



WGL

ENERGY ANSWERS.
ASK US.

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS

**INNOVATION AND TECHNOLOGY/ MICROGRIDS AND ENERGY
INFRASTRUCTURE**

**JOHN DUKES, GM WGL ENERGY SYSTEMS SALES
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WGL ENERGY SYSTEMS

WGL Energy Systems designs, builds, owns and operates distributed generation systems and delivers energy efficiency solutions to meet commercial customers financial, operational and carbon reduction goals.

DISTRIBUTED GENERATION
ONSITE SOLAR
COMBINED HEAT & POWER
FUEL CELL TECHNOLOGY
ENERGY EFFICIENCY
OFFSITE RENEWABLES
MICROGRIDS

GRID-CONNECTED MICROGRIDS INCREASE RESILIENCY



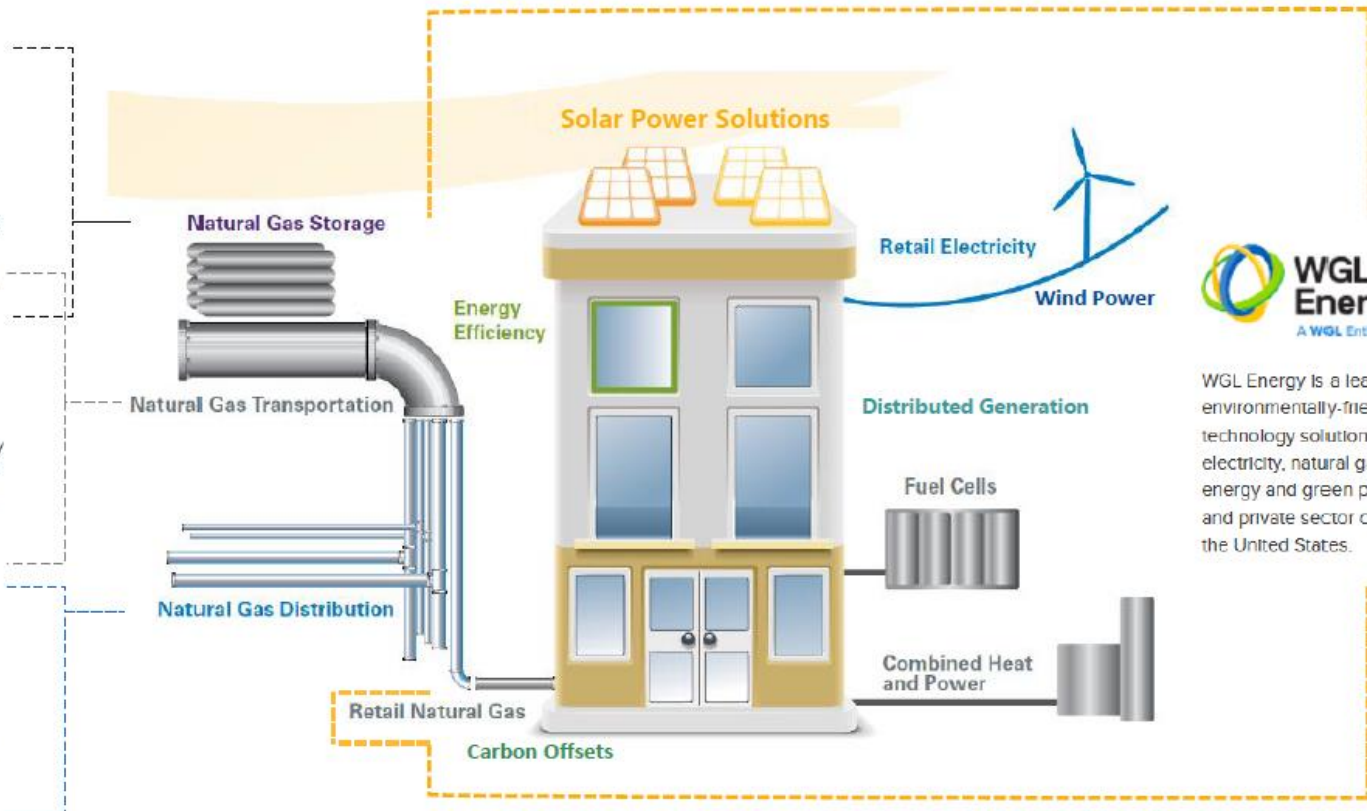
Hampshire Gas is a natural gas storage business which owns and operates facilities in and around Hampshire County, West Virginia.



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.



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 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 BUSINESS ACTIVITIES

WGL Business units now have sales, assets and business activities in 32 U.S. States and the District of Columbia



- Alabama
- Arizona
- California
- Connecticut
- Delaware
- District of Columbia
- Florida
- Georgia
- Hawaii
- Illinois
- Indiana
- Iowa
- Kansas
- Kentucky
- Louisiana
- Maryland
- Massachusetts
- Michigan
- Minnesota
- Mississippi
- Missouri
- New Jersey
- New Mexico
- New York
- North Carolina
- Ohio
- Oklahoma
- Pennsylvania
- South Carolina
- Tennessee
- Texas
- Virginia
- West Virginia

EXAMPLE – MICROGRID RESNODE



WGL Energy Microgrid Solutions

Energy as a Service

Energy as a Service (EAAS) is today's solution for financing energy security and resiliency. EAAS is a cyber-secure, black start, island mode and grid independent power supply.

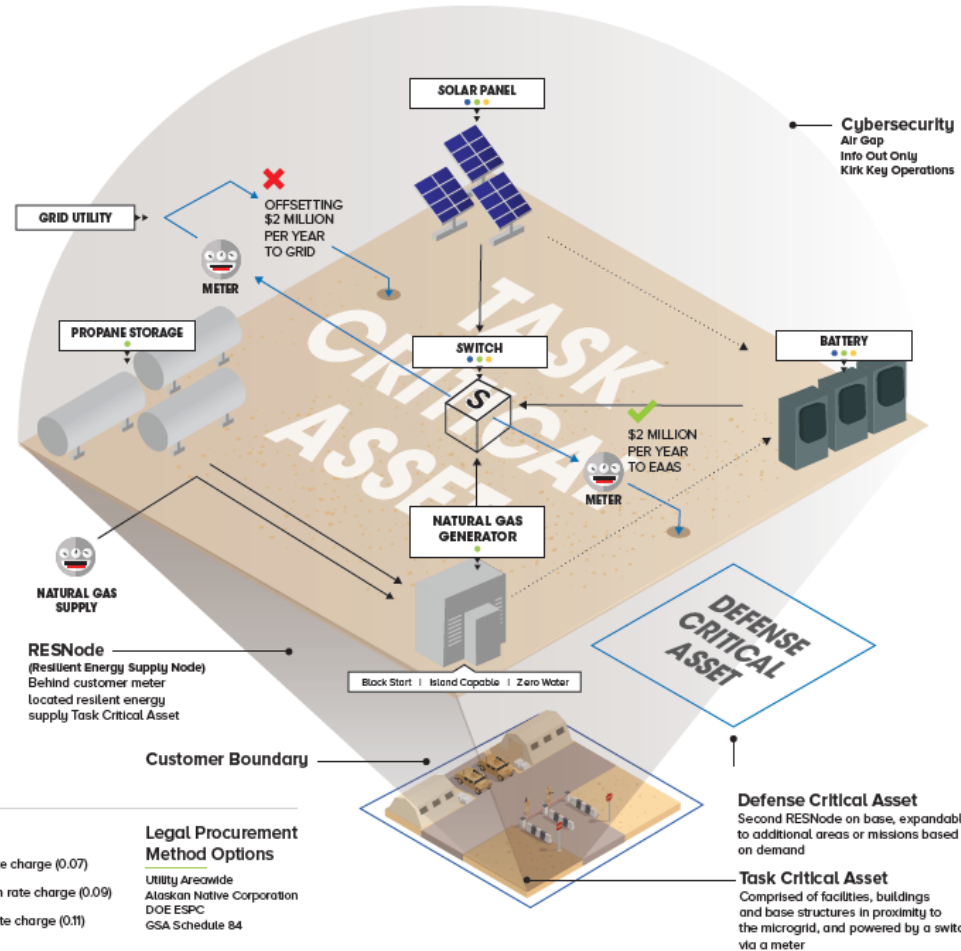
WGL Energy's Resilient Energy Supply Node (RESNode) is a behind-the-meter generation system that can supply grid independent power at grid competitive rates to ensure continued operation of mission critical system for a duration of 25 days.

RESNode systems are available in pre-configured and modular designs, providing shorter lead times for acquisition. Systems are available in 250kW and 750kW pre-designs, and are scalable to larger size kW outputs.

RESNode installations require zero appropriations, and are available for contract under the Areawide, Schedule 84, DOE ESPC and from Native American Corporations.

RESNode installations are funded by offsetting payments to the grid.

For more information, contact:
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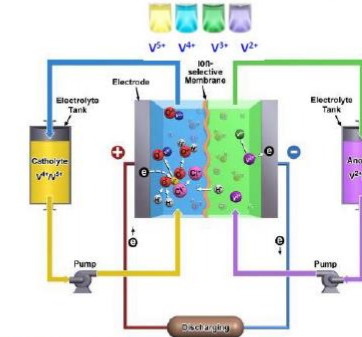
TECHNOLOGY AND INNOVATION

INNOVATIVE TECHNOLOGY FOR RESILIENCY

UET Advanced Vanadium Flow Battery

Versatile, Durable, Safe & Cost-effective

- Chemistry developed at Pacific Northwest National Laboratory
- Improved and Commercialized by UET
- Stability from -40°C to $+50^{\circ}\text{C}$
- Unlimited cycles
- No degradation for 20+ years
- Safe, non-flammable, non-reactive – no thermal runaway mechanisms



Confidential



TECH

- Fuel cells
- Alternative energy storage
- New generation systems
- Intelligent secure local distribution

INNOVATIVE TECHNOLOGY FOR RESILIENCY

ETAGEN Linear Generator



High Efficiency

Long travel extracts maximum energy

Trace NOx

Low temperature reaction

Low Maintenance

No oil, spark plugs, valves, or rotating bearings

Low Cost

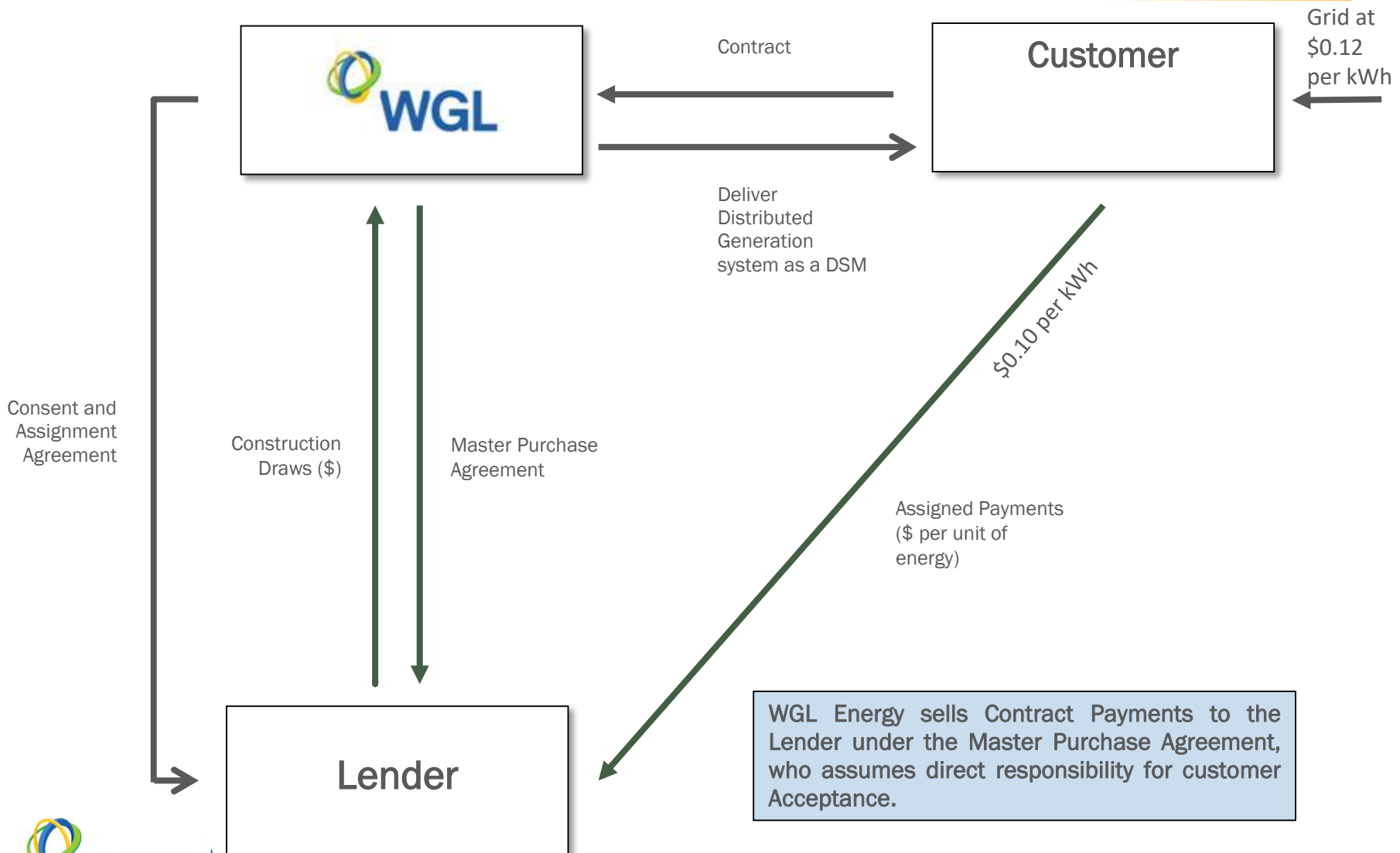
Standard materials, low capex assembly

INNOVATION

- External cash flows
- Private ownership/
- Common ownership
- Pay for use



INNOVATION - FINANCIAL FLOW DIAGRAM



EXAMPLE – THE PARKS AT WALTER REED

- The Parks at Walter Reed is a 66-acre redevelopment site carved out from the larger 110-acre former Walter Reed Army Medical Center in Washington, DC.
- At this multi-use, eco-campus, WGL Energy will design, build, own, and operate an onsite microgrid powered by renewable generation, CHP, and energy storage to increase the campus' energy efficiency and resiliency while also reducing its overall energy costs.
- WGL's business model will reduce construction costs and provide energy at-or-below the tariff-rate.

<https://vimeo.com/133603788>

password: digital

WGL ENERGY'S BUSINESS MODEL

- Our unique financing model allows for no upfront capital costs for the customer (reduce CAPEX and OPEX) and a stable electricity price through a Power Purchase Agreement (PPA) that is similar to a monthly utility bill.
- WGL financial pro forma captures all available revenue streams (e.g. tax incentives, spark spread) and factors in operations and maintenance costs.

CAPABILITIES

ENERGY PROJECTS

SCADA

EMCS

Secure Microgrids

Geothermal Systems

Cogeneration

Solar PV Systems

Fuel Cells

HVAC Systems (Chillers, Boilers)

Cooling Towers/Condenser Water

Dedicated Outdoor Air Systems

Chilled Water Systems

Steam Distribution Systems

Lighting and Lighting Controls

Electrical Distribution Systems

Building Automation Systems

Energy Management Systems

Metering and Sub metering

Radiant Heating and Cooling

Heating and Cooling Recovery System

DOMESTIC WATER REDUCTION

Reduced Flow Plumbing Fixtures

NON-DOMESTIC WATER REDUCTION

Steam Sterilizers

Vacuum Pumps

Air Compressors

Film Processors

Food Service Equipment

Refrigeration Equipment

WATER REUSE

Reverse Osmosis Units

Stills

Water for Injection

Air Handling Unit Condensate

Cooling Tower Blow-Down

ENGINEERING SERVICES

Energy Audits

Feasibility Studies

Condition Assessments

Design Build

Commissioning