WGL Energy
A WGL Entity

ONE COMPANY. ONE TEAM.

FC 1130 WORKSHOP

WGL PRESENTATION NOVEMBER 19, 2015

PRESENTED BY JOHN DUKES, GENERAL MANAGER OF WGL ENERGY SYSTEMS SALES

166-YEAR HISTORY

UNRIVALED EXPERIENCE

DIVERSIFIED SPECTRUM OF ENERGY SOLUTIONS

Washington Gas
A WGL Company

Washington Gas Light Company is a regulated natural gas utility serving approximately 1.1 million customers in the metropolitan Washington, D.C. area.

WGL Energy
A WGL Entity

WGL Energy is a leader in efficient and environmentally friendly energy technology solutions that provide electricity, natural gas, renewable energy and green products to public and private sector customers across the United States.

WGL Midstream
A WGL Company

WGL Midstream is a wholesale energy solutions business that invests in and optimizes natural gas pipelines and storage facilities in the Midwest and Eastern United States.

Hampshire Gas
A WGL Company

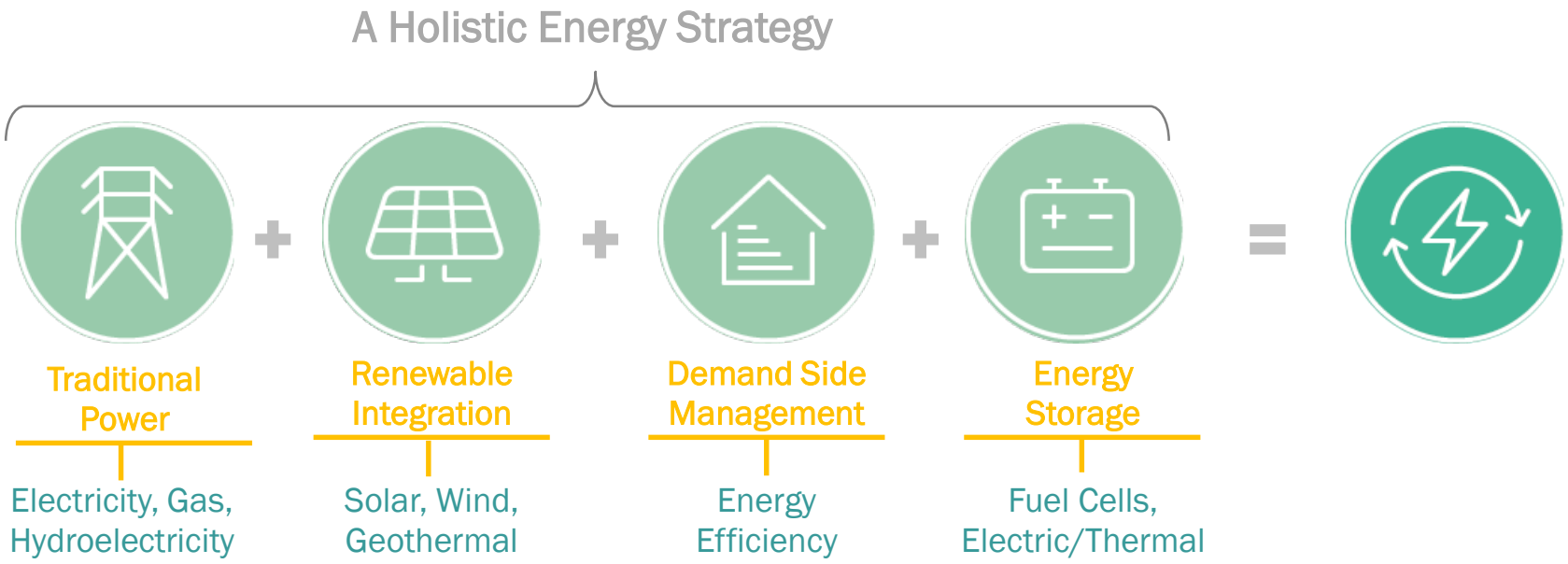
Hampshire Gas is a natural gas storage business which owns and operates facilities in and around Hampshire County, West Virginia.

VARIABLES THAT YIELD COST UNPREDICTABILITY

Variables That Yield Unpredictable Energy Costs for Organizations:

Without longer-term planning, variables that yield unpredictable energy costs for organizations could flatline distributed efficiencies and even create higher costs than pay-per-load options.

ACHIEVING ENERGY DIVERSITY



A holistic energy strategy has consideration for adaptable distributed generation capabilities allowing organizations to "plug and play" as a result of circumstances (threats, breaches, attacks, economics, etc.) affecting a project or installation.

Our practical approach delivers secure distributed energy at budget neutrality

WGL Energy
A WGL Entity

DISTRIBUTED GENERATION

Distributed generation (DG) is power produced at the point of consumption, giving consumers control of their energy.

FUEL CELL TECHNOLOGY

COMBINED HEAT & POWER (CHP)

SOLAR POWER

As one of the most experienced commercial solar financiers in the nation WGL Energy can design, build, finance, maintain and operate distributed generation assets.

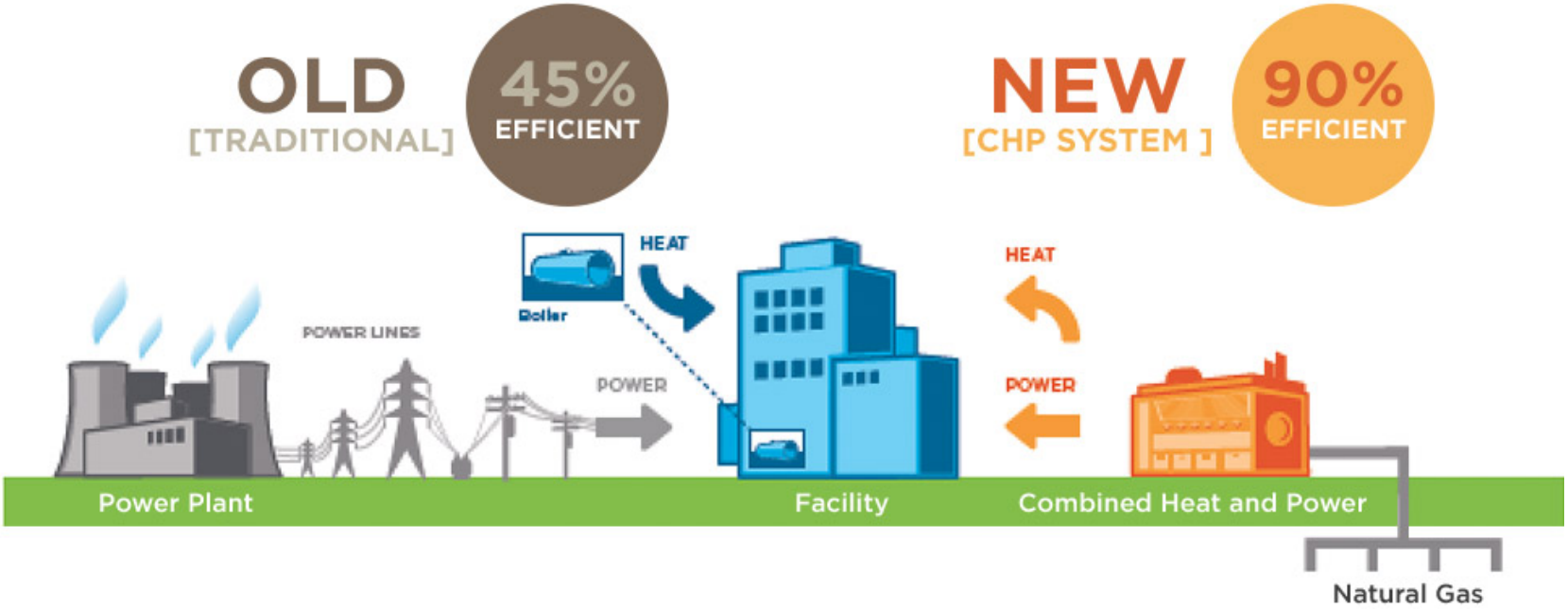
DISTRIBUTED GENERATION

ADVANTAGES

- ✓ Maintains power even with security breaches or natural disasters
- ✓ Reduces energy price volatility
- ✓ Eliminates inefficiencies and congestion that result from grid-reliant transmission and distribution
- ✓ Packages traditional energy and renewable resources such as solar power.
- ✓ Can reduce greenhouse gas emissions
- ✓ Increases reliability and resiliency

WGL Energy
A WGL Entity

CHP TECHNOLOGY



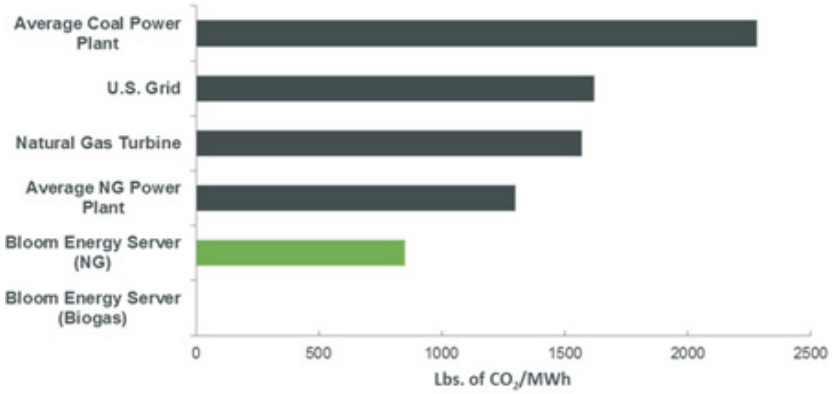
CHP technology takes advantage of the waste heat from electricity production to provide both electricity and useful thermal energy from a single energy source

FUEL CELL TECHNOLOGY

Water Usage Compared

Generation Type	Gallons per MWh	Annual Gallons (per MW of Bloom equivalent generation)
Bloom Energy Server	0	.001 million
Combined Cycle Nat Gas Plant (cooling tower)	250	2.1 million
Coal Power Plant (open loop cooling)	35,000	291 million
U.S. Grid	10,300	86 million

CO_2 Emissions



> Fuel cell technology uses virtually no water; and can be installed in parallel with a microgrid to ensure critical load operates without interruption.

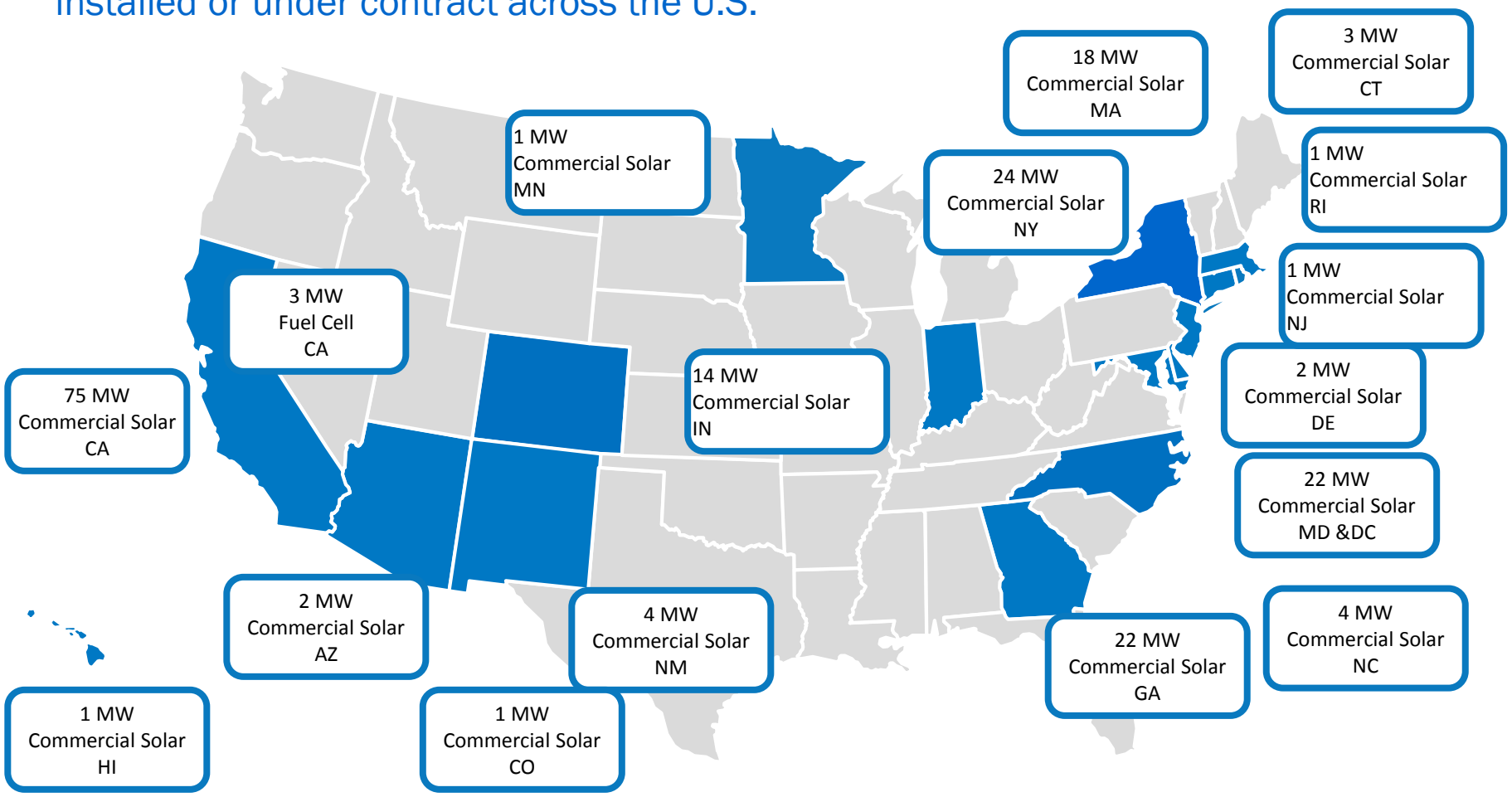
WGL Energy
A WGL Entity

SOLAR TECHNOLOGY

Solar technology is quickly becoming a cost effective renewable energy source whose application singularly or in aggregate provide significant customer benefits.

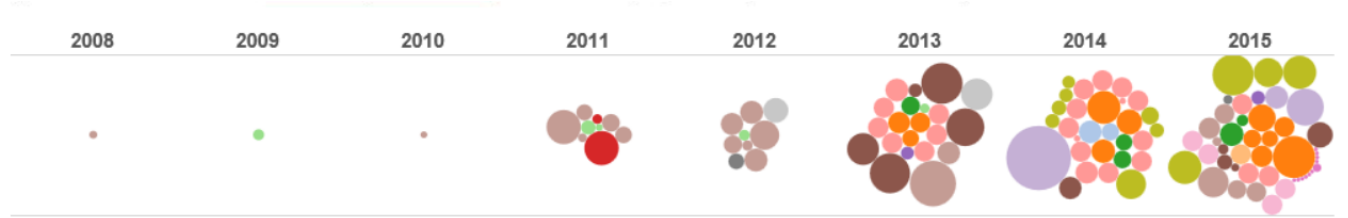
OUR CURRENT DG FOOTPRINT

WGL Energy has 145 MW of Distributed Generation projects installed or under contract across the U.S.

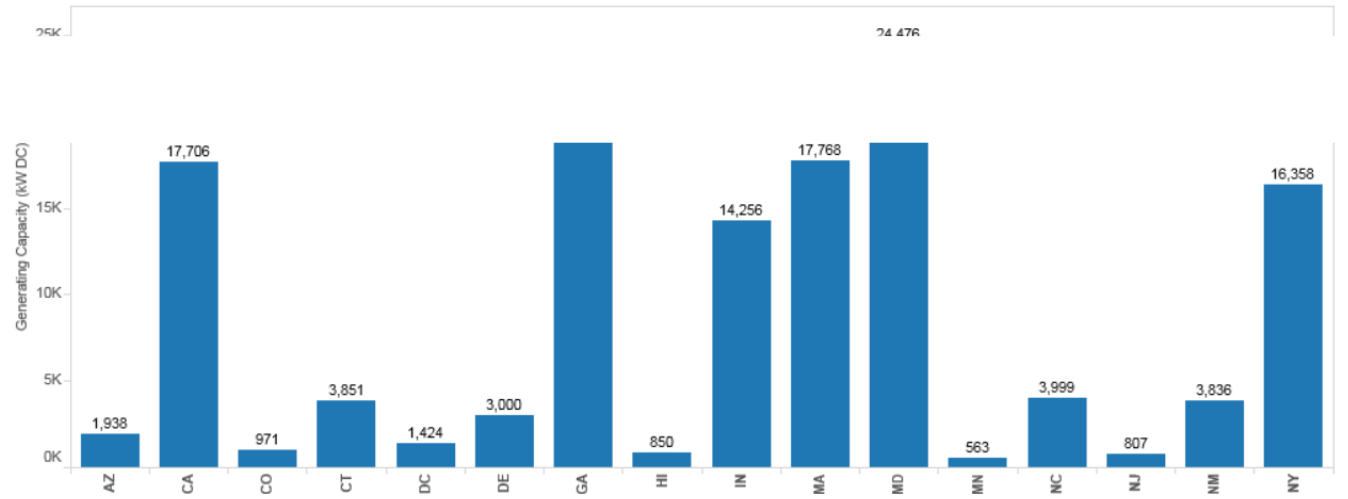


WGL Energy
A WGL Entity

WGL ENERGY'S SOLAR PROJECTS



Scroll over the circles above to see more details about our individual solar projects. Click on the year to see the projects installed that year, and click on each state's bar below to see the individual projects in that state.



WGL market presence has grown over the years to include a greater number of projects across the US. Distributed generation is becoming a critical supply source for more customers nationally.

CUSTOMER PROFILE: GSA COGENERATION PROJECT

WGL Energy completed the largest at the time Utility Energy Services Contract for cogeneration at the GSA Central Heating and Cooling Plant in Washington D.C .

- Construction costs $64 million
- Annual savings $8 million
- Simple payback 8 years

- Excess electric capacity was designed for power export when prices are favorable and the facility has enjoyed significant economic benefits due to the ability to sell exported power.

- New refrigeration equipment meets the chilled water needs of eight Smithsonian Institution museums located along the National Mall.

- Project reduces the plant's electric costs while generating surplus electricity to be used for future chilled water capacity or plant expansion.

- Reduced emissions improve regional air quality.

Off takers

✓*The Castle*
✓ *Freer Gallery of Art*
✓ *South Quadrangle Building*
✓*Arts and Industries Building*
✓*Hirshhorn Museum*
✓*National Air and Space Museum*
✓*National Museum of the American Indian*

GSA®

WGL Energy
A WGL Entity

GSA , CONT.

EQUIPMENT INSTALLED INCLUDE:

- 17,000 tons of cooling equipment including two steam-driven chillers
- New cooling towers & auxiliary equipment
- Retrofitted an existing boiler into a waste-heat boiler
- Automated plant control system
- New electrical switchgear
- Two 5 MW gas turbines & gas compressors
- 2 miles of piping including 1 mile underground distribution piping serving 8 Smithsonian buildings

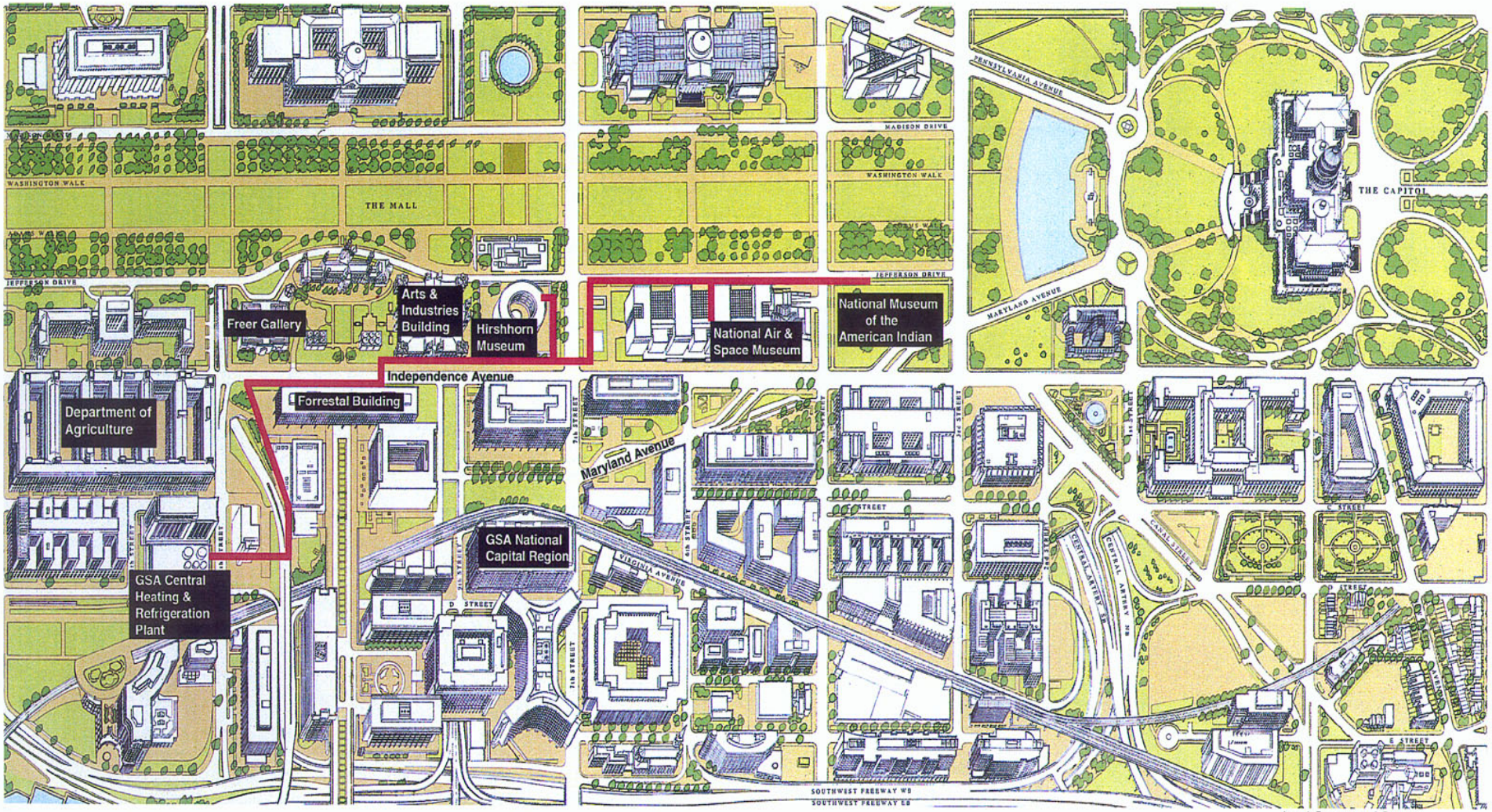
PROJECT BENEFITS:

- Updated cooling equipment with a estimated 30-year life expectancy
- Migration to a cleaner burning fuel to generate electricity
- Full self-generating power capability
- Re-use of existing facility
- Full utilization of existing plant personnel
- Greater redundancy & operational flexibility

WGL Energy
A WGL Entity

GSA , CONT.

U.S. General Services Administration
National Capital Region



Joseph Passonneau & Partners
reproduced under license agreement by GSA

Chilled Water Distribution System
GSA Cogeneration and Chiller Plant Expansion Project

Chilled water distribution lines

CUSTOMER PROFILE: ARCHITECT OF THE CAPITOL (CHP)

A recent agreement with the Architect of the Capitol demonstrates the strong competitive position of our diversified energy solutions portfolio and well-established position in the government and commercial sector. The Architect of the Capitol is responsible for the maintenance, operation, and development of over 17 million square feet of federal buildings. The Architect of the Capitol has selected WGL Energy Systems to develop a **7.5 megawatt** natural gas cogeneration system for its electricity and heating and cooling requirements. This innovative solution will deliver significant energy efficiency benefits and will help support the federal government's sustainability goals by reducing its carbon footprint.

The market continues to strive for secure, resilient energy supply derived through behind the meter generation.

WGL Energy
A WGL Entity

CUSTOMER PROFILE: KIPP DC PROJECT (SOLAR)

Size – 227 kW DC
Number of Panels –755
Estimated Annual Production –297 MWh
Estimated Environmental Benefit–Avoids over 205 metric tons of CO2 emissions, equivalent to avoiding emissions from the burning of about 220,000 pounds of coal

WGL Energy owns and operates more than 16 megawatts of energy solutions throughout Washington, D.C. and surrounding areas. Our unique financing model makes large scale solar projects a viable option for educational institutions such as KIPP DC. WGL Energy and KIPP DC, a network of high-performing, college-preparatory public charter schools Washington, D.C., partnered with Sol Systems and Volt Energy, one of the largest minority-owned solar energy development firms, to build a solar energy facility at KIPP DC's Douglass Campus in the historic Anacostia neighborhood. The project created electricity savings for the four KIPP schools at the campus while providing a unique educational opportunity for its students.

The 227 kW DC solar energy system, is a combination of solar carports and rooftop solar arrays. WGL Energy, which owns and operates the solar energy development, financed the project in partnership with Sol Energy. The swift third-party financing required no upfront capital expenditures for KIPP DC, and the non-profit benefits from a stable price for its electricity supply through a 20-year Solar Purchase Power Agreement (PPA), giving them maximum protection from volatile energy markets and reliable source of power independent of the grid.

CUSTOMER PROFILE: SANTA CLARA COUNTY (FUEL CELL)

BLOOM ENERGY FUEL CELLS

Proprietary solid oxide fuel cells perform a clean and highly efficient electro chemical process of onsite electricity generation from fuel such as natural gas and bio gas.

WGL Energy financed, built and owns a 2.6MW project that is providing clean and efficient energy to municipal facilities Santa Clara County in California, for **an annual CO2 reduction of 5 MILLION POUNDS**

WGL Energy
A WGL Entity

CUSTOMER PROFILE: WSSC (SOLAR)

WSSC wastewater treatment plants, MD

✓Located in Upper Marlboro & Germantown, Maryland
4.0 MW, 17,000 panel ground mount system
✓20 year PPA with annual escalator
Output: 6.6 million kWh/yr
CO2 offsets: 358,680 gallons of gasoline/ yr
✓Saving ratepayers approximately $3.5 million over the life of the agreement

WGL Energy
A WGL Entity

DISTRIBUTED GENERATION

We are continually expanding our portfolio of distributed generation assets.

In total, WGL Energy has 130 MEGAWATTS of owned distributed energy installed or under contract across 16 states and the District of Columbia.

We have **40 MW** of new distributed generation contracted or under construction.

In Minnesota, we're one of the first distributed generation asset owners to group together a portfolio of small commercial projects. Customers benefit with efficiency and savings, as well as from the projects using Minnesota-made system components.

WHAT ARE THE REGULATORY BARRIERS?

WHAT CHANGES TO TARIFFS AND OR REGULATIONS WOULD EXPAND DISTRIBUTED GENERATION IN THE DISTRICT?

- ❑ Enforceable timelines for interconnection
- ❑ Removal of the net metering limit of 1 MW in the District by DC Council
- ❑ Wheeling of power from CHP plants
- ❑ Strong state energy plans promoting distributed generation
- ❑ Open competitive markets for distributed generation projects
- ❑ Keep the market competitive
- ❑ Regulation should encourage entrance of innovative solutions to meet energy needs in the District of Columbia and remove regulatory barriers

FC1130 IS A GREAT FIRST STEP

WGL APPLAUDS THE COMMISSION FOR OPENING THIS WORKSHOP TO HELP INFORM THE PUBLIC OF THE OPPORTUNITIES THAT DISTRIBUTED GENERATION CAN BRING TO THE DISTRICT

WGL welcomes the opportunity to participate!