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Electricity Production under the Green New Deal: *A Modern Monetary Theory Approach*

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Abstract:
This paper applies theories of institutional adjustment and Modern Monetary Theory to the problem of rapidly transitioning to an electricity provisioning system consistent with the Green New Deal. We argue the current obstacles are primarily financial, not technological in nature, and offer a high-level policy framework for using fiscal tools at the Federal level that overcomes the obstacle, while protecting rate-payers from cost burdens. Drawing upon theories of institutional adjustment after John Fagg Foster, we show that it is feasible to craft a policy solution to the financial barriers to adoption of rapid transition to a clean and renewable grid, even under relatively conservative assumptions for institutional change.

Keywords: Modern Monetary Theory, Fiscal Policy, Green New Deal, Public Utility Economics, Public Policy

JEL codes: E61, E62, H40, Q4, Q58

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Introduction

A major challenge for the Green New Deal (GND) is making the transition away from a fossil fuel-based energy system. Presently, institutions governing the production and distribution of energy are evaluated on the basis of their technical capabilities and financial feasibility, measured in the context of pecuniary gains towards private energy producers. Successful policy implementation, however, requires a restructuring of these institutions to incorporate environmental criteria into their evaluations. This paper incorporates such environmental criteria and develops a policy framework that suggests a direct role on the part of fiscal authorities. Key to this approach is the way in which cost pressure to wholesale and retail electricity rates may be mitigated by establishing a financing bank to provide funds that may be distributed to load serving entities (LSEs) to mitigate the consequences of accommodating aggressive renewable portfolio standards.

The layout for this paper is as follows. First, we offer a brief review of the theory of institutional adjustment to provide a lens through which solutions to the challenge of transitioning away from fossil fuel-based energy provisioning may be viewed. Second, we provide an overview of the existing system of energy production, including a discussion of the problems in the present system regarding its environmental sustainability. The purpose here will be to re-define the problem of energy provisioning with a new underlying value structure; only then may solutions to the problem be implemented in a way that achieves the goal of mitigating and reducing the effect of climate change. Third, we offer a set of policy solutions that achieve this goal. It should be noted that there may be some gaps in our proposals – we are not proposing a "magic bullet" that will automatically solve all of the current issues. As such, in situations where the technology to solve the problem does not yet exist, we focus on providing proposals to move towards developing that technology, leaving its implementation to future research.

The Theory of Institutional Adjustment Restated

As new methods for problem solving emerge, they must be incorporated into the existing institutional fabric to have effect. Foster's theory of institutional adjustment explains this process. For Foster, institutions are defined as "prescribed patterns of correlated human behavior" (Foster 1981a, 908). More plainly, they may be thought of as a set of behaviors, coordinated by an underlying value system. The electric industry, for example, may be thought of as an institutional arrangement whereby different human activities are connected in a purposeful manner to generate energy. If we take "energy production and distribution" as the present problem, then the current method of provisioning is one possible solution to that problem. Every possible solution must be evaluated, and it is through this evaluation process that the value structure of the institution becomes clear.

We categorize these methods of problem solving based on the Veblenian instrumental-ceremonial dichotomy (Waller 1982; Bush 1983; Munkirs 1988). Instrumental methods of problem solving are those grounded primarily in scientific inquiry and promote the general continuation of the life process. Ceremonial methods, on the other hand, are grounded in mysticism or dogma and promote invidious distinction and the reinforcement of existing social hierarchies. It is important to recognize that this is a *dichotomy*, not a *dualism*; both instrumental and ceremonial behaviors and values may exist simultaneously in the same institutional setting (Bush 1987). The key question, however, is which values dominate. From a broad perspective, the technical activities involved in generating and delivering the energy to users involve numerous instrumental behaviors. However, this provisioning of energy involves many ceremonial behaviors as well – primarily the activities involved in the sales effort and various lobbying activities that protect the market positions of dominant energy producers. In the existing political-economic structure, in which standards of judgment are based on pecuniary returns, the profit-motive involved ensures that the ceremonial activities come to dominate the instrumental ones. As a result, methods of problem solving are judged based on the satisfaction of the profit-centered value structure (Baranes 2020). The decision by energy companies in California to manipulate electricity markets in 2000 and 2001, when judged on instrumental values of providing energy to customers, makes little sense – the result was rolling blackouts and brownouts. Or, more recently, the case of Pacific Gas & Electric (PG & E), wherein the firm has been found liable for damages associated with wildfires caused by negligence in maintaining the rights of way of the transmission network in Northern California. However, when judged on ceremonial values, such a decision allows for price gouging and massively inflated profits that would not have existed otherwise.

The use of non-renewable fossil fuels in energy production may be seen in this light as well. Based on existing methods of problem solving and standards of judgement, the use of fossil fuels is promoted based on their ability to provide energy and in a profitable manner. Technological innovations such as fracking further this goal by allowing enterprises to access new sources of fuel for energy production. However, the continued use of fossil fuels threatens the ability for humans to survive on the planet, and the side effects of their extraction are often devastating. As such, when applying ecological standards of judgement to such activity, it is clear that this kind of energy provisioning is antithetical to process of instrumental problem solving. The primary goal of the Green New Deal, from this lens, is to introduce and reinforce these new methods of problem solving grounded in environmentally sustainable criterion. Part of the process of institutional adjustment, then, is the prescription of these environmental values to the coordinated behaviors in energy provisioning.

When new methods of problem solving emerge, the existing institutional structure must be adjusted to account for them[1] (Foster 1981b). The ability for institutions to adjust depend on three key principles: instrumental primacy[2], recognized interdependence, and minimal dislocation. The principle of instrumental primacy states that institutional adjustment is predicated on the existence of new methods of problem solving (Bush 1987; Tool 2000; Sturgeon 2009; Baranes 2020). While this is intuitively obvious, it is still a vital starting point – it is impossible to incorporate new methods of problem solving if those new methods are unknown! As such, the implementation of a GND and the application of environmental criterion for judging energy provisioning is first predicated on the development of technologies that can provide energy in an environmentally friendly way. However, it is important to recognize that these new methods of problem solving do not appear randomly, nor are they automatically incorporated into the pre-existing institutional structure. The second principle of institutional adjustment – recognized interdependence – argues that new patterns of behavior are the result of directed action and occur in ways that recognize the effect they have on existing methods of problem solving. The development of environmentally sustainable ways of generating energy, then, must recognize that the existing provisioning system is designed for fossil fuels. Without recognizing what additional adjustments the introduction and implementation of these new methods of energy production will require, such institutional change is doomed to failure. This leads to the final principle of institutional adjustment – minimal dislocation. This principle states that non-problematic aspects of the existing institutional structure must be left unchanged; this serves as the limiting factor for institutional change. As we apply environmental standards of judgment and use these standards to guide the development of new methods of energy provisioning, successful transformation requires that we recognize what existing methods already satisfy this goal and work within those methods.

In the next section, we will examine the existing methods of energy production viewed through the lens of institutional adjustments that implement environmental criterion. In doing so, we will identify which aspects of our proposed energy system are currently affected by technical limitations and which aspects are non-problematic. Once we have established our limits to institutional adjustment, then we can begin implementing solutions.

Electricity Provisioning in the United States

The technical aspects of electricity provisioning involve three distinct processes. First, electricity must be generated through renewable or thermal methods. Clean renewable methods include solar, wind, or wave power, while thermal methods include coal, natural gas, biomass, geothermal or nuclear power[3]. Renewable energy generation tends to be variable in output and intermittent, due to the relative unpredictability of the resources upon which it relies. Consider, for example, solar

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[1] Our focus here will be on progressive institutional change, where instrumental methods of problem solving displace ceremonial ones. However, it is worth noting that *regressive* institutional change may occur as well, whereby ceremonial methods of problem solving displace instrumental ones, and thereby reinforce existing hierarchies and the status quo. For more on this topic, see Bush (1987).

[2] Foster refers to this as the principle of technological determination. To avoid confusion with more modern usages of the phrase, this principle is renamed “instrumental primacy” (Sturgeon 2009).

[3] We emphasize that not all renewable methods are “clean” from an ecological evaluative criteria. Technically biomass and waste incinerating plants are renewable, in that they do not rely upon fossil-fuel inputs, but they are not clean and are inconsistent with a sustainable energy system.

power generation. While it is true that there is a deterministic relationship between insolation, time of day, season and place, it is also true that random events may occur that affect the actual amount of realizable energy. In other words, intermittent and random cloud cover implies that the generation from a solar plant is subject to the same intermittency. This intermittency issue applies to other forms of renewable generation, such as wind turbines or a tidal energy generation system. Even more so than solar, the output of plants reliant on wind are likely to vary even more significantly, suggesting the hourly profile of generation would not be considered a reliable source of dispatchable energy. To overcome the problem of intermittency, it is necessary to pair the generating plant with a storage technology that can serve as either a load sink or a discharge source on demand. Electricity storage is currently viable as mechanical, chemical, electrochemical, and thermal systems, each with qualities that structure their suitability for the application in question. For example, a central coordinating problem that grid reliability institutions must address is the requirement to maintain a constant frequency (60 Hz) within a low margin of error. Frequency response resources must be dispatched on a short time horizon (seconds to minutes) to either increment or decrement generation, so that supply is balanced precisely with demand. For this problem, a battery works well to provide instantaneous frequency response services. For longer duration problems, such as shifting generation from off-peak to peak periods, a mechanical system such as pumped hydroelectric projects may be better suited for its ability to dispatch stored energy over hours or days.

In the industry parlance, thermal resources are considered “dispatchable”, which means they do not depend upon natural systems to drive their generating plants. Thermal units can dispatch generation such that it follows load on a fairly precise schedule. The storage technologies identified above, while technically viable, are not widely used due to their relatively high budgetary costs and lack of previous use in industrial application.

Second, electricity must be delivered to load centers via transmission lines and, ultimately, to end-users through local distribution systems. The collected interconnectedness of transmission and distribution lines, as well as the systems of substations and transformers forms the electrical grid. The particular structure of the grid serves as an enabling and constraining process for the possibilities of energy provisioning. In the abstract, an electrical grid may be considered as an undirected network graph. The nodes of the network are sources and sinks of energy, as well as interconnection points that form the boundaries between the high-capacity regional grid and the lower capacity local distribution systems, while the edges are transmission and distribution lines of varying degrees of capacity. A dense network, one in which there is a high proportion of direct connections between nodes, implies a redundant, low-congestion grid. A sparse network, wherein there is a low proportion of direct connection between nodes, suggests a system with less redundancy and higher congestion, as power flows through a few, high-volume nodes. The electric grid in the United States as it exists today is sparse, though there are distinct regional clusters where network topology is denser, with each cluster connected via a small number of high-voltage interconnections (see Watts & Strogatz, 1998). One advantage of the relative sparseness of the national grid lies in lower operations and maintenance (O & M) costs due to having less line mileage than that of a denser alternative. However, the benefit of avoiding O & M costs comes at the expense of network congestion and reliability.

Third, the entities responsible for the generation, transmission, and distribution of energy must coordinate with one another to ensure a reliable grid. Load-serving entities (LSEs) are further required to balance the supply and demand for electricity on a short timeframe. Imbalances may emerge when load schedules do not accurately predict the actual usage of energy during any given hour, when weather fluctuations affect the output of a renewable generating plant, or when there are other unforeseen obstacles and interruptions to the supply of fuel. As the proportion of intermittent generation sources increases, the balancing problem becomes more acute and the need for highly flexible resources to address sub-hourly imbalances is increased. Natural gas plants presently have an advantage over renewable energy generating plants in that they are capable of quickly ramping up generation to support peaking needs and are viewed as cost-effective by planning authorities. As such, natural gas plants are considered necessary to support the non-dispatchable nature of intermittent resources like wind and solar.

It is worth emphasizing an aspect of the above perspective among electrical system planners: the conventional wisdom is that natural gas is necessary to incorporate renewables into the grid. While utility industry planners often share this view, it does not reflect the possibilities born out of the technical engineering science, but is rather a mediated view about what is feasible from a financial perspective, as most planners are concerned with the accounting cost. However, engineering research has shown that very high levels of renewable integration are possible given existing technology, provided that efforts to think beyond conventional wisdom are employed. Most notably, Jacobson et al. claim that, for the United States, it is feasible to supply one hundred percent of the nation's electrical needs by 2050 through sustainable power generation, using technologies available today and at costs competitive with conventional systems (2015). Subsequently, this research agenda has been extended to 139 countries (Jacobson et al., 2017). This is an ambitious claim, which has met significant resistance in its field. In 2017, Clack et al. marshalled a serious challenge to the 2015 paper by Jacobson et al., seeking to undermine the modeling accuracy and the veracity of its claim that it provided a framework for "low-cost solutions to the grid reliability problem with 100% penetration of [wind, water and solar] WWS.[4]" The important and substantive aspects of the Clack et al. (2017) critique lie in relation to their interlocuter's claims to the cost efficiency of the proposed solution as evaluated using typical cost-benefit analysis techniques. What is not undermined by the critique is the claim of technical feasibility; indeed, the authors of the rebuttal study admit that "it is not in question that it would be theoretically possible to build a reliable energy system excluding all bioenergy, nuclear energy, and fossil fuel sources" (Clack et al., 2017). Moreover, this controversy highlights the key point of this paper: it is *presently technologically possible* to attain the desired goal of rapid transition away from a fossil fuel-based electrical provisioning system. However, there are financial barriers to this, at present, which need to be addressed.

Utilities, both investor-owned and municipally owned, are the primary institution by which investments in generating resources materialize. Like other going concerns, utilities finance investment activities internally by a) setting rates that cover costs at budgeted or normal levels of output over arbitrary accounting periods, or b) externally through the issuance of debt. Unlike most going concerns, utilities are typically subject to regulation by state commission, which serves as

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[4] It is worth noting that this study includes twenty-one coauthors with prestigious appointments across establishment energy sector policy institutions. Taken together, the conflict of interest statement is longer than the abstract, with funding sources from the fossil fuel sector.

both an enabling and limiting factor on the business activities of the utility. Regulated utilities enjoy the privilege of their franchise and are entitled to cost-recovery relief, so long as an appeal to the commission for rate increases can be demonstrated to be in the public interest. For example, if a utility conducts a study that shows that over some planning period they will have a non-trivial chance of failing to meet the electrical load demands of its ratepayers, or otherwise exceed some tolerance threshold for grid reliability concerns, they may choose to invest in additional dispatchable generating capacity. Under such circumstances, the commission will generally grant cost pressure relief and allow for a rate increase to cover the incremental cost of the proposed investment. However, the commission may also deny requests for rate increases if it believes the utility is trying to "inflate" its rate-base by proposing unnecessary investments that are not in the public interest[5]. External finance is used when the utility wishes to dampen the direct effect of its investment plans on the pressure to raise rates, in an effort keep their appeals for rate relief "reasonable."

With these financial considerations in mind, let us examine how an aggressive renewable portfolio standard (RPS) might cause a financial situation that results in rising rate pressure for the utility, which will be passed onto end-users through a hike in retail rates. Suppose the state government passes legislation that requires all LSEs to serve loads via a portfolio of at least 60% renewables by 2030.[6] For any given resource in the portfolio, we may describe its capacity factor as:

$$CF = \frac{DispatchedHours_t}{TotalHours_t}$$

The CF measure indicates the proportion of potential that a resource will be expected to achieve over an accounting period. Land-based wind resources achieve CF scores ranging from 30% to 40% on average, while solar photovoltaic resources come in lower at 18% - 26% (NREL, 2020). For LSEs that attempt to establish rates that cover expected costs, a portfolio that includes higher proportions of generating plants used to "firm up" the intermittency of clean renewable resources introduces a rate-increasing bias into their cost structure.

In general, the electricity provisioning process involves several barriers to implementation of the GND, both technical and financial. Technically, there are questions about the capability of green technologies to generate energy in a reliable way *without* the need for natural gas backups, though as shown by Jacobson et al., much of this technology does already exist (2017). The main concern, then, is the financial constraint, which proper institutional adjustment can overcome. Financially, there are the requirements of LSEs to set stable rates that maintain themselves as going concerns in the face of uncertainty in energy production. In the next section, we develop several policy proposals to overcome these challenges and generate progressive institutional adjustment.

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[5] The authors are aware that not all regulatory commission function to preserve the public interest and are subject to regulatory capture.

[6] This is current California law codified by SB 100 in 2018.

Progressive Institutional Adjustment in Electricity

Recall that the principles of institutional adjustment – instrumental primacy, recognized interdependence, and minimal dislocation – argue that successful implementation of the GND in the energy industry requires the technical capabilities to generate and distribute clean renewable energy on a national level, as well as directed action and recognition of how its implementation will affect existing methods of energy distribution, and it will leave unchanged the non-problematic aspects of existing methods of energy generation and distribution. The purpose of this section is threefold. First, we will identify the existing non-problematic aspects of the current system, as they will serve as the institutional limits to the implementation of the GND. In other words, which current aspects of the energy system already meet the environmental standards[7] laid out in the Green New Deal? Second, we will identify the gaps in current technology that prevent full implementation of the GND in the context of fulfilling these environmental criteria, as this will serve to denote the technical limits of possible institutional adjustment. Where these gaps are identified, however, we will propose directions for research and technological innovation that satisfy them. Finally, once the limits are known, we will propose a set of policies that will allow the energy industry to more readily satisfy the environmental criteria imposed by the GND. Key here will be the establishment of a financing bank to provide funds that may be distributed to LSEs, which would serve to mitigate the consequences of accommodating aggressive renewable portfolio standards. Recognizing Foster's dictum of "that which is technically possible is financially feasible," our policy proposals begin with the technological capabilities of the existing system and discuss adjustments to patterns of behavior that will accommodate centering of environmental-instrumental standards of judgment.

Institutional Limits to Adjustment

As the principle of minimal dislocation explains, proper progressive institutional adjustment to eliminate the problematic aspects of an institutional structure requires keeping its non-problematic features unchanged. In this section, we examine these unproblematic features. As will be seen, some of these may become the basis for implementation of the GND in the institution, while others may *become* problematic in the future, requiring further adjustment. This is not a bug, but a feature – as new, greener methods of generating energy are developed, less efficient methods should be eliminated and replaced.

The first institutional limit is the transmission grid through which energy is delivered to load centers. As discussed above, the United States grid has the characteristics of a sparse network, in which power flows through a few high-volume nodes. As a result, there is less line mileage and less redundancy. While O & M costs are lower under such an arrangement, there are also fewer paths for energy to flow source to sink, which can result in blackouts or other congestion management issues. This sparse network is presently able to distribute energy where it is needed under normal conditions, while accommodating the generation of clean renewable energy. Consequently, the grid may be considered non-problematic. The development of an infrastructure to generate renewable energy, then, should fit within this sparse network. However, as will be

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[7] In the context of this paper, these environmental standards of judgment laid out in the Green New Deal primarily emphasize net-zero carbon emissions and 100% renewable electricity production. As such, solutions to the problem of energy provisioning must meet these standards in order to be considered viable solutions.

noted below, it is possible that creating more nodes on the grid will be a necessary part of initial implementation.

The second institutional limit is the present clean renewable methods already in operation. Rather than starting from scratch, basing the new infrastructure on what has already been completed allows energy generators to build on pre-existing knowledge. For example, the technology to store energy generated from solar and wind power already exists and is used. Rather than re-invent the wheel, policy makers should focus on a) expanding the storage capacity to accommodate dense renewable generation penetration as thermal methods are phased out and b) integrating these technologies into the distribution grid.

Technical Limits to Adjustment

As stated by the principle of instrumental primacy, institutional change depends first and foremost on the technical capability to change. In the present context, this means identifying which proposals for completely "greening the grid" rely on technology that has yet to be developed.

The most obvious technical limitations are the storage requirements for clean renewable energy. As discussed above, one key issue with solar, wind, and wave energy is the uncertainty behind its generation due to their reliance on natural ecological systems. Powering the grid, however, requires energy to be generated and distributed on demand and in a more certain manner than is presently available, given the load required. As a result, attempting to switch out the thermal grid for a renewable grid all at once would likely lead to shortages and blackouts. Dealing with this problem requires both a short-term and a long-term solution. Short-term, it may be necessary to maintain a targeted fleet of flexible ramping thermal generators so that disruptions to the power grid are avoided during periods of intermittent generation. While this may not satisfy the environmental criteria discussed here, it does fit within the principle of minimal dislocation – the ability to provide enough energy to satisfy consumer needs is presently a non-problematic aspect of the present institutional structure and must be maintained.

Long term, however, the federal government must invest directly in the creation of storage capacity and technology to increase the speed of generation from renewable energy. This investment, further, should be *direct* on the part of the federal government, rather than in the form of research subsidies or subcontracting to private energy producers. The reason for this is two-fold: first, the federal government does not face the same financial criteria new private investments must meet to warrant creation and implementation. The government is not in the business of making a profit and, as such, it is able to bear the high fixed costs without a guarantee of return that private enterprises are unable to incur. Precedence for this activity, as shown by Mazzucato, may be found throughout history, such as in the development of DARPA and numerous base-line pharmaceutical research projects that would not have existed without direct action from the federal government (2011). Once the new technologies are advanced to a point where they are financially feasible for the private sector to utilize, they may be turned over to private enterprises for further development and management. The key here is that the fixed costs of developing this emerging technology are too high to be feasible for private enterprise. However, for a sovereign currency-issuing government like the United States, these financial costs are immaterial.

Attaining Progressive Institutional Adjustment

As stated above, the conventional wisdom amongst the energy production industry is that natural gas is necessary due to the financial and technical infeasibility of widescale clean renewable energy generation and distribution. Unlike the technical limits mentioned above, the financial infeasibility is *not* a limit to the implementation of the Green New Deal. Rather, the financial constraint must be removed by shifting the burden of finance from the private sector to the public sector. In the previous subsection, it was discussed how GND implementation may promote progressive institutional adjustment by putting the onus of technological development on the non-profit-constrained federal government. This section further develops a plan for policies that can be immediately implemented to improve clean renewable energy generation and distribution. Ultimately, what we find is a reassertion of Foster's dictum: that which is technically possible is financially feasible (Foster 1981c; Wray 2016; Nersisyan and Wray 2019).

As per the principle of recognized interdependence, we acknowledge that much of the burden of the transfer from thermal energy production to clean renewable falls on utilities or LSEs that balance the supply and demand for energy on a short time frame. Furthermore, since LSEs are regulated by commission, its costs are ultimately passed on to rate-payers. As such, part of the process of institutional adjustment must involve the introduction of facilities to support these LSEs as they deal with the cost-pressure associated with accommodating aggressive renewable portfolio standards. Special purpose financing vehicles could be established that would provide funds to LSEs to offset the incremental costs due to compliance. Such an institution might be called the Federal Finance Bank for Energy.

If this sounds fanciful, consider the Bonneville Power Administration (BPA). The BPA is a federal power marketing agency established in 1937, during the New Deal, for the purpose of electrifying the Pacific Northwest. Currently, the agency is required by statute to self-fund its operations, and it does so by establishing rates to collect revenues from the sale of energy from federal hydroelectric projects and a nuclear plant in the Columbia River basin (Bonneville Project Act, §7, 50 Stat . 735, as amended by DOE Act, §301(b), 91 Stat. 578, Aug. 4, 1977). Due to a legislative change known as the Northwest Power Act (Northwest Power Act, 94 Stat. 2697), the BPA was required to explicitly account for the environmental costs and benefits of its energy planning and provisioning activities. Particularly important among these provisions was the recognition of the interdependence between fish survival rates, the federal partners that own the dams—such as the U.S. Army Corps of Engineers and Bureau of Reclamation—, and the BPA, who markets its power and manages the river. As a result, the BPA plans its operations subject to fish and wildlife constraints, thereby incurring direct and overhead costs as well as lost opportunity to optimize the system for power generation. However, the Northwest Power Act reimburses the BPA for these costs owing from broader public benefits resulting from environmental activities that comply with the law (Northwest Power Act, §4(h)(10)(C), 94 Stat. 2710). In effect, the "4(h)(10)(C) Credit" is a direct credit offset for public benefits that uses public money authorized by Congress. Examining the arrangement in more detail illustrates how the mechanism may be applied more broadly to the financial constraints for the Green New Deal:

1. The BPA conducts a study of the operations necessary to comply with fish mitigation constraints annually.
2. The direct and overhead costs associated with compliance are established using conventional accounting practices.
3. The value of foregone power production is calculated using the same methods established in Step 1.
4. All costs are tallied and submitted to Treasury for credit against outstanding liabilities.

It is worth emphasizing the simplicity of this arrangement. While the BPA is self-financed, much like the USPS, it retains a note with the Treasury for liquidity support due to its status as a public entity. The only limits to this arrangement are statutory – technically, the Treasury credit could be any dollar amount, so long as it is authorized by law. What matters for our discussion is that the specific statutory provision that provides the credit does so on the basis that conservation of endangered species is an explicit public benefit that should be funded by public money, while not burdening private ratepayers.

Using the 4(h)(10)(C) Credit as a Model for Public Finance

Due to its simplicity and consistency with the institutional adjustment principles laid out above, we propose the establishment of a federal financing institution whose charge is to allocate credits to LSEs for the purpose of offsetting the costs associated with rapid adoption of aggressive renewable portfolio standards. A Federal Finance bank for Energy would be modeled from the same principles that underpin the 4(h)(10(C) credit specific only to BPA, expanding this to all LSEs subject to regulatory mandates to meet renewable targets. Regulatory bodies and commissions currently adjudicate whether the plans and rate-schedules of a utility are "reasonable" and consistent with the public interest, therefore this institutional capacity may be placed in charge of ensuring that public funds from the Energy Bank are used to facilitate the transformation as quickly as possible while preventing cost-shifts to retail users of energy. A feasible financing arrangement proceeds as follows:

1. A utility conducts an Integrated Resource Plan (IPR) that demonstrates compliance with, say, a 100% RPS plan by the target date.
2. The utility conducts a cost of service study and establishes new rates that recover the costs associated with meeting the objects in the IPR.
3. Regulatory bodies review the rate proposal and validates the incremental costs associated with compliance with the RPS targets.
4. The regulatory body grants release of funds from the Energy Bank to offset the private costs for the public benefit realized by execution of the plan.

The relationship between the Energy Bank and utility or LSE may be direct or indirect. We believe that given the long history and institutional capacity of regulatory commissions, it fits best to have the commission act as intermediary between the Energy Bank and entities seeking cost relief. However, there may be instances in which state regulatory capture impedes such intermediation, which calls for federal intervention. Any legislation that authorizes the Energy Bank and its conduct should include provisions for empowering the Federal Energy Regulatory Commission (FERC) to intervene and ensure that program is pursuing its objectives.

While this is not the only way to finance transition to a Green New Deal consistent electric grid, we believe this method has the advantage of simplicity and consistency with existing institutional arrangements. Ideally, the energy system will become nationalized, a managed dissolution of fossil-fuel infrastructure will begin as soon as possible, replaced by large-scale direct investment in green public infrastructure. Policymakers should pursue such a plan. However, in the absence of that project, it may be more feasible to add in the financing layer discussed in this paper to accomplish the goal with minimal dislocation to institutional and technical aspects of the current system.

Conclusion

The point of this paper was to develop a policy framework by which the electrical provisioning aspects of the Green New Deal could successfully be implemented into the existing institutional structure. Using Foster's theory of institutional adjustment and the energy industry as our case studies, we identified that successful implementation requires the introduction and assimilation of environmental standards of judgement through problem solving. These environmental standards come to replace the ceremonial pecuniary standards when determining what actions involved in energy provisioning should be institutionally permissible. Through the principles of instrumental primacy, recognized interdependence, and minimal dislocation, we argued that the existing methods of energy provisioning provide a good starting point for the implementation of the Green New Deal. As previous research has found, existing technologies in renewables can be used to generate net-zero carbon emissions, and further developments in this field will only speed up this process. As such, the technical capabilities to solve the problem of clean energy provisioning do exist – what is needed is a way to implement them.

Based on the principles of modern monetary theory, we argued that a financially sovereign government does not face traditional spending constraints the way a private firm or household does. As such, the development and introduction of these new technologies requires direct government action, as it is the only institution capable of overcoming the high fixed costs associated with the development. Recognizing the profitability constraints of private energy providers, we argued that more financial support is required in the early stages of the pipeline, where the barriers to green energy provisioning are highest. Once the technology has been introduced, made available, and made widespread, it may be transferred to the private sector. In this way, implementation fits within the context of the principle of minimal dislocation.

The path to the full implementation of the Green New Deal is a long one – more research on the specific technologies needed is required, and the effects of this implementation are not likely to be known for quite some time. Furthermore, discipline is necessary to ensure that the programs are not abandoned prematurely. Continual oversight and re-evaluation will be necessary to ensure the environmental criteria of the GND are met. What we have done here is provide a roadmap for how such a policy can be first introduced in the energy industry.

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