Regional Renewable Energy Study
Review of Findings and Forecasts

Presented to:

Climate, Energy and Environment and Policy Committee

Metropolitan Washington Council of Governments

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Renewable Energy Study Scope

- **Supplemental Analysis from Multi-Sector Approach to Reducing GHG Emissions**
- **Refine "10% Renewable Energy Goal"**
  - Document goal in terms of total MWh, by sector and by Virginia, Maryland, and the District of Columbia
  - Estimate equivalent renewable energy deployment needed to reach the goal – specifically solar PV capacity, and number of systems, along with other viable technologies, as appropriate
- **Provide additional analysis of renewable energy issues with comparisons that are easy to explain and understand.**
  - Document regional desire and opportunities for green power purchasing
  - Explain constraints and their impact
  - Compare potential with existing goals and external examples (e.g., from related regional goals and accomplishments from across the country)
  - Provide assumptions and calculations for renewable energy penetration and potential

Project Approach & Tasks

- Provide additional support and analysis to build confidence in the current goal to achieve “10% of regional electricity consumption from renewable sources” for regional leaders and stakeholders. Include data sources to inform future MWCOG goal setting, planned actions, and tracking of renewable energy deployment.

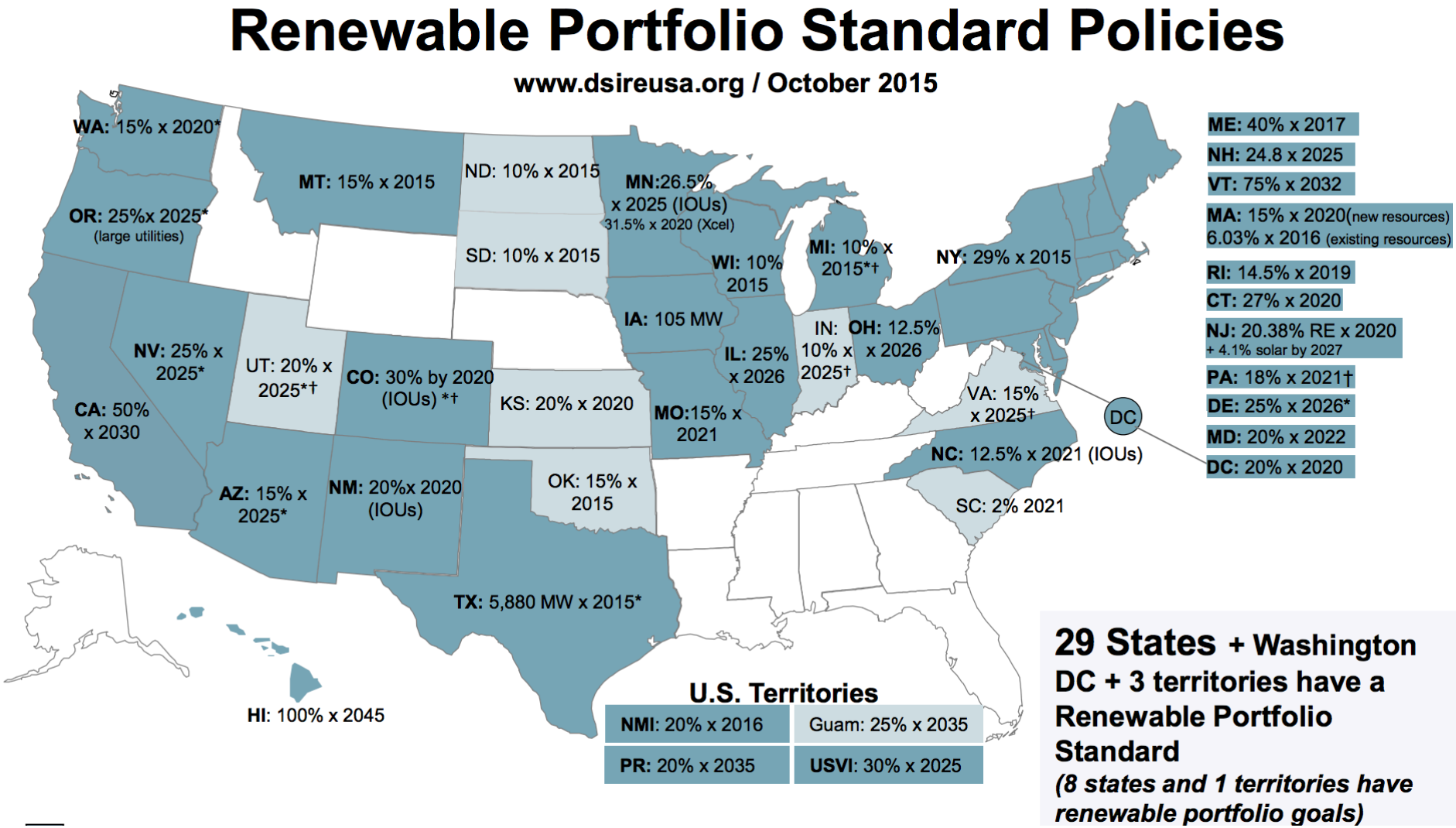
- Investigate and analyze, at a summary level, regional drivers for renewable energy implementation including:
  - ✓ Current adoption trends and forecasts
  - ✓ Existing renewable potential studies from MWCOG members, as available
  - ✓ Regional green power purchases, as available
  - ✓ Electric utility integrated resource plans
  - ✓ Revisit sector potential for Institutional (government agency & non-profit), Commercial, Residential, Utility
  - ✓ Regional constraints to deployment including economic, policy and technical
  - ✓ Regional opportunities and co-benefits

Top-Line Goal

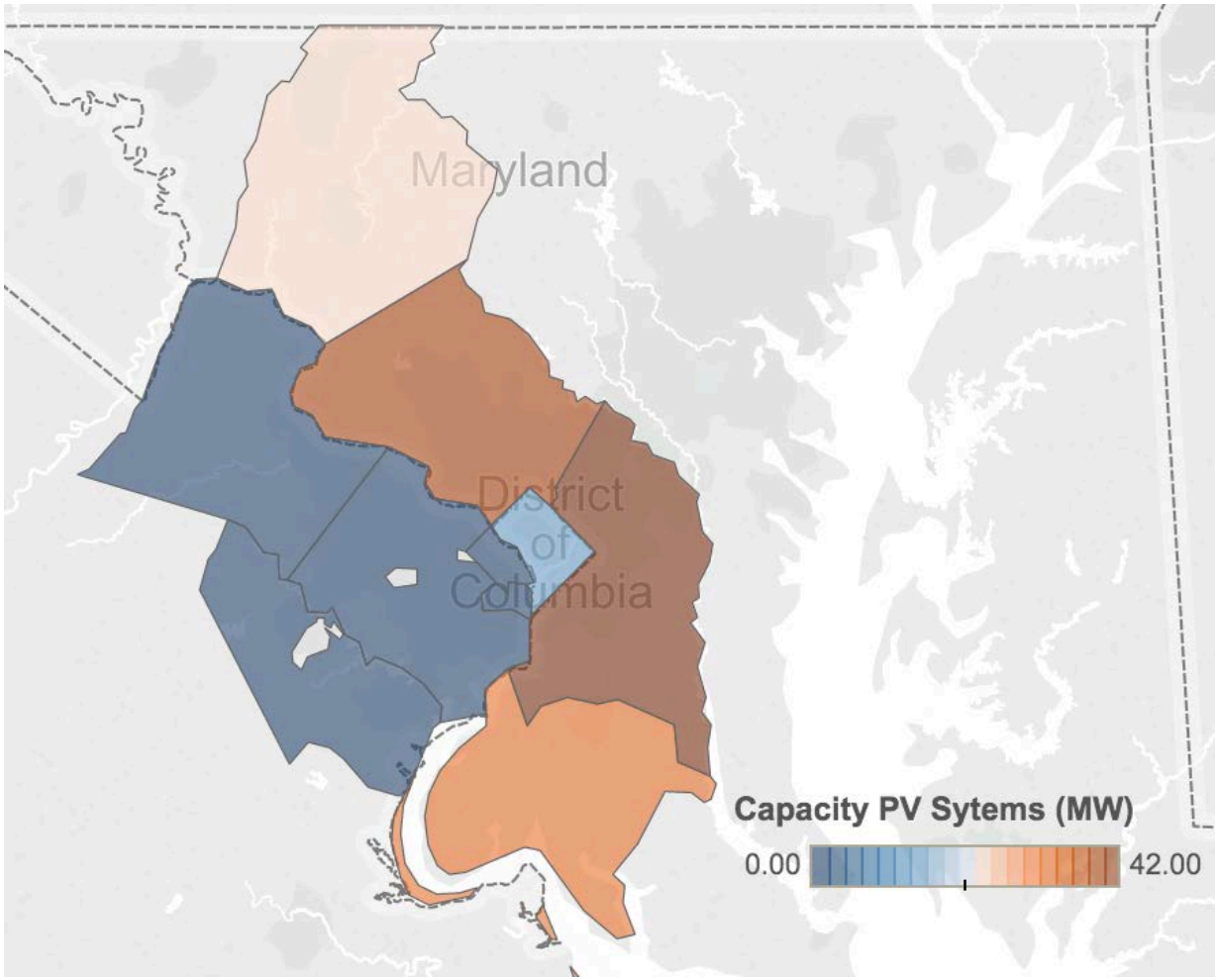
- 2012 Total Electricity Usage by Jurisdiction (from MWCOG)
- Target: 10% of 2012 Electricity Sourced from Renewable Energy (RE) [~6,000 GWh]
- Sources to be included for RE target: On-site renewables + Off-site renewables + RECs

JURISDICTION		TOTAL KWH USAGE	
		2005	2012
MD	Montgomery County	10,348,986,387	9,264,634,701
MD	Prince Georges County	6,095,019,444	7,406,153,004
MD	Frederick County	5,846,364,723	2,972,379,345
MD	Charles County	1,352,991,067	1,332,500,859
VA	Alexandria	1,747,945,750	1,757,052,807
VA	Arlington	3,097,359,329	3,241,416,881
VA	Fairfax City	327,884,768	306,084,682
VA	Fairfax County	12,148,492,539	13,050,307,311
VA	Falls Church	125,718,688	131,486,413
VA	Loudoun County	2,442,478,150	5,115,753,311
VA	Manassas City	638,103,464	813,364,269
VA	Manassas Park	70,746,318	80,545,159
VA	Prince William County	2,946,733,509	3,825,402,395
DC	Washington	11,735,691,057	10,878,440,707
	TOTAL	**58,924,515,193**	**60,175,521,844**
10% Renewable Energy Target (Annual kWh)			**6,017,552,184**

National RPS Goals

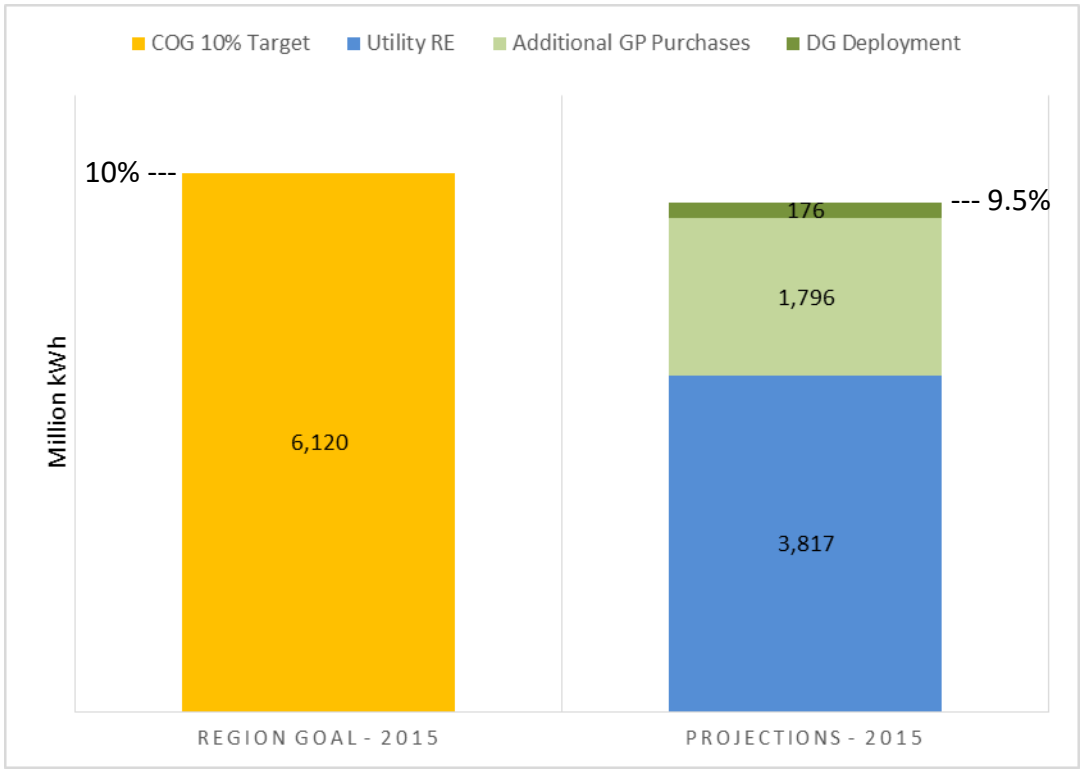


2015 Regional Solar PV Deployment by County



Total installed solar PV as of 12/31/15
Source: Northern Virginia Regional Commission, April 7, 2016

2015 Renewable Energy Analysis Summary



- Overall regional renewable energy consumption at 9.5% of total in 2015
- Utility supplied non-hydro renewable energy represents over 6% of regional consumption
- Customer voluntary Green Purchases estimated at almost 3% (via EPA Green Power Partnership)
- Distributed generation (primarily solar) estimated at 0.3% (via MWCOG data)

Utility Sector Contribution to Renewable Targets

Year	VA Voluntary RPS[a]		MD RPS		DC PRS	
	With Large Hydro	Without Large Hydro[b]	With Large Hydro	Without Large Hydro	With Large Hydro	Without Large Hydro
2012	2.3%	1.5%	9.0%	6.5%	8.0%	5.5%
2013	2.3%	1.5%	10.7%	8.2%	9.5%	7.0%
2014	2.2%	1.4%	12.8%	10.3%	11.1%	8.6%
2015	2.2%	1.4%	13.0%	10.5%	12.7%	10.2%

- Utility RPS goals/requirements were factored into jurisdictional energy consumption to calculate total regional impact
- A variety of distributed generation technologies are (or could be) included
  - Category 1: Priority technologies (currently being deployed)
  - Category 2: Future opportunities (technically feasible but not currently being deployed)

Renewable Energy Technology	COG Regional Target
Solar Photovoltaics	1
Solar Thermal Electric	1
Solar Water Heat	2
Solar Space Heat	2
Solar Thermal Process Heat	2
Wind (All)	1
Qualifying Biomass	1
Hydroelectric <30MW	2
Geothermal Electric	2
Geothermal Heat Pumps	1
Geothermal Direct-Use	1
Municipal Solid Waste	1
Landfill Gas	1
Anaerobic Digestion	1
Fuel Cells using Renewable Fuels	1

2015 Renewable Energy Analysis By MWCOG Jurisdiction

State	Jurisdiction	Projected Consumption	10% RE Goal	Utility Supplied RE w/o Large Hydro	Customer Voluntary Green Power Purchases	DG Deployment	Total Projected RE	Total Projected RE (%)
MD	Maryland Total	21,300	2,130	2,236	809	150	3,195	15.0%
VA	Vriginia Total	29,369	2,937	506	56	7	569	1.9%
DC	Washington DC Total	10,531	1,053	1,074	931	18	2,023	19.2%
	TOTAL	**61,200**	**6,120**	**3,817**	**1,796**	**176**	**5,788**	**9.5%**

Annual GWh

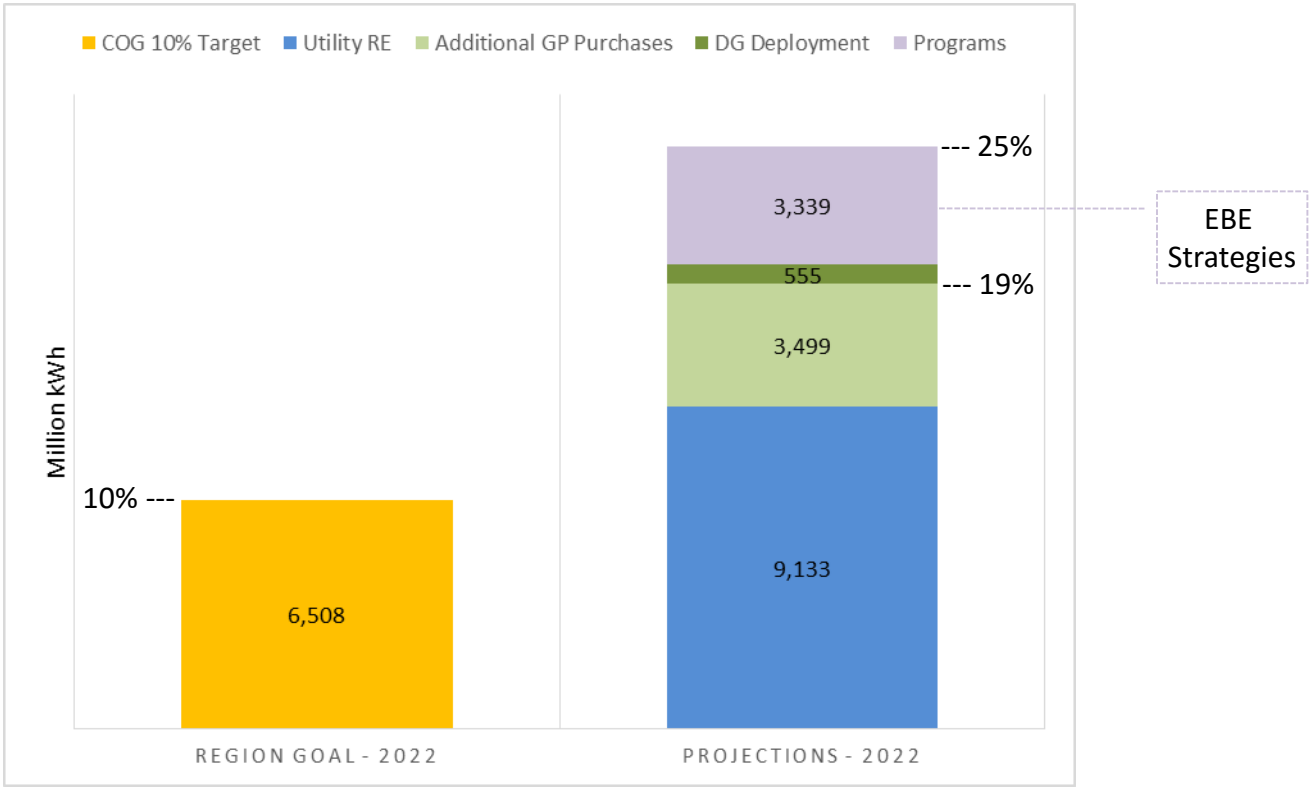
2022 Forecast Assumptions

- Forecasts are based on a combination of RPS targets for utility supply and “what if” scenarios.
- These can be considered as illustrative calculations of what is possible in the region, but not necessarily predictive.
- The major drivers for utility supplied non-hydro renewable energy is expected come from mandatory RPS goals in MD and DC and contribute the most to attainment of renewable energy targets within COG.
- There is a large, ongoing impact of voluntary purchases by government agencies, commercial, and industrial energy users and forecasts for this analysis include a 10% annual increase in these voluntary purchases.
- Distributed generation forecast includes a conservative estimate of annual growth potential of 20-25% per year through 2020 then 5% thereafter (compared to the compound growth rate through 2015 of 45% per year).

2022 Renewable Energy Strategies/Programs Forecast Updates

- Aggregated purchasing programs – Updated based on recent changes in availability of ITC and current trends.
  - Includes residential, commercial and government sectors
- Community Solar – Added this category to the analysis based on the high level of interest and potential for this type of deployment.
  - Includes residential and commercial sectors
- Incentives – Updated based on current trends.
  - This includes property tax abatements, density allowances, and permit fee reductions only.

2022 Renewable Energy Forecast Summary



- Overall regional renewable energy consumption forecast at over 25% of total in 2022
- Utility supplied non-hydro renewable energy represents 14% of regional consumption
- Customer voluntary Green Purchases estimated at over 5% (via EPA Green Power Partnership)
- Distributed generation (primarily solar) estimated at 1% (via MWCOG data)
- Additional regional strategies could potentially contribute 5% more clean power consumption

2022 Renewable Energy Forecast By Category with Solar Capacity Equivalencies

State	Projected Consumption	10% RE Goal	Utility Supplied RE w/o Large Hydro	Customer Voluntary Green Power Purchases	DG Deployment	Programs	Total Projected RE	Total Projected RE (%)
MD	22,630	2,263	5,658	1,577	470	1,298	9,002	39.8%
VA	32,647	3,265	1,303	109	28	1,631	3,070	9.4%
DC	9,799	980	2,173	1,814	57	410	4,454	45.5%
TOTAL	**65,076**	**6,508**	**9,133**	**3,499**	**555**	**3,339**	**16,526**	**25.4%**

Annual GWh

State	Solar PV Capacity (MW)
MD	1,333.5
VA	1,110.9
DC	361.0
TOTAL	**2,805.3**
Less Existing Solar PV	*122.7*
Net New Solar PV	**2,682.6**

Year	Sector	MW	Projects	Notes
2022	New Residential	587.3	117,468	~10% of 2012 single family residences
2022	New Commercial	640.6	3,203	~3,800 acres needed
				(Pentagon with parking is ~1,000 Acres)
2022	New Utility	1,454	291	~8,700 acres needed
				(Dulles Airport is >12,000 Acres)
2022	**Total New**	**2,682.6**	**120,962**	

- Renewable electricity forecasts (kWh) for DG Deployment and Programs was converted to solar capacity using location-specific solar yield factors in MD, DC and Northern VA
- For relative project volume estimates, the mix of solar capacity by sector nationally was applied to capacity forecasts and then sector-specific assumptions were used to calculate number of projects

Questions?