

Descriptive Analysis

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1 Things to look up

- When did placed in service switch to start construction?

2 Pre-2005 Credits

- Energy Policy Act of 1992
 - made 10% ITC for solar and geothermal permanent
 - first enactment of PTC for electricity generated using wind or closed-loop biomass
- Working Families Tax Relief Act of 2004
 - extended PTC through December 31, 2005; at this point PTC for poultry waste, too
- American Jobs Creation Act of 2004
 - Added open-loop biomass (including agricultural livestock waste), geothermal, solar, small irrigation power, and municipal solid waste (landfill gas and trash combustion); but limited to five-year PTC period
 - Open-loop biomass, small irrigation power and municipal solid waste received only half credit
 - Introduced PTC for refined coal, with rate of \$4.375 per ton on qualifying serviced placed in service before January 1, 2009

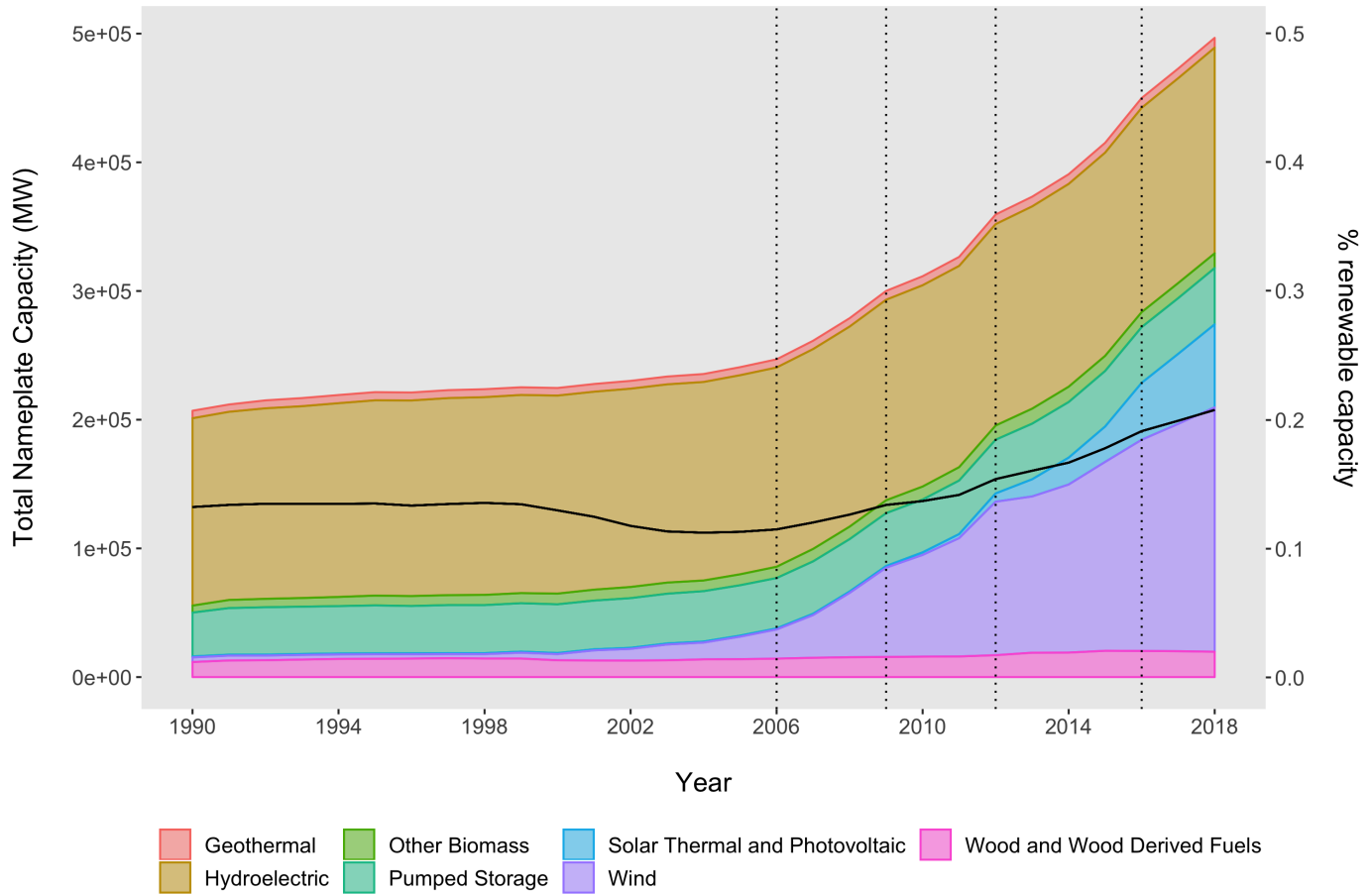
3 Relevant Policies 2005–Present

- After December 31, 2005, PTC for solar expires
- Energy Policy Act of 2005 (8/8/05)
 - increased solar ITC from 10% to 30% for 2006 and 2007
 - 30% ITC for fuel cell power plants,
 - 10% for stationary microturbine power plants placed in service during 2006 and 2007
 - extended PTC for all facilities except solar energy and refined coal for two years, through 2007
 - added PTC for hydropower (half-credit) and Indian Coal (seven-year period, \$1.50 per ton for first four years, then \$2.00 per ton for last three years)
 - extended PTC period from 5 to 10 years for all qualifying facilities (other than Indian Coal) for all qualifying facilities placed in service after August 8, 2005
- Tax Relief and Health Care Act of 2006 (12/20/06)
 - extended ITC through 2008
 - extended PTC through 2008 for all technologies but solar, refined coal and Indian coal through 2008

- Emergency Economic Stabilization Act of 2008 (10/3/08)
 - extended credits for solar, fuel cells and microturbines through December 31, 2016
 - provided 10% credit for geothermal heat pump property
 - 30% credit for qualified small wind energy property
 - 10% credit for combined heat and power (CHP)
 - ITC all with placed-in-service deadline of December 31, 2016
 - PTC for wind and refined coal extended through 2009
 - PTC for closed-loop and open-loop biomass, geothermal, small irrigation, municipal solid waste, and hydropower extended two years through 2010
 - added PTC for marine and hydrokinetic renewable energy; and new credit for steel industry fuel
- American Recovery and Reinvestment Act of 2009 (2/17/09)
 - extended PTC for wind through 2012 and for other technologies through 2013
 - allowed ITC or one-time grant in lieu of PTC for property placed in service or start construction in 2009 and 2010
- Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act of 2010
 - extended grant program for one year (through 2011)
- American Taxpayer Relief Act of 2012 (1/2/13)
 - extended PTC for wind through 2013,
 - changed placed-in-service PTC requirement to start construction
- Tax Increase Prevention Act of 2014 (12/19/14)
 - PTC and ITC in lieu of PTC option retroactively extended through 2014
- Consolidated Appropriations Act, 2016 (12/18/15)
 - extended the 30% credit rate for solar electric or heating property (but not fiber-optic) through 2019
 - Termination date changed from placed-in-service deadline to construction start date
 - Credit set at 26% for construction beginning in 2020; 22% for 2021
 - To qualify for a rate in excess of 10%, property must be placed in service by December 31, 2023
 - extended PTC expiration date for nonwind facilities through end of 2016
 - extended ITC in lieu of PTC option through 2016
 - extended PTC for Indian Coal through 2016
 - removed placed in service limit for Indian Coal
 - extended PTC for wind through 2019 with reduced rates each year
 - A permanent 10% ITC will remain for solar and geothermal
- Bipartisan Budget Act of 2018 (2/9/18)
 - retroactively extended PTC for nonwind and Indian Coal for tax year 2017
 - extended ITC for five years for fiber-optic solar, fuels cells, small wind, microturbine, CHP, geothermal heat pump property
 - For property eligible for 30% credit rate through 2019, credit rate reduced according to solar reduction schedule
 - All termination dates changed to construction start deadlines

4 EIA Annual Capacity Data

U.S. Renewable Energy Capacity (MW)



Comments

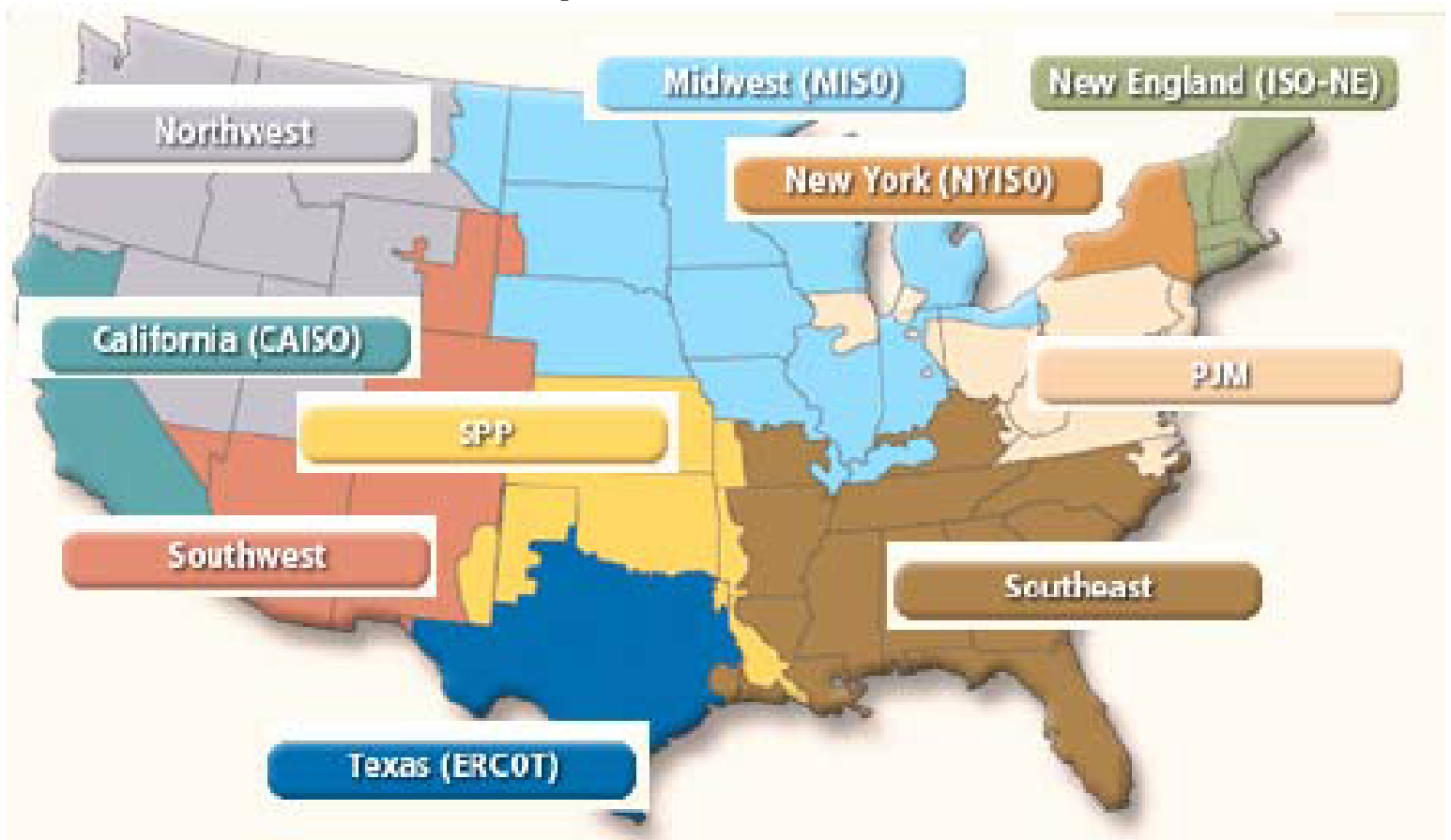
- Vertical lines at 2006 (ITC and PTC increase), 2009-2012 (loan grant program), 2016 (initial expiration)
- Renewables growth driven by solar (after 2012) and wind (after 2006)

Figure 1: Renewable capacity (as stock and percent of total capacity) by region in 2018

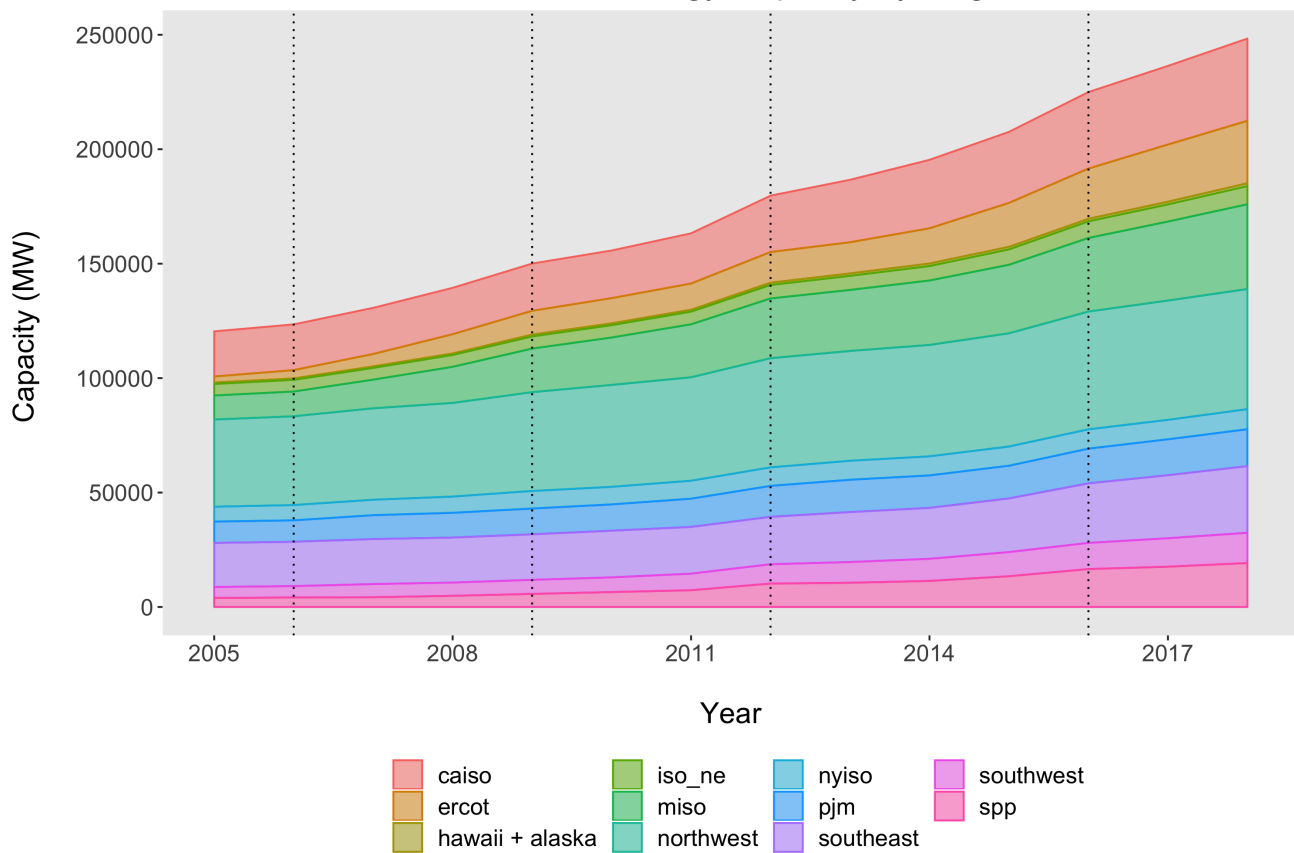
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7 pjw	0.203
8 hawaii + alaska	0.198
9 nyiso	0.142
10 iso_ne	0.131
11 southeast	0.0824

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6 spp	19210.
7 pjw	16127.
8 hawaii + alaska	13216.
9 nyiso	8777.
10 iso_ne	7927.
11 southeast	1236.

Figure 2: FERC Power Markets



Renewable Energy Capacity by Region



% Renewable Capacity by Region

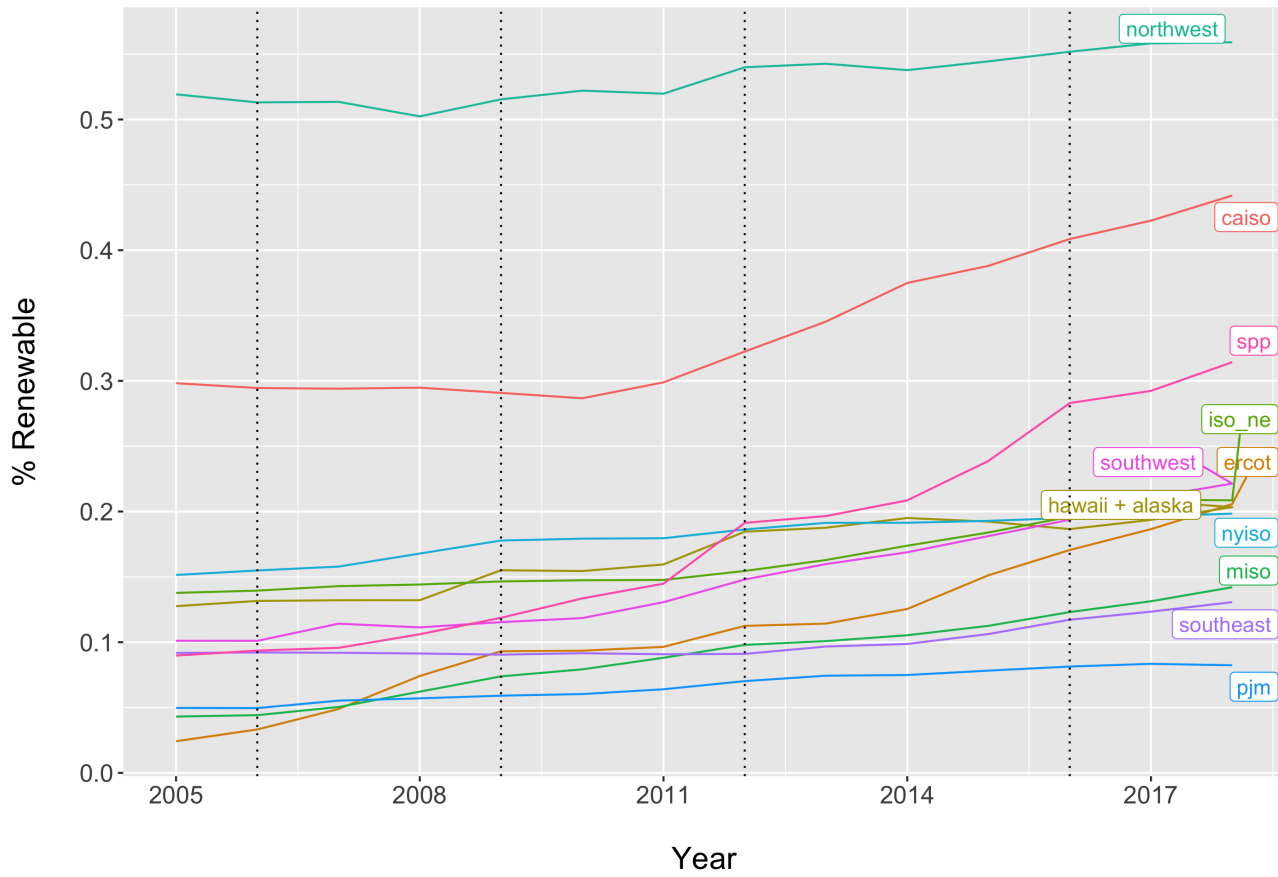
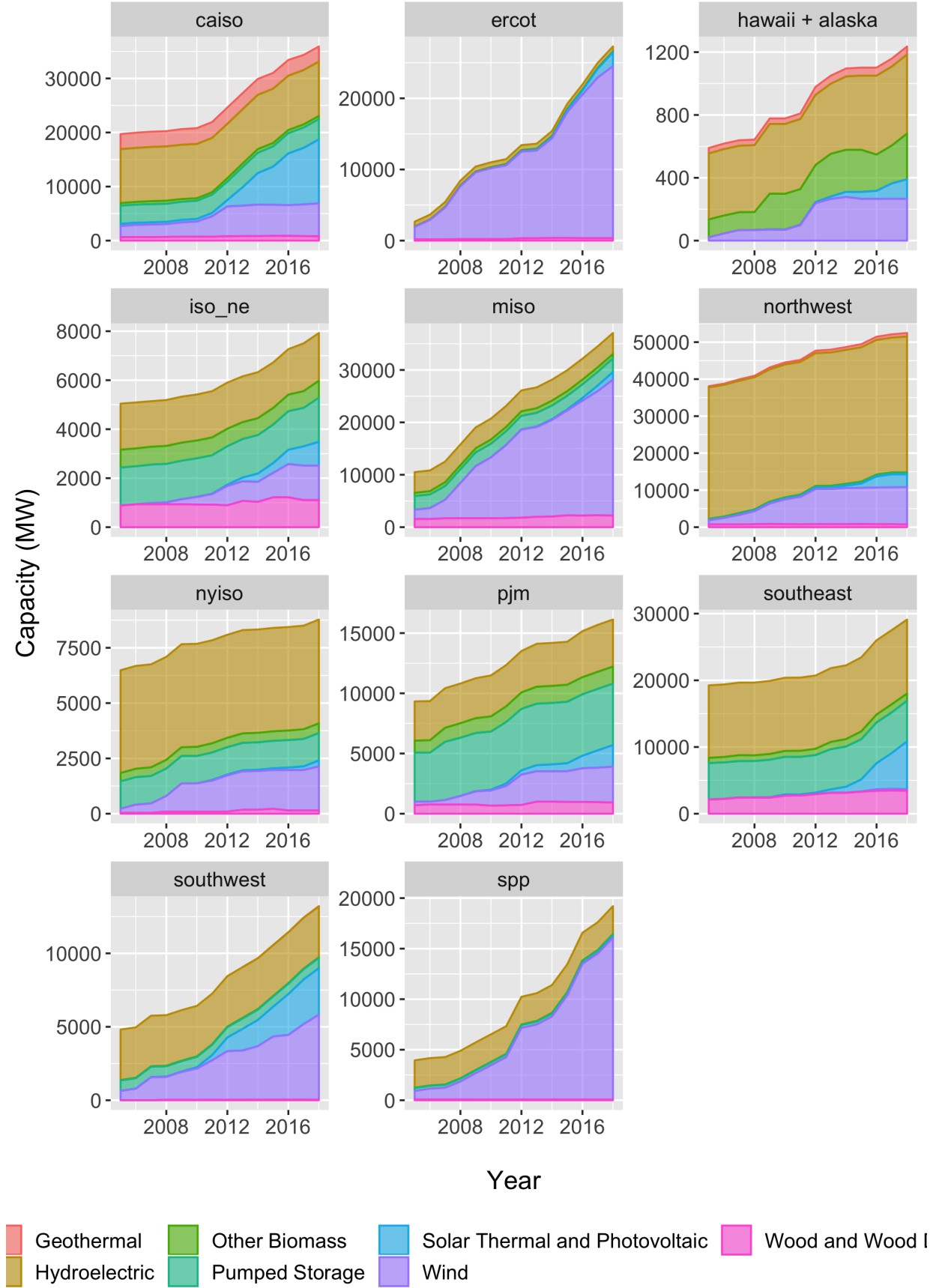
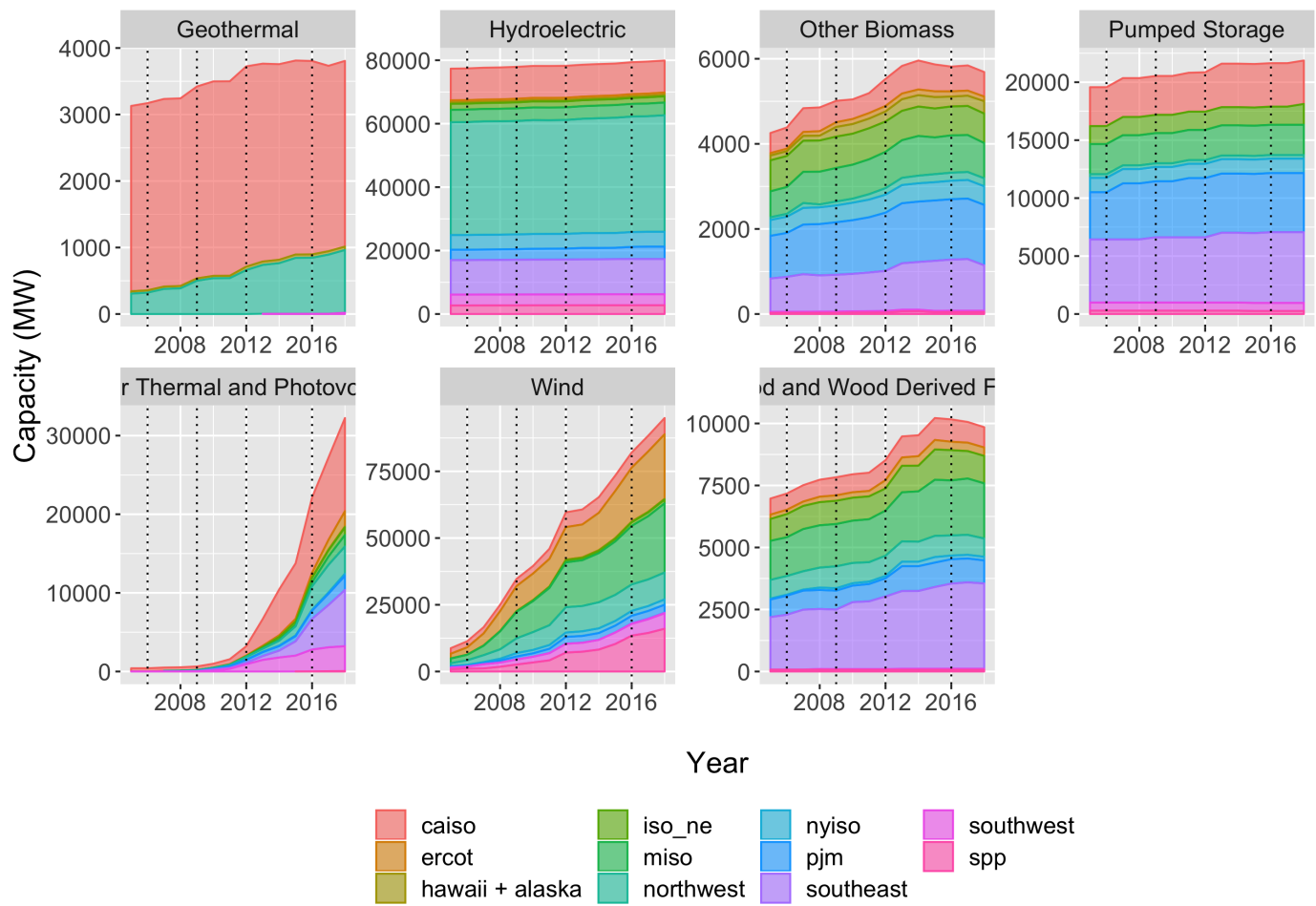
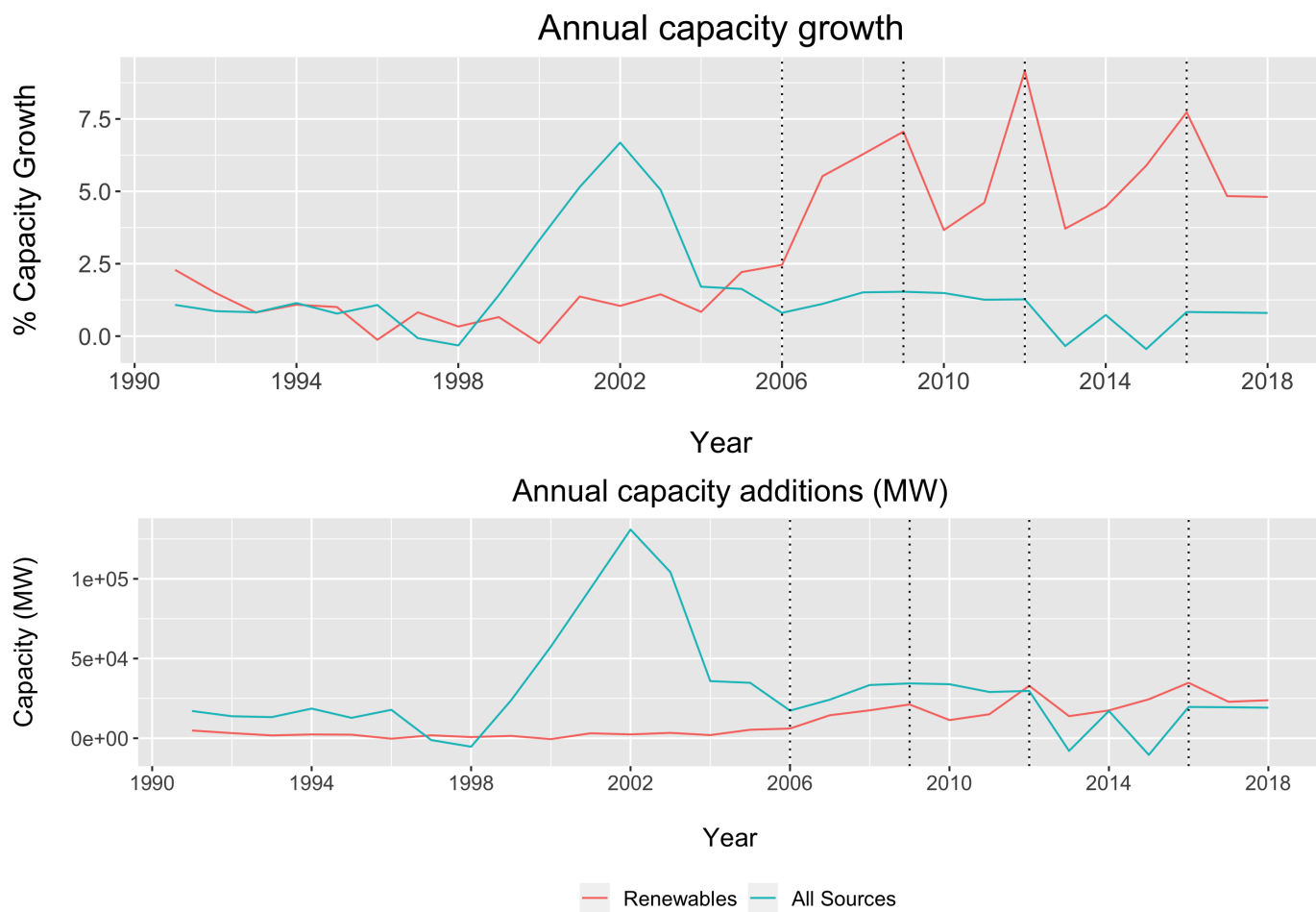


Figure 3: Renewable Energy Sources by Region





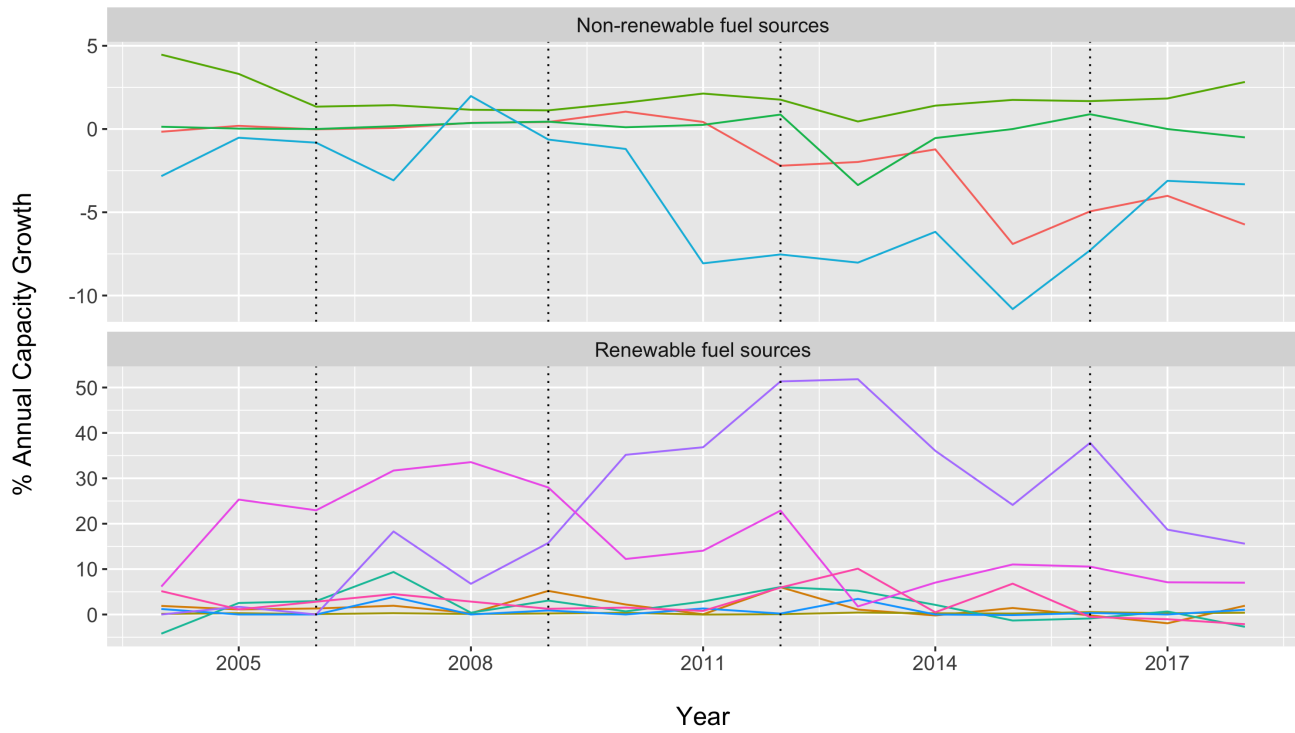


Vertical lines indicate the following policy changes:

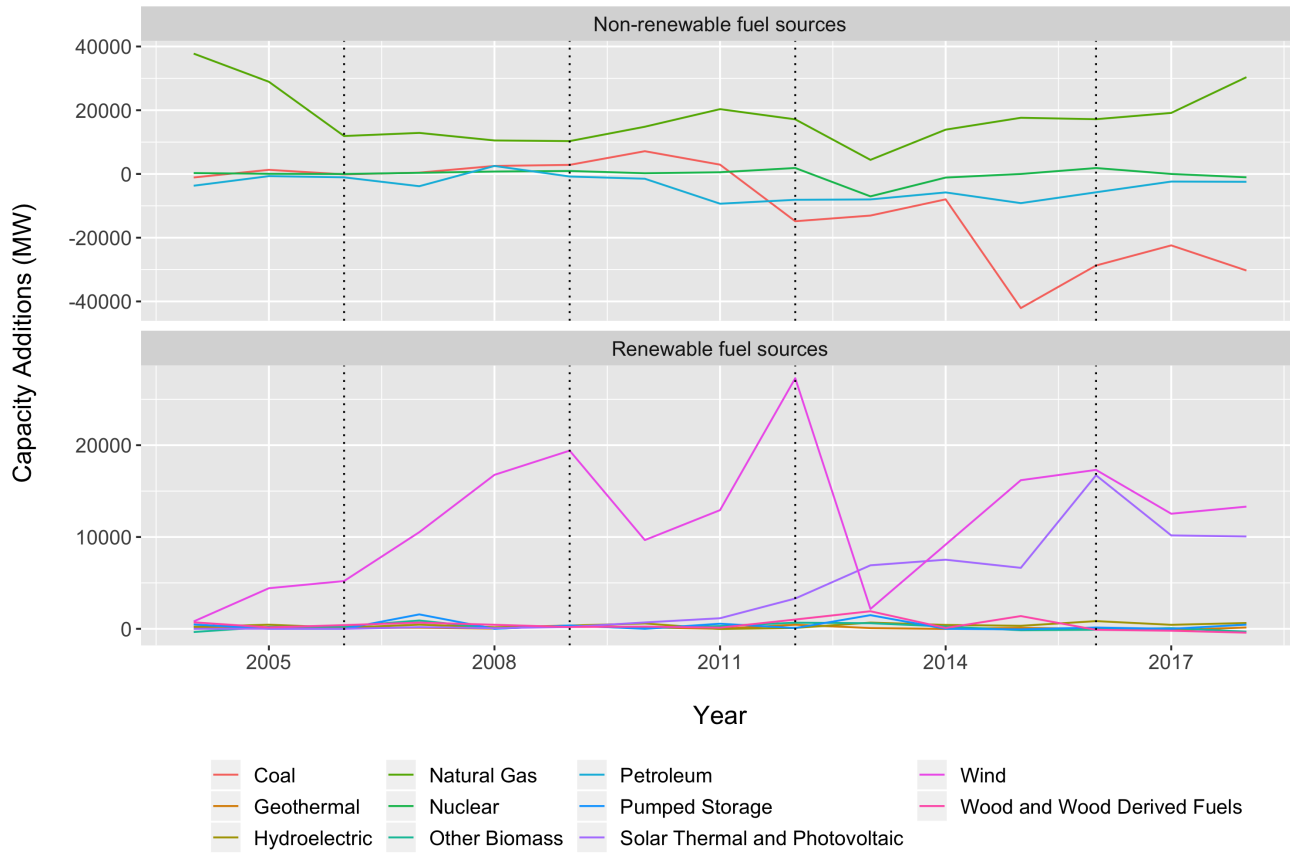
- 2006: First year of 30% ITC, 10-year PTC
- 2009-2012: Loan grants in lieu of ITC; ITC or loan grant in lieu of PTC
- 2016: Original end of ITC

There appear to be spikes in renewable capacity additions that align with these programs.

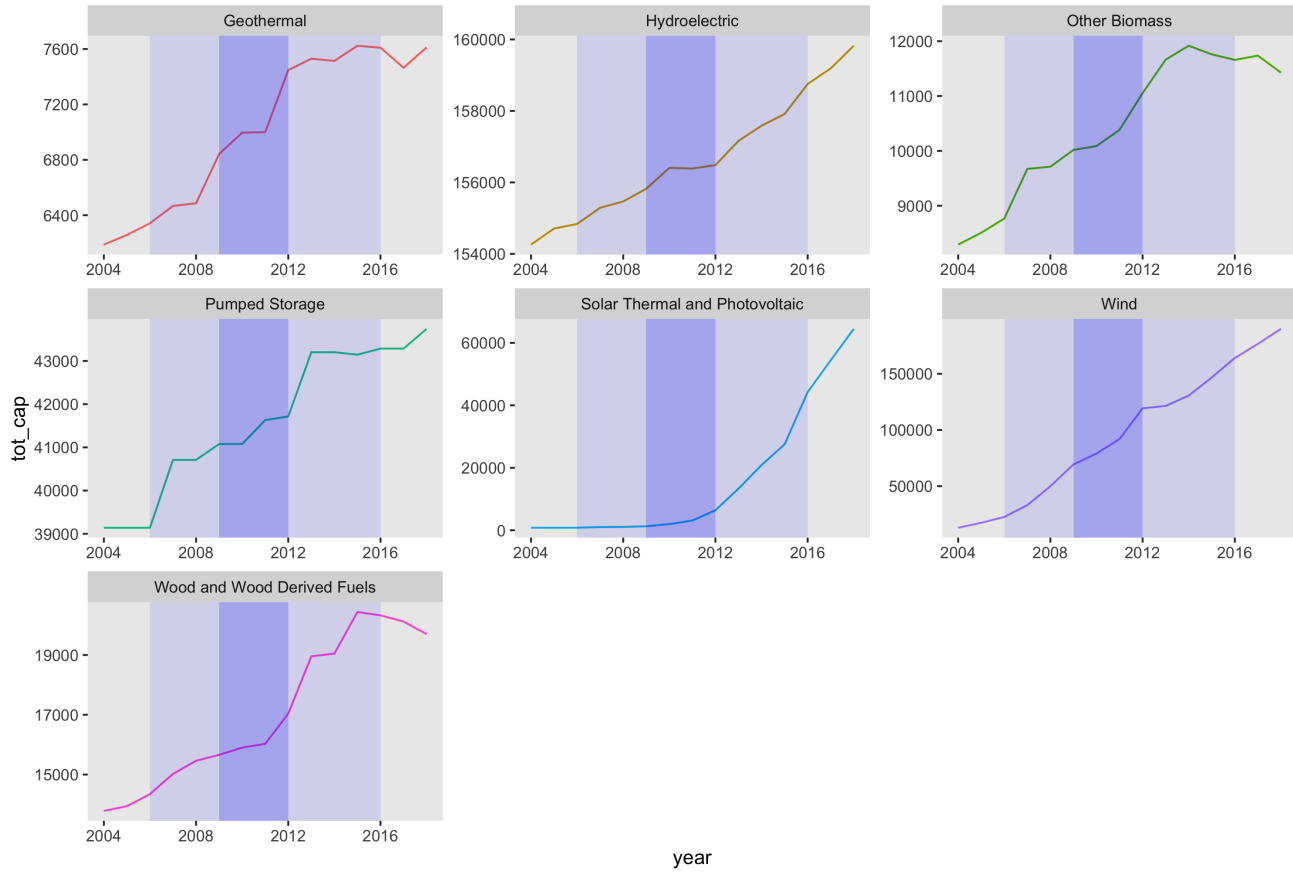
Annual Capacity Growth by Technology



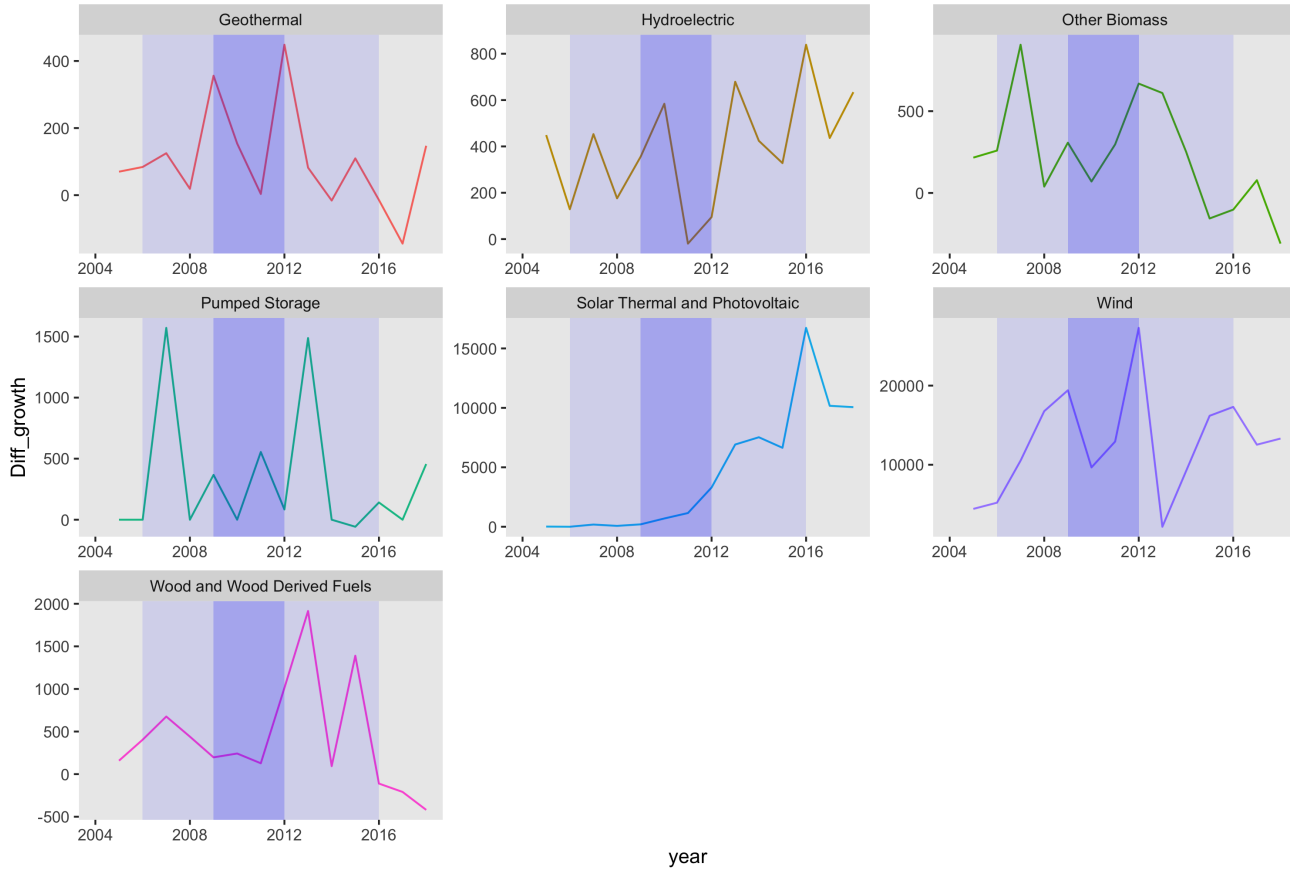
Annual Capacity Additions by Technology



U.S. Renewable Energy Capacity (MW), 2005-2018



Annual Capacity Additions (MW), 2005-2018

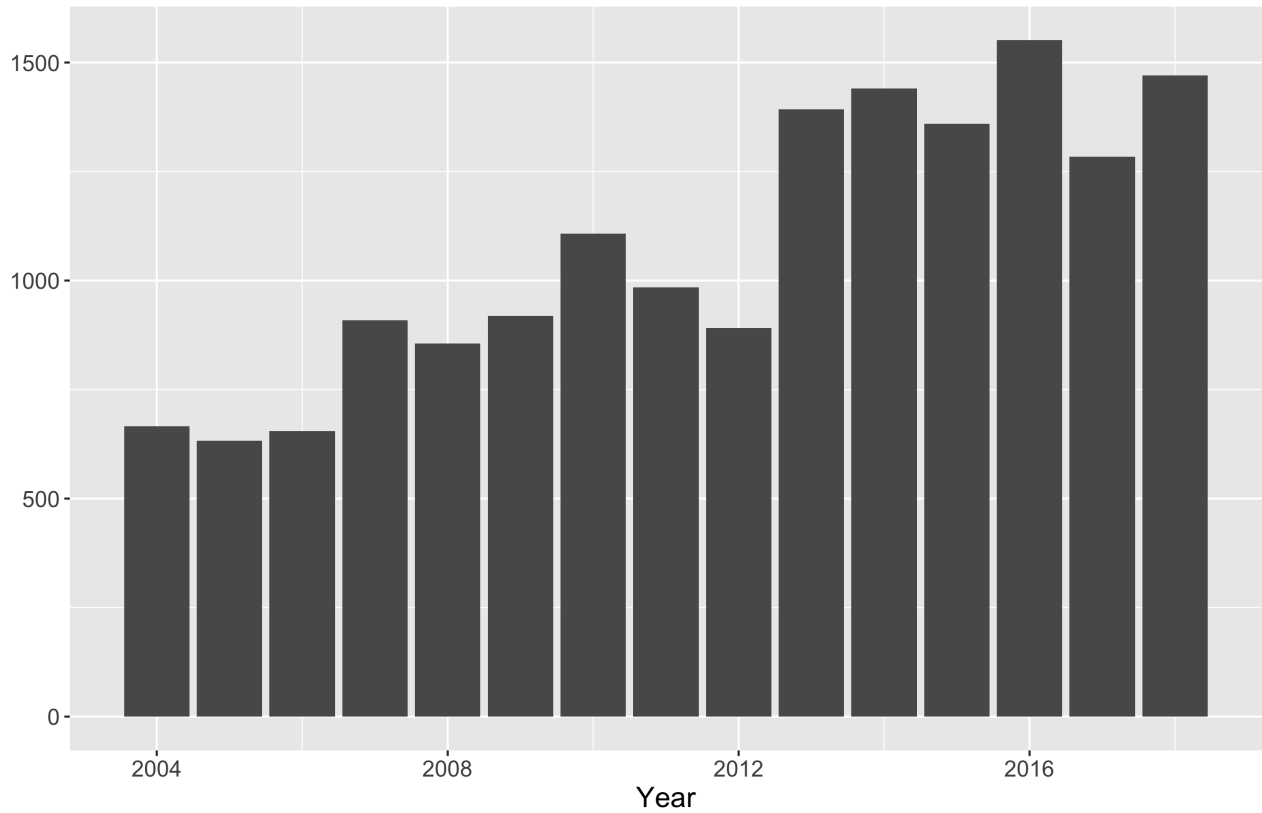


5 To Do with capacity data

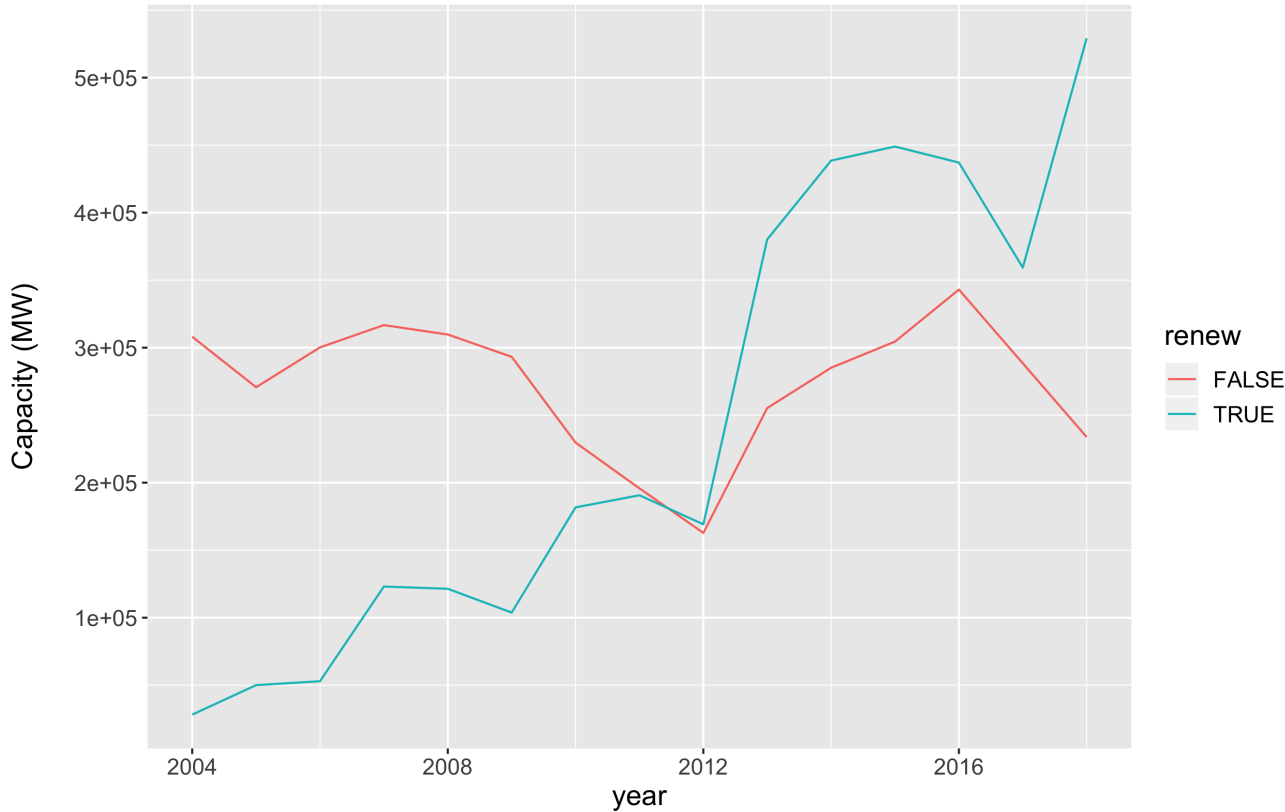
1. Renewable capacity in regulated vs. non-regulated... (I started but need to weight appropriately)
2. Find out details about placed in service requirements for tax credits
3. Calculate variable = tax credit rate for each technology + RPS variables

6 Proposed generator data

Number of proposed generators by year



Proposed capacity additions



Size of proposed capacity additions

