

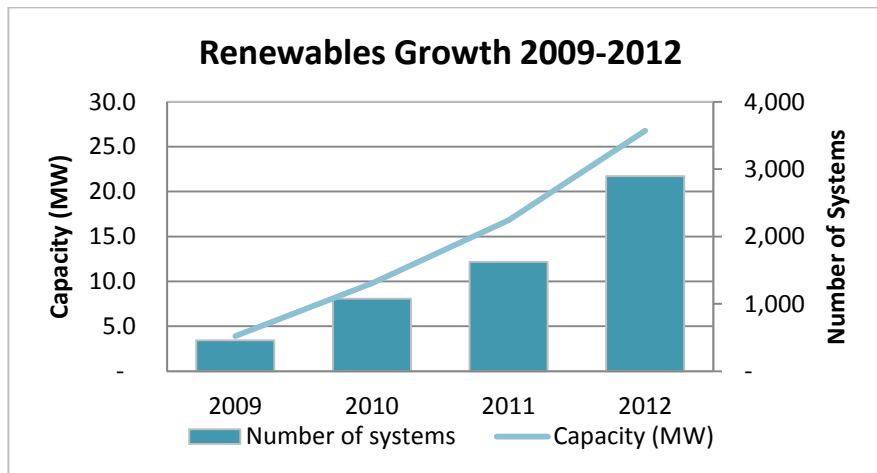
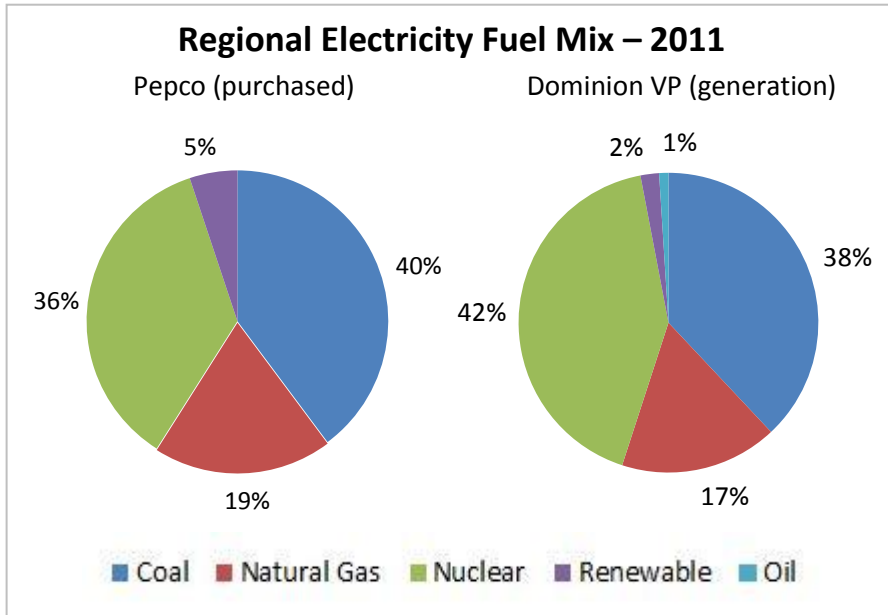
MWCOG ENERGY INFRASTRUCTURE PRIMER



METROPOLITAN WASHINGTON
Council of Governments

Regional Electricity Generation

The majority of the region's power is purchased on the PJM wholesale power market and imported. Coal and nuclear account for ~80%.



The region has 19 power plants with an operating capacity of 8,517MW.

Power Plant	Primary Fuel	Capacity (MW)	City/County
Chalk Point	Coal	2,647	Prince George's Co.
Dickerson	Coal	930	Montgomery Co.
Morgantown	Coal	1,548	Charles Co.
Panda Brandywine	Natural Gas	289	Prince George's Co.
Possum Point	Natural Gas	1,944	Prince William Co.
NIH Cogeneration	Natural Gas	22	Montgomery Co.
Benning	DFO	580	Washington, DC
Buzzard Point	DFO	288	Washington, DC
Dean Drive	DFO	3	City of Manassas
Manassas Water	DFO	2	City of Manassas
Covanta Arlington	WTE	29	City of Alexandria
Covanta Fairfax	WTE	124	Fairfax Co.
Montgomery WTE	WTE	68	Montgomery Co.
I-95 Landfill Phase I	LFG	3	Fairfax Co.
I-95 Landfill Phase II	LFG	3	Fairfax Co.
PG Co Brown Station	LFG	3	Prince George's Co.
Covanta Gude	LFG	3	Montgomery Co.
SCE Oaks Landfill	LFG	2	Montgomery Co.
PWC Landfill	LFG	2	Prince William Co.
TOTAL		8,490 MW	

DFO = Distillate, light fuel oil, diesel **WTE** = Waste to energy **LFG** = Landfill gas



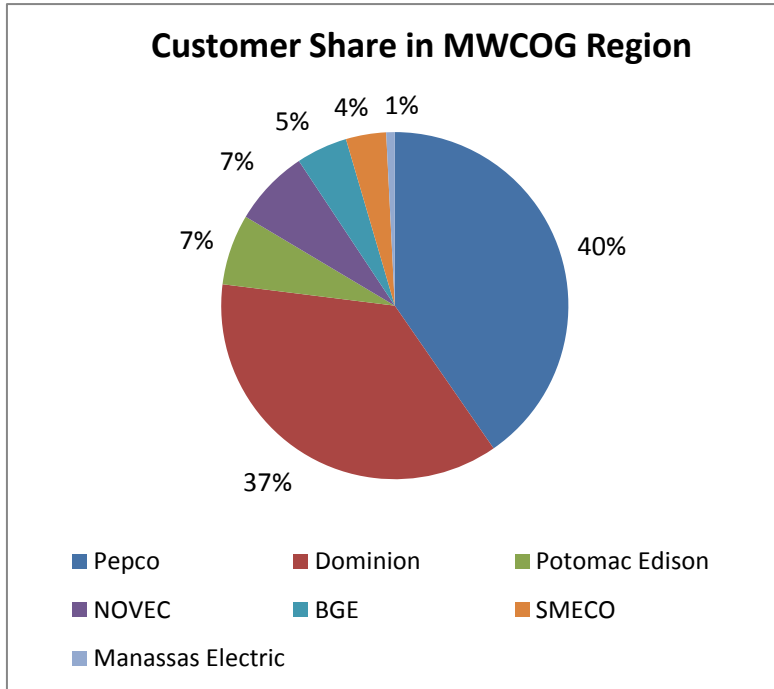
Regional Electricity Market

The MWCOG region has seven electricity providers:

- Four investor-owned utilities.
- Two electric cooperatives.
- One municipal utility.

The table at right shows the 2013 customer base, total electricity consumption and the MWCOG jurisdictions covered by each utility.

The chart below shows relative customer share by utility.



Regional Electricity Sales by Utility			
	Customer Base (accounts in MWCOG region)	Annual Consumption (million kWh)	MWCOG member jurisdictions covered
Pepco	796,930	24,512.7	District of Columbia, Montgomery and Prince George's Counties (DC, MD)
Dominion VP	722,845	24,448.8	All Virginia jurisdictions except Cities of Manassas and Manassas Park (VA)
Potomac Edison	130,054	3,720.3	Montgomery & Frederick Counties (MD)
Northern Virginia Electric Cooperative (NOVEC)	140,712	3,446.8	Manassas, Manassas Park, and Fairfax, Loudoun, and Prince William Counties (VA)
Baltimore Gas & Electric	94,284	2,041.2	Montgomery & Prince George's Counties (MD)
Southern Maryland Electric Cooperative (SMECO)	73,982	1,564.5	Charles and Prince George's Counties (MD)
Manassas Electric	15,699	813.4	City of Manassas (VA)
TOTAL	1,974,506 customers	60,547.7 million kWh	Total MWCOG Region



Regional Electricity Infrastructure

The electrical infrastructure in the region consists of **approximately \$10.2 billion in assets**, and includes:

- **75,000 miles of distribution line.** This is lower voltage line delivering power to local end-users.
- **470 substations.** Substations are electrical facilities that transform high voltage power sent from generation stations on the transmission grid to lower voltage power for local distribution.
- **259,002 transformers.** Transformers are used to step up voltage to transmission lines and step down voltage to distribution lines.
- **600+ smart switches.** Remotely controlled switches, sensors, automatic circuit reclosers and communication technology reduce outage duration.
- **1,974,506 total electric meters.**
 - 1,018,971 smart meters.
 - 82,522 time-of-use customers.

Together, the seven electric utilities in the region own approximately **\$10.2 billion** in assets within the MWCOG footprint

Utility	Asset Value (millions)	Planned investment in MWCOG Region through 2018 (millions)
Pepco	\$ 4,538	\$ 3,001
Dominion VP	\$ 3,187*	\$ 1,388
Potomac Edison	\$ 1,084**	\$ 4.4
NOVEC	\$ 700	\$ 150
BGE	\$ 589	N/A
SMECO	\$ 48	\$ 85
Manassas Electric	\$ 29	\$ 4.4
TOTAL	\$ 10,175	\$ 4,634
*Estimate, includes DVP distribution assets only		
** Estimate, includes Potomac Edison generation, transmission and distribution assets		



Regional Electricity Infrastructure Upgrades

Examples of current and forthcoming investments in electricity system improvements and upgrades include:

Dominion Virginia Power:

Spending approximately **\$275 million per year** in infrastructure improvements for grid reliability and security:

- **Neighborhood Transformer Replacement Program:** A \$20 million project to proactively replace old transformers before problems occur. The program has thus far replaced 3,300 transformers, with 450 scheduled in 2014.
- **Undergrounding:** Dominion recently won approval to begin a distribution hardening project to underground taplines (small lines connecting buildings to main overhead lines). The project will invest \$175 million per year to underground about 350 miles of line, focusing on the 20% worst-performing lines. The project goal is to cut outage durations following major storms in half.
- **Physical & Cyber Security:** Dominion has proposed to spend up to \$500 million over the next 5-7 years to harden critical assets against physical and cyber security risks.

Pepco:

Spending over **\$3 billion** in critical infrastructure improvements through 2018:

- **Undergrounding:** In partnership with the District of Columbia, Pepco developed a \$1 billion plan to underground 60 overhead feeders. Final approval of the program is expected in 2014.
- **Priority Feeder Program:** Recently increased from \$1.6 million to \$3.6 million, this program identifies the least reliable distribution feeders for maintenance and upgrades to improve overall system reliability.
- **Distribution Automation:** This program includes sensors, controls and various intelligent devices such as automatic circuit reclosers, remotely controlled switches, smart relays, switches and digital remote terminal units that allow Pepco to identify and resolve problems with the system more quickly.
- **Vegetation Management:** Recently increased from \$1 million to \$1.5 million per year to add additional feeders to the trimming schedule and increase trimming frequency in priority areas.

NOVEC:

Spending approximately **\$30 million per year** in new infrastructure, upgrades and replacements:

- **Substation automation:** Automation has been achieved for 100% of substations. Private fiber optic network is installed at 90% of substations, and 60 smart triple single reclosers and 30 remotely-controlled switches have been installed.

- **Undergrounding:** NOVEC is in the process of installing about 2/3 of the system underground.
- **Physical & Cyber Security:** NOVEC plans to expand surveillance and to have critical data backed up at multiple server locations. The timing of these events is under review.



Regional Natural Gas Infrastructure

The MWCOG region has three natural gas providers.

- **Washington Gas holds about 95%** of the region’s natural gas customer base.
- The three natural gas utilities own approximately **\$4.5 billion in physical assets** within the MWCOG footprint.

The region’s natural gas infrastructure consists of approximately:

- **15,000 miles of distribution pipeline.**
- **15 million gallons of propane storage.**
- **1,126,330 total meters.**
- **12,332 smart meters.**

The table below shows relative customer share and total consumption in 2013 by utility.

Regional Natural Gas Sales by Utility			
	Customers (in MWCOG region)	Annual Consumption (million therms)	MWCOG member jurisdictions covered
Washington Gas	1,072,119	1,536.7	All COG Jurisdictions
Columbia Gas	248,345	140.5	City of Manassas, City of Manassas Park, Fairfax, Loudoun, and Prince William Counties
Baltimore Gas & Electric	7,605	10.6	Montgomery & Prince George's Counties
TOTAL	1,126,330 customers	1,553.5 million therms	Total MWCOG region

Washington Gas has proposed the following investments in the region’s natural gas infrastructure:

Washington Gas Capital Investment Highlights									
	Actual			Projected					
<i>(Dollars in millions)</i>	2011	2012	2013	2014	2015	2016	2017	2018	5-Yr Projected
New business (service extensions)	40	54	71	81	92	108	133	123	536
Replacements and Improvements	71	99	104	136	130	130	127	126	650
TOTAL	111	153	175	217	222	238	260	249	1,186

