power).⁴ The United States pursued nuclear power in spite of its obvious public health and environmental dangers, including the

perils of nuclear weapons proliferation. Part of the irony of the U.S. government's pursuit of nuclear power and virtual ignoring of solar energy⁵ is that among advanced industrialized countries, the United States has arguably the greatest ostensive solar potential. I am specifically pointing to its sun- and heat-drenched Southwestern desert region.⁶ (The United States also has a very windy Midwest.⁷) Thus, it is possible to conceptualize a scenario in which the United States becomes a major producer of surplus energy by exploiting the sunlight and heat of this desert region.⁸

The United States' nuclear path was set by economic elites (through the Rockefeller Foundation and the Panel on the Impact of the Peaceful Uses of Atomic Energy). Conversely, U.S. economic elites went on the record in the 1950s (via the Association for Applied Solar Energy) in opposing government support for solar power. The result is that nuclear power presently appears as the only viable alternative to fossil fuels, with solar energy an evolving substitute at best.⁹ Nuclear power nonetheless is so plagued by economic, safety (e.g., the Fukushima Daiichi disaster), and geopolitical liabilities that in spite of depleting fossil fuels and the obvious dangers of global warming, the world, including the United States, has only moved relatively slowly toward nuclear power as an alternative to what are disappearing and perilous fossil fuels.¹⁰

More than fifty years after economic elites in the desert Southwest expressed their disapproval of public subsidies for solar power, we are left wondering how far solar power could have been developed if the U.S. government had pursued this form of energy as aggressively as it did nuclear power. It is precisely because there is no economic and safe alternative to fossil fuels¹¹ that the international community cannot agree to a global strategy to avoid cataclysmic climate change.¹²

The Limits of Nuclear Power

The decision in the 1950s to back nuclear power and not do the same for solar has seemingly profound implications for the present period and for humanity and the environment generally. Safety has remained a key concern with the operation of nuclear power plants¹³ (e.g., the recent nuclear meltdowns in Japan¹⁴), and as a result, the costs of such plants has skyrocketed—as nuclear power plants have to

be built/engineered with redundant and sophisticated safety systems. The costs of nuclear power plants have increased over time as larger and larger plants are constructed to achieve higher economies of scale in an effort to push down the costs per unit of energy delivered.¹⁵ The result is that civilian nuclear power can only proceed with heavy government subsidies, including capping firms' liability in the case of a public health disaster arising from the accidental release of radioactive energy (e.g., the Price-Anderson Act).¹⁶ A recently authorized nuclear power plant in the United States has been suspended because the government demanded a greater financial contribution from the operators of the plant.¹⁷

Another liability of civilian nuclear power relates to politics. Particularly after the Three Mile Island (1979) accident and the one at Chernobyl (1986),¹⁸ much of the public has become leery of nuclear power.¹⁹ (The public apprehension of this source of power is being amplified by the Japanese Fukushima Daiichi nuclear disaster of March 2011.²⁰) Local business interests, fearful for the local economic climate,²¹ successfully prevented the start-up of a completed nuclear power plant on Long Island, New York, in the 1980s.²² Potentially decisive local opposition to a finished plant drives up the risk and uncertainties of nuclear power.²³ The Vermont state legislature voted in 2010 not to extend the operating license of the Yankee nuclear power plant.²⁴ Current plans have the New Jersey Oyster Creek nuclear power plant shutting down in 2019, ten years earlier than initially planned, because of management's unwillingness to comply with the state government's demand for upgrading the safety measures of the plant.²⁵

Perhaps the most long-term liability of nuclear power is its waste by-product. Nuclear waste has a half-life that is in the tens of thousands of years. Thus, even if a relatively modest amount of this waste were to contaminate an aquifer, lake, river, or watershed, the water would be unsuitable for consumption for ostensibly eons. There is no storage technology/method currently available that can safely and assuredly store nuclear waste for the entirety of its radioactive life.²⁶ Hence, a future dominated by nuclear energy would entail ever more waste that poses a grave, intractable threat to human health and the ecosystem for countless generations.²⁷

Another liability of nuclear waste arises from the fact that such waste can be mined (processed) for weapons-grade material. There is a distinction between what are known as breeder and light water

nuclear reactors.²⁸ The breeder variant results in more weapons material, but light water reactor waste can also be used to manufacture nuclear weapons.²⁹ The result is that U.S. foreign policy has been virtually schizophrenic on the matter of other countries developing a domestic nuclear power capacity. In the 1950s, through its Atoms for Peace program, the United States internationally promoted civilian nuclear power.³⁰ In the 1970s, the Carter administration (1977–1981), because of weapons proliferation concerns, made it a political priority to limit the global trade in civilian nuclear technology.³¹

The Bush and Obama administrations' stance on Indian and Iranian nuclear civilian power programs is particularly contradictory, if not perplexing. India (in an arms race with its neighbor Pakistan) has not signed the Nuclear Non-Proliferation Treaty and has developed nuclear weapons. In spite of this, the U.S. government, under the presidency of George W. Bush, sponsored India's entrance into the international system of civilian nuclear power.³²

By contrast, Iran is a signatory to the Nuclear Non-Proliferation Treaty and, even according to the United States' intelligence agencies, is in compliance with this treaty (i.e., it is not pursuing a nuclear weapons program).³³ Under the terms of the nonproliferation treaty, because it is not engaged in a weapons program, Iran is within its rights to gain a civilian nuclear capacity.³⁴ Nevertheless, the U.S. government is leading an effort to block Iran's development of this capacity, even threatening it with military attack to prevent Iran from employing civilian nuclear energy.³⁵

Notwithstanding its selective diplomacy on nuclear weapons and energy, it was the United States that opened the door to nuclear weapons and energy. As already noted, the United States promoted nuclear energy beginning in the 1950s. Moreover, the United States has the most civilian nuclear reactors in the world, 104 of a global total of 440, and it is currently building more.³⁶ Perhaps more importantly, the United States has a huge number of nuclear weapons stockpiled (both limited-range tactical nuclear missiles and intercontinental ballistic nuclear missiles).³⁷ What makes U.S. diplomacy on nuclear energy particularly unviable and self-defeating is that the United States cannot offer an alternative to fossil fuels and nuclear power. Thus, as fossil fuels deplete in a country like Iran,³⁸ it is left with one of two alternatives: develop nuclear power in an effort to attain energy independence or become dependent on an international fossil

fuel market that is dominated by fewer and fewer producing countries and will be increasingly volatile as more and more of these finite resources are consumed.³⁹

Why Nuclear Power?

Historically, why did the United States decide to aggressively sponsor/subsidize the development, deployment, and operation of civilian nuclear power? Why did it not do the same for solar? U.S. economic growth projections in the 1950s and beyond did seemingly create a bias for nuclear power. The full potential of solar remains unknown, but in the short term solar power cannot be adapted to the energy needs created by the U.S. economy, especially when that economy is being spurred by energy-profligate urban sprawl.

But near-medium-term energy demand projections did not, however, prompt the United States to pursue and promote nuclear power. Into the 1950s, the United States was a leading producer of petroleum,⁴⁰ and it remains the country with the largest reserves of coal.⁴¹ It also contains massive amounts of natural gas.⁴² Moreover, when it came into relief in 1973 that the United States could not meet its domestic oil demand through domestic production, it was able to turn to foreign supplies to meet its needs.⁴³ Therefore, among advanced industrialized countries in the post-World War II period, the United States was in the best position to forego pursuing civil nuclear power and instead invest in the long-term energy strategy of developing solar energy.

Frank N. Laird, in his book *Solar Energy, Technology Policy, and Institutional Values*, holds that the United States aggressively deployed civilian nuclear power and forewent solar energy because of the ideas that dominated White House thinking on energy. Laird explains that during the post-World War II period, the ideas of energy supply and national security were linked, and beginning with the Eisenhower administration (1953–1961), these concepts became tied to nuclear power—which held the promise of virtually limitless and inexpensive supplies of energy.⁴⁴

Laird, however, fails to grapple with the fact that throughout the postwar period and into the contemporary era, the thinking on energy supply that dominates the U.S. polity is rather unique. This

uniqueness results from the position America holds in the global economic/political system. It is the prime leader of the capitalist world system and was tasked with (undertook) the goal of actively maintaining it.⁴⁵ One of the key points of *Urban Sprawl, Global Warming, and the Empire of Capital* is that the U.S. government relied on its domestic stocks of fossil fuels in an effort to resuscitate the American economy from the Great Depression. Subsequent research shows that this approach of using urban sprawl as an economic stimulus was initialized in the early 1920s after an economic downturn following World War I (Chapter 4 of this book). Consumers in the United States (not counting businesses and government) today are the leading purchasers of the world. They take in roughly 20 percent of the globe's total production of goods and services.⁴⁶ Therefore, urban sprawl and the demand it creates for consumer durables (retail items expected to last at least three years [e.g., automobiles]) in the United States have profound implications for the capitalist world system and its stability/viability.⁴⁷

Thus, energy supply and national security in the United States are not linked in the conventional sense of minimizing energy use in an effort to shield the domestic economy from the exporting decisions of nations that control surplus energy.⁴⁸ (This is the approach that the countries of Western Europe and Japan adopt.⁴⁹) Instead, the proximate concern of the U.S. government as it relates to energy is propping up what Ellen Meksins Woods labels the "empire of capital"⁵⁰ through urban sprawl. Put differently, urban sprawl in the United States has been a center of gravity for the American-led world system (i.e., for the American Empire⁵¹)—drawing in allies with access to the economic demand created by urban sprawl⁵² and punishing/destroying adversaries by denying access.⁵³ Thus, oil depletion is not simply an economic phenomenon, but implies the end of U.S. global empire and the world political system as we know it.⁵⁴ In other words, the American global system has been predicated on surplus petroleum, and it cannot persist in the absence of this surplus or without some other surplus energy that can economically power urban sprawl. It is this need for surplus power that is ostensibly driving the nuclear energy revival in the United States. (It also explains why there has been an increase in spending on solar power [and biofuel⁵⁵] by the U.S. government.⁵⁶) Thus, energy supply politics in the United States is the politics of global hegemony.

The promotion of civilian nuclear power in the 1950s by the United States was also about global hegemony, but in different ways than it is today. If the United States' allies became dependent on nuclear energy, then American dominance of this technology would reinforce its economic/political dominance.⁵⁷ The U.S. domestic deployment of nuclear power plants in the 1950s, 1960s, and 1970s would allow the perfection of such technology and a demonstration of its effectiveness.

In the immediate post-War World II period, the United States sought to limit its Western European allies' knowledge of civilian nuclear power by subsidizing/directing Western European scientists' research in this area. Through such subsidies, Western European scientists were drawn into nuclear energy (and not into solar). The United States, however, tried to circumscribe these scientists' activities to abstract research on nuclear power and not its application. The United States attempted to maintain a monopoly on the application of civilian nuclear energy by classifying all of its knowhow on this matter.⁵⁸

In analyzing the seeming demise of civilian nuclear power in the United States during the late 1970s, researchers emphasize the role of domestic political opposition, safety issues, and economics.⁵⁹ American power companies stopped ordering nuclear power plants domestically, however, when it became clear that the United States no longer dominated/controlled the enrichment of nuclear fuel.⁶⁰ (The enrichment of nuclear fuel refers to the process of increasing in this fuel the amount of uranium 235 [²³⁵U]—the most readily/easily fissionable kind of uranium.) Political scientist Joseph Camilleri, in *The State and Nuclear Power*, points out that “for a great many years the United States enjoyed a monopoly of commercial enrichment capacity within the western world,” and that “during the 1970s more than 90 percent of the world's nuclear power stations were fueled with enriched uranium.”⁶¹

In an effort to entice private firms into the enrichment of nuclear fuel, the Nixon administration (1969–1974) drove up the price of enriched fuel.⁶² This prompted governments in other countries to aggressively develop their own enrichment capacity.⁶³ Shortly thereafter, U.S. nuclear power companies realized that to remain competitive in selling power plants internationally, they had to offer countries nuclear fuel processing technology.⁶⁴ The Carter administration (1977–1981) prohibited firms from exporting such technology⁶⁵

because the processing of nuclear material can be used to substantially expand the amount of weapons-grade material.⁶⁶ Once other countries actively deployed enrichment technology,⁶⁷ civilian nuclear power was no longer a lever the United States could potentially use to economically/politically dominate others.⁶⁸ Instead, it became a major concern with regard to nuclear weapons proliferation.⁶⁹

Why Not Solar?

Why did the United States forego solar in the 1950s? Solar does not ostensibly have the potential of being an imperial tool, like nuclear did. Most obviously, no one country can dominate the source energy of solar (i.e., the sun, wind, waves)—as opposed to nuclear, in which raw uranium and processed fuel are subject to strategic control.

Additionally, nuclear power is based on a highly complex and centralized technology (i.e., nuclear energy plants).⁷⁰ This creates potentially high barriers to entering the nuclear energy field. Therefore, if the United States had fully solved the nuclear civilian formula, this knowledge could have been used to dominate the global energy system. (One factor prompting the U.S. government into civilian nuclear power was the concern that the Soviets would solve this formula and be able to draw away the United States' allies as a result.⁷¹) By contrast, solar energy (in all its forms) is a more diffuse/decentralized power source—with energy being captured where it can be found (e.g., deserts, windy canyons, oceans). In the most idealized form, solar is a local electricity source—with power collected on every rooftop, from every body of water with a current, off of every building corner with wind regularly gusting, and so forth.⁷²

The success of solar is in reducing the per-unit costs for energy-collecting equipment (i.e., solar panels, photovoltaic cells, wind and wave turbines).⁷³ This is in contrast to nuclear, in which the lower per-unit energy costs can ostensibly come only from building larger and larger power plants. Perhaps more importantly, nuclear safety can seemingly be ensured only through such centralized plants.⁷⁴ This means that capturing solar is potentially simple (i.e., the purchase of energy-collecting equipment), whereas the high capital costs of producing nuclear energy create virtually insurmountable barriers to generating electricity from nuclear reactions.

As a result, a nuclear energy system is easier to dominate by a few actors/investors (i.e., monopolize). Thus, today we see three dominant firms in the field of building nuclear power plants—Russia’s Rosatom, France’s Areva, and Westinghouse (now owned by Toshiba of Japan).⁷⁵ Even when the United States was actively building nuclear power plants in the 1960s and 1970s, there were two dominant American builders of nuclear reactors—General Electric and Westinghouse.⁷⁶

In the case of solar power, currently there is concern that Chinese firms will come to dominate the manufacture of collecting equipment (e.g., solar panels and wind turbines). (China is believed to build over half of all solar collection equipment.) This potential dominance results from China’s low labor costs, subsidized loans for solar equipment manufacturers, and free land and copious research funds from the government. The Chinese government also subsidizes the building/operation of domestic solar power collectors.⁷⁷

Nevertheless, there are numerous firms competing in the solar energy manufacturing field, and entrance is possible.⁷⁸ The U.S. government does offer subsidies for solar projects—including for the manufacturing of solar collecting equipment.⁷⁹ Most significantly, the federal government recently issued \$16 billion in loan guarantees for twenty-eight renewable-energy projects.⁸⁰ However, in 2010 the *International Herald Tribune* reported that several U.S. solar energy projects were in abeyance because of a lack of financial support.⁸¹

Conclusion

At the dawn of the twenty-first century, the world faces the twin dilemmas of global warming and fossil fuel depletion (particularly petroleum). These dilemmas were in significant part created by three decisions undertaken by the United States in the post-World War II period.⁸² The first was to accelerate the sprawling of its urban zones to stabilize its own economy and those of its Cold War allies. This meant that the capitalist camp was predicated on large amounts of surplus energy, which are necessary to maintain and foster energy-profligate urban sprawl.

A second key energy-related decision undertaken in the United States during the 1950s was its pursuit of nuclear power as the prime alternative to fossil fuels. By the late 1970s, it was brought into sharp

relief that civilian nuclear power has several debilitating liabilities: It is dangerous to operate; it creates highly hazardous and long-lasting radioactive waste; it is uneconomic; it invokes strong political opposition; and civilian nuclear energy opens the door to greater and greater proliferation of nuclear weapons. Therefore, more and more reliance on nuclear power poses a grave threat to human civilization. As a result, the United States stopped ordering new nuclear power plants, and this energy source seemed destined to fade from existence.⁸³

The U.S. decision in the 1950s to back nuclear energy was accompanied by the decision not to make a major public investment in solar energy. The result is that solar energy science and engineering are substantially behind where they otherwise would be. With the threats of global warming and fossil fuel exhaustion, nuclear power made a political comeback—with Germany, for instance, extending the legal life of its seventeen nuclear power plants by seventeen years in 2010⁸⁴ and the United States planning the construction of fourteen new reactors.⁸⁵ Nevertheless, given the liabilities of nuclear power (e.g., the Fukushima Daiichi nuclear disaster), the world remains dangerously and unsustainably dependent on fossil fuels. The central argument of this book is that economic elites are directly behind all three decisions outlined above. In *Urban Sprawl, Global Warming, and Empire of Capital*, I highlight how economic elites politically sponsored urban sprawl in the 1930s. Subsequent research has shown that this sponsorship was evident in the 1920s (i.e., the President's Conference on Unemployment) (Chapter 4). By the 1950s, when the policy of urban sprawl was well entrenched, prompting the United States to consume profligate sums of fossil fuels, economic elites (particularly Lewis Strauss) backed major federal subsidies for civilian nuclear power. Economic elites also rejected public subsidies for solar energy (Chapter 3). In Chapter 5, I describe how economic elites backed profligate petroleum use and how the United States continued its excessive oil consumption even after the petroleum shocks of the 1970s. By contrast, the countries of Europe sought to curb their exposure to the world fossil fuels market, in part with the expansion of nuclear power (just when the United States was winding down its nuclear-building efforts).

The United States continues to reject conservation as a strategy to cope with the crises of global warming and energy/oil depletion.⁸⁶ Instead, the global economic elite advocates technology (i.e., ecological modernization) in response to these mortal environmental crises. The

U.S. and the global commitment to addressing climate change and fossil fuel depletion through alternative fuels and technology are evident with the Asia-Pacific Partnership for Clean Development and Climate, the US-China Clean Energy Forum, the World Business Council for Sustainable Development (WBCSD), and the International Chamber of Commerce (ICC) (Chapter 6). There are no current technological solutions to the climate change and energy crises (at least not without triggering a nuclear-related crisis [i.e., excessive waste and potential weapons proliferation]), and as a result, there is no global strategy to address climate change or energy supply issues (e.g., the failure of the 2009 Copenhagen Climate Change Conference).

In the next chapter (Chapter 2), I outline different theories that can be used to analyze state behavior and, more specifically, the energy policies that are the subject of this book. The two central theories that I posit are state autonomy theory and economic elite theory. Proponents of state autonomy theory hold that government elites (or political elites) are the main drivers of state behavior. Advocates of economic elite theory contend that economic elites are at the center of public policy formation.