A Comparison of Renewable Portfolio Standards and Feed-In Tariffs as Legislative Mechanisms to Provide Renewable Power Incentives: Impacts on Power Supply, Transmission, and Grid Intermittency

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Abstract

A federalist form of government divides political sovereignty between a central federal authority and constituent states or provinces, as used in several countries, including in the United States, Germany, India, Australia, Brazil, Canada, Malaysia, and Switzerland. The transcendent issues are legal and regulatory, to implement energy policy in such governments. Particularly, feed-in tariffs, net metering, and renewable portfolio standards, the primary renewable incentives in various industrialized countries, when implemented at the state rather than federal level, must be designed and implemented carefully to be a regulatory fit in a federalist system of government. There are more regulatory issues than first apparent, as evident in those policies attempted to be implemented by states in the United States. This article examines all of these renewable energy policies as a regulatory mechanism in a federalist system.

Keywords: Renewable, Portfolio, Feed-In, Tariff, Federalism, Preemption, Net Metering

I. Overview of Legal Context

Legal structure in a given country affects the mechanisms though which that country can promote renewable power technologies. Some countries have a federalist form of government, in which states have certain, but not other, legislative and regulatory means to promote renewable energy technologies. Federalist forms of government describe a system in which political sovereignty is constitutionally divided between a central federal authority and constituent states or provinces. Such federalist forms of government affect several large and established countries, such as the United States, Germany and India. Other federalist countries include Australia, Brazil, Canada, Malaysia, Mexico, Nigeria, and Switzerland.

This article will examine Constitutional issues making more complex the implementation of renewable energy policy in countries with a federalist form of government. Effective policy and permissible policy are not identical in such countries. In particular this article will examine renewable initiatives implemented recently in the United States and the Constitutional federalist issues affecting this form of government and policy implementation. The United States is chosen for examination because it has a well established federalist system with a significant amount of decisions by the Supreme Court regarding what is and is not permissible for a state to do. Moreover, these judicial decisions already involve, in part, the renewable energy initiatives enacted at both the federal and state levels of government. While not all federalist systems in the world are the same, the United States offers an excellent model of analysis, with some possible observations perhaps applicable federalist countries such as Germany, India, Australia, Brazil, Canada, and Switzerland.

To change the technology of energy use to more low-carbon renewable resources, the transcendent issues have *not* been technological; they have become legal and regulatory. These challenges are pivotal. And the challenges are for those handling legislations and regulation, not the engineering aspects of the new renewable energy technologies.

The importance of the electric sector to the modern industrial economy is reflected in its changing role and its societal impacts. In 1949, only 11% of global warming gases came from the electric sector; today it is more than

one-third.[1] National agencies concluded that the electric power sector offered the most cost-effective opportunities to reduce CO2 emissions, compared to the transportation sector.[2] So the power sector will be the carbon reduction focus as international and national policy moves forward.

Electricity is a unique commodity in the economy in two unique regards. First, energy is a unique force in the universe. Energy -- whether in the form of coal which empowered the industrial revolution, oil which powers modern transportation and current spacial land-use patterns, or electricity, which is the unique force of the information age and modern electronic equipment -- is the signature technology of the modern era that comprises the last 300 years of the several million years of human life forms on the planet.[3] Second, electricity, unlike all other forms of energy, can not be efficiently stored in bulk for more than a second, before it is lost as waste heat. [4] Therefore, the supply of electricity must match the demand for electricity over the centralized utility grid of a nation on an instantaneous basis, or else the electric system shuts down or expensive equipment is damaged.[5]

The primary issues are now legal. The Kyoto Protocol, the world greenhouse gas (GHG) control agreement, now expires by its terms at the end of 2012.[6] A 2010 report for CERES,[7] forecasts three key energy industry trends:

- Reducing greenhouse gas (GHG) emissions by up to 80%
- Less emphasis on fossil fuel generation of electricity
- Greater implementation of smart grid and energy efficiency technologies

Such trends foresee both significant environmental changes regarding global warming mitigation and a fundamental shift in how the economy produces and utilizes electricity in a post-industrial economy. As specific means to

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1. *See* U.S. Department of Energy, Energy Information Administration, http://www.eia.doe.gov/oiaf/1605/ggrpt/excel/historical_co2.xls.

2. *Energy Estimates Show rise in CO2 Emisssions, Offer Mitigation Options,* ||Carboncontrolnews.com, June 30, 2008, at 20.

3. S. Ferrey, Environmental Law: Examples & Explanation, 537, 539-540 (5th ed. 2010).

4. *Id*. at 542.

5. S. Ferrey, Unlocking the Global Warming Toolbox (2010).

6. *See* www.unfccc.org.

7. Ceres, The 21st Century Electric Utility: Positioning for a Low-Carbon Future (2010).

these practical changes, CERES notes[8] for renewable resources:

○ Renewable Portfolio Standards as important policy implementation tools
○ Net metering as a way for augmenting renewable incentives

However, there are significant looming legal and regulatory issues around how to implement energy policy and regulatory authority.

Ⅱ. Renewable Power as the New Regulatory Element

A. The Financial Requirements

It has been estimated that a $10 trillion expenditure in renewable resources will be required over the next two decades just to limit the rise in Earth temperature.[9] This is equal to 0.5 – 1.1% of global GDP.[10] According to a 2007 report from the United Nations Environment Programme, investment capital flowing into renewable energy worldwide climbed from $80 billion in 2005 to $100 billion in 2006.[11]

Despite the emergence of, and attention to, renewable energy sources, forecasters do not yet see the international mix of power generation sources changing appreciably over the next several decades. The percentage of fossil fuels in the mix—and thus the potential sources of GHGs in the electric power sector—is forecast to remain relatively constant. The International Energy Agency predicts that by 2030, world demand for energy will grow by 59% and fossil fuel sources will still supply 82% of the total, with non-carbon renewable energy sources supplying only 6%.[12]

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8. *Id*. at viii.

9. Richard Cohen & Gerry Khermouch, , *IEA's $10 trillion Climate Price Tag*, Electricity Journal 1 (December 2009). It might achieve about as much in saved energy acquisition costs -- $8.6 trillion by 2030.

10. *Id*.

11. United Nations Environment Programme (June 2007), available at http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=512&ArticleID=5616&l=en.

12. INT'L ENERGY AGENCY, WORLD ENERGY OUTLOOK 2004 (2005), available at http://www.iea.org/textbase/nppdf/free/2004/weo2004.pdf.

B. U.S. Current Stimulus at the Federal Level of Government

In the U.S., the federal support for renewable power development has been through tax incentives and stimulus grants. In response to economic crisis, the Obama Administration stimulus package included a significant incentive package for the electric sector,[13] poured $80 billion in spending and $20 billion in tax incentives into renewable energy and energy efficiency, as part of the $787 billion stimulus plan.

This includes $12.35 billion for energy efficiency improvement through low-income weatherization, state block grants, public and Section 8 housing efficiency, and Department of Defense efficiency.[14] There is a 30% investment tax credit for advanced energy manufacturing, a 30% advanced energy facilities tax credit applies to transmission and grid-related new equipment, and $1.6 billion of CREB renewable energy bonds, first created by the Energy Policy Act of 2005.[15] The renewable energy Section 45 production tax credit was extended through 2012 or 2013 for different renewable technologies, or the option to take a grant from the Treasury that mirrors the tax credit.

The U.S. Department of Energy in 2009 awarded more than $155 million in stimulus funds to 41 industrial efficiency projects, including district energy systems and combined heat and power facilities.[16] By the end of 2010, the Treasury dispensed $5.53 billion in Section 1603 cash grants to 1,387 renewable project developer, principally denominated by wind project developers ($4.7 billion of the total for wind, with another 415 million each for solar and for geothermal, landfill gas, hydroelectric, biomass and fuel cell), with another $9 billion of project eligibility in the pipeline.[17] There is $6 billion for a loan guarantee program for renewable energy projects under construction by September 2011, which should support about $60 billion of renew-

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13. American Recovery and Reinvestment Act of 2009, Pub.L. 111-5, 123 Stat. 115 (2009).

14. http://www.nytimes.com/2009/02/14/us/politics/14stimintro.ready.html?_r=1.

15. U.S. Department of Energy, http://www.energy.gov/recovery/48C.htm.

16. http://www1.eere.energy.gov/solar/news_detail.html?news_id=15600.

17. Jeffrey Ryser, Solar *Developers Seek two-year Extension of Cash Grant Program for New Projects*, Electric Utility Week 9, 10 (November 22, 2010); *Cash Grant Program for Renewable Projects Could Leave Government Owing $9 billion*, Electric Utility Week 3 (Dec 13, 2010).

able loans for renewable power and transmission projects.[18] In the first half of 2010, 339 Mw of grid-connected PV power was installed.[19]

In the U.S., the Production Tax Credit ("PTC") set forth in Section 45 of the Internal Revenue Code remains the cornerstone of federal policies supporting renewable energy.[20] The PTC was originally enacted as part of the Energy Policy Act of 1992 and has been periodically extended, with each extension lasting only for a limited period.[21] Qualified facilities are wind, closed-loop biomass, open-loop biomass, geothermal, small irrigation power, municipal solid waste and qualified hydropower facilities.[22] These are set forth in Table 1.

The amount of the credit is 2.0 cents per kilowatt hour for wind, closed-loop biomass, geothermal and solar[23] energy facilities; 1.0 cent per kilowatt hour for open-loop biomass, small irrigation power, landfill gas, trash combustion and qualified hydropower facilities.[24] The PTC applies for ten years for wind and closed loop biomass and open-loop biomass built after August 8, 2005 and 5 years for other qualified facilities following the date the qualified facility was originally placed in service.

Certain developers who otherwise could obtain this credit were allowed to elect an investment tax credit on tangible property instead, subject to some qualifications. This essentially provides a cash grant instead of tax credits and is subject to 5-year recapture rules. A taxpayer may make an irrevocable election to have certain qualified facilities placed in service in 2009 through 2013

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18. NREL Technical Report (July 2009). Available at http://www.nrel.gov/docs/fy09osti/44930.pdf; Database of State Incentives for Renewables and Efficiency, available at http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US48F&re=1&ee=1.

19. Jeffrey Ryser, *U.S. Solar Installations head for Record Year thanks to lower costs and 1603'Grants*, Electric Utility Week 23-24(Oct 18, 2010).

20. 26 U.S.C. 45.

21. The Tax Relief and Health Care Act of 2006 extended the PTC to qualified facilities placed in service before January 1, 2009. Public Law 109-58 (The Tax Relief and Health Care Act of 2006, Section 201.

22. The PTC also applies to Refined Coal, 26 USC § 45.(c)(7) and 45(d)(8) and 45 (e)(8).

23. Section 710 of The American Jobs Creation Act of 2004 (Public Law 108-357) extended the PTC to open–loop biomass, geothermal energy, solar energy, small irrigation power, and municipal solid waste facilities. The Energy Policy Act of 2006 extended the PTC to facilities placed in service before January 1, 2008, but the in-service date for solar energy facilities was not extended, and remains January 1, 2006.

24. Internal Revenue Bulletin No. 2006-25, June 19, 2006, Notice 2006-51.

(2012 for wind facilities) be treated as energy property eligible for a 30 percent investment credit under section 48. These credits for renewable technologies are summarized in Table 2.

Congress in December 2010 passed the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010, which extends several expiring renewable energy and fuel tax incentives and includes some new incentives.[25] The Act extends the Section 1603 grant in lieu of tax credits. The Section 1603 program to provide cash grants worth up to 30 percent of eligible costs of renewable energy projects. Qualifying renewable energy projects receive cash payments from the U.S. Department of Treasury in lieu of the traditional energy-related production and investment tax credits under Sections 45 and 48 of the Internal Revenue Code. Qualifying projects include wind turbines, certain biomass facilities, geothermal facilities, landfill gas facilities, certain trash facilities, certain hydropower facilities, solar facilities, fuel cells, cogeneration facilities under 50 Mw, gas micro-turbines and geothermal heat pumps, as set forth below in Table 1A.

TABLE 1A: FEDERAL RENEWABLE ENERGY TAX CREDITS AMOUNTS AND ELIGIBILITY DATES

ENERGY PROPERTY	TERMINATION DATE	CREDIT
Large Wind	Jan 1, 2013	30%
Closed-Loop Biomass Facility	Jan 1, 2014	30%
Open-loop Biomass Facility	Jan 1, 2014	30%
Geothermal (under IRC sec. 45)	Jan 1, 2014	30%
Landfill Gas Facility	Jan 1, 2014	30%
Trash Facility	Jan 1, 2014	30%
Qualified Hydropower Facility	Jan 1, 2014	30%
Marine & Hydrokinetic	Jan 1, 2014	30%
Solar	Jan 1, 2017	30%
Geothermal (under IRC sec.48)	Jan 1, 2017	10%
Fuel Cells	Jan 1, 2017	30%
Micro-turbines	Jan 1, 2017	10%
Combined Heat & Power	Jan 1, 2017	10%
Small Wind	Jan 1, 2017	30%
Geothermal Heat Pumps	Jan 1, 2017	10%

25. H.R. 4853, the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010.

There is a time limit on realizing these credits. Now, property will qualify if it is placed in service in 2011 or if construction begins before 2012 and the project is placed in service before the applicable credit termination date (January 1, 2013 for large wind projects, January 1, 2014 for biomass, trash, marine and certain other facilities, or January 1, 2017 for solar, geothermal, fuel cells, micro-turbines, combined heat and power, small wind, and geothermal heat pump facilities). The Act also extends through 2011, related to renewable energy but unrelated to electric production, the $1.00 per gallon tax credits for the sale or use of biodiesel, renewable diesel, and biodiesel mixtures, as well as the alternative fuel credit and the alternative fuel mixture credit and the $0.10 per gallon small agri-biodisel producer credit. In 2009, about 65% of the projects elected the Section 1603 refundable cash grant in lieu of the production tax credit, while in 2010 the percentage so electing rose to 85%.[26]

One needs to begin, but not finish installation of the renewable energy project by the near-term date. The U.S. Treasury Department "begin construction" requirement for qualifying for the 30% ARRA cash grant, under the original legislation, provided that a project either must be placed in service in 2009 through 2011, or if construction begins within these deadlines must be placed in service by the end of 2012 for large wind projects, 2013 for biomass, certain geothermal and other projects, and 2016 for solar and other projects. Treasury Department guidance specified that the beginning of construction could be satisfied either by beginning "physical work of a significant nature" or paying or incurring at least 5% of the total cost of the specified energy property (the "5% safe harbor"). For wind or other remote projects, starting construction of roads that are integral to facility development may constitute physical work of a significant nature. Production of components or parts that are in existing inventory or are normally held in inventory by a manufacturer do not qualify. The 5% safe harbor considers a cost "incurred" by an accrual-method taxpayer when "economic performance" has occurred, and property is provided and/or when title passes, excluding amounts paid as prepayments or deposits. In 2010, Governor Schwarzenegger signed SB 401, which excludes from California gross income the cash grant in lieu of tax credits (the Treasury grant) pursuant to Section 1603 of the American Recovery and Re-

26. *Cash Grant Program for Renewable Projects Could Leave Government Owing $9 billion*, Electric Utility Week 3 (Dec 13, 2010).

investment Act of 2009.

There is accelerated tax depreciation for certain renewable energy projects. The Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010 Act extends and temporarily increases bonus depreciation for investment in certain energy equipment.[27] For qualifying property that is acquired and placed in service after September 8, 2010, and before January 1, 2012, the Act provides for 100 percent bonus depreciation; or if placed in service in 2012, there is 50 percent bonus depreciation (property generally must have a recovery period of 20 years or less). The Act also allows taxpayers to elect to accelerate certain AMT credits in lieu of bonus depreciation for taxable years 2011 and 2012.

The depreciation provision for non-fossil fuel electric projects is illustrated in Table 3. A comparison of the value of federal tax credits is compared apples-to-apples in Table 4.[28] Despite the importance of the PTC, renewable power additionally is provided incentives in certain states by other significant incentives.[29]

Table 1: Summary of Federal Credit for Electricity Produced from Certain Renewable Resources		
Eligible electricity production activity (sec. 45)[1]	Credit amount for 2010[2] (cents per kilowatt-hour)	Expiration[3]
Wind	2.2	December 31, 2012
Closed-loop biomass	2.2	December 31, 2013
Open-loop biomass (including agricultural livestock waste nutrient facilities)	1.1	December 31, 2013

27. H.R. 4853, the Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010.

28. This tabular material in this section and tables are adapted from Staff Report, Joint Committee on Taxation, *Present Law Energy-Related Tax Provisions and Proposed Modifications Contained*, *in* the President's fiscal Year 2011 Budget (Apr 12, 2010).

29. According to the Department of Energy Funded Database of State Incentives for Renewables & Efficiency (DSIRE), 26 states offer some type of solar energy tax incentive with over 51 different types of programs. Overall there are 228 different types of rebates available in the states for renewable energy. *See* Rusty Haynes, N.C. Solar Center, N.C. State University, Solar America Cities Annual Meeting (Apr 15, 2008). *See* http://www.dsireusa.org/summarytables/financial.cfm?&CurrentPageID=7&EE=1&RE=1.

Geothermal	2.2	December 31, 2013
Solar (pre-2006 facilities only)	2.2	December 31, 2005
Small irrigation power	1.1	December 31, 2013
Municipal solid waste (including landfill gas facilities and trash combustion facilities)	1.1	December 31, 2013
Qualified hydropower	1.1	December 31, 2013
Marine and hydrokinetic	1.1	December 31, 2013

Table 1 notes

[1] Except where otherwise provided, all section references are to the Internal Revenue Code of 1986, as amended.

[2] In general, the credit is available for electricity produced during the first 10 years after a facility has been placed in service.

[3] Expires for property placed in service after this date.

Table 2: Summary of Federal Investment Tax Credit Energy Production Incentives

		Credit rate	Maximum credit	Expiration
Energy credit (sec. 48)	Equipment to produce a geothermal deposit	10%	None	None
	Equipment to use ground or ground water for heating or cooling	10%	None	December 31, 2016
	Micro-turbine property (< 2 Mw electrical generation power plants of >26% efficiency)	10%	$200 per Kw of capacity	December 31, 2016
	Combined heat and power property (simultaneous production of electrical/mechanical power and useful heat > 60% efficiency)	10%	None	December 31, 2016
	Solar electric or solar hot water property	30% (10% after December 31, 2016)	None	None

Energy credit (sec. 48)	Fuel cell property (generates electricity through electrochemical process)	30%	$1,500 for each 1/2 Kw of capacity	December 31, 2016
	Small (<100 Kw capacity) wind electrical generation property	30%	None	December 31, 2016

Table 3: Summary of Non-Fossil Fuel Capital Cost Recovery Provisions under Federal Tax

Eligible Activity	Description of Provision	Expiration
Five-year cost recovery for certain energy property (sec. 168(e)(3)(B)(vi))	A five-year MACRS recovery period is generally provided for equipment using solar and wind energy to generate electricity, to heat or cool (or provide hot water for use in) a structure, or to provide solar process heat; equipment using solar energy to illuminate the inside of a structure using fiber-optic distributed sunlight; equipment used to produce, distribute, or use energy derived from a geothermal deposit; and qualified fuel cell property. A five-year MACRS recovery period is provided for certain biomass property, including (i) a boiler, the primary fuel for which will be an alternate substance; (ii) a burner (including necessary on-site equipment to bring the alternate substance to the burner) for a combustor other than a boiler if the primary fuel for such burner will be an alternate substance; (iii) equipment for converting an alternate substance into a qualified fuel; and (iv) certain pollution control equipment.	For five-year recovery period for certain solar equipment - December 31, 2016
Special allowance for cellulosic biofuel plant property (sec. 168(l))	An additional first-year depreciation deduction equal to 50 percent of the adjusted basis of qualified cellulosic biofuel plant property.	December 31, 2012

Pollution control facilities (secs. 169, 291)	A taxpayer may elect to recover the cost of any certified pollution control facility over a period of 60 months. A corporation taxpayer must reduce the amount of basis otherwise eligible for the 60- month recovery by 20 percent.	None
Energy efficient commercial buildings deduction (sec. 179D)	A taxpayer may take an additional deduction of $1.80 per square foot of commercial property that exceeds certain energy efficiency standards	December 31, 2013

Table 4: Comparison of Selected Federal Energy Production Tax Credits

	(1) Statutory credit amount	(2) Credit amount in dollars per MMBtus of heat energy	(3) Credit amount in dollars per MMBtus of displaced heat energy of fossil fuel feedstock
Wind power	2.2 cents per kilowatt-hour	$6.45	$2.23
Geothermal power	2.2 cents per kilowatt-hour	$6.45	$2.23
Open-loop biomass	1.1 cents per kilowatt-hour	$3.23	$1.12
Advanced nuclear power	1.8 cents per kilowatt-hour	$5.28	$1.82
Ethanol	45 cents per gallon	$5.92	$5.92
Biodiesel	$1 per gallon (expired 12/31/09)	$8.45	$8.45

Source: from Energy Information Agency, Annual Energy Outlook

Even some leaders of the oil industry suggest that fifty percent of total energy demand in the world could be met by solar, wind and other renewable

resources by 2050.[30] In addition to environmental and climate benefits, a renewable energy economy would have national security benefits by reducing importation of fuels, as well by reducing the vulnerability of the electricity grid to terrorist attack.[31] However, solar photovoltaic technologies do require a relatively large amount of land compared to conventional means of power production.[32] Concentrating solar collectors require ten times as much land area, and wind turbines require up to 70 times as much land area, as does a typical fossil-fuel-fired power plant.[33] This is because solar technology is less efficient in generating electricity[34] through a centralized turbine technology than concentrated fossil-fuel technologies.[35] Concentrated solar power technology plants consume significant amounts of water because their electric production is less efficient than use of fossil fuels, and four states have denied permits for such solar facilities because of their water demands.[36]

Ⅲ. Renewable Portfolio Standards

A. The State-Level Federalist Policy Tool

One state-level legal tool is mandatory minimum renewable energy supply requirements, usually imposed on retailing electric utilities or independent retail suppliers. These alternatives typically are known as Renewable Portfolio Standards ("RPS"). In the U.S. as of 2011, approximately twenty-nine states and the District of Columbia had some form of RPS standard.[37] Half of that half of the U.S. states employ differentiated tiers of RECs, serving a various functions for those tiers:

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30. *See* Jeremy Rifkin, The Hydrogen Economy: The Creation of the Worldwide Energy Web and the Redistribution of Power on Earth 189(2002).

31. *See* Ross Gelbspan, Boiling Point 176 (2002).

32. Robert Glennon and Andrew Reeves, *Solar Energy's Cloudy Future*, Arizona Journal of Environmental Law & Policy 91, 103-104 (2010).

33. *Id*. at 105.

34. *Id*. at 127, note 248, quoting Electric Power Annual 2008, showing less than 20% efficiency of installed solar capacity.

35. *Id*. 101, note 64.

36. *Id*. at 95, 100-101.

37. *See* www.dsireusa.org.

- Some states distinguish tiers by the vintage for the creation of the REC
- Some states designate tiers by type of technology of renewable resource so as to be able to promote a certain technology
- Some states create technology set-asides or bands of technology
- Other states have only a single type of REC regardless of technology, evidenced by a single tier, with only new construction renewable energy projects eligible other states have a single tier which allows both new and existing projects to qualify

Representative Northeast state programs for RPS are illustrated in Table 6. The RPS programs in the twenty-nine U.S. states are very different in terms of what technologies qualify. Most states allow solar, wind, biomass, and landfill gas resources to qualify in RPS programs; states are less consistent regarding eligibility for biogas, MSW, geothermal, all hydro resources, fuel cells and ocean tidal renewable resources to qualify. Some states count co-generation while Pennsylvania and Massachusetts include coal gasification and non-renewable distributed generation. Resource eligibility in state RPS programs has expanded beyond traditional renewables, with three states now allowing demand-side energy efficiency to meet at least a portion of their RPS requirement. Some states set standards based on a percentage of installed capacity, while other states set standards based as a percentage of total electricity sales.

RPS programs have been characterized as a form of back-door renewable subsidies.[38] In about half of the RPS programs, solar energy installations are being encouraged in a variety of ways. Several states also reward rebates to customers who install solar systems. Solar-specific RPS designs in 11 states and Washington D.C. include solar or distributed generation set-asides for a percentage of eligible projects. These set aside policies have already supported more than 100 MW of solar photovoltaic projects and 65 MW of solar-thermal electric capacity. Roughly 6,700 MW of solar capacity would be needed by 2025 to fully meet existing set-aside requirements. Eligible projects technologies are set forth in Table 5. Some states allow credits to be traded, while other states do not.

38. Robert Glennon & Andrew Reeves, *supra* at 106.

Table 5:"Renewable" Resources as Defined in Early-Adopter State Statutes

State	Solar	Wind	Fuel Cell	Methane /Landfill	Biomass	Trash-to-Energy
Arizona	x	x			x	
California	x	x		X	x	x
Connecticut	x	x	x	X	x	x
Iowa	x	x	x		x	
Illinois	x	x			x	x
Maine	x	x	x		x	x
Maryland	x	x	x	X	x	
Massachusetts	x	x	x	X	x	x
Minnesota		x			x	
Nevada	x	x	x			
New Jersey	x	x	x	X	x	x
New Mexico	x	x	x	X	x	x
New York	x	x				x
Oregon	x	x		X		x
Pennsylvania	x	x		X	x	x
Rhode Island	x	x		X	x	x
Texas	x	x		X	x	x
Wisconsin	x	x	x		x	x

State	Hydro	Tidal	Geothermal	Photovoltaic	Dedicated Crops
Arizona		X		x	
California	x		X	x	
Connecticut	x			x	
Iowa				x	
Illinois		X			x
Maine		X	X	x	x
Maryland			X	x	x
Massachusetts		X	X		x
Minnesota					
Nevada				x	x
New Jersey		X	X	x	x
New Mexico		X	X	x	x
New York		X	X	x	x
Oregon		X	X	x	x
Pennsylvania	x		X	x	x
Rhode Island	x			x	
Texas		X	X	x	x
Wisconsin		X	X	x	

Table 5 Note: Photovoltaic is included within solar in some states; methane and or trash-to-energy may be included within a broad definition of "biomass".

RPS programs have had an impact as a policy tool. Over 50% of the non-hydro renewable capacity additions in the U.S. for the decade from 1998 through 2007 occurred in states with RPS programs; 93% of these additions came from wind power, 4% from biomass, 2% from solar, and 1% from geothermal resources.[39] The required percentage of energy delivered currently from renewables ranges from 2-40% of annual retail sales in different state programs, but these numbers can be deceiving depending upon whether preexisting renewable resources are eligible counted.[40]

B. Legal Limits in a Federalist Regulatory System

Recall that states regard the geographic location where RECs are created differently:

- Several states expressly require that the RECs be created by power generation in the state, some other states require that it either be in-state or in the service territory of a state utility, and yet other states ban the export of RECs out of their states- - these each raise some Constitutional dormant commerce clause issues
- Some states require an in-state transmission interconnection to count an out-of-state REC
- Several states require that a REC actually be associated with energy that is or could be, by virtue of transmission capability that is contracted, delivered in-state
- Some states allow a wider trading area within an ISO or similar region
- Several states encourage, but do not require, RECs to be traded in-state by attaching a multiplier value to these in-state RECs
- Distributed generation typically must be located in the state to qualify to create RECs

These geographic program restrictions raise commerce clause concerns under the U.S. Constitution.[41] Providing limitations for in-state use of elec-

39. R. Wiser & G. Barbose, Renewable Portfolio Standards in the United States, Lawrence Berkeley Laboratory, LBNL 154E,1 (Apr 2008).

40. *See* www.dsire.org.

41. S. Ferrey, Environmental Law: Examples and Explanations 150-155 (5th ed., 2010).

tricity, fuel, or renewable portfolio standards has not been found legally constitutional by the U.S. courts. The dormant Commerce Clause in U.S. law prohibits actions that are facially discriminatory against interstate commerce.[42] Discriminatory statutes are subject to judicial "strict scrutiny," and for such a statute or regulation to be valid the state must establish that there is a compelling state interest for which the statute is the least intrusive means to achieve that interest. If the statute is found to discriminate against out-of-state interests based on geographic limitations or favoring local interests to the detriment of interstate commerce, the court will find the statute to be per se invalid.[43]

Ⅳ. The State-Level Feed-In Tariff and Federalist Issues

A. The Regulatory Tool

Feed-in tariffs are the most w*id*ely employed renewable energy policy in Europe and increasingly, the rest of the world.[44] Approximately 60 countries, including seventeen European Union countries, Brazil, Indonesia, Israel, South Korea, Nicaragua, Norway, Sri Lanka, Switzerland and Turkey all used feed-in tariffs to promote and support renewable energy.[45] A few of these countries also have a federalist form of government. Feed-in tariffs have been successful in encouraging significant renewable energy development in nearly all of the countries in which they have been deployed,[46] but can impose significant costs on captive utility rate payers.

A feed in tariff establishes a secure contract for wholesale electricity sale at a set price that results in a rate of return attractive to investors and develop-

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42. *See* 128 S. Ct. at 1808-09 (quoting *Oregon Waste Systems, Inc. v. Dep't of Envt'l Quality of State of Or.*, 511 U.S. 93, 100 (1994).

43. *See Philadelphia v. New Jersey*, 437 U.S. 617, 624 (1978) (noting that if a statute is facially discriminatory, it is virtually per se invalid).

44. *See* Rickerson and Grace, The Debate over Fixed Price Incentives for Renewable Electricity in Europe and the United States: Fallout and Future Directions (Feb 2007).

45. *Id*.

46. Held, A., Ragwitz, M., Huber, C., Resch, G., Faber, T., & Vertin, K., Feed-in systems in Germany, Spain and Slovenia: A comparison (2007).

ers. The feed-in tariff rate is based not on what the buying utility wants to pay, but rather on a rate that regulators determined will prov*id*e an adequate profit to the seller of the power.[47] Thus, it is not a market transaction, but rather an administrative fiat. Feed-in tariff structures are typically either fixed payments based on an electricity generator's cost to produce electricity, or as a fixed premium paid above the spot market or wholesale market price of electricity.[48] These fixed payments are long-term contracts for from five to thirty years in duration.[49] These feed-in tariffs typically exceed substantially utility-avoided costs, and therefore are justified only by their achieved objective and results, and not typically accepted ratemaking methodology under U.S. law to minimize prudent generating costs.[50] Often the fixed-payment feed-in rates and terms are differentiated by technology and are based on the cost of deploying a given renewable energy technology.[51]

Costs of a feed-in tariff are passed on to consumers by purchasing energy suppliers and reflect a public policy regulatory decision to increase the percentage of renewable electricity sources in use. Many of the countries employing feed-in tariffs today are trying to reduce the amount that their administrators thought was the amount to pay. Spain, Italy, and other countries are recognizing after-the-fact that they have locked in to excessive Feed-in tariffs, which they would now like to reduce. The feed-in tariff promotes renewable power by actually linking the renewable subsidy to the price paid for renewable power, while the RPS does this by creating a separate tradable renewable attribute apart from the value of the power.

B. Constitutional Preemption of State Feed-In Tariffs

State RPS programs to promote renewable power, as discussed above, must

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47. Teresa Morton & Jeffrey Peabody, *Feed-In Tariffs: Misfits in the Federal and State Regulatory Regime?*, 23 Electricity Journal 17 (Oct 2010).

48. Rickerson, Sawin, Grace, *If the Shoe FITs: Using Feed-In Tariffs to Meet U.S. Renewable Electricity Targets*, 20 Electricity Journal 73, 74 (May 2007).

49. Held, A., Ragwitz, M., et al, *supra*.

50. S. Ferrey, The Law of Independent Power section 5:9 (2011).

51. Janet Sawin, *National Policy Instruments: Policy Lessons for the Advancement & Diffusion of Renewable Energy Technologies Around the World*, presented at the International Conference for Renewable Energies, Bonn 2004. *See* http://www.worldfuturecouncil.org/fileadmin/user_upload/Miguel/Sawin__2004__National_policy_instruments.pdf.

be carefully navigating around limitations of the Commerce Clause of the U.S. Constitution, and if done regionally around the Compact Clause, feed-in tariffs must be aware of legal Constitutional limitations in the Supremacy Clause of the Constitution. State feed-in tariffs, until either the U.S. Constitution or the Federal Power Act are altered, are prohibited if mandated by states at prices above the utility's avoided cost of purchasing or producing power for any investor-owned utilities which are regulated.[52] All state feed-in tariffs are designed to do precisely that.

The Federal Power Act in the U.S., sections 205 and 206,[53] empowers exclusively the Federal Energy Regulatory Commission ("FERC") to regulate rates for the interstate and wholesale sale and transmission of electricity.[54] Section 201(f) of the Federal Power Act exempts municipal or publicly owned utilities from FERC authority. The U.S. Supreme Court, in *Federal Power Commission v. Southern California Edison Co.,* 376 U.S. 205, 215–16 (1964), held that Congress meant to draw a "bright line," easily ascertained and not requiring case-by-case analysis, between state and federal jurisdiction. The Act creates this "bright line" between state and federal jurisdiction with wholesale power sales falling on the affirmative *federal* side of the line.[55]

When a transaction is subject to exclusive federal FERC jurisdiction and regulation, state regulation is preempted as a matter of federal law and the U.S. Constitution's Supremacy Clause, according to a long-standing and consistent line of rulings by the U.S. Supreme Court.[56] As articulated by the U.S. Supreme Court "the filed rate doctrine is not limited to 'rates' *per se*: 'our

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52. 16 U.S.C. 824(a)(2); 18 C.F.R. 292.400; See *American Paper Institute v. American Electric Power Serv. Corp*., 461 U.S. 402 (1983).

53. 16 U.S.C. §§ 824d and 824e.

54. *Public Utility District No. 1 of Snohomish County Washington v. FERC*, 471 F.3d 1053, 1058 (9th Cir. 2006), *aff'd in part and rev'd in part sub nom. Morgan Stanley Capital Group, Inc. v. Public Utility District No. 1,* 128 S. Ct. 2733 (2008).

55. *Id*. For a discussion of the California and Western energy crisis that spawned this litigation, *see* S. Ferrey, *Soft Paths, Hard Choices: Environmental Lessons in the Aftermath of California's Electric Deregulation Debacle*, 23 Virginia Env. L. J. 251 (2004).

56. *New England Power Co. v. New Hampshire*, 455 U.S. 331 (1982); *Montana-Dakota Co. v. Public Service Commission*, 341 U.S. 246, 251 (1951), *Nantahala Power & Light Co. v. Thornburg*, 476 U.S. 953 (1986); *Mississippi Power & Light Co. v. Mississippi ex rel. Moore*, 487 U.S. 354 (1988); *Entergy Louisiana, Inc. v. Louisiana Public Service Commission,* 539 U.S. 39 (2003) and *New England Power Co. v. New Hampshire*, 455 U.S. 331 (1982).

inquiry is not at an end because the orders do not deal in terms of prices or volumes of purchases.'"[57]

FERC jurisdiction preempts any and all state regulation of wholesale power transactions and prices: "FERC has exclusive authority to determine the reasonableness of wholesale rates."[58] Federal law creates a "'bright line' between state and federal jurisdiction with wholesale power sales....falling on the federal side of the line."[59] This so-called "filed-rate doctrine" in 1986, and again in 1988, 2003, and 2008, was upheld as to its application emphatically by the Supreme Court.[60]

Attempts by states indirectly or directly to promote higher wholesale energy prices for "certain renewable energy projects have been consistently stricken by the courts and by FERC.[61] The U.S. Supreme Court has held that state regulation is not allowed to conflict with federal regulation, by layering on additional state requirements as obstacles where the federal government exercises jurisdiction.[62] This particularly applies to pricing of wholesale or interstate power transactions.[63]

Promotion of certain types of renewable fuels for power supply, via a renewable resource price preference above and beyond the FERC-established price of other wholesale power transactions at the utility's avoided cost, was held inconsistent with the Federal Power Act and stricken.[64] However, if

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57. *Northern Natural Gas Co. v. State Corp. Commission*, 372 U.S. 84, 90–91 (1963) and *Nantahala Power & Light Co. v. Thornburg*, 476 U.S. 953, 966–67 (1986).

58. *Mississippi Power & Light Co. v. Mississippi*, 487 U.S. 354, 371 (1988); *accord Public Utility District No. 1 of Snohomish County, Washington v. FERC*, 471 F.3d 1053, 1066 (2006); *aff'd in part and rev'd in part sub nom. Morgan Stanley Capital Group, Inc. v. Public Utility District No. 1 et al*., 128 S. Ct. 2733 (2008).

59. *Id*. citing *Nantahala, supra., Southern California Edison, supra, and Mississippi Power, supra*.

60. *Nantahala Power & Light Co. v. Thornburg*, 476 U.S. 953, 963 (1986); *Mississippi Power & Light Co. v. Mississippi ex rel. Moore*, 487 U.S. 354 (1988) ; *Entergy Louisiana, Inc., v. Louisiana Public Service Commission*, 539 U.S. 39 (2003).

61. *Independent Energy Producers Ass'n v. California Pub. Utilities Comm'n*, 36 F.3d 848 (9th Cir. 1994).

62. *Pacific Gas & Electric Co. et al. v. State Energy Resources Conservation and Development Commission et al*., 461 U.S. 190, 204 (1983); *Hines v. Davidowitz*, 312 U.S. 52, 67 (1941).

63. *Independent Energy Producers Association v. California Public Utilities Commission*, 36 F.3d 848 (9th Cir. 1994); *Southern California Edison Co*., 70 F.E.R.C. ¶ 61,215 (1995).

64. *Id*.

states impose a rate in excess of avoided cost by either "law or policy," the "contracts will be considered to be void ab initio."[65] FERC determined that there were no bases "...under which states have independent authority to prescribe rates for sale by QFs [Qualifying Facilities under the federal Public Utility Regulatory Policies Act of 1978] at wholesale that exceed the avoided cost cap contained in PURPA. Moreover, for states to mandate rates above avoided costs for a particular class of power suppliers (i.e. QFs) also runs counter to Congress' and the Commission's current policies which strongly favor competition among all bulk power suppliers."[66]

This longstanding precedent was reaffirmed and clarified in a FERC declaratory order in 2010 and 2011, when California argued that its environmental purposes should make it exempt from preemption in setting above-market wholesale feed-in renewable tariff rates for cogeneration facilities of less than 20 Mw and that environmental costs could be considered avoided costs.[67] The affected utilities and others countered that federal law does not allow state regulation of wholesale sales to achieve state environmental goals, that federal preemption cannot be avoided based on an environmental purpose of the preempted state regulation, and states may not under the guise of environmental regulation adopt an economic regulation that requires purchases of electricity at a wholesale price outside the framework of the Federal Power Act, or if acting under PURPA, at a price that exceeds avoided cost.[68] FERC held that wholesale generators can receive no more than system-wide avoided cost for power sales: "even if a QF has been exempted pursuant to the Commission's regulations from the ratemaking provisions of the Federal Power Act, a state still cannot impose a ratemaking regime inconsistent with the requirements of PURPA and this Commission's regulations—i.e., a state cannot impose rates in excess of avoided cost."[69] FERC rejected all of California's arguments regarding generic environmental rationales for wholesale rates in excess of limits under federal law or set by FERC.[70]

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65. *Connecticut Light & Power Co*,70 FERC at 61, 029-61,030.

66. *Connecticut Light & Power Co*,70 FERC at 61,029.

67. FERC Order on Petitions for Declaratory Order, In re: California Public Utilities Commission, Southern California Edison Company, Pacific Gas and Electric Company, San Diego Gas & Electric Company, FERC Dockets Nos. EL10-64-000 & EL10-66-000 (July 15, 2010).

68. *Id*.

69. *Id*.

70. *Id*.

After losing its petition, California moved for FERC rehearing, or in the alternative a clarification, of this FERC order.[71] While FERC dismissed a rehearing of the matter of whether California authority over wholesale power sale rates was preempted,[72] it did issue a clarification that the avoided costs determined for a Qualifying Facility (―QF‖) selling power to the utility could be determined (1) with respect to actual costs incurred by the purchasing electric utility and (2) reflecting requirements or restrictions imposed under state law on the technologies eligible, thus yielding different tariffs for different technologies subject to state law supply mix requirements.[73] This clarifies that a state can utilize its long-standing authority to specify what mix of power generation technologies a regulated utility should procure going forward. This FERC 2010 order and clarification still preempt the European-style and to-date U.S. state calculations of high feed-in tariffs.

Ⅴ. State Net Metering of Renewable Energy

Net metering in the U.S., is also known as "energy banking" in many of the other countries in the world. It allows those who net meter to either create their own banked power, and by doing so to avoid that approximately two-thirds of the retail power cost that is for other than the cost of the power itself (including transmission, distribution, taxes, and other miscellaneous costs assessed) or to be paid at the higher retail price of power for less expensive wholesale power. However, it does cross-subsidize the net metering party by pushing such costs of subsidy on all ratepayers.

As of 2012, in the U.S., forty-three states and the District of Columbia had some form of net metering, which operates the retail utility meter backwards when a renewable energy generator puts power back to the grid.[74] Net metering can pay the eligible renewable energy source approximately three or four times more for this power when it rolls backwards the retail rate, than paid to any other independent power generators for wholesale power, and much

71. *Order Granting Clarification and Dismissing Rehearing*, Re Southern California Edison Company, et al., 133 FERC Para. 61,059 (October 21, 2010).

72. *Id*. at paragraphs 15, 19.

73. *Id*. at para. 20.

74. *See* www.dsire.org re net metering by the states.

more than the time-dependent value of this power to the purchasing utility.

Some states that allow net metering put a limit on the percentage of total supply that can be net metered, to avoid the problem of net metering power back to the utility when the utility does not need the power. Certain states limit the amount of power that can be net metered, to restrict it to incidental sale of incremental power, rather than a surplus payment to a commercial production of power.[75] The state positions on net metering are set forth in Table. 6.

Table 6
State Net Metering Regulations in Early Adopter States

State	Eligible Technologies	Eligible Customers Limits	Size Limitations	Price	Authorization
Arizona	Renewables & cogeneration		< 100 kW	Excess* purchased at avoided cost	Ariz. Corp. Comm. Decision No. 52345
California	Solar and wind	Residential and Small Commercial	< 10 kW	Excess purchased at avoided cost; month- to-month carryover allowed w/utility consent	Calif. Pub. Util. Code §2827
Colorado	All resources		< 10 kW	Excess carried over month-to-month	Pub. Svc. Co. of Colo., Advice Letter 1265; Decision C96-901
Connecticut	Renewables & cogeneration		< 50 kW for cogeneration; < 100 kW for renewables	Excess purchased at avoided cost	Dept. of Pub. Util/ Control, Order No. 159
Idaho	Renewables & cogeneration	Residential and small commercial	< 100 kW	Excess purchased at avoided cost	ID PUC Orders Nos. 16025 (1980); 26750 (1997)
Indiana	Renewables & cogeneration		< 1,000 kWh/ month	Excess is "granted" to the utility; No purchase of excess	170 IN Admin. Code §4-4, 1-7
Iowa	Renewables		No size limit	Excess purchased at avoided cost	Iowa Util. Bd., Utilities Division Rule §15.11(5)
Maine	Renewables & cogeneration		< 100 kW	Excess purchased at avoided cost	Me. PU Code Ch. 36, §§1(A)(18), (19), §4(C)(4)
Maryland	Solar	Residential	< 80 kW	Excess carried over to following month	Maryland Art. 78, §54M

75. Mary Powers, *Maryland Regulatory Staff Takes Side of Solar Producers on Net Metering Issues*, || Electric Utility Week 24 (Aug 16, 2010).

Massachusetts	Renewables & cogeneration		< 60 kW = Class I Between 60 kW and 1 MW = Class II Between 1-2 MW = Class III[76]	Excess purchased at avoided cost	Mass. Gen. Laws c. 164, §1G(g); D.T.E. Order 97-111 Note: < 30 kW 220 CMR §8.04(2)
Minnesota	Renewables & cogeneration		< 40 kW	Excess purchased at "average retail utility energy rate"	Minn. Stat. §261B.164(3)
Nevada	Solar and wind		< 10 kW	Excess purchased at avoided cost; annualization allowed	Nev. R. Stat. Ch. 704
New Hampshire	Solar, wind & hyrdo		< 25 kW	PUC may require "netting" over 12- month period; retailing wheeling allowed for up to 3 customers	
New Mexico	Renewables, fuel cells, micro turbines		< 1,000 kW	Excess credited to following month; unused credit is granted to utility at end of 12-month period	NM PUC Order 2847 (11/30/98)
New York	Solar	Residential	< 10 kW	Excess credited to following month;	NY Public Service
				unused credit is granted to utility at end of 12-month period	Stat. §66-j
North Dakota	Renewables & cogeneration		< 100 kW	Excess purchased at avoided cost	N.D. Admin. Code §69-09-07-09
Oklahoma	Renewables & cogeneration		< 100 kW and annual output < 25,000 kWh	Excess is "granted" to the utility; no purchase of excess	Ok. Corporations Comm. Schedule QF-2
Pennsylvania	Renewables		< 50 kW	Excess purchased at wholesale rate	PECO Rate R-S, Supp. 5 to PA Tariff PUC No. 2, Page 43A
Rhode Island	Renewables & cogeneration		< 25 kW for larger utilities; < 15 kW for smaller utilities	Excess purchased at avoided cost	PUC Supp. Decision and Order, Docket No. 1549
Texas	Renewables		< 50 kW	Excess purchased at avoided cost	Texas PUC, Rule §23.66(f)(4)

76. The recent GREEN, COMMUNITIES ACT (Senate No. 2768 pro*vides* for Class I, II, III, neighborhood, solar and wind net metering facilities with wind and solar up to 2 MW allowed to net meter.

Vermont	Solar, wind, fuel cells using renewable fuel, anaerobic digestion	Residential, commercial, and agricultural customers	<15 kW, except < 100 kW for anaerobic digesters	Excess carried over month-to-month; any residual excess at end of year is "granted" to the utility	Reuse of Net Metering, VT. PSB Docket No. 6181 (April 21, 1999)
Washington	Solar, wind and hydropower		< 25 kW	Excess credited to following month; unused credit is granted to utility at end of 12-month period	
Wisconsin	All Resource	All retail customers	< 20 kW	Excess purchased at retail rate for renewables, avoided cost for nonrenewables	Pub. Svc. Comm. Schedule PG-4
Connecticut	Solar, wind, hydro, fuel cell, sustainable biomass	Residential	No size limit	Not specified	CT Public Act 98-28 (1998)
Illinois (pending)	Solar and wind	All retail customers	< 40 kW	Excess carried over month-to-month; any residual excess at end of year is purchased at avoided cost	Ill. Legis. S.B. 1228
Maine	Renewables or other applicable technology		< 100 kW	Excess carried over month-to-month; any residual excess at end of 12-month period is eliminated	Me. PU Code Ch. §313 (1998); PUC Order No. 98-621 (December 19, 1998). [35-A MRSA §3210(2)(C)]
Puerto Rico (pending)	Renewables	Residential	< 50 kW	Excess carried over month-to-month; any residual excess at end of year is purchased at avoided cost	

* "Excess" refers to the "net excess generation" of electricity by the customer-generator (i.e., generation exceeds consumption) during the billing period.

Among U.S. states, Massachusetts has gone the furthest of all, adopting a community net metering amendment.[77] One can designate anyone in the same utility service territory as someone whose metered retail electricity consumption also can be rolled backwards in reverse due to sales from an unrelated

77. 220 C.M.R. 11.04(7)(C).

net metered renewable power project.[78] In other words, if one's solar collector or wind turbine produces more power than one consumes, one can roll one's own retail meter back to zero to reflect no net consumption, and simultaneously roll back the net consumption on other meter(s) in the community. By creating a legal hypothetical premise of shared on-site power consumption from one source at unrelated locations, this ensures that the entire net wholesale distributed net generation quantity will be credited at retail rates by rolling back some retail meters.

In Massachusetts, this allows one's surplus and unused distributed renewable power to be treated as if it were produced and used on site at another location in the same utility geographic service territory -- although that power is not produced there and the other customer produces no distributed power at all, nor does the power physically ever reach that other customer. As a legal concept, one rolls back multiple retail meters where the retail (including transmission & distribution charges, taxes, and regulatory costs), not wholesale, price of power is credited at a recent $ 0.12 - $ 0.17/Kwh, or approximately 300% the actual market value of wholesale power through this legal convention. Although there are six other states (California, Oregon, Pennsylvania, Rhode Island, Washington, West Virginia) that allow an owner who has multiple meters on its property to apply the net metered sale to all of its personal meters,[79] to date, Massachusetts is the only state to allow such a regulatory multi-meter accounting, and this new program has not been challenged in court.

By turning the meter backwards, net metering effectively compensates the generator at the full retail rate for transferring just the wholesale energy commodity. While most states compensate the generator for excess generation at the avoided cost or market-determined wholesale rate, as Table 7 shows, some states compensate the wholesale energy seller for the excess at the fully loaded, and much higher, retail rate.

Ⅵ. Direct Renewable Subsidies

78. *Id*.

79. Ethan Howland, *Arizona Eyes Aggregated Net Metering Plan similar to programs in Six States*, Electric Utility Week 19-20 (Dec 6, 2010).

A. The Regulatory Tools

There is a variety of ways to incentivize the deployment of these various renewable generation resources. Primarily, these include federal tax incentives, renewable portfolio standard requirements, and promotional feed-in tariffs paid for the sale and delivery of renewable energy. An additional mechanism is the state system benefit charge and renewable trust funds. These are set forth in Table 7 for representative Northeast U.S. states.

At the state level, the system benefits charge is like a tax on utility consumption, or surcharge mechanism, for collecting funds from electric consumers, the proceeds of which then support a range of energy activities. In order to support renewable resources, funds are collected through a nonbypassable system benefits charge to users of electric distribution services.[80] The money raised from the system benefits charge is then used to ―buy down‖ the cost of power produced from sustainable technologies , so that they can compete with more conventional technologies.

Between 1998-2012, approximately $3.5 billion will have been collected by 14 U.S. states with existing renewable system benefit charges to endow energy trust funds.[81] As of 2006, U.S. states' energy trust funds had committed almost $400 million to support 2,249 MW of renewable energy capacity.[82] Most only provide assistance to new projects, and not existing renewable projects. The funding levels of these state charges on electric distribution range from $0.07/mwh in Wisconsin up to almost $0.6/mwh in Massachusetts.[83] The mean value is about 0.1 cents/kWh of consumption.[84]

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80. S. Ferrey, Law of Independent Power, *supra*., Section 10:95 and note 3.

81. M. Bolinger & R. Wiser, for Clean Energy States Alliance, The Impact of State Clean Energy Fund Support for Utility-Scale Renewable Projects (2006), available at http://eetd.lbl.gov/ea/ems/cases/lbnl-56422.pdf.

82. *Id.*, report of Laurence Berkeley Laboratory available at http://eetd.lbl.gov/ea/ems/cases/lbnl-56422.pdf.

83. *Id.*

84. Martin Kushler, et al., *Five Years In: An Examination of the First Half-Decade of Public Benefit Energy Efficiency Policies*, ACEEE Paper U04 (Apr 2004).

Table 7: Seven Northeast State Public Benefits Funding Renewable Projects

State	Funding	Renewables Uses and Eligibility
Connecticut	0.5 mills/kWh in 2000 0.75 mills in 2002 1 mill in 2004 - $28 million/year average through 2012 Fund reduced by approx. 33% in FY04 and for next 7 years to pay back bonds issued to cover state budget deficit.	Solar, wind, ocean thermal, wave, tidal, landfill gas, low emission biomass, fuel cells. Economic development and renewables for customers. May invest in renewable projects outside of state.
Massachusetts	Averages 0.95 mills/kWh first 5 years = $40 million per year. 0.25 mills dedicated for MSW pollution controls or retirement. 0.5 mills thereafter (no MSW) ~$20-$25 million/year.	New solar, wind, ocean, advanced biomass, fuel cells, possibly DSM and distribution generation.
New Jersey	1.8 mills/kWh for energy efficiency and Class I renewables for first 4 years; 2.1 mills/kWh next 4 years (min. of $107.5 million/yr through 2008). 75% of funds for efficiency $9~105 million/yr avg) 25% of funds for Class I renewables (~$35 million/yr avg) 2001 BPU Order sets initial 3 year (2001-2003) funding level at $358.5 million (75% for efficiency, 25% of Class I renewables).	Class I renewables (wind, PV, solar thermal, biomass, fuel cells, LFG, wave/tidal, and geothermal.) Allocation of renewable energy funds is 60% customer sites, 40% grid supply in 2001, and split 50/50 each year thereafter.
New York	0.6 – 1.0 mills/kWh per utility; avg. ~0.7 mills ~$78 million/yr for 3 years (1999-2001) Efficiency = 67%; renewables/R&D = 18%; low-income = 14% $17 million over three years for renewables (including $4 million from Niagara Mohawk) Fund extended at $150 million/yr for 5 years. $70 million over 5 years for renewables, including $47.5 million for wind power, and the rest for biomass and solar.	Wind, solar, biomass. Competitive bidding by technology. Funding programs include grants, loans, guarantees, investments, buy downs, and rebates.
Rhode Island	2.3 mills/kWh 1997-2012, (2.0 mills/kWh for DSM programs and 0.3 mills/kWh for renewables) ~$17 million/yr, with 2.5 million/yr for renewable	Wind, solar, sustainable, biomass, existing hydro 100 MW or less.

• Reflects the sum of the annual average of each fund. Since funds have different durations, actual annual funding amounts will vary.

As Table 8 illustrates, the funding level is in the range of $175-$250 million annually for the cumulative impact of the fourteen state renewable energy system benefit charge and trust fund programs.[85] While many of these programs are set up to run indefinitely, others have set life spans. The level of per capita funding ranges between $0.90-$4.40 annually for renewable energy.[86] Expressed another way, for each megawatt hour sold in the state, the level of subsidy ranges from $0.07-$0.59.[87]

Table 8: State Renewable System Benefit Funding Levels and Program Duration

State	Approximate Annual Funding ($million)	Per-Capita Annual Funding	Per-MWh Funding	Funding Duration
CA	$135	$4.0	$0.58	1998 – 2011
CT	$15 - $30	$4.4	$0.50	2000 – indefinite
DE	$1 (maximum)	$1.3	$0.09	10/1999 – indefinite
IL	$5	$0.4	$0.04	1998-2007
MA	$30 - $20	$4.7	$0.59	1998 – indefinite
MT	$2	$2.2	$0.20	1999 - July 2003
NJ	$30	$3.6	$0.43	2001-2008
NM	$4	$2.2	$0.22	2007 – indefinite
NY	$6 - $14	$0.7	$0.11	7/1998 – 6/2006
OH	$15 - $5 (portion of)	$1.3	$0.09	2001 – 2010
OR	$8.6	$2.5	$0.17	10/2001 - 9/2010
PA	$10.8 (portion of)	$0.9	$0.08	1999 – indefinite
RI	$2	$1.9	$0.28	1997 – 2002
WI	$1 - $4.8	$0.9	$0.07	4/1999 – indefinite

B. The Federalist Legal Issues

The system benefit charge and renewable trust fund, since they do not directly set the terms or prices of the sale of wholesale power, but rather are

85. M. Bolinger & R. Wiser, for Clean EnergyStates Alliance, The Impact of State Clean Energy Fund Support for Utility-Scale Renewable Projects (2006), available at http://eetd.lbl.gov/ea/ems/cases/lbnl-56422.pdf.

86. *Id* .

87. *Id*.

much like a tax, is within general state power and is not directly affected by the Federal Power Act in the U.S. legal and regulatory system. However, in applying this tax, it must be even-handed and not discriminate against interstate commerce based on place of origin of the power generation. As long as the tax is imposed even-handedly at the retail level, and/or over power distribution, over which aspects the states have regulatory authority pursuant to the federal power act, there is no Constitutional problem in a federalist system. However, if the state attempted to tax wholesale power transactions, interstate power sales, or transmission of power, all of which are reserved to federal authority pursuant to the Federal Power Act, that state regulation could be suspect.

Ⅶ. Conclusion

Legal structure affects the tools that can be used legally to effectively promote renewable power technologies. Those countries with a federalist form of government, such as the United States, Germany, India, Australia, Brazil, Canada, Mexico, Switzerland, and others must carefully design and implement renewable energy policies.

Renewable initiatives implemented recently in the United States are an examination of what can go wrong or right under this form of federalist government in the era of renewable energy. There are a series of judicial decisions, interpreting the dormant Commerce Clause and the Supremacy Clause of the U.S. Constitution, constrain the discretion of unlimited government control at a particular level of government. While not all federalist systems in the world are the same, the United States offers a rubric for analysis. To change the technology of energy use to more low-carbon renewable resources, the form of government matters. These challenges are important, and not always appreciated in legislations and regulation.

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