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Ukrainian Rapid Energy Generation Plan

Use of the LNG / CNG “Virtual Gas Pipeline” for heating systems and power generation for critical infrastructure.

September 6, 2023

About Us

Superior Performance Energy was founded to bring together a diverse group of stakeholders from energy companies, utilities, equipment suppliers, and project developers in alternative fuel and power generation sectors to promote clean renewable energy as a critical pathway to achieve global decarbonization objectives worldwide. We offer products, solutions, and services suitable across the entire energy value chain. We support our customers on their way to power independence and more sustainable future through affordable renewable energy systems.

Services Provide:

- Solar Power Solutions
- Wing Turbines
- Hydroplants
- Mobile Gas Turbines
- Mobile Supply of Biogas, LNG, CNG and H2

Rapid Microgrid Deployment





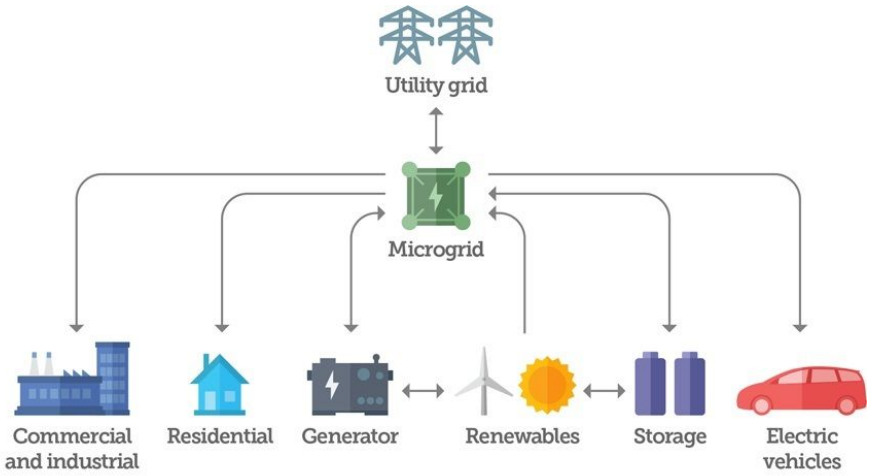

Introduction to MICROGRID

- Microgrid is **local, small-scale power generation networks** from distributed power generation sources – today powered by natural gas but in the future from solar cells, wind turbines happening in tandem with the dynamics of a digitalization process that has already rocked some industries In USA.

- **More Secure:** naturally more resilient and greatly reduces the impact of damage to the electric grid.

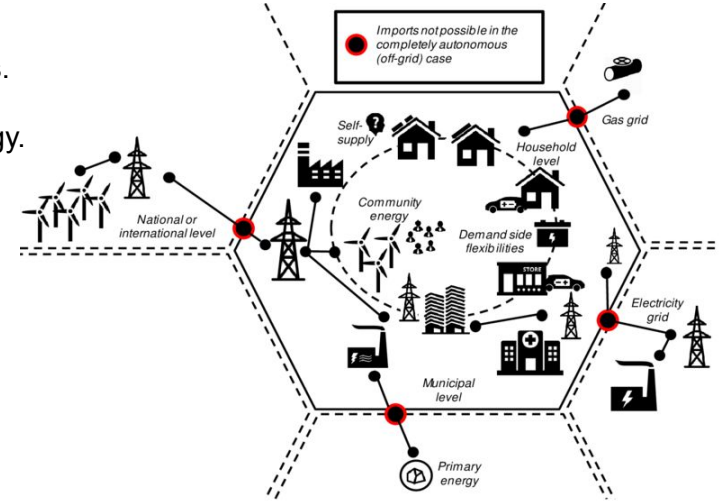
- **Less Transmission Loss:** When you factor in transformers, transmission lines, and local distribution, losses are generally between 8 and 15%. Those losses could be dramatically reduced if we stopped shipping electricity across the country with transmission lines.

- **Ability to separate and isolate** itself from the utility during a disturbance with little or no disruption.



Microgrid architecture for Ukraine

- **Distributed generating devices:** gas piston power plant, turbo generator sets.
- **Battery stations** - devices for the accumulation and storage of electrical energy.
- **Management and Monitoring:** The system of automatic dispatching control of the network SCADA and data storage.
- **Fuel Source:** CNG / LNG containers refilled via mobile gas deliveries.



Mobile Gas Turbine Microgrid for Large Plants

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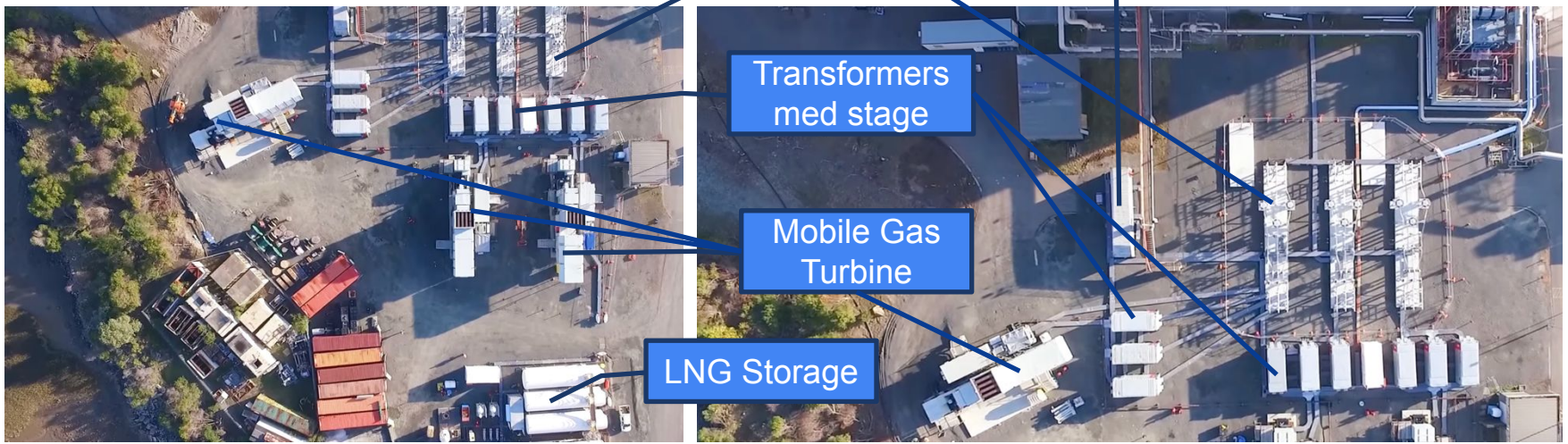

Mobile Gas Turbine Microgrid for O&G / Mining

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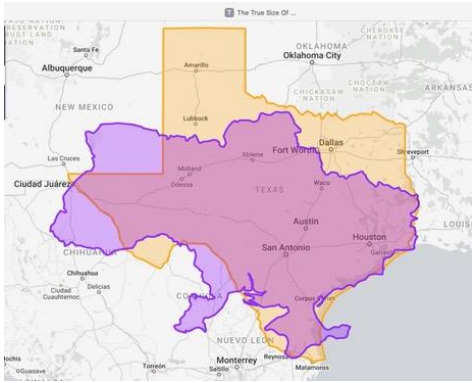
Securing Onsite – Gas Power Generation is the Key!

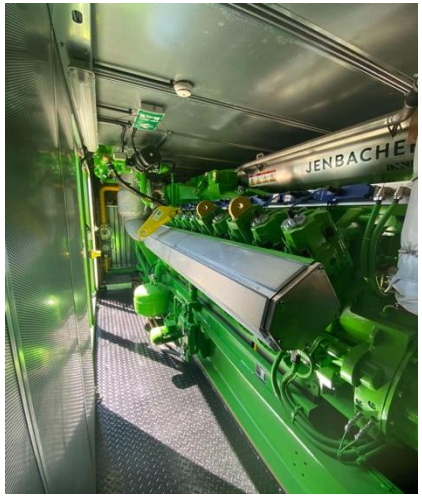
- Immediate deployment of mobile (modular) -based, 1- 35 MW gas-powered turbine-driven power generators to support critical infrastructure (hospitals, water treatment facilities, municipal buildings), as well as residential sector
- Financial assistance to identify best suited mechanisms, ranging from:
  - US-funded humanitarian aid to pre-qualified public / private customers
  - Lending/loan guarantee to end-users,
  - Energy as a service by US-based Superior Performance Energy (Exploring)
- Development of **grid resilience** via existing gas lines and **mobile gas** (**CNG / LNG) deliveries**, as a foundation for post war **Micro-grid** energy architecture.



Gas Piston Power Plant – (Now Available)

Generate Electric power from 300 kW to 10.4 MW

JENBACHER TYPE 2	JENBACHER TYPE 3	JENBACHER TYPE 4	JENBACHER TYPE 6	JENBACHER TYPE 9
				
294 kW – 330 kW	500 kW – 1,067 kW	901 kW – 1,562 kW	1,451 kW – 4,507 kW	10,400 kW



Small Capacity Mobile Gas Turbine – 1 MW - (Now Available)

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TURBINE MARINE INC

TM1000 Turbine Power Generation Systems

- Output up to 1,000 kW (1400 HP)
- Engine efficiency 25%+ single cycle operation
- Split-shaft design with five stage axial compressor
- Output speed of 1,500 RPM
- Modular assembly
- Airflow to 14.1 lb/sec
- Minimal engine drive accessories
- Selectable fuel option (Liquids and Gases)
- E

- Self-sustainable, small-footprint
- Strong and discrete design
- 1-3 hours deployment – just need access to gas
- Can work off of CNG / LNG / RNG
- Lowest power generation cost
- Low maintenance requirements
- Requires 13,000-16,000 BTU per 1MWH
- Annual production capacity is 75 units (1mw or 3 mw)

Large Capacity Mobile Gas Turbine – 5 to 35MW (Now Available)

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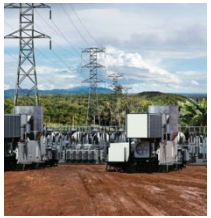
Companies with Major Manufacturing Capabilities in the United States

GE Gas Power | Solar Turbines A Caterpillar Company | WÄRTSILÄ | SIEMENS energy | MITSUBISHI POWER | DYNAMIS POWER SOLUTIONS | jereh



jereh North American Group

Item	Description
Engine	Siemens SGT A05
ISO Base Rating	5.5 MW @ ISO Working Condition
Generator	Leroy-Somer
Terminal Voltage	13.80 kV±5%
Frequency & Speed	60 Hz ±2%, 1800 rev/min
Heat Rate, LHV	10290 Btu/kW·h(10848 kJ/kW·h)
Efficiency	33.2%
Exhaust Flow	46.52 lb/sec(21.1 kg/sec)
Exhaust Temp	515.7 °C(960.3 °F)
Noise Level	< 85 dB(A)@1 meter
Rig-up Time	< 4 Hours

Item	Description
Engine	GE LM2500 +G4
ISO Base Rating	33.85 MW @ ISO Working Condition
Generator	Brush
Terminal Voltage	13.80 kV±5%
Frequency & Speed	60 Hz ±2%, 3,600 rev/min
Heat Rate, LHV	8,760 Btu/kWh(9,243 kJ/kWh)
Efficiency	39.50%
Exhaust Flow	201.72 lb/sec(91.5 kg/sec)
Exhaust Temp	526.6 °C(979.88 °F)
Noise Level	< 90 dBA @ 1 meter
Rig-up Time	< 8 Hours

Mobile LNG Transport and Storage Options (Now Available)

20,000 Gallon Trailer:
Used mainly to set up rapid onsite LNG storage


10,000 Gallon Trailer:
Standard 40 Ft Trailer most commonly used to transport LNG


2,000 Gallon Bobtail:
Onboard regasification


120 Gallon LNG Tank:
Onboard Stainless Steel LNG Tank




5,000 Gallon Trailer Regasification Unit
All Inclusive Solution


Mobile Regasification Units


Terminal Fueling Rack System

Matching LNG with Power Generation Capacity and Grid Consumption

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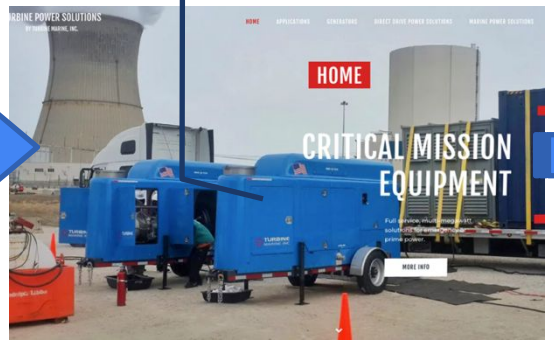
LNG Storage Capacity → Regasification Rate → Regasification Rate → Consumption Rate



A combination of number and capacity of LNG trailers, regasification units will be optimized for best ROI based on the following criteria:

- Cost of fuel from different Sources
- Fuel Availability and daily capacity
- Time to fill and transport to the project site
- Distance between source and delivery point
- Regasification speed to match the consumption rate
- Time to deplete trailer and transport to the refueling site

1 MWh = up to 16 MMBTU
1 Gallon LNG = 82,000 BTU
1 MWh = 195 Gallons

- 120 Gallon Tank / 450L Tank = 40 min of 1MWh
- 5,000 Gallon Tank = 1 day of 1MWh / 25 MWh Total
- 10,000 Gallon Tank = 2 days of 1MWh / 50 MWh Total
- 20,000 Gallon Tank = 4+ days of 1MWh / 100 MWh Total

LNG Availability from Europe

FIGURE 9 – MAPPING OF MARKET PLAYERS (NON-EXHAUSTIVE)*

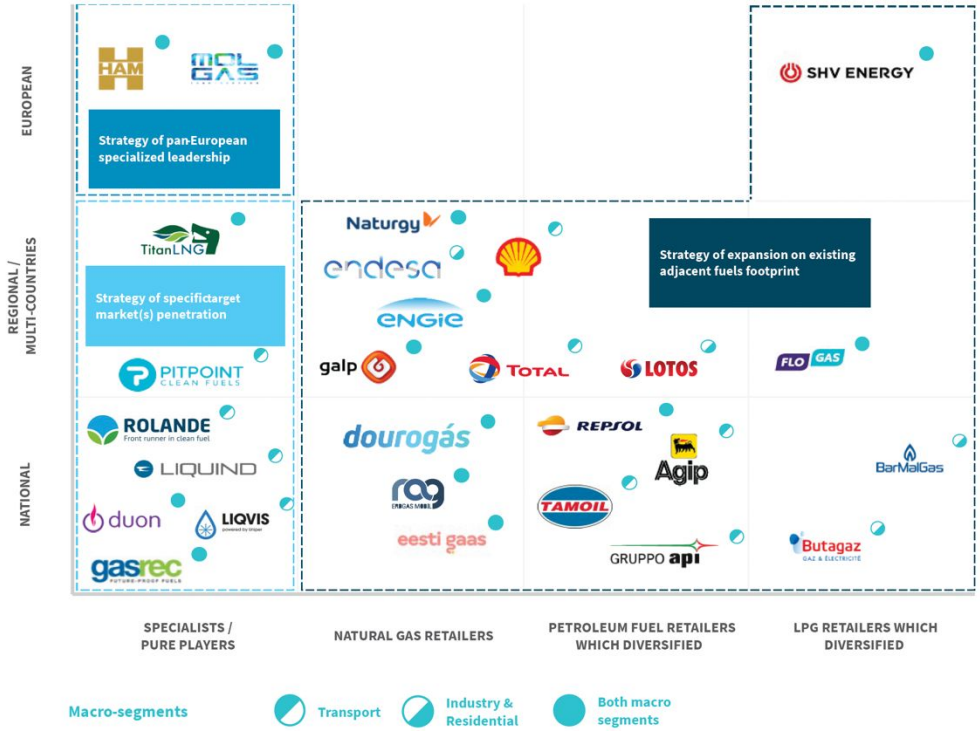
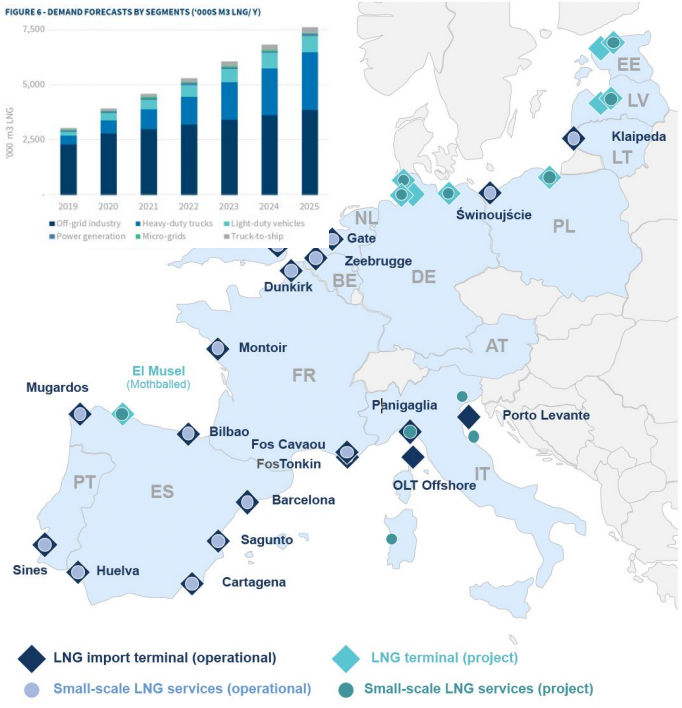
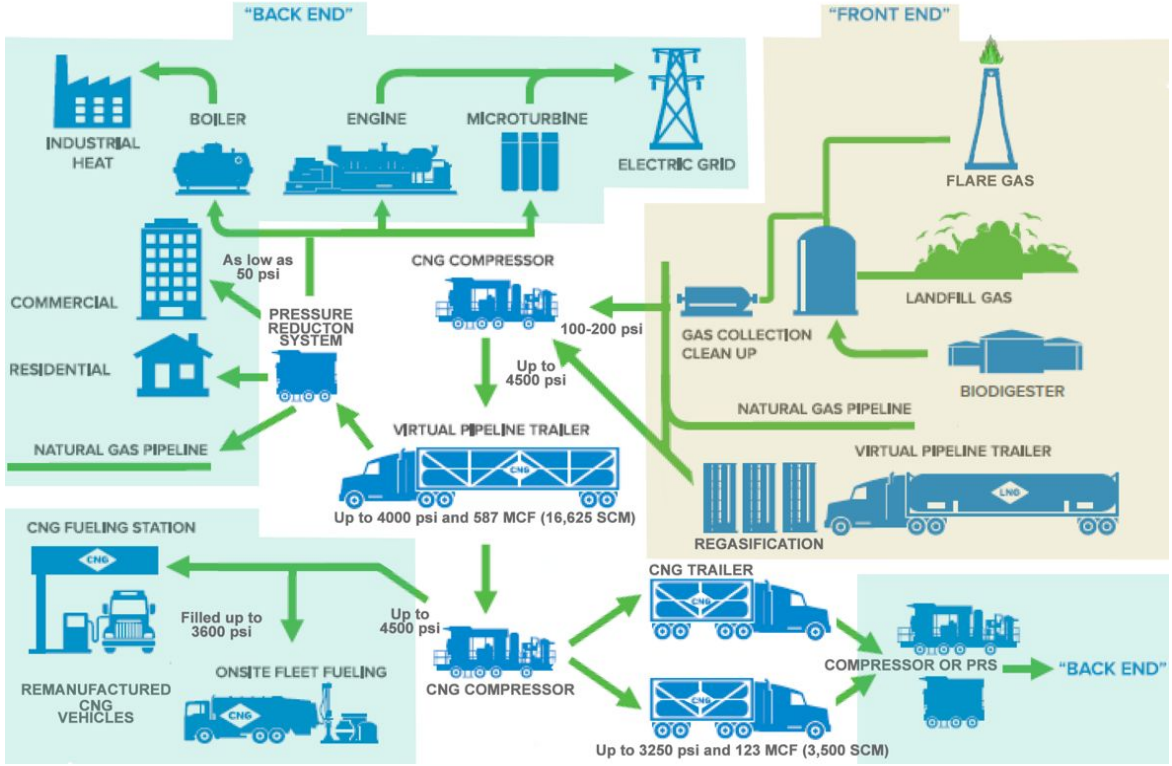


FIGURE 2 – MAP OF LNG TERMINALS AND TRUCK LOADING SERVICES



Not just a quick fix, foundation for next-age power generation

- **2023-2035 Strategy:** Combination of Mobile Gas Turbines and Mobile LNG / CNG supply will provide solutions for many decades to come.
- **Localized Power Generation:** Microgrids will be the standard of new age power generation.
- **Transitioning from imported gas to domestically produced:** Very soon gas will be generated, compressed or liquified locally from multiple sources. O&G, Farming, Land fields, waste-water facilities.
- **Sustainability:** Mobile Gas turbine today can be powered by LNG / CNG and Biogas / RNG. Operational experience will allow to start operating from Liquid and Compressed Hydrogen (H2)



Other Mobile LNG Applications

Industrial Customers

Natural Gas Network

LNG For Heavy-Duty Trucks

L-CNG for Transportation

Marine Fuel

Aerospace / Future Fuels

Thank You!

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