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BREAKING UP IS HARD TO DO: AMERICAN EXCEPTIONALISM AND THE TRANSITION TO A RENEWABLE ENERGY FUTURE

ANDREW ASKLAND*

INTRODUCTION

America is currently transitioning from fossil fuels to renewable energy alternatives, but that transition is grudging and erratic. This lies in part with the fact that the technologies that enable renewable alternatives are still evolving. However, a larger part of the explanation lies with a pervasive failure to acknowledge the inevitability of adopting renewable sources for future energy needs. That failure of recognition is rooted in how the transition to renewable energy is framed. Prosperity and economic growth are linked to fossil fuels by past practices. That link and a complacency reinforced by influential economic actors with vested interests in the fossil fuel economy militate against a robust commitment to the advancing alternative energy future.

Change is difficult. It is often discomfiting, sometimes threatening, and for good reason there is resistance.¹ Cobbling things together so that they work is not easy. Proposed changes to an established routine are often rightly recognized as a devaluation of earnest past labors and their product. The knowledge of how arduous it is to build something and hold it together prompts resistance to the whims of fitful criticism. As a consequence, the criticism is often derided as youthful idealism or feckless academic second-guessing. Resistance to change thickens with experience.² Over time we settle into biased opinions about recurring patterns of behaviors.³ As Aristotle observed

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1. See KEITH E. STANOVICH, *RATIONALITY AND THE REFLECTIVE MIND* 19–22 (2011) (explaining that our autonomous processing system will lead us first to follow our learned associations and must be overridden by a second system in order to allow for a higher level analysis).

2. See NASSIM NICHOLAS TALEB, *THE BLACK SWAN* 142–44 (2007).

3. See DANIEL KAHNEMAN, *THINKING, FAST AND SLOW* 199–200 (2011).

more than two thousand years ago, habits are more efficient than continuous reappraisals of similar facts so we adopt habits that have proven productive.⁴ Disruptions to our established habits require a renewed evaluation of our use of time and energy that is presumed to be inefficient, and so the threshold for crediting a disruption is relatively high.⁵

I. FRAMING THE RENEWABLE FUTURE

This account of habits as a source of resistance to change is about framing.⁶ We inevitably frame issues that confront us, and the framing usually foretells the solution that we will devise for the issue.⁷ We are cognitively prone to frame the new by referencing what we already know.⁸ This is adaptive behavior to be sure, but it makes us susceptible to misunderstanding the new because we force it into already familiar categories.⁹ This framing is often unconscious, but we can also purposefully squeeze new information into old categories, aware that we intend to discredit what does not fit comfortably into the world that we already know.¹⁰ We may explain away the anomalies that do not fit into familiar patterns or we may suppress them as unworthy of the bother of further inquiry. To the extent that new information challenges vested interests, the drive to diminish or dismiss that new information is greater.¹¹ Indeed, when the stakes are high, we may not be satisfied with explaining away the threat to

4. See Aristotle, *Nicomachean Ethics*, I.9, 1099b9–1099b20, in ARISTOTLE, *NICOMACHEAN ETHICS* 104–05 (Sarah Broadie & Christopher Rowe trans., 2002).

5. For example, if we deliberated the costs and benefits of brushing our teeth each morning and evening, we would be distracted by competing claims upon our time and energy, sometimes miscalculate and consequently brush less frequently (or perhaps too often, if the calculations are spread across the day). Better to inculcate the habit of teeth brushing at particular times of day and close out temptations to use those minutes differently.

6. See Cass R. Sunstein, *Behavioral Analysis of Law*, 64 U. CHI. L. REV. 1175, 1176 (1997) (“Much behavioral works suggests that preferences and values are sometimes constructed rather than elicited by social situations.”).

7. See Mark Kelman et al., 25 J. LEGAL STUD. 287, 304–05 (1996) (arguing that the way a consumer’s choice in the marketplace is framed can lead the consumer to make the framer’s desired choice, even if it does not maximize the consumer’s self-interest).

8. See Christine Jolls et al., *A Behavioral Approach to Law and Economics*, 50 STAN. L. REV. 1471, 1535–36 (1998).

9. See Cass R. Sunstein & Edna Ullmann-Margalit, *Second-Order Decisions*, 110 ETHICS 5, 9, 14–15 (1999).

10. See TIMOTHY D. WILSON, *STRANGERS TO OURSELVES* 29–31, 41 (2002).

11. See Roger G. Noll & James E. Krier, *Some Implications of Cognitive Psychology for Risk Regulation*, 19 J. LEGAL STUD. 747, 765–67 (1990).

ourselves; we may act to frame the challenge for others so that they too will dismiss it and instead adhere to what is already established.¹² We live in an age of indirect persuasion; logical syllogism is overwhelmed by the invocation of agreeable images and well-crafted slogans.¹³ These messages are often aimed at us directly, but they are more often insinuated in the background, e.g. the ubiquity of product placement in movie scenes and on television shows. The limits of framing stretch to the boundaries of the framer's ingenuity. With repetition, framing can dictate the scope of the framed party's imagination.

After the oil embargo of 1973, what were previously oil companies became energy companies. It was not clear then how oil companies would adjust to the Organization of the Petroleum Exporting Countries' (OPEC) choke on the throttle of petroleum exports to the U.S., so oil companies quickly acquired various alternative energy companies to hedge their bets.¹⁴ Once individual OPEC nations recognized that they relied upon a stable Western economy, both as the locus for the investment of their profits and as the purchasers of their exports and thus their primary source of national revenues, OPEC identified price target ranges that were consistent with their high profits and Western economic stability.¹⁵ International energy companies resorted to their petroleum priorities. Current framing is misleading as it focuses on the intensive exploitation of domestic fossil fuel sources to make the U.S. energy independent. This is an overstated notion because our economy is tied to a world economy in which many of our trading partners have no domestic supplies and depend upon oil imports. Increased domestic production in the U.S. has positive effects. It does reduce our consumption of imports (thereby reducing our balance of trade deficit) and it does provide a measure of national control over vital energy requirements. However, given current production practices, consumption norms, and reliance upon fossil fuels, independence from oil-producing countries is a false hope that

12. It may be difficult to parse one's motives for framing a debate, i.e., the threat may be so substantial that it blinds one to the limitations of one's reasoning. It can prove too expensive to commit to an unbiased evaluation. One can sincerely believe in the merits of a biased framing that aims to stamp out what has to be blasphemy lest a worldview crumble to bits.

13. For example, who can favor a death tax whatever the merits of imposing a charge on estates or inheritances? Who can criticize a government policy if it is tantamount to not loving one's country?

14. See DANIEL YERGIN, *THE PRIZE: THE EPIC QUEST FOR OIL, MONEY AND POWER* 660–64 (1991).

15. See generally FRANCISCO PARRA, *OIL POLITICS: A MODERN HISTORY OF PETROLEUM* 240–48 (2004).

shields prospects for higher profits and reduced regulation in the guise of a fortified America, isolated from the uncertainties of a complex world economy.¹⁶

The effort to shape public perception of the continued viability of a fossil fuel economy raises profound questions about the fair terms of deliberation in a participatory democracy.¹⁷ A consensus has arisen that democracy cannot be defined merely as periodic elections, but instead requires a motivated electorate with ready access to reliable information about candidates and policy options, and the means to deliberate about the merits of their ballot choices.¹⁸ Meaningful elections depend upon informed deliberations.¹⁹ Related to these issues of democratic governance (and elaborating on the topic of framing) is the ethics of the manipulation of others.²⁰ If I leave a newspaper open to a favorable review of a movie so that someone will perhaps read that review and later be favorably disposed to that movie when I propose seeing it together, have I objectionably manipulated that person and her evening hours? Is that manipulation less objectionable if I reveal to her what I have done before she decides whether to join me at the Cineplex? How about proposing the movie shortly after doing a favor for that person? Am I negotiating a trade or exacting the price of an unsolicited gift? Are the criteria for evaluating potential manipulations different if what is at stake is an essential feature of the other's well-being? For example, her health, so that I may cite Popeye to encourage her to eat spinach, or her soul, so that I may rely upon ritual to reinforce codes of good behavior, or the foundations of the economy, i.e. its fossil fuel basis? How paternalistic can we be when manipulating another for their benefit?²¹ We will not solve the problem of the limits and possible just rationales for manipulation in its various forms, but we can recognize the nature of the

16. See IAN RUTLEDGE, *ADDICTED TO OIL: AMERICA'S RELENTLESS DRIVE FOR ENERGY SECURITY* 154–55 (2005).

17. See Joseph M. Bessette, *Deliberative Democracy: The Majority Principle in Republican Government*, in *HOW DEMOCRATIC IS THE CONSTITUTION?* 102, 114–15 (Robert A. Goldwin & William A. Schambra eds., 1980); AMY GUTMANN & DENNIS THOMPSON, *WHY DELIBERATIVE DEMOCRACY?* 30–35 (2004).

18. See Dieter Fuchs, *Participatory, Liberal, and Electronic Democracy*, in *PARTICIPATORY DEMOCRACY AND POLITICAL PARTICIPATION* 33–34, 39–41 (Thomas Zittel & Dieter Fuchs eds., 2007).

19. See JAMES S. FISHKIN, *WHEN THE PEOPLE SPEAK* 13–15 (2009); JAMES S. FISHKIN, *DEMOCRACY AND DELIBERATION* 35–36 (1991).

20. See Claudia Mills, *Politics and Manipulation*, 21 *SOC. THEORY & PRAC.* 97, 99–100 (1995).

21. See Seana Valentine Shiffrin, *Paternalism, Unconscionability Doctrine, and Accommodation*, 29 *PHIL. & PUB. AFF.* 205, 212–14 (2000).

challenge faced by anyone proposing a transition to a non-fossil fuel based economy.²² The tentacles of fossil fuel spread wide and deep, straining the imagination to envision an economy that does not rely significantly on fossil fuel.²³ The prospect of a profound change of orientation feels like a surrender of so much that is good in our recent past and we are reinforced in that response by many parties whose livelihoods and business models rest on a fossil fuel foundation.²⁴

II. THE LOOMING PAST

It is worth pausing to review the success of the fossil fuel based economy. It enabled the rise of powerful parties with vested interests that will be significantly impacted should the energy paradigm shift. Moreover, the anticipated losses are sufficiently large that they provide a powerful temptation to game the discussion about when and how energy generation shifts from a fossil fuel to a renewable orientation. Fire is able to thwart the cold, assists in food preparation, and relies upon a combustible material. Wood was that material for most of human evolution. Peat proved a suitable material in some locations. Various oil products, including whale oil (which lit lamps for much of the nineteenth century), provided the energy platform for the industrial revolution's transformation of the world's economic activities. Coal-powered steamships and railroads proved irrepressible means of advancing that revolution.²⁵ The inexpensive energy provided by fossil fuels made modern economies and their civil societies possible. The refinement of petroleum for use in combustion engines raised the ante exponentially and the U.S. has enjoyed a post World War II prosperity built upon ready access to cheap oil that now serves as the "normal" economic condition, i.e., sustained growth, with which we compare later periods and which we long to duplicate.

European allies and enemies alike were devastated by World War II. National infrastructures were in tatters. Though the Marshall Plan was instrumental in jump-starting many economies, European economic growth and prosperity trailed the U.S.

22. See Cass R. Sunstein & Richard H. Thaler, *Libertarian Paternalism Is Not an Oxymoron*, 70 U. CHI. L. REV. 1159 (2003), reprinted in THE CONSTRUCTION OF PREFERENCE 689–94 (Sarah Lichtenstein & Paul Slovic eds., 2006).

23. See generally MICHAEL L. ROSS, THE OIL CURSE: HOW PETROLEUM WEALTH SHAPES THE DEVELOPMENT OF NATIONS (2012).

24. See TIMOTHY MITCHELL, CARBON DEMOCRACY: POLITICAL POWER IN THE AGE OF OIL 6 (2011).

25. See WOLFGANG SCHIVELBUSCH, THE RAILWAY JOURNEY: THE INDUSTRIALIZATION OF TIME AND SPACE IN THE 19TH CENTURY 4–7 (1977).

into the 1980s.²⁶ Meanwhile, the combination of domestic supplies and inexpensive imports provided consistent low prices for energy as a factor of production costs in the U.S. Gas-guzzling motor vehicles and inexorably larger and distantly dispersed suburban homes became the norm. More importantly, sustained economic growth permitted blue collar workers to earn healthy incomes and to purchase homes and an expansive array of consumer goods. The American Dream is now articulated as the accumulation of consumer goods. Rising incomes for a very large proportion of U.S. workers funded the realization of the American Dream. The national self-doubt that had plagued the Depression Era was dispelled and in its stead arose a booming enthusiasm for the American version of the market model.²⁷ The evidence for its superiority abounded, in spite of its unstable reliance upon fossil fuels given a shift from domestic to foreign sources. This shortcoming went largely un-noted.

Energy was cheap during these growth years and those low costs contributed to U.S. industrial growth and unprecedented improvements in consumer lifestyles.²⁸ Then came the shock of the oil embargo of 1973. The embargo demonstrated a dependence upon imported oil that had been steadily growing and whose potential risks had not yet registered.²⁹ There was a sudden awareness of the vulnerability of an economic model that relied upon cheap imported oil.³⁰ The OPEC countries recognized that their resource had been undervalued even as developing countries recognized the conveniences of a fossil fuel economy.³¹ Subsequent to 1973, a more carefully monitored supply and increased demand has raised the costs for goods that use fossil fuels in their production.³² This encompasses not just fuel oil, but plastic goods, fertilizers, clothes, etc. Petroleum had become more than an energy source, it had insinuated itself into the economy in many diverse ways and all were affected. It is unlikely that the fossil fuel energy prices that underwrote the U.S. post-World War II economic surge into the 70s will ever return. And so the prosperity that was engendered during that

26. TONY JUDT, *POSTWAR: A HISTORY OF EUROPE SINCE 1945*, 93–97 (2005).

27. *See generally* T.H. WATKINS, *THE GREAT DEPRESSION: AMERICA IN THE 1930s* (1993).

28. YERGIN, *supra* note 14, at 254, 717.

29. MICHAEL T. KLARE, *BLOOD AND OIL: THE DANGERS AND CONSEQUENCES OF AMERICA'S GROWING DEPENDENCE ON IMPORTED PETROLEUM* 74–82 (2005).

30. DAVID FRUM, *HOW WE GOT HERE: THE 70's*, 318–19 (2000).

31. TOYIN FALOLA & ANN GENOVA, *THE POLITICS OF THE GLOBAL OIL INDUSTRY: AN INTRODUCTION* 145 (2005).

32. PARRA, *supra* note 15, at 180–214.

time will not return, at least it will not return if it awaits the fossil fuel prices of that time.

III. A FINITE RESOURCE

The supply story is not limited to strategic throttling of access to the resource. The supply of oil is a fixed quantity. No fossil fuel producing country, no matter how vast its reserves, has unlimited reserves. The nature of how fossil fuels come into being informs us that it is a finite resource. We can debate about the quantity of recoverable fossil fuel that lies beneath the earth's surface and indeed we have developed and continue to develop techniques that permit us to gainfully extract fossil fuels that had previously seemed unrecoverable. However ingenious our technology as it reduces the cost of extraction and permits the profitable recovery of awkwardly accessible resources, it wrestles with a finite quantity of that resource (the ingenuity often requires significant disruptions of large tracts of land and even larger areas of sub-surface terrain; the disruptions often permanently scar the surface and pump toxic materials into invaluable aquifers). Developed and developing nations rely upon energy to fuel their economic activities and their quest for growth to satisfy rising consumer demand presses hard on energy usage.³³ Energy consumption is rising worldwide (driven by a preoccupation with growth and current methods of achieving that growth), and if that rise is to continue, then energy will have to be generated from non-fossil fuel sources. However reassuring our past energy practices and however deeply ingrained our current energy practices, the future requires a reorganization of our energy resource priorities. Eventually, fossil fuel resources will be exhausted (or the cost of extraction will prove prohibitive)³⁴ and it is undeniably prudent to anticipate that inevitable limit by devising renewable alternatives.

We can certainly adopt practices that are less energy intensive. Conservation is the easiest method of reducing the rate of our consumption of fossil fuels.³⁵ We might also rethink the rela-

33. DANIEL YERGIN, *THE QUEST: ENERGY, SECURITY, AND THE REMAKING OF THE MODERN WORLD* 769–81 (2011).

34. For example, shale oil that is recoverable at an energy cost that exceeds the energy value of what is recovered would generate a net energy loss. As the energy investment for recovery approaches the energy value of what is recovered, the venture becomes non-viable. So it may be that we cannot "exhaust" fossil fuel reserves because some amount, extremely expensive to recover, remains in the ground.

35. John C. Dernbach & Donald A. Brown, *The Ethical Responsibility to Reduce Energy Consumption*, 37 *HOFSTRA L. REV.* 985, 987 (2009).

tionship between growth and well-being to conceptualize less energy absorptive alternatives than are currently in vogue.³⁶ There is ample evidence that material goods above a floor of comfort do not predict happiness or contentment and the switch to renewable energy may provide an opportunity to more clearly decouple that false relationship.³⁷ Developed countries are better situated to make these adjustments and the adjustments will be adopted in developing countries as those countries often mimic the models and practices of developed countries.³⁸ Nonetheless, the unavoidable fact is that intensive use of fossil fuels is steadily reducing its supply and a softer throttle on use cannot obviate the fixed nature of the resource.³⁹

The impact of fossil fuel use on global climate is an independent reason to hasten the replacement of fossil fuel with energy alternatives that do not contribute to global warming. But supply fixity alone is reason to anticipate a transition to alternative energy sources. Climate change grounds a persuasive argument about the pace at which that transition ought to occur.⁴⁰ Indeed, anthropogenic contributions to climate change arise from excessive use of fossil fuels worldwide, but particularly in developed countries in the West and rapidly developing countries in Asia. The politics of comparative national economic growth have obfuscated a clear evaluation of the evidence that links human-produced carbon dioxide and other gases to global warming.⁴¹

IV. SOLAR PANELS RISE

Despite the disruption portended by a shift away from fossil fuel, there have been developments in recent years that indicate openings for renewable energy and these openings are likely to widen. Residential solar panels are a good example of the slowly growing movement toward renewables over the fossil fuel model.

36. See generally ROGER SCRUTON, *HOW TO THINK SERIOUSLY ABOUT THE PLANET* 379 (2012).

37. See ROBERT E. LANE, *THE LOSS OF HAPPINESS IN MARKET ECONOMIES* 4 (2000).

38. See generally Amati Etzioni, *A New Social Movement? in VOLUNTARY SIMPLICITY: THE POETIC ALTERNATIVE TO CONSUMER CULTURE* 55–73 (Samuel Alexander ed., 2009).

39. LESTER R. BROWN, *WORLD ON THE EDGE: HOW TO PREVENT ENVIRONMENTAL AND ECONOMIC COLLAPSE* 135 (2011).

40. See BILL MCKIBBEN, *EAARTH: MAKING A LIFE ON A TOUGH PLANET* 2–27 (2010); PAUL GILDING, *THE GREAT DISRUPTION: WHY THE CLIMATE CRISIS WILL BRING ON THE END OF SHOPPING AND A NEW WORLD* 42 (2011).

41. See Mark Sagoff, *The Poverty of Economic Reasoning About Climate Change*, 30 PHIL. & PUB. POL'Y. 8, 14 (2012), available at <http://journals.gmu.edu/index.php/PPPQ/>.

Electric power companies have a strong preference for the development of concentrated solar facilities rather than distributed solar networks, i.e. panels located on roofs of individual properties. Power companies are energy providers; they generate and distribute energy at rates approved by public utility commissions that guarantee reasonable rates on investment.⁴² Power companies service the distribution network before it reaches individual homes or businesses. They leave the maintenance of power-consuming appliances to individual real property owners.⁴³

Concentrated solar energy fits the power company model. Power companies would be diversifying the source of the energy that they distribute, but they would remain in control of energy generation. Even when concentrated solar is outsourced to third parties, those third parties operate within the model according to which consumers rely upon energy generated and distributed (viz. controlled) by power companies.⁴⁴ A distributed approach to solar energy generation challenges the model. Individual homes and businesses generate their own electricity and rely upon the power companies to provide energy when the sun is not shining or their consumption needs exceed the capacity of their solar panels.⁴⁵ Moreover, power companies have been obligated (despite lobbying by some against the practice) to purchase energy generated by households and business in excess of their needs, though often at wholesale prices and with the payment of service charges.⁴⁶ One effort to promote an increased contribution by renewable energy technologies to the power grid focuses on long term contracts to renewable providers, large and small, with reimbursement based on the cost of generation for

42. See Siobhan McIntyre & Timothy P. Duane, *Water, Work, Wildlife, and Wilderness: The Collaborative Federal Public Lands Planning Framework for Utility-Scale Solar Energy Development in the Desert Southwest*, 41 ENVTL. L. 1093, 1097 (2011). We will skip the question of what qualifies as a reasonable return as market rates vary with shifting economic conditions. For example, the current interest rates offered by banks are often less than 1%. Utilities pay generous returns on investment due to their monopoly status, however, since they are subject to public regulation, they do not pay over-reachingly generous returns.

43. *Id.*

44. KATHARINE KOLLINS ET AL., Nat'l Renewable Energy Lab., NREL/TP-6A2-47408, RENEWABLE ENERGY PRICES IN STATE-LEVEL FEED-IN TARIFFS: FEDERAL LAW CONSTRAINTS AND POSSIBLE SOLUTIONS (2010).

45. *Id.* at 17.

46. See, e.g., *Net Energy Metering (NEM)*, CAL. PUB. UTILITIES COMM'N, <http://www.cpuc.ca.gov/PUC/energy/DistGen/netmetering.htm> (last visited Feb. 24, 2013).

each particular technology.⁴⁷ These feed-in tariffs aim to provide price certainty and contract length in order to help finance renewable energy investments that are tied to the specific facts of individual renewable technologies.⁴⁸

The distributed model is uncomfortable for power companies accustomed to generating and selling energy. The prospect of purchasing energy from individual homeowners and businesses undermines the model. Power companies do not want to be in the business of servicing individual solar units on residential properties. Despite this, at least in regions of the country where distributed solar is an attractive option for individual homeowners and businesses, power companies are being forced to rethink that reluctance.⁴⁹

How did distributed solar prosper and proliferate despite power company resistance? Subsidies and credits were driving forces. Many homeowners were willing to invest in the installation of solar units (initially costing approximately \$50,000 and now costing as little as \$10,000, half of which is often reimbursed by local governments or utility companies). These pioneers led the way for the expansion of solar energy installations. The subsidies and credits were not limited to homeowners, but also encompassed business properties. Some businesses were willing to install solar panels, permitted by their profit and expense ledger to amortize the installation costs of the solar panels. Enter the transactional lawyers who identified an opportunity to link property owners, whose properties possessed solar energy generation potential, but could not afford installation charges or would not benefit from the available subsidies and credits to other parties who were willing to finance the installation in exchange for access to the subsidies and credits on offer. Transactional attorneys engineered financial instruments (power purchase agreements or PPDs) to take advantage of these opportunities, an example of creative financing at its best, when the creativity generates desirable outcomes and advances publicly endorsed social goods.⁵⁰

47. See SCOTT HEMPLING ET AL., NAT'L RENEWABLE ENERGY LAB., NREL/TP-6A2-4672, RENEWABLE ENERGY PRICES IN STATE-LEVEL FEED-IN TARIFFS: FEDERAL LAW CONSTRAINTS AND POSSIBLE SOLUTIONS 1 (2010).

48. See, e.g., ARIZ. PUB. SERV. CO., COMMENTS REGARDING FEED-IN TARIFF FOR RENEWABLE ENERGY PRODUCTION, DOCKET NO. E-00000J-09-0505 8 (2000).

49. Importantly, public utility commissions are playing an increased role in assessing the environmental impact of the power companies. See Michael Dworkin et al., *The Environmental Duties of Public Utility Commissions*, 18 PACE ENVTL. L. REV. 325, 326–27 (2000).

50. These solar partnerships and leasing structures are in contrast to the prevailing trends on Wall Street where new financial instruments mostly aim to

The effect of transactional attorney involvement expanded the market for solar technology at the private sector level. This coincided with mandates adopted by various public utility commissions across the country that insisted that a rising portion of energy generated by covered companies originate in renewable sources.⁵¹ The effect of this requirement on power companies is uneven and there are continuing battles and periodic setbacks, e.g. an effort in Arizona to count nuclear energy as a qualifying renewable source. The mandates do not differentiate between concentrated and distributed sources of solar energy and power companies continue to promote the virtues of the concentrated approach. However, the model of solar units owned by entities other than the owner of the real property upon which the panels are located stimulated the rise of a powerful business model that promotes distributed solar energy production. There are now several companies willing to install solar panels on private homes at their cost in exchange for an agreement by the property owner to purchase energy from the company that installs and maintains the panels.⁵² These companies have the ability to evaluate individual residential sites for their access to sunshine and to compute historical energy usage patterns by the household to determine whether they can profitably install the solar panels. An alternative approach is “community solar” or “solar gardens” which are small cooperatives that share the costs of installation and maintenance at sites other than the cooperative members’ homes, but earn credits for their home electricity bills.⁵³ The appropriate emphasis is upon profitability, and it is clear that there is a way forward with current technology and the innova-

hold onto profits for individual investors and shift the risk of loss to public coffers. One can summarize the point of securitizing collateral debt obligations and credit default swaps as an effort to provide insurance coverage against loss without acknowledging that insurance coverage was actually in play because insurance underwriters are required to hold reserves against their policy exposure and it is much more profitable to issue insurance policies without setting aside reserves. The further perfidy is packaging debts as securities when it is clear that the debts are of very low quality and will very likely not perform, meanwhile collecting fees for creating the security instruments and for selling them to buyers who are unaware of the underlying weakness of the debts collected together to form the security instrument. MICHAEL LEWIS, *THE BIG SHORT: INSIDE THE DOOMSDAY MACHINE* 140–49 (2010).

51. See Johusa P. Fershee, *Changing Resources, Changing Market: The Impact of a National Renewable Portfolio Standard on the U.S. Energy Industry*, 29 ENERGY L.J. 49, 65 (2008).

52. See, e.g., *Solar PPA*, SOLARCITY, <http://www.solarcity.com/residential/solar-ppa.aspx> (last visited Feb. 24, 2013).

53. Paul Rauber, *Solar for All*, SIERRA (2013), available at <http://www.sier-raclub.org/sierra/201301/community-solar-rooftop-panels-292.aspx>.

tion of investor funded installation of solar panels for the near future to be increasingly solar panel powered.

V. SURRENDER THE SILVER BULLET

Distributed solar is working in some areas of the country, but is not currently an obvious option in other parts of the country (though its viability will broaden as the underlying technologies improve). There is likely no silver bullet to solve our future energy requirements.⁵⁴ There is a need for multiple alternatives to fossil fuel generation and a reduction in energy wastage during production and transmission. Thus, an important priority is the development of means of transmission that conserve larger amounts of energy fed into the system and permit wider distribution within the system to better match peak demand in one location to generation capacity located several states away.⁵⁵

Energy storage is another huge issue that affects current production processes, and it will be increasingly relevant to energy production from renewable sources. Solar energy will be a more reliable replacement for fossil fuel when solar energy can be efficiently stored for later use. Indeed, various other renewable sources can be pursued with greater zeal when power generated in propitious conditions can be efficiently stored. Storage is a critical feature of the viability of electric vehicles. Their current range roughly compares with the range of combustion engine vehicles, but the recharging of their batteries is slow and the availability of recharging stations further limits the destinations that the vehicles can reach. Their use as service vehicles fits within these limitations, but the electric car of the future will require long lasting batteries that can be recharged more quickly by a network of recharging stations.

The silver bullet attraction of fossil fuel is that for more than a century it has been the most cost-effective source of energy with an associated benefit of supporting technologies that are fundamentally the same throughout the world. Economies of scale argue for increased similarities for both production and maintenance cost savings. A perceived drawback to renewables is that different approaches will be better suited to different locations; at a minimum, the mix of renewables will differ from location to location. For instance, a system of geothermal power works where there are suitable resources beneath the earth's surface,

54. AMORY LOVINS, ROCKY MOUNTAIN INST., *REINVENTING FIRE: BOLD BUSINESS SOLUTIONS FOR THE NEW ENERGY ERA* 12 (2011).

55. Timothy P. Duane, *Greening the Grid in California*, 25 NAT. RESOURCES & ENV'T 2, 3 (2010).

but not where suitable resources are absent or at prohibitive depths. Wind turbines work where the winds blow consistently⁵⁶ and solar panels depend upon reliable sunshine. Improved technologies can change the thresholds for profitable utilization of the variable renewable resources, e.g. there is likely a way to profitably harness solar energy even in locations with frequently overcast conditions if the solar panels are inexpensive to manufacture and install, and improved efficiencies yield a sufficient quantity of energy to justify those costs when the sun shines.⁵⁷

Wind power contributes about 3% to our national energy needs, but it is more than a third of our capacity for new energy and about two thirds of its equipment is produced domestically (and these advances have occurred despite three breaks over the past two decades in the subsidies designed to promote their development). Wind turbines are mostly industrial sized and so the generation of wind energy fits in the concentrated model.⁵⁸ Wind farm location is an issue, both for perceived visual impairments and for the disruption of bird migration routes.⁵⁹ The politics of siting can be deeply problematic.⁶⁰ However, the location of wind farms is negotiable and some of the visual effects reflect the novelty of the technology. Eventually windmills will likely be accepted as preferable to power plant smoke stacks and off-shore drilling platforms. Their utility will hasten their acceptance. The disruption of bird migration routes can be mitigated by incorporating an awareness of those routes in the wind farm planning process. These adjustments are already being implemented and the prospect of enlarging the wind turbine vision to incorporate smaller units with improved storage capacities can provide inexpensive and reliable energy to isolated homes and communities.

Biomass is off to an uneven start in the U.S. in part because it has been captured by corporate corn interests. Corn is not an efficient source of biomass and its use as a fuel diverts supplies

56. Ernest E. Smith & Becky H. Diffen, *Winds of Change: The Creation of Wind Law*, 5 TEX. J. OIL, GAS & ENERGY L. 165, 167 (2009).

57. Ronald H. Rosenberg, *Harmonious Federalism in Support of National Energy Goals—Increased Wind Renewable Energy*, 85 N.D. L. REV. 781, 798–801 (2009).

58. See generally *Industry Statistics*, AM. WIND ENERGY ASS'N, http://www.awea.org/learnabout/industry_stats/index.cfm (last visited Feb. 24, 2013).

59. See generally Stephen Harland Butler, *Headwinds to a Clean Energy Future: Nuisance Suits Against Wind Energy Projects in the United States*, 97 CAL. L. REV. 1342 (2009).

60. See generally Uma Outka, *Siting Renewable Energy: Land Use and Regulatory Context*, 37 ECOLOGY L.Q. 1041 (2010).

from food production.⁶¹ That diversion can be acutely burdensome when projected across a world market for corn products. Brazil offers a preferred biomass alternative, at least as to the materials used to generate power: their biomass energy is derived from more efficient sources that do not disrupt food production, though the uncontrolled expansion of cultivated acreage into jungles and grasslands is problematic.⁶² Indeed, biomass production should focus on vegetable matter that is not diverted from food production or is available as waste in the food production cycle. It is also noteworthy that biomass production does not meaningfully relieve global warming concerns.

We should expect extensive variation in the composition of renewable energy depending upon the characteristics of particular regions. This should not be viewed as grounds to object to a renewable energy future. Quite the reverse, we are spoiled by the simplicity of silver bullet remedies (which makes it easier to overlook their costs) when individual variety is the more accurate description of how most requirements of modern life ought to be addressed. Local conditions do vary and the corporatized view of solutions, according to which one solution is imposed to reduce management complexity, should be eschewed for the more plausible acceptance of regional variety. Ease of administration and economies of scale argue for standardization, but these benefits need to be evaluated in light of the reduced efficiencies that arise from imposing standardization where variable approaches produce more efficient results and economies of scale are trumped by the benefits of diverse applications.⁶³ State and local initiatives, responsive to regional renewable resources, can be coordinated and supported within a national program of guidance and incentives. The promotion of better transmission systems and reduced transmission costs and improved storage technologies should also be sensitive to regional variety. Weather conditions obviously affect these challenges and it is reasonable to anticipate solutions that vary according to the variety of prevailing weather.

61. Elisabeth Rosenthal, *As Biofuel Demand Grows, So Do Guatemala's Hunger Pangs*, N.Y. TIMES, Jan. 6, 2013, at A6.

62. See generally MARCO AURÉLIO DOS SANTOS, RIO6, A BRIEF HISTORY OF ENERGY BIOMASS IN BRAZIL (2006), available at http://www.rio6.com/download/Biomass_use-in-Brazil.pdf.

63. See generally Cliff Chen et al., *Weighing the Costs and Benefits of State Renewable Portfolio Standards in the United States: A Comparative Analysis of State-Level Policy Impact Projections*, 13 RENEWABLE & SUSTAINABLE ENERGY REV. 552, 556 (2009).

VI. AMERICAN EXCEPTIONALISM

Why are we moving slowly toward a renewable future? Uncertainties about the underlying technologies explain some of it, but another contributing cause of the general failure to recognize the fossil fuel dead end is a widely shared complacency that is abetted by vested interests. On the one hand, it is reasonable that a power company will not want to retire a plant until the costs of constructing that plant have been recovered from revenues associated with its use. So a certain degree of gradualism is to be expected. But the resistance is deeper rooted than that. There is a large-scale reluctance to concede that the prevailing fossil fuel paradigm is fundamentally flawed (inasmuch as it promotes economic growth with the increased consumption of a depleting resource) and that serious and persistent efforts need to be pursued now to transition with deliberate speed to a renewable future. Our current way of living is dependent upon inexpensive fossil fuels and it is difficult to grasp that increased demand for a diminishing supply is shaking the foundations of that way of living. A contributing factor to this seeming determination to play out the fossil fuel economy for as long as it satisfies current energy needs (despite rising costs, a finite supply, and increasingly obvious externalities) is a mistaken idea about American Exceptionalism.

One way of interpreting American Exceptionalism is to review American history and identify people and deeds that are exceptional, and develop those people and deeds as American achievements: an exceptionalism rooted in the deeds and character of Americans.⁶⁴ Another view regards whatever Americans do or whoever we are as exceptional. Deeds and people are exceptional because they are American. The second view suffers causal confusion and misunderstands how exceptionalism works. It succumbs to the temptation to misconstrue national pride when it is under duress so that it loses track of why someone or some deed is exceptional.⁶⁵ Many people and many deeds in America's history are truly exceptional, but the exceptional description precedes and is not dependent upon the American description.⁶⁶ The mistake is relevant to our present subject because a mistaken vision of American Exceptionalism may regard the current Amer-

64. SEYMOUR MARTIN LIPSET, *AMERICAN EXCEPTIONALISM: A DOUBLE-EDGED SWORD* 31–32 (1996).

65. DONALD E. PEASE, *THE NEW AMERICAN EXCEPTIONALISM* 9–14 (2009).

66. GORDON S. WOOD, *THE IDEA OF AMERICA: REFLECTIONS ON THE BIRTH OF THE UNITED STATES* 4–7 (2011); GORDON S. WOOD, *THE RADICALISM OF THE AMERICAN REVOLUTION* 3–8 (1991).

ican version of the market economy and its entanglement in fossil fuels as an instance of American Exceptionalism of the second sort. The market economy that we have relies upon fossil fuel, and the gloss of American Exceptionalism makes that market model and its reliance upon fossil fuels ineluctably American. Fossil fuel dependence becomes the American way of life and American Exceptionalism anoints that way of living as the best.

The American version of the market economy and the American culture that has developed over its 230 plus years is truly remarkable and a large part of that remarkableness is its receptivity to change.⁶⁷ Americans celebrate entrepreneurship like no other culture in the world.⁶⁸ Unfortunately, the pace of change can overwhelm a culture's ability to accommodate it and we are struggling to stay abreast of a plethora of technological changes that are rapidly transforming how we live and what we aspire to accomplish.⁶⁹ Change can be dizzying and that dizziness makes it difficult to distinguish change that brings good fortune from change that transforms what we already value in exchange for a more problematic substitute.⁷⁰ We welcome guidance about how to distinguish one kind of change from another and it is hardly surprising that a major paradigm shift stirs up huge clouds of obfuscation.⁷¹

Paradigm shifts are broadly comprehensive and penetrating. The impending impact of such shifts makes explanations that diminish their portents and discredit their insights appealing alternatives.⁷² A paradigm shift is a monumental reorientation of perspective, e.g. from a geocentric universe to a heliocentric universe, which renders obsolete maps and methods of calculating the position of stars in the sky and a cosmic mythology of the human place and meaning in the universe. A shift to renewables is not quite as shocking as that, but it is close. It is a radical

67. See generally HARTMUT KAEUBLE, *SOCIAL MOBILITY IN THE NINETEENTH AND TWENTIETH CENTURIES: EUROPE AND AMERICA IN COMPARATIVE PERSPECTIVE* (1986).

68. JOHN STEELE GORDON, *AN EMPIRE OF WEALTH: THE EPIC HISTORY OF AMERICAN ECONOMIC POWER 17* (2004).

69. GARY E. MARCHANT ET AL., *THE GROWING GAP BETWEEN EMERGING TECHNOLOGIES AND LEGAL-ETHICAL OVERSIGHT: THE PACING PROBLEM 8–10* (2011).

70. NORMAN DAVIES, *VANISHED KINGDOMS: THE RISE AND FALL OF STATES AND NATIONS 729–39* (2011).

71. H.W. BRANDS, *AMERICAN DREAMS: THE UNITED STATES SINCE 1945, 383–85* (2010).

72. Thomas Kuhn introduced the concept 'paradigm shift' and its subsequent overuse weakens the force of its original meaning. See generally THOMAS S. KUHN, *THE STRUCTURE OF SCIENTIFIC REVOLUTIONS* (1962).

reorientation of humans to their means of generating energy for their lives.

This is a tipping point story and we can get on the rising curve of change early and manage a resolute, but calibrated transition with room for multi-faceted experimentation and incremental learning, or we can stall and later be overwhelmed when the tipping point occurs and be forced to scramble, wasting effort and resources in our desperation.⁷³ The tipping will come and we can be proactive to ease the tumult of transition or blunder into the post-fossil fuel world, cursing a change that we refused to anticipate.

American Exceptionalism has the unfortunate effect of casting the transition to renewable energy as surrender. Somehow the challenge is rephrased as sticking it out with an American allegiance to fossil fuel or a cozying up to a defeatist renewable orientation. The concentration of wealth and income in the hands of fewer Americans over the past few decades⁷⁴ and a resulting disinclination to acknowledge any proposal that might diminish that concentration or the means by which it was acquired is part of a distorted American Exceptionalism. But a consideration of that redistribution of wealth and income and its effects upon national receptivity to change would be a lengthy digression.⁷⁵ Suffice it to note that as the U.S. surrenders its vision of itself as an inclusive state, which actively seeks to provide everyone with access to economic opportunity, and instead adopts an extractive state vision, in which the economic elite extract wealth from the rest of society, it is tilting its economic rules to favor the wealthy and to defend already well-established economic practices and players.⁷⁶ The popular image of dirty oilmen doing manly deeds, contrasted with effete environmentalists teasing energy out of a delicate and unwilling wind turbine, reinforces the American-ness of oil. We are letting the accident of our past drive our current and future course, mistaking the events that have already occurred as final and complete evidence of what is to come.⁷⁷ This deification of the past is in fact the

73. MALCOLM GLADWELL, *THE TIPPING POINT: HOW LITTLE THINGS CAN MAKE A BIG DIFFERENCE* 7–9 (2000).

74. TIMOTHY NOAH, *THE GREAT DIVERGENCE: AMERICA'S GROWING INEQUALITY CRISIS AND WHAT WE CAN DO ABOUT IT* 4 (2011).

75. Kathleen D. Vohs et al., *The Psychological Consequences of Money*, 314 *SCI.* 1154, 1156 (2006).

76. See generally DARON ACEMOGLU & JAMES A. ROBINSON, *WHY NATIONS FAIL: THE ORIGINS OF POWER, PROSPERITY AND POVERTY* 335–68 (2012).

77. We need to reread David Hume and recall the mistake of constant conjunction; because events occurred in a particular sequence in the past is no

worst sort of defeatism⁷⁸ and it is contrary to the most productive American traditions. We have not flourished as an economy or a political culture by clinging blindly to the practices of the past.⁷⁹ The founding of the country is the application of principles long simmering in the Western tradition, but then dramatically applied in a radically unprecedented manner. Our economy is recurrently lifted by a rethinking of how things can be rearranged to promote preference, satisfaction, and profit.⁸⁰ The true American Exceptionalism is an openness to changed conditions and a willingness to re-imagine our place in a transformed world. A commitment to fossil fuels is a failure to renew a true American Exceptionalism.

VII. THE MALLEABLE MARKET MODEL

This reluctance to graduate from a fossil fuel model tracks a simplistic view of how the market model works. For some, especially those prospering in its current form, the market that we know is the ripened fruit of accumulated past progress; it is the final statement of how a market economy should work. Similarly, our fossil fuel economy is the exemplar of how energy should be provided for a market economy. If it were not for ungrateful OPEC countries conspiring to artificially inflate prices or the developing countries rushing to pursue their own version of the market that is similarly built upon fossil fuel foundations, the American economy would be flourishing at post-World War II levels. Rather than stewing in this static and myopic posture, we ought to view the coordinated efforts of OPEC and the rise of developing nations' economies as evidence of the success of the economic model that the U.S. presents to the world. A realistic view of that market model would acknowledge the tremendous variety that it can comprehend within its core principles. Its variable forms permit the model to better suit the histories and cultural traditions of multiple nations.⁸¹ OPEC countries adopted nationalistic economic perspectives on their oil reserves. Instead of remaining solely natural resource exporters, a role often delegated to colonies that then relied upon the colonizers to supply

guarantee that the sequence will reliably recur in the future. *See generally* DAVID HUME, AN INQUIRY CONCERNING HUMAN UNDERSTANDING (1748).

78. PHILIP E. TETLOCK, EXPERT POLITICAL JUDGMENT: HOW GOOD IS IT? HOW CAN WE KNOW? 144 (2005).

79. *See generally* JOSEPH J. ELLIS, AMERICAN CREATION: TRIUMPHS AND TRAGEDIES IN THE FOUNDING OF THE REPUBLIC (2007).

80. MILTON FRIEDMAN, CAPITALISM AND FREEDOM 10–11 (1962).

81. JEFFREY D. SACHS, THE END OF POVERTY: ECONOMIC POSSIBILITIES FOR OUR TIME 31 (2005).

their manufactured goods as compensation for the natural resources, they aspire to diversify their economies and they are using their oil resources to finance that transition. The wisdom of some of these diversification efforts is debatable, but they are grounded in sound macro-economic theory. Many developing countries are attempting to throw off the supply-side orientation of the planned economic model and instead adopt the demand oriented economic model that a liberal democratic order promotes. Sometimes these countries are less committed to the politics than the economics of an American or Western political economy, but the history of the West suggests that economic liberties ineluctably bloom into political liberties. It is noteworthy, however, that a demand orientation need not reproduce exactly the practices of the American economic system.

There are many market variations available that comport with a demand orientation.⁸² Indeed, we often overlook how many modifications the U.S. has made to its economic system over the years, most of those practices before and after the changes were regarded as consistent with a democratic market orientation despite a current repugnance for some of them, e.g, children working in factories or *Lochner* era “protections” of worker freedom to contract.⁸³ Particular markets not surprisingly reflect the values of the societies in which they operate and those values vary among societies and across time. Core market elements persist across these varieties because markets enable people to get more of what they want.⁸⁴ Of course the market can and does influence that wanting,⁸⁵ but it presumes that people have independent ideas about their wants and, moreover, that their values will interact with market forces to help shape them.⁸⁶

The identification of externalities and how they should be compensated is partly about a public willingness to identify what

82. ELIZABETH ANDERSON, *VALUES IN ETHICS AND ECONOMICS* 141–43 (1993).

83. MICHAEL NOVAK, *THE SPIRIT OF DEMOCRATIC CAPITALISM* 27 (1982).

84. A market orientation focuses on consumer demand to identify which goods and services competing firms will produce for profit as the core coordinating feature of an economy and it relies upon micro-economic principles to explain how an ideal firm will identify the price and quantity of output for its goods. It is, at least in theory, largely agnostic about which goods and services consumers prefer, especially as those preferences may originate outside the market.

85. See CYNTHIA CROSSEN, *TAINTED TRUTH: THE MANIPULATION OF FACT IN AMERICA* 73 (1994).

86. See ALLEN BUCHANAN, *ETHICS, EFFICIENCY, AND THE MARKET* 92 (1985).

qualifies as a cost imposed upon others.⁸⁷ Air pollution caused by an industrial plant can be, but need not be, identified as an externality depending upon what is posited as the governing baseline.⁸⁸ Whether education is a public good and so appropriately an expense shared across society, or a private good and so an expense absorbed by individuals as they decide whether to expend income to procure it, is a value question.⁸⁹ The market can help implement the selection so that it is accomplished more efficiently, but the question of whether education is appropriately a private or a public good reflects the value judgments of the society making the choice. The selection can change over time. Note the movement in the U.S. from the post-World War II years when post-secondary education was heavily subsidized by state funds (because the subsidy was regarded as an investment in future prosperity) to current low levels of state support which is justified by reduced revenue and the rationale that the cost of post-secondary education is primarily a private prerogative.⁹⁰

A presentist orientation makes current market practices seem like necessary practices. A current dependence upon fossil fuels makes it seem that the dependence is necessary, just as a flood of personal use vehicles, nearly one per adult, can seem necessary rather than an oblivious self-indulgence and waste of resources. Personal use vehicles can be mistaken for a crucial expression of personal freedom because they do provide a means to travel independent to some degree of the travel preferences of others, e.g. time of departure, route, radio station or other audio selection, etc. Their use for commuting purposes belies this image of freedom as personal use vehicles plod along well-rehearsed routes during narrowly constrained times.⁹¹ Burgeoning exurbs with personal use vehicles for every person old

87. See ANDREAS A. PAPANDREOU, *EXTERNALITIES AND INSTITUTIONS* 56 (1994).

88. See CARL F. CRANOR, *LEGALLY POISONED: HOW THE LAW PUTS US AT RISK FROM TOXICANTS* 10–11, 210–12 (2011).

89. See JONATHAN KOZOL, *SAVAGE INEQUALITIES: CHILDREN IN AMERICA'S SCHOOLS* 261–65 (1991).

90. See Douglas N. Harris & John F. Witte, *The Market for Schooling*, *SHAPING EDUCATION POLICY: POWER AND PROCESS* 98–111 (Douglas E. Mitchell et al. eds., 2011).

91. We might view personal use vehicles as though their detrimental impacts were an integral feature of their use and thus balance costs against benefits in an a-historical evaluation of their value rather than assuming a primary value that has regrettable downstream consequences. We cannot start afresh this way, but we can periodically recalculate and recognize that we have made errors, sometimes egregious, and re-engineer our lives to correct our mistakes.

enough to drive is not a long-term solution for how we should lead productive, happy lives when the costs of fossil fuel for those vehicles is so high (the burden is on non-human habitat into which these exurbs grow and is a separate and alone sufficient ground to rethink our population distribution strategies). A reconsideration of how we transport ourselves is not surrender to defeatism. It is a retooling in light of a more comprehensive and realistic understanding. A renewable energy future is similarly not a retreat, but rather a bold move forward.

One might object that if a renewable energy future is inevitable, let it come when the market recognizes its inevitability. No need to hasten the end of fossil fuels. When the market faces higher costs and diminished supply, the genius of the market will respond accordingly. The metaphor of the invisible hand used by Adam Smith to explain how different people pursuing their own self-interests produces a bountiful cooperation can be misleading about the processes of the market.⁹² The invisible hand may suggest that the less that is done to interfere with individual participants in a market, the more efficient it will be, and that invisible hand efficiency includes anticipating or responding to abrupt, far-reaching changes in conditions.⁹³ That suggestion overstates the power of the metaphor, which serves more accurately to describe micro-economic decision-making than it does macro-economic conditions within which firms and households operate.

The metaphor captures the production and exchange of widgets, but not the provision of police protection or national defense or the identification of wilderness areas or health care⁹⁴ or even the behavior of multi-national corporations. Indeed, markets have generally conceded that many utilities are better provided as public monopolies than as competitive enterprises to spare the burden of a complex and redundant network of water and sewer lines. We do not expect market participants at the street level to anticipate or adequately prepare for a climatic cataclysm or for major social disruptions, such as epidemics. Some argue that firms and households can respond by insuring against such improbable, but possible events, but it is more plausible that the market would task government with the responsibility of identifying possible catastrophes for which it would prepare and

92. See ADAM SMITH, AN INQUIRY INTO THE NATURE AND CAUSES OF THE WEALTH OF NATIONS 28 (James E. Thorold Rogers ed., 1776).

93. See generally ACCEPTING THE INVISIBLE HAND: MARKET BASED APPROACHES TO SOCIAL-ECONOMIC PROBLEMS (Mark D. White ed., 2010).

94. See, e.g., Kenneth J. Arrow, *Uncertainty and the Welfare Economics of Medical Care*, 53 AM. ECON. REV. 141, 143–44 (1963).

afterwards repair as a cooperative venture. The transition to renewable energy can qualify as such a cooperative effort and, as John Dernbach has pointed out, renewable energy can be facilitated with laws that refocus economic development to promote sustainability. These laws can, among other things, create structures that enable sustainable activity, remove legal impediments to sustainable activities, and overcome market barriers to sustainable activities, etc.⁹⁵

VIII. FOLLOW THE MONEY

Fossil fuels did not reach their current status without significant subsidies and other government support.⁹⁶ The tax code has ample generous provisions to promote fossil fuel infrastructure development and extraction practices.⁹⁷ This is less a complaint than an observation. We should expect economic interests to lobby for favorable status and for the lenient regulations and softened tax burden that flow from that status. Fossil fuel has benefitted from the status and it seems disingenuous when fossil fuel adherents insist that renewables ought to do it on their own, as though that were the governing norm. The prevailing norm is to persuade the government that your technology is productive, usually with evidence and arguments, but also with techniques that limit the debate. The lobbying is usually phrased by a company or a cartel to advance its interests; the lobbying is not usually phrased as a promotion of ideal market practices. Contributions earn access and the repetition of a particular perspective on an issue can make it eventually seem that that perspective is the only plausible or the obviously preferred perspective.

Government subsidies and incentives are crucial features in the rise of hydraulic fracking technologies that now provide access to natural gas in shale located at depths and in locations that had been thought unrecoverable. The technology was

95. John C. Dernbach, *Creating the Law of Environmentally Sustainable Economic Development*, 28 *PACE ENVTL. L. REV.* 614, 630–40 (2011).

96. See, e.g., Mona Hymel, *The United States' Experience with Energy-Based Tax Incentives: The Evidence Supporting Tax Incentives for Renewable Energy*, 38 *LOY. U. CHI. L.J.* 43, 43 (2006); Jim Rossi, *The Limits of a National Renewable Portfolio Standard*, 42 *CONN. L. REV.* 1425, 1427 (2010).

97. See ELIZABETH CATLIN & MICHAEL DWORKIN, INST. FOR ENERGY & THE ENV'T AT VT. LAW SCH., *CLI BACKGROUND PAPER NO. 5: SUBSIDIZATION OF NON-RENEWABLE ENERGY RESOURCES IN THE UNITED STATES I* (2009); BURNS H. WESTON & TRACY BACH, CLIMATE LEGACY INITIATIVE, *RECALIBRATING THE LAW OF HUMANS WITH THE LAWS OF NATURE: CLIMATE CHANGE, HUMAN RIGHTS AND INTERGENERATIONAL JUSTICE* (2009).

developed with government research expenditures, not by private entrepreneurs, though the latter enjoy the profits of the new technology's implementation.⁹⁸ The enthusiasm for energy independence has tampered a consideration of the technology's externalities and it is likely that those costs, whose scope is currently unknown, will be borne by U.S. taxpayers. Many different chemicals are injected into the ground as part of the process, including formaldehyde, naphthalene and crystalline silica (known carcinogens).⁹⁹ Perhaps this is how representative democracies inevitably work in pluralistic societies; interests vary in intensity and in power and intense, powerful interests have the most success in influencing lawmakers. Whatever the rationale, and regardless of whether this is how representative government ought to work, it is how it often works now.¹⁰⁰ However, there is also room for logic and facts as a source of power and a persistent clamor for renewable energy as another form of lobbying to persuade lawmakers to recognize its merits (and recognize the externalities of alternatives such as fracking).¹⁰¹

To date the effects of lobbying for renewables has been uneven.¹⁰² The adoption of renewable portfolio standards, which tend to promote renewable energy use, has thus far been a matter of state law and policy, which allows for variability but lacks national coordination.¹⁰³ There is no firm commitment to the idea that credits for renewable energy should be a national priority.¹⁰⁴ Federal and state legislation that provide credits have had limited terms, often expiring or being renewed shortly before the scheduled expiration. The credits are renewed or not, depending upon the vicissitudes of particular authorizing committee members and the supporting role that renewables play in

98. See generally Alex Trembath, *US Government Role in Shale Gas Fracking History: An Overview and Response to Our Critics*, BREAKTHROUGH INST. (Mar. 2, 2012), http://thebreakthrough.org/archive/shale_gas_fracking_history_and.

99. Adam Davidson, *Welcome to Saudi Albany*, N.Y. TIMES MAG., Dec. 16, 2012, at MM22.

100. See generally RICHARD H. THALER & CASS R. SUNSTEIN, *NUDGE: IMPROVING DECISIONS ABOUT HEALTH, WEALTH, AND HAPPINESS* (2008).

101. See generally David E. Adelman & Kristen H. Engel, *Reorienting State Climate Change Policies to Induce Technological Change*, 50 ARIZ. L. REV. 835 (2009); Lincoln L. Davies, *State Renewable Portfolio Standards: Is There a "Race" and Is It "to the Top"?*, 3 SAN DIEGO J. CLIMATE & ENERGY L. 3 (2012).

102. Gabriella Stockmayer et al., *Limiting the Costs of Renewable Portfolio Standards: A Review and Critique of Current Methods*, 42 ENERGY POL'Y 155, 159 (2012).

103. Lynn M. Fountain, *Johnny-Come-Lately: Practical Considerations of a National RPS*, 42 CONN. L. REV. 1475, 1478-79 (2010).

104. David Spence, *The Political Barriers to a National RPS*, 42 CONN. L. REV. 1451, 1462-63 (2010).

unrelated political scenarios, more a function of partisan squabbling than evidence of a national prioritization. As a result there are frequent gaps in the availability of the credits and a prevailing tone of uncertainty, hardly conditions that encourage business buy-in (though the variability does complicate an analysis of the success of these incentives).¹⁰⁵ The prevarications are particularly damaging because the cyclic recurrence of the funding decision creates the impression that there is a longstanding commitment to renewable energy even as the episodic uncertainty undermines the confidence of potential investors.

The unreliability of legislative support tracks the problems already encountered by the renewable energy companies as they try to compete with fossil fuels. As Tim Duane has convincingly described, there has been a history of fluctuating prices for energy over the past several decades, the fluctuations driven by global events beyond the control of individual energy companies.¹⁰⁶ As the price points for fossil fuels rise, the price points for renewables, whose costs include the development of new technologies and an immature market for its products, become competitive. But a series of world economic crises dropped the price point for fossil fuels and made renewable investments based upon the pre-crisis fossil fuel price points no longer profitable. The roller coaster drops occurred several times and not surprisingly cost investors large sums of money, led to the closure of various renewable energy related companies, and dampened the enthusiasm for future renewable energy investment. Duane argues for a government guarantee for the production of renewable energy at particular price points, which price points diminish over time, e.g. a decade.¹⁰⁷ These guarantees, via wide-scale adoption of feed-in tariffs, would both ensure that investors can recoup their investments, assuming that their renewable energy plants are profitable at the price points that inspired the original investment, and simultaneously foster the strength of the renewable energy sector. Unreliable credits can have the same effect as reduced fossil fuel price points by creating instability and deterring investment.

The renewable energy sector is not yet mature. Even though it is currently a part of our national energy portfolio, there are many elaborations and modifications ahead. Future innovations in renewable technologies will build upon a prospering renews-

105. See Hymel, *supra* note 96, at 65.

106. See generally Timothy P. Duane, *Greening the Grid: Implementing Climate Change Policy Through Energy Efficiency, Renewable Portfolio Standards, and Strategic Transmission System Investments*, 34 VT. L. REV. 711 (2010).

107. See *id.* at 778–80.

ble energy sector whose research activities are important benefits of the construction and operation of renewable energy facilities. An important feature of the American Exceptionalism model is responsiveness to ideas that improve products and services whatever the source of the idea. More people working in renewable energy create a larger source for innovative ideas. The NASA space program brought together a huge number of bright, energetic scientists and technicians and their ideas exceeded the exact parameters of their assignments. Many inventions were incubated in NASA projects that had broad scientific impacts. The Bell and DARPA labs have similar histories. Bright, motivated people working together frequently have ideas that surpass the bounds of their original project. A viable renewable energy sector will help engender more ideas about the theory and practice of renewable energy and related technologies.

These ideas will be generated within the U.S. by people largely working for U.S. companies or, more likely, from collaborations of many nationals from many countries pursuing joint enterprises. An obvious benefit of weaning off fossil fuels is reducing the transfer of wealth to OPEC nations and improving national security by making the economy less susceptible to disruptions in its energy supply. Less money would be sent abroad for the oil, more money would be spent in the U.S. and in cooperative ventures with U.S. participants to develop renewable energy technologies and then to build and maintain the generation and distribution infrastructure.

IX. CONCLUSION

The future will necessarily rely upon renewable energy and an American solution to the challenge of facilitating the transition (and escaping a dependence upon imported oil) is the resolute development and implementation of renewable energy technologies. This transition is a matter of crucial national self-interest for economic and security reasons. Renewable energy is possible and necessary and the costs of a clumsy transition from fossil fuels to renewables can be minimized if federal and state governments, encouraged by the American people, recognize that the transition is a vital national priority.

