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EPA Proposed Regulation of CO_2 from Existing Power Plants

Symposium on the EPA's Proposed Rules on Carbon Reduction

September 25, 2014

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EPA's Proposed Rules on Carbon Reduction Context and Challenges

- National view of Electric Generation Technology
- We are not just coal
- The proposed rule is all about CO_2 reduction
- Our goals are aligned with the environmental community
- EPA has been prescriptive in how it established each state's CO_2 emission reduction requirement, providing states with the flexibility to craft their own unique plan to achieve the state's CO_2 reduction requirement
- Preliminary challenges we have identified are: timing, cost, and reliability, as well as the ability to efficiently adapt nuclear, solar, wind, and hydro technologies in our region

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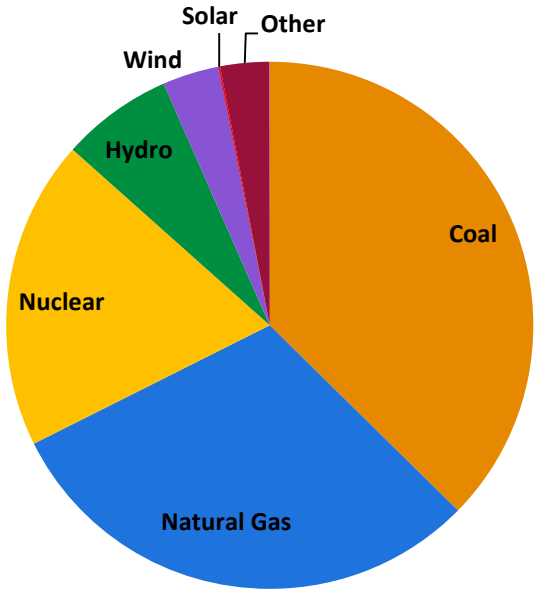
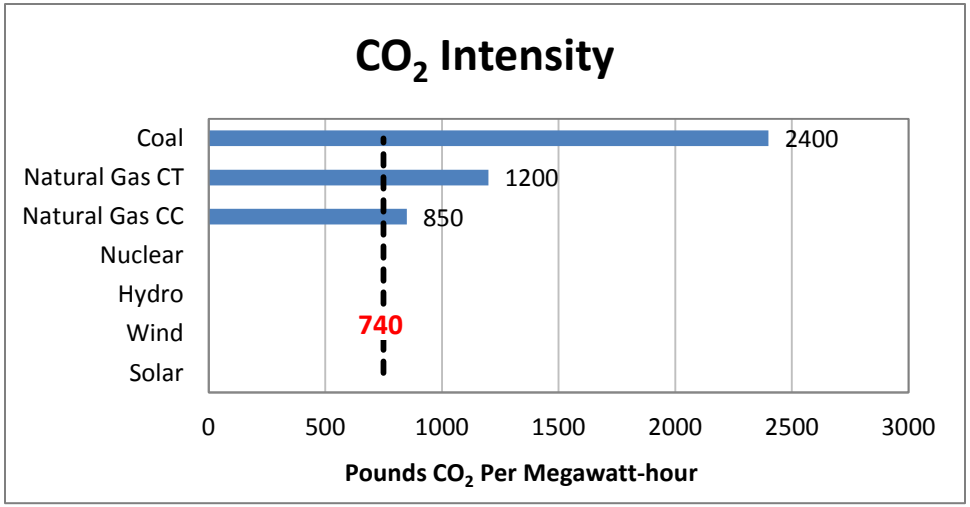
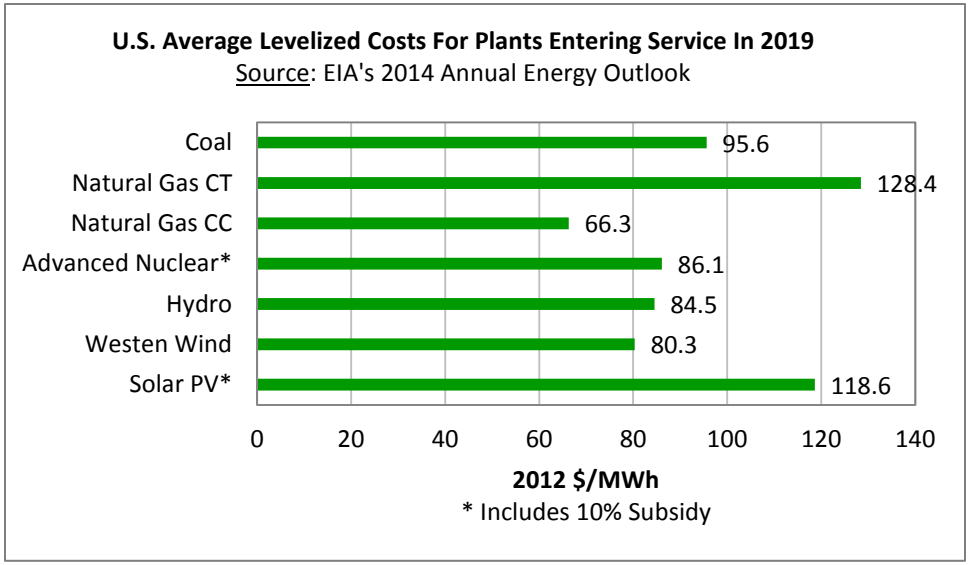
EPA Proposed Carbon Reduction Guidelines
National View of Electric Generating Technology
2012 US National View



Electricity Generation by Source (EIA)	
Coal	37%
Natural Gas	30%
Nuclear	19%
Hydro	7%
Wind	3%
Solar	0.1%
Other	3%





The proposed rules target carbon emissions with mandatory state-level performance goal, rather than a goal for individual energy sources

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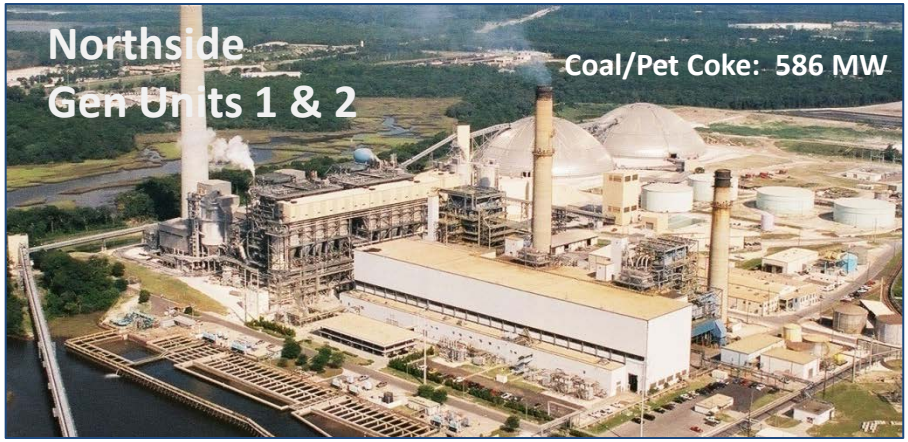
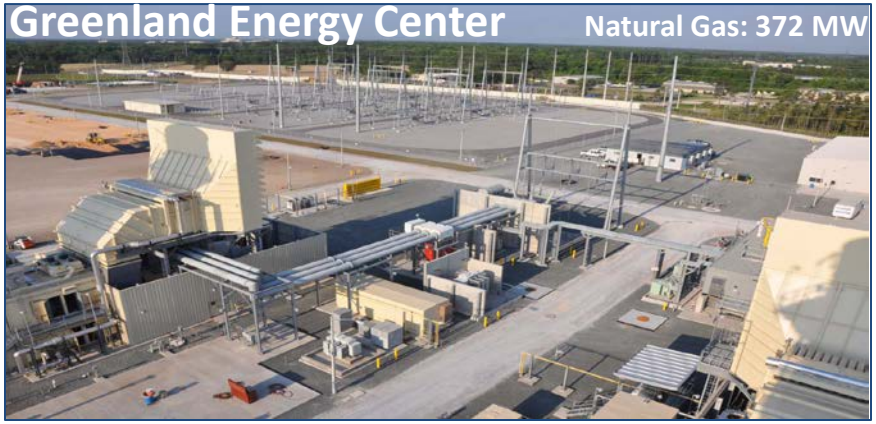
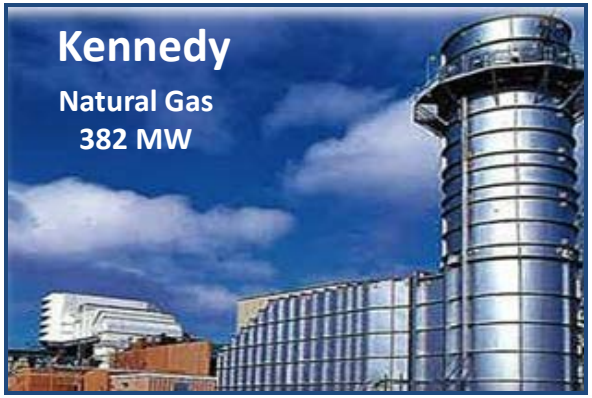
Existing Generation Capacity – 3225 MWs
We Are Not Just Coal







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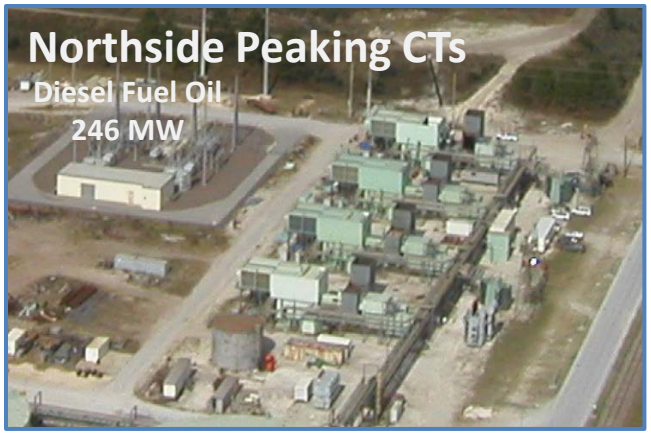
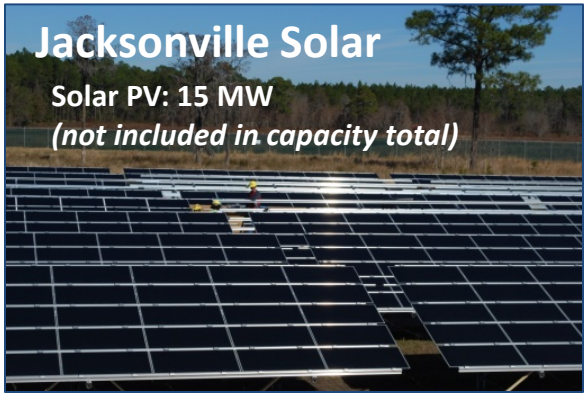



The Energy Authority – TEA



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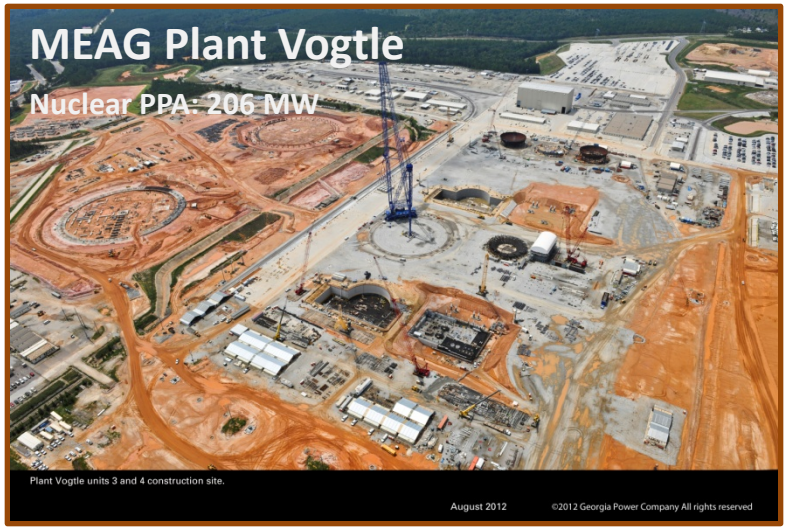
Existing Generation Capacity – 3225 MWs
We Are Not Just Coal

- In the 2018-2019 time frame, JEA's sale to FPL will suspend, adding 383 MW.
- FPL's output will be reduced to its equity ownership percentage of 20%.

Upon completion of Georgia Power's Plant Vogtle Nuclear Units 3 (2017) and 4 (2018), JEA has contracted to purchase a total of 206 MW of capacity and energy.



Future Renewables: Add where economically viable or mandated.

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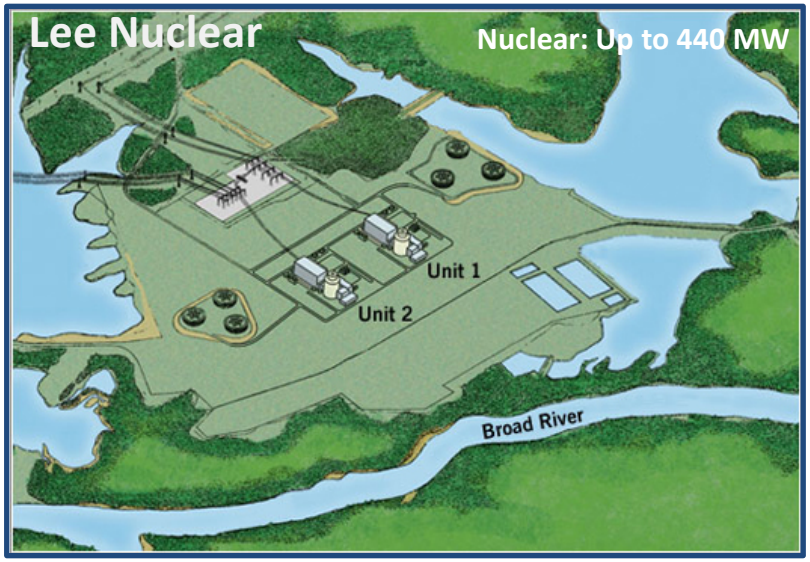
Future Generation Capacity
We Are Not Just Coal

Greenland Energy Center was constructed with future expansion capacity of up to 1000 MW – through conversion of existing units and additional unit construction.



JEA has an option to purchase up to 20 percent of Duke Energy's William States Lee III Nuclear Station (440 MW), in Cherokee County, South Carolina.

Future Renewables: Add where economically viable or mandated.

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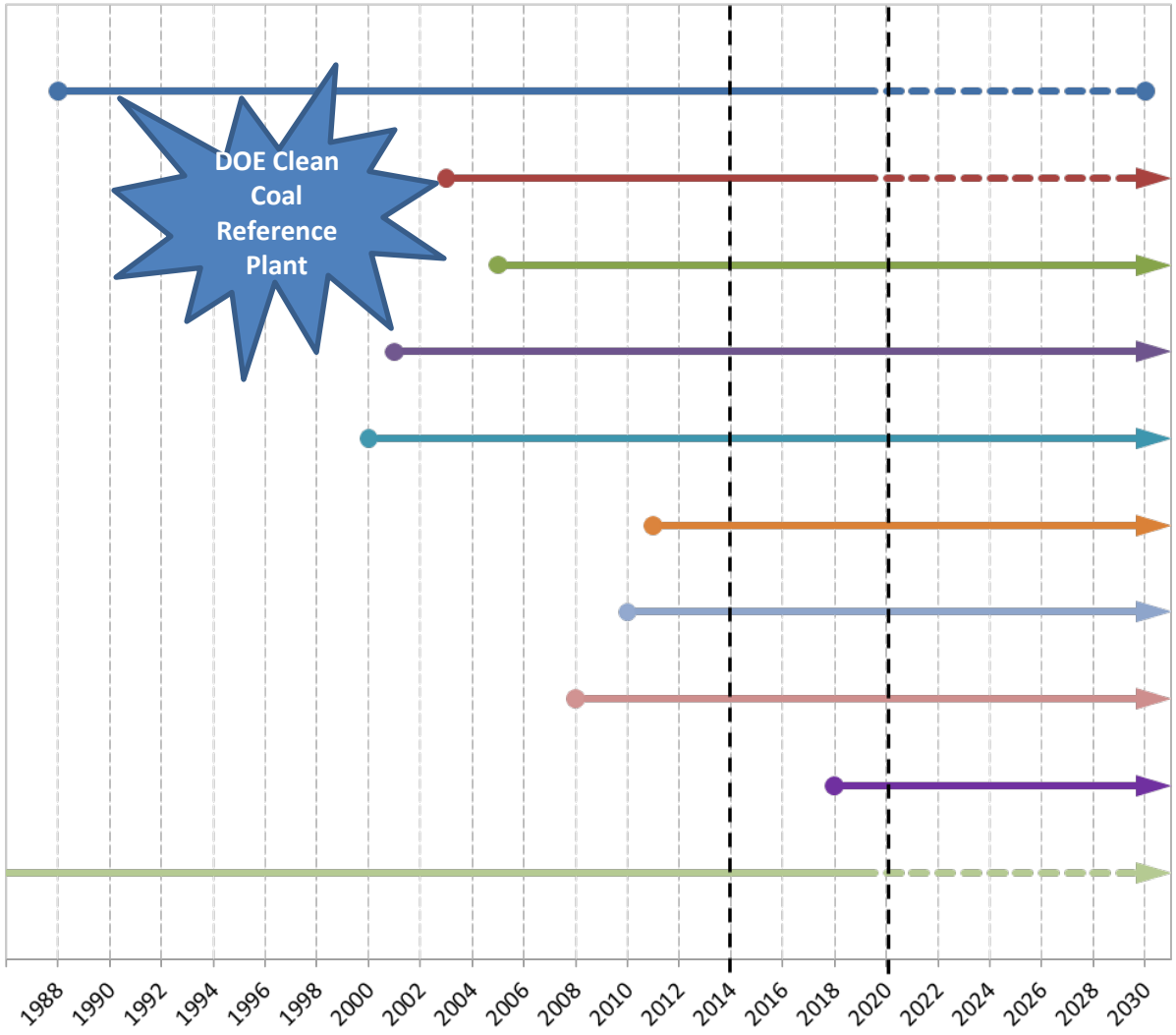
JEA Electric Generating Units

Unit	Fuel	MW
SJRPP	Coal	634
Northside 1&2	Coal	600
Brandy Branch	Gas - CC	450
Brandy Branch	Gas - CT	150
Kennedy	Gas - CT	300
Greenland	Gas - CT	300
Jax Solar	Solar	15
Landfill Gas	Methane	10
Vogtle	Nuclear	200
Northside	Diesel - CT	212



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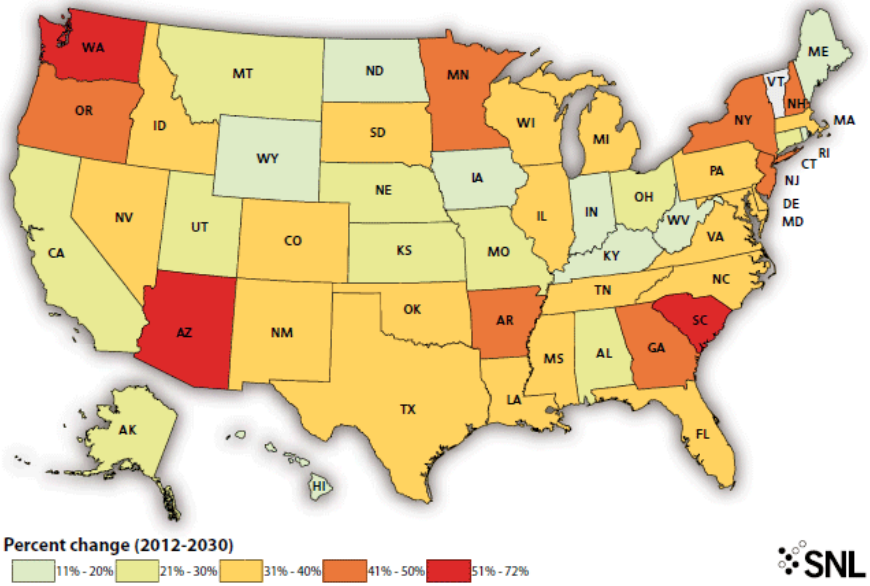
EPA's Clean Power Plan – Florida Perspective State Goals – Flexible State Plans

State	Historical emissions rate (2012)	Interim emissions rate goal (2020-2029)[1]	Final emissions rate goal (2030+)	Required change (2012-2030)[2]
Florida - 35	1,200	844 – 794	740	-38%

EPA's proposed carbon emissions rates for existing power plants (lbs/MWh)



State	Historical emissions rate (2012)	Avg. interim emissions rate goal (2020 - 2029)	Final emissions rate goal (2030+)	Required change (2012-2030)
Alabama	1,444	1,147	1,059	27%
Alaska	1,351	1,097	1,003	26%
Arizona	1,453	735	702	52%
Arkansas	1,640	968	910	45%
California	698	556	537	23%
Colorado	1,714	1,159	1,108	35%
Connecticut	765	597	540	29%
Delaware	1,234	913	841	32%
Florida	1,200	794	740	38%
Georgia	1,500	891	834	44%
Hawaii	1,540	1,378	1,306	15%
Idaho	339	244	228	33%
Illinois	1,895	1,366	1,271	33%
Indiana	1,923	1,607	1,531	20%
Iowa	1,552	1,341	1,301	16%
Kansas	1,940	1,578	1,499	23%
Kentucky	2,158	1,844	1,763	18%
Louisiana	1,466	948	883	40%
Maine	437	393	378	14%
Maryland	1,870	1,347	1,187	37%
Massachusetts	925	655	576	38%
Michigan	1,696	1,227	1,161	32%
Minnesota	1,470	911	873	41%
Mississippi	1,130	732	692	39%
Missouri	1,963	1,621	1,544	21%

State	Historical emissions rate (2012)	Avg. interim emissions rate goal (2020 - 2029)	Final emissions rate goal (2030+)	Required change (2012-2030)
Montana	2,245	1,882	1,771	21%
Nebraska	2,009	1,596	1,479	26%
Nevada	988	697	647	34%
New Hampshire	905	546	486	46%
New Jersey	932	647	531	43%
New Mexico	1,586	1,107	1,048	34%
New York	983	635	549	44%
North Carolina	1,646	1,077	992	40%
North Dakota	1,994	1,817	1,783	11%
Ohio	1,850	1,452	1,338	28%
Oklahoma	1,397	931	895	36%
Oregon	717	407	372	48%
Pennsylvania	1,540	1,179	1,052	32%
Rhode Island	907	822	782	14%
South Carolina	1,597	840	772	52%
South Dakota	1,135	800	741	35%
Tennessee	1,903	1,254	1,163	39%
Texas	1,298	853	791	39%
Utah	1,813	1,378	1,322	27%
Virginia	1,297	884	810	38%
Washington	763	264	215	72%
West Virginia	2,019	1,748	1,620	20%
Wisconsin	1,827	1,281	1,203	34%
Wyoming	2,115	1,808	1,714	19%

SNL Sources: U.S. EPA Clean Power Plan, CleanPowerPlanmaps.epa.gov
Map credit: Whit Varner

[1] Range necessary to achieve interim goal of 794

EPA utilizes four steps, or "Building Blocks", to calculate "Required Change"

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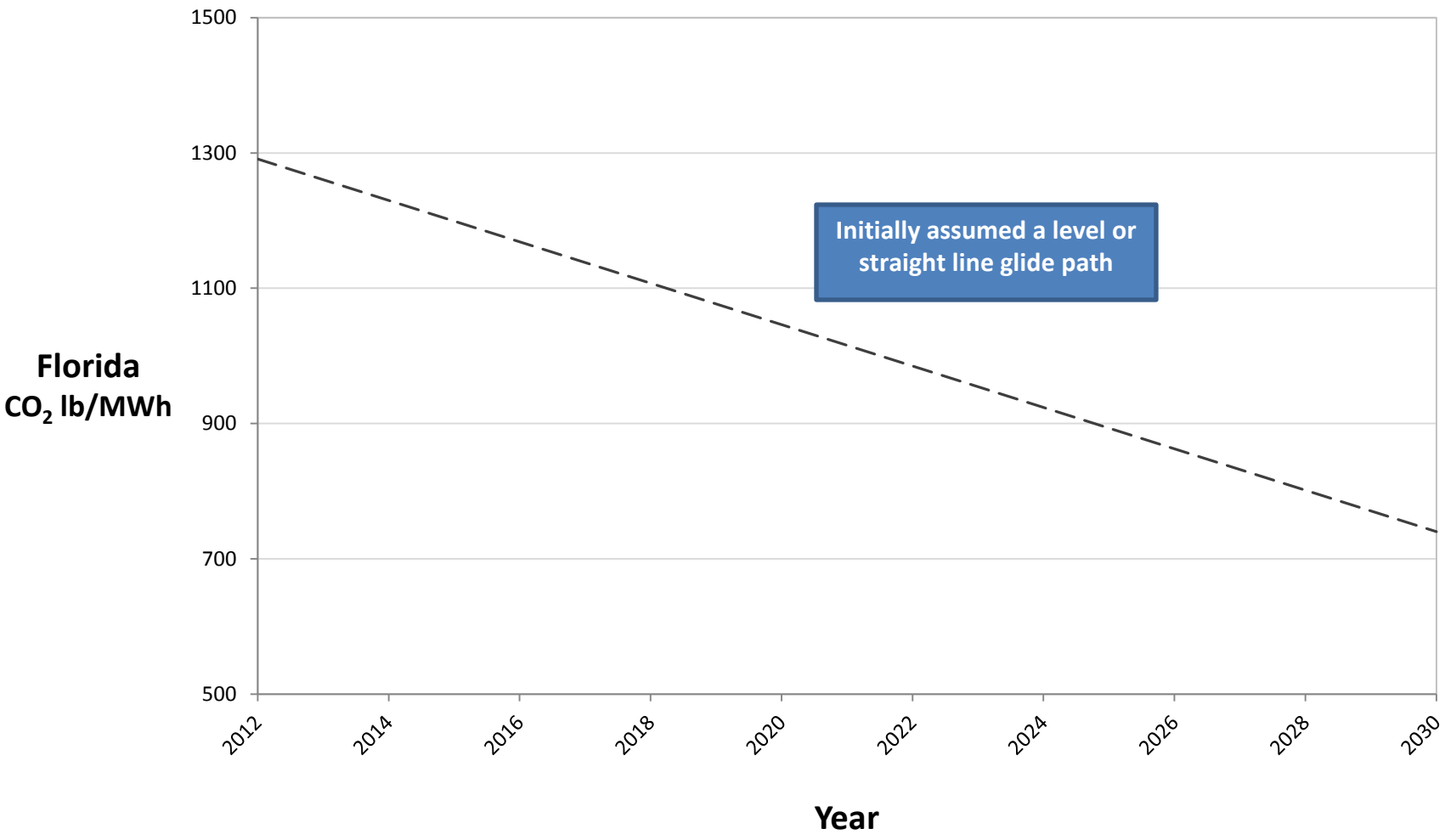
Challenges: Timing, Cost, and Reliability



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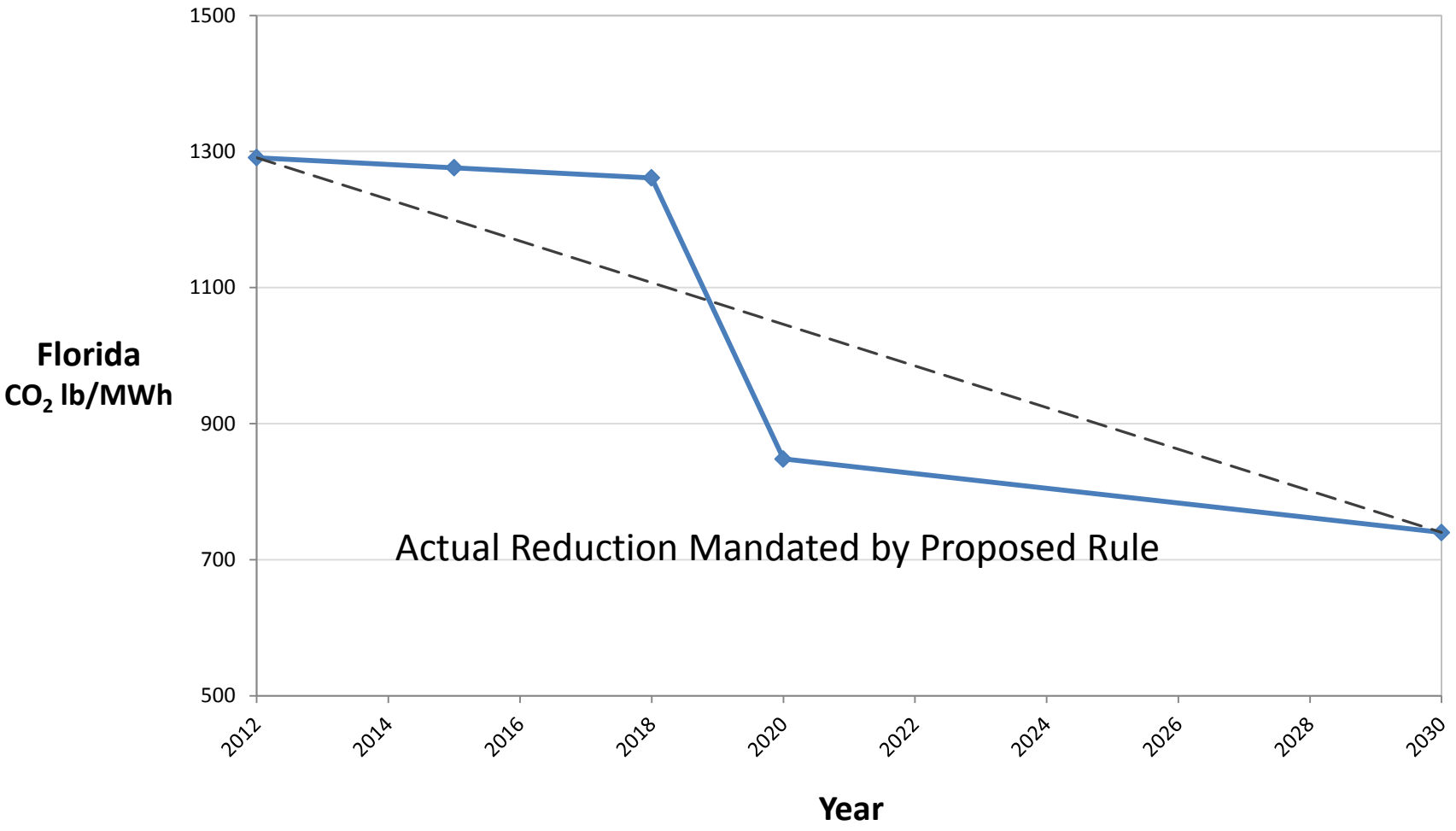
Challenges: Timing, Cost and Reliability



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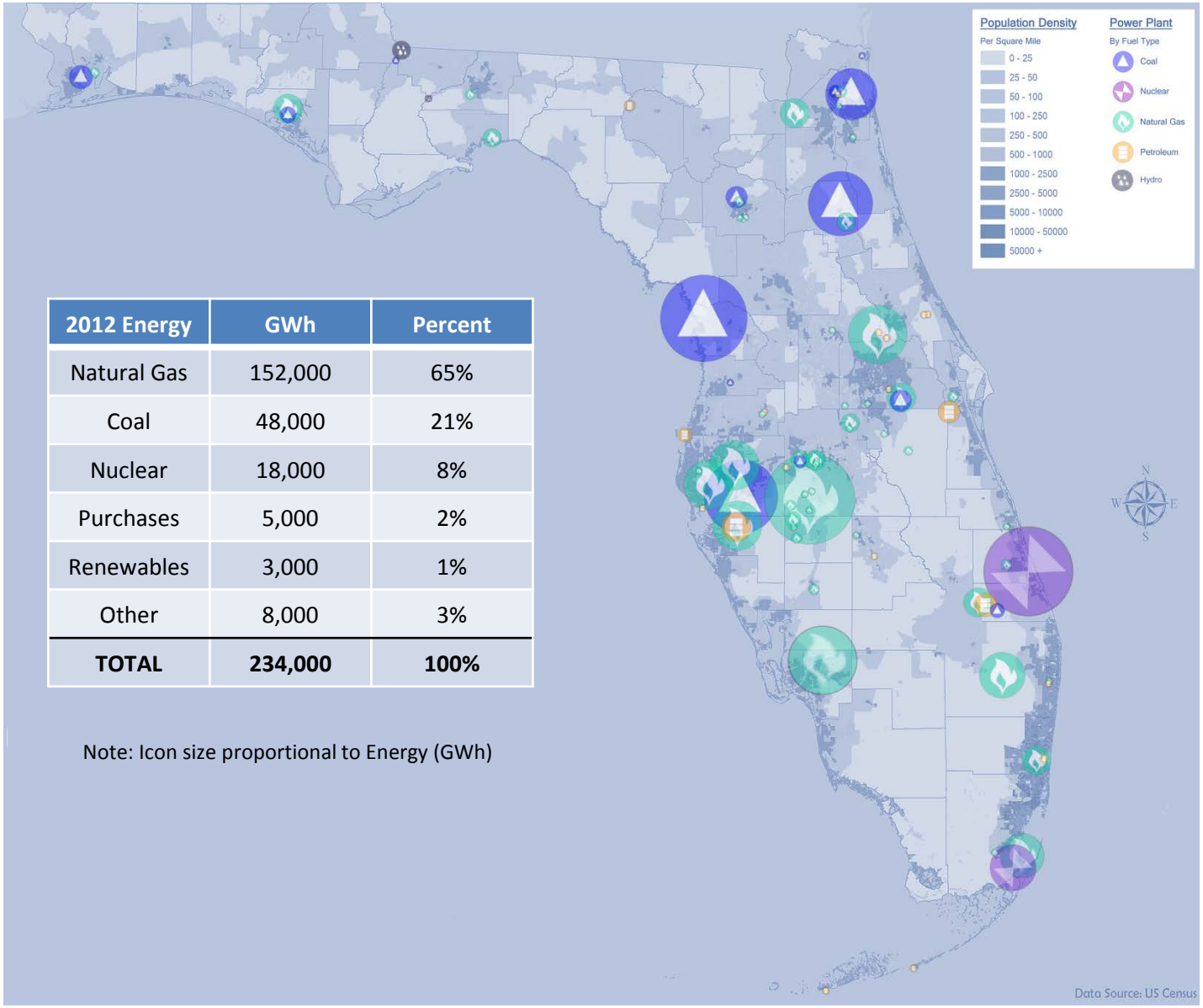
EPA's Proposed Clean Power Plan
Preliminary Challenges: timing, cost, reliability
Florida Power Plants – 2012 Energy

2012 Energy	GWh	Percent
Natural Gas	152,000	65%
Coal	48,000	21%
Nuclear	18,000	8%
Purchases	5,000	2%
Renewables	3,000	1%
Other	8,000	3%
TOTAL	**234,000**	**100%**

Note: Icon size proportional to Energy (GWh)



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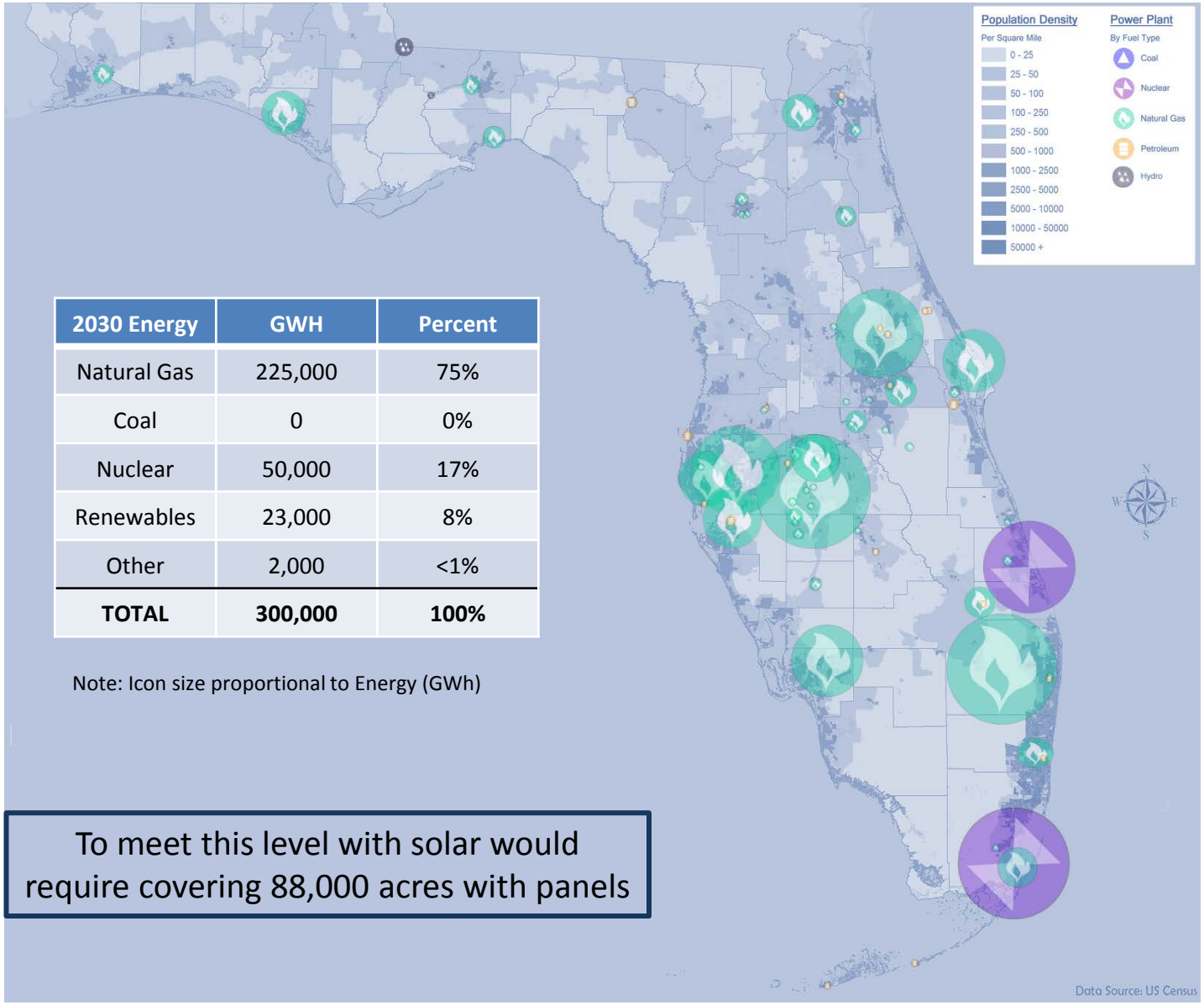
EPA's Proposed Clean Power Plan
Preliminary Challenges: timing, cost, reliability
Florida Power Plants – Redispatch Estimate

2030 Energy	GWH	Percent
Natural Gas	225,000	75%
Coal	0	0%
Nuclear	50,000	17%
Renewables	23,000	8%
Other	2,000	<1%
TOTAL	**300,000**	**100%**

Note: Icon size proportional to Energy (GWh)



To meet this level with solar would require covering 88,000 acres with panels

EPA's Proposed Clean Power Plan

Preliminary Challenges: timing, cost, reliability

Florida Major Natural Gas Pipelines

Electric System reliability will rest on two, maybe three major natural gas

[1] Sabal Trail not yet fully permitted

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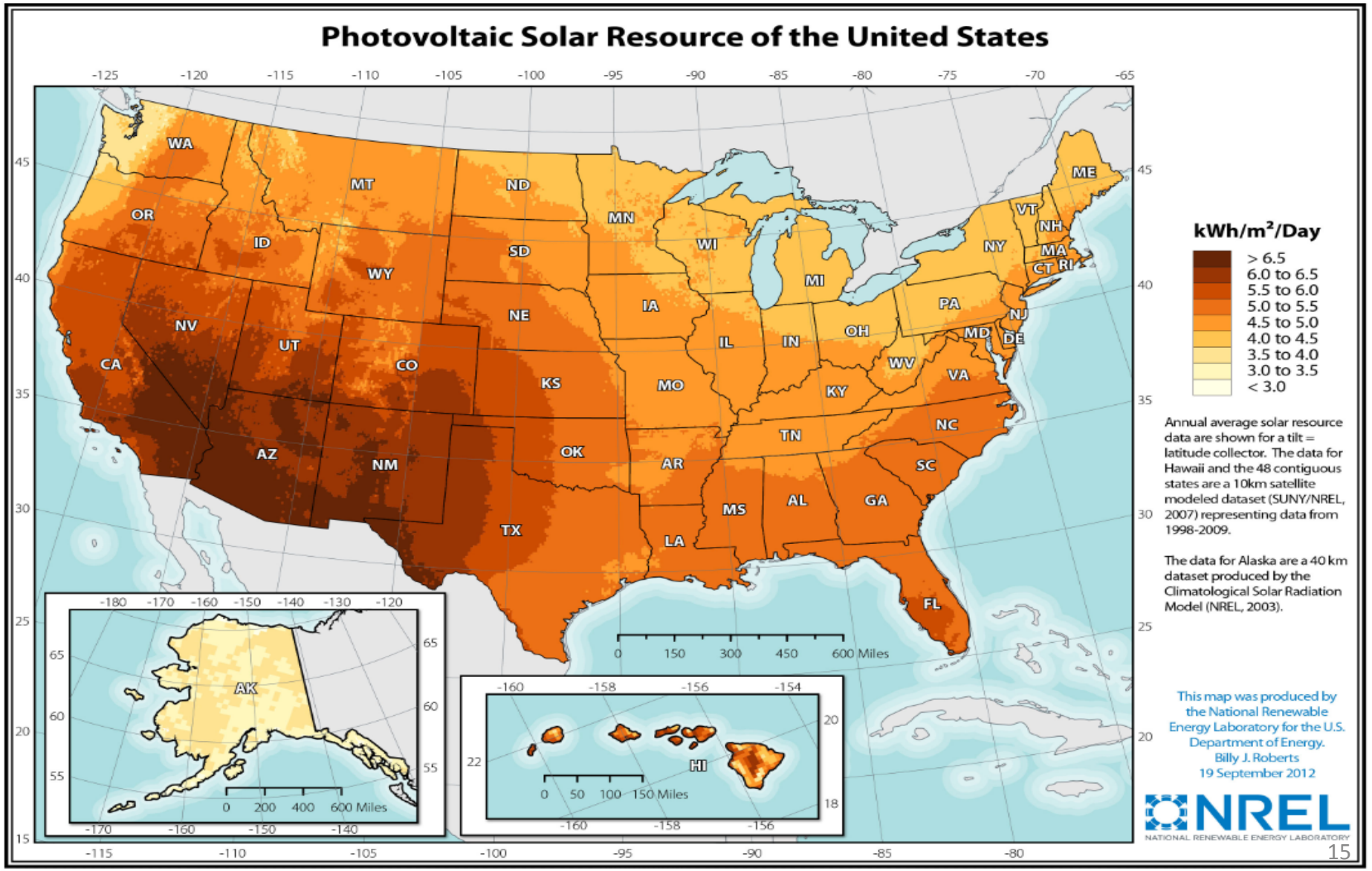
EPA's Proposed Rule on Carbon Reduction

Preliminary Challenges: Ability to efficiently adapt



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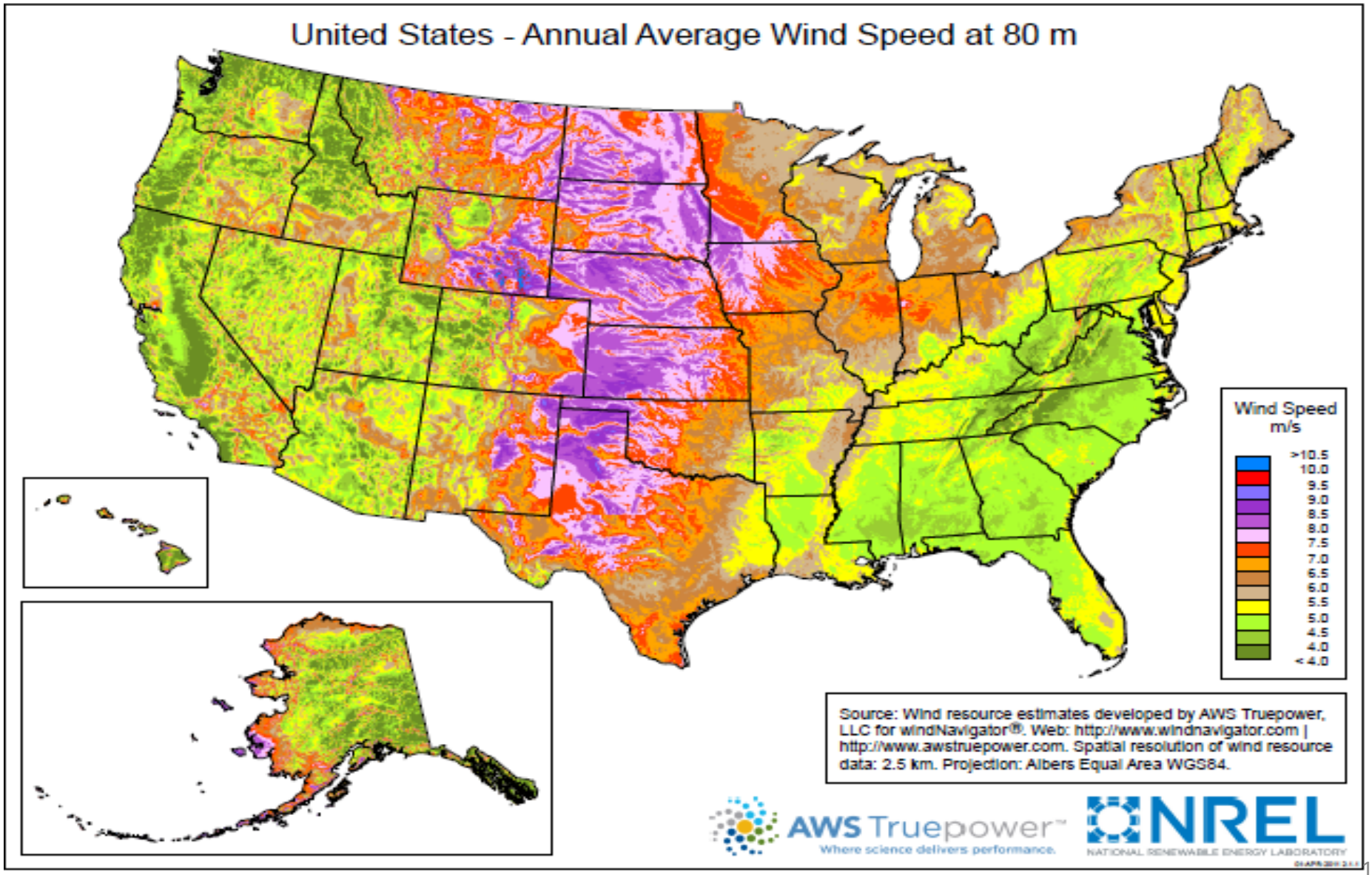

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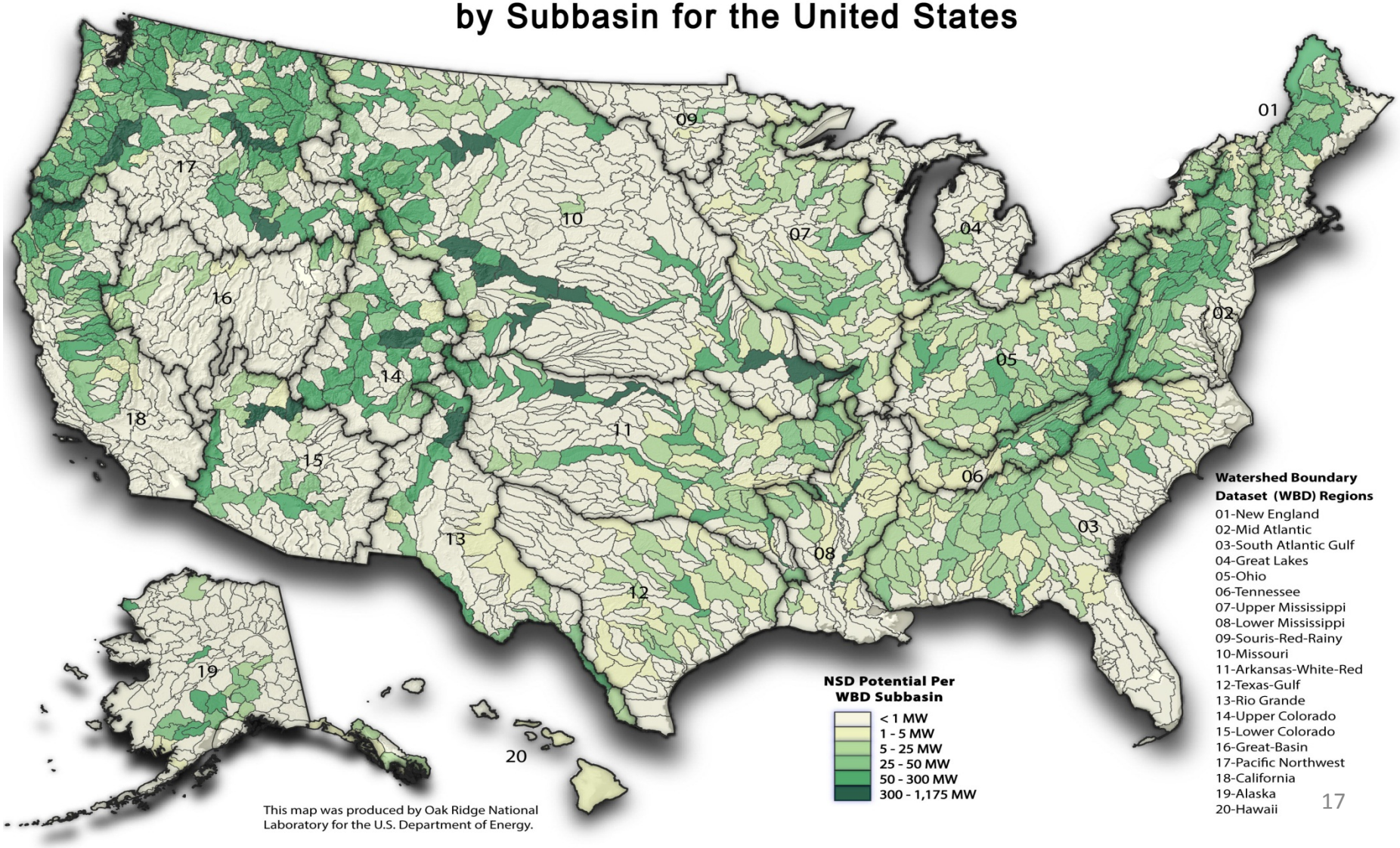

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Preliminary Challenges

- The Southeast and Florida in particular received disparate treatment in setting mandatory state level carbon reduction goals –
  - 34 states have higher emission rates than Florida, yet only 15 states received higher carbon reduction goals.
  - Kentucky, North Dakota, Utah and others will be allowed to continue using coal because in 2012 there was no idle NGCC redispatch capacity in these states.
  - CO_2 emissions from residential and commercial heating in Northern states will not be regulated, while Florida's heating will be regulated.
- Similar disparate treatment could occur at the state level, with a significant economic shift to the south.
- Places current generating assets at risk – stranded cost.
- Current generation technologies capable of achieving meaningful change are challenged by timing, cost and reliability: nuclear, wind, solar, and NGCC.
- Places significant accelerated downward pressure on electric unit sales – energy efficiency and distributed generation.
- Potential higher costs, especially unit costs, for consumers and businesses.

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EPA Proposed Regulation of CO_2 from Existing Power Plants

SUMMARY

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EPA's Proposed Clean Power Plan

Steps to Calculate Required Change

EPA's four Building Blocks for State Goals

1. Coal heat-rate (efficiency) improvement – 6% across the entire coal fleet

2. Re-dispatch existing coal units to existing natural gas combined cycle units (NGCC)
   - **Florida would re-dispatch 90% of coal energy to NGCC**

3. Zero carbon generation to increase substantially: existing nuclear fleet to generate 5.8% more energy in addition to new units now under construction. Florida would increase renewables from 2% in 2012 to 10% in 2030.

4. End-Use Energy Efficiency to provide 10% of cumulative CO_2 reductions by 2030
   - Florida would increase from 2% in 2020 to 10% in 2030

Final EPA Computation for Florida

Projected Reduction	lbs CO_2/MWh
2012 Base Rate	1,200
BB1 – Improved Coal Heat Rate	(29)
BB2 – Redispatch	(274)
BB3 – Nuclear	(7)
BB3 – Renewables	(83)
BB4 – Efficiency	(67)
Total Reduction	(460)
State Goal	740
Percent Reduction from 2012	38.3%