

Panda Temple I











Panda Sherman Power



Pilesgrove Solar



Panda Temple II





Panda Liberty





Panda Stonewall



Panda Patriot





Patriot Power

Project Overview

Joe Lloyd, Vice President of Operations

PandaPowerFunds

13 October,2016

Panda Power Funds

- Privately owned company
- Headquarters in Dallas, TX
- Why the Bear?

Patriot Project

Project Brief



Location	Lycoming County, PA
Service Areas	PJM Western Hub Energy/MAAC capacity area
Target Commercial Operation Date	July 2016
Gross Operating Capacity	828 MW
Equipment Technology	2 Independent Siemens Single Shaft H combined-cycle gas/steam turbine trains each with an air cooled condenser
EPC Contractor	Gemma Power Systems/Lane Construction
Base Load Heat Rate	6,490 Btu/kWh (ISO HHV)

PandaPowerFunds

Project Summary

- Approximately 550 peak construction jobs
- 30 month schedule
- Second Marcellus gas fueled power station
- Sister project in Towanda
- Offsets loss of coal fired plants
- Supplement Green Power – Wind/Solar
- Currently building Hummel plant

PandaPowerFunds

Schedule Highlights

- NTP: 20 December 2013
- First Major Foundation: April 2014
- First Major Equipment on Site: June 2014 - Unit 10 Generator Stator
- PPL Saegers 230kV Switchyard In Service 22 May 2015
- Plant Switchyard In Service : 01 June 2015
- Fuel Gas Pipeline Work Completed (UGI): 08 February 2015
- Fuel Gas Available (UGI): 17 July 2015
- Unit 10 Initial Operation: March 2016
- Unit 20 Initial Operation: March 2016
- Facility Commercial Operation July 2016

PandaPowerFunds

Project Summary

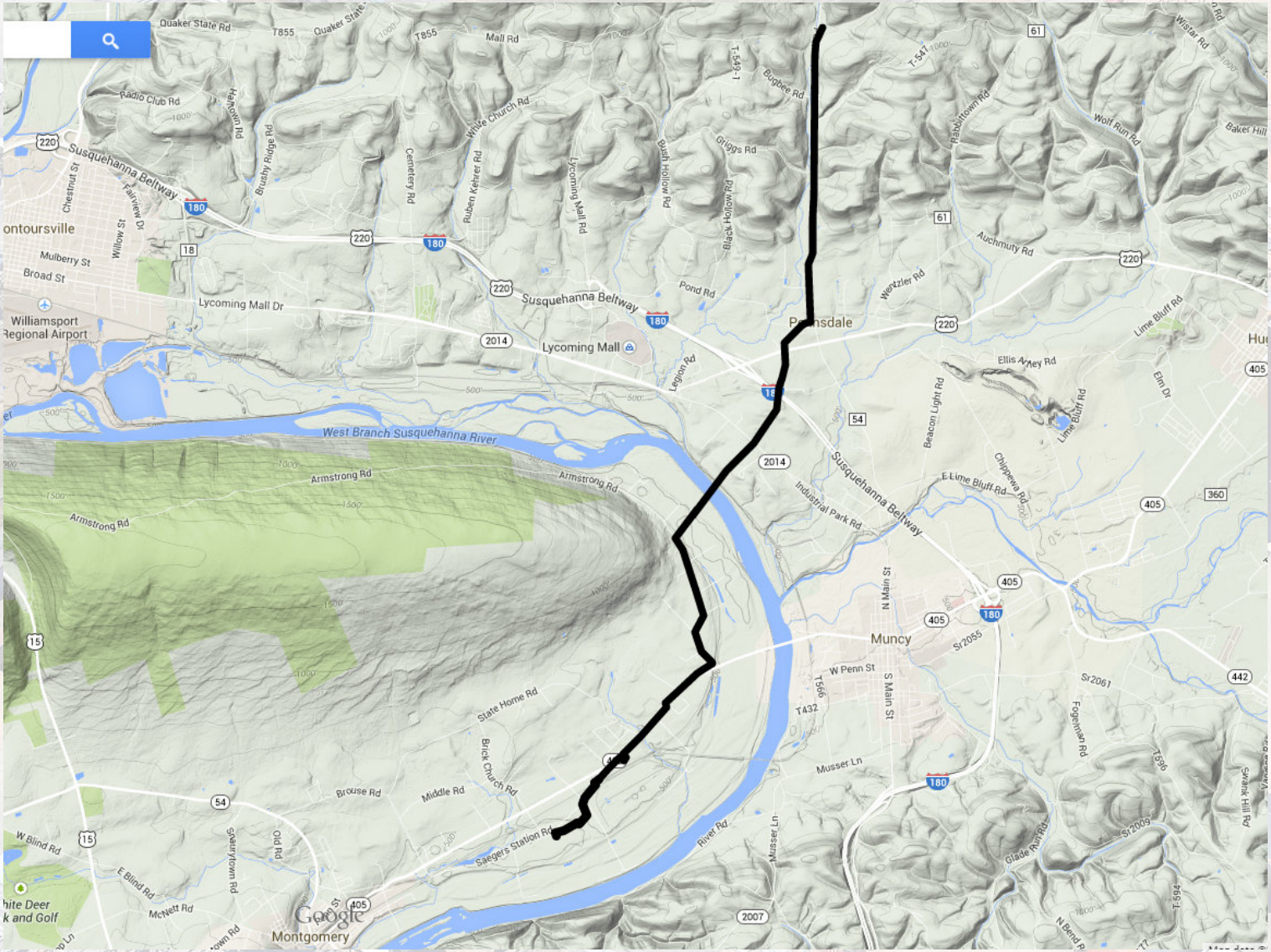
- 828 MW Combined Cycle Single Shaft
- 60% Efficient
- Based on :
  - Siemens 8000H Gas Turbine
  - Siemens Generator
  - Vogt Heat Recovery Steam Generator
  - Siemens Steam Turbine
  - EVAPCO Air Cooled Condenser
  - Alstom Generator Step Up Transformers

PandaPowerFunds

Project Summary

- Gas Pipeline
  - 8.1 Miles
  - Connecting Pennsdale to Montgomery
  - Under Susquehanna River
  - Under I-180
- Switchyard and Transmission line
  - 1.4 mile transmission line
  - 230,000 Volt switchyard
- Sewer and Water Interconnects
  - Montgomery Township

PandaPowerFunds



Gas Pipeline Route

PandaPowerFunds



Gas Pipeline with HV

PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



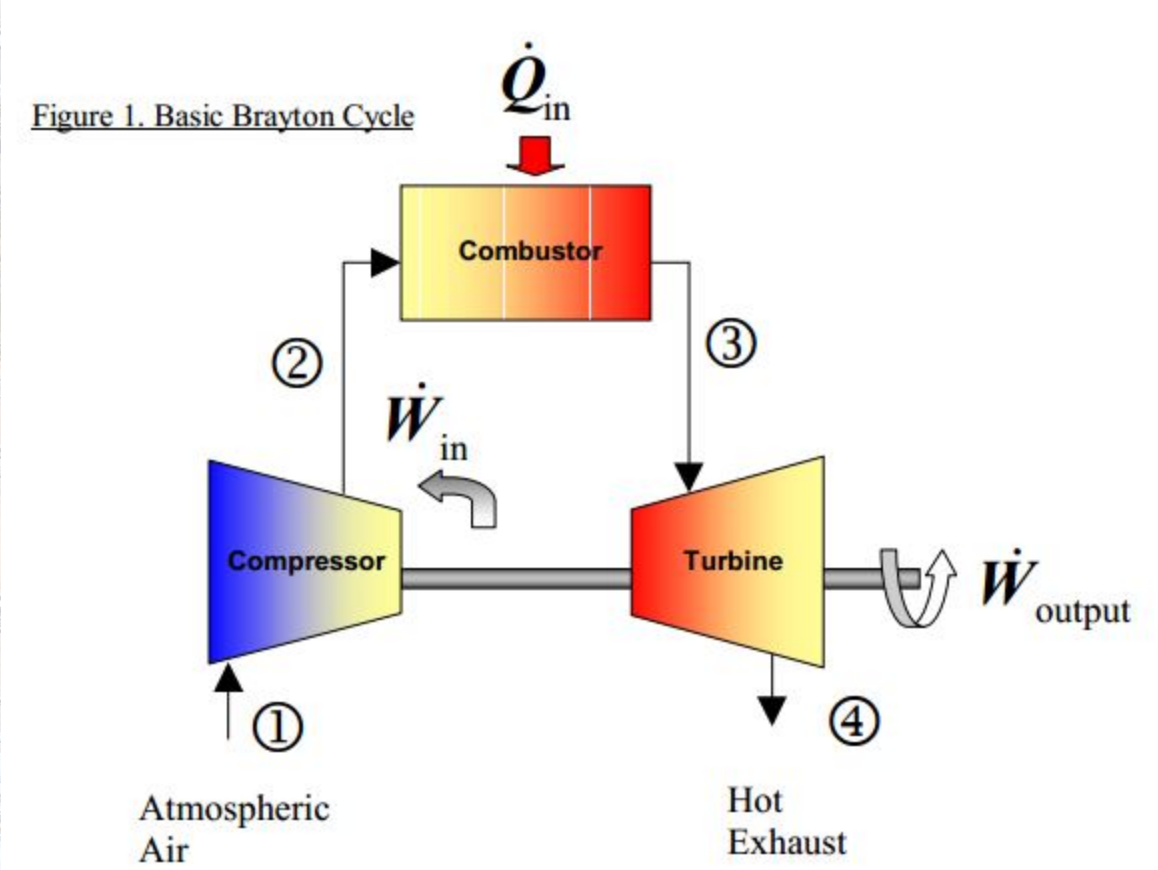
PandaPowerFunds

Electricity 101 and Combined Cycle

- Electricity 101
  - What is needed to make electricity
  - From the generator to your home
- Combined Cycle
  - What does it mean
  - Why is it more efficient

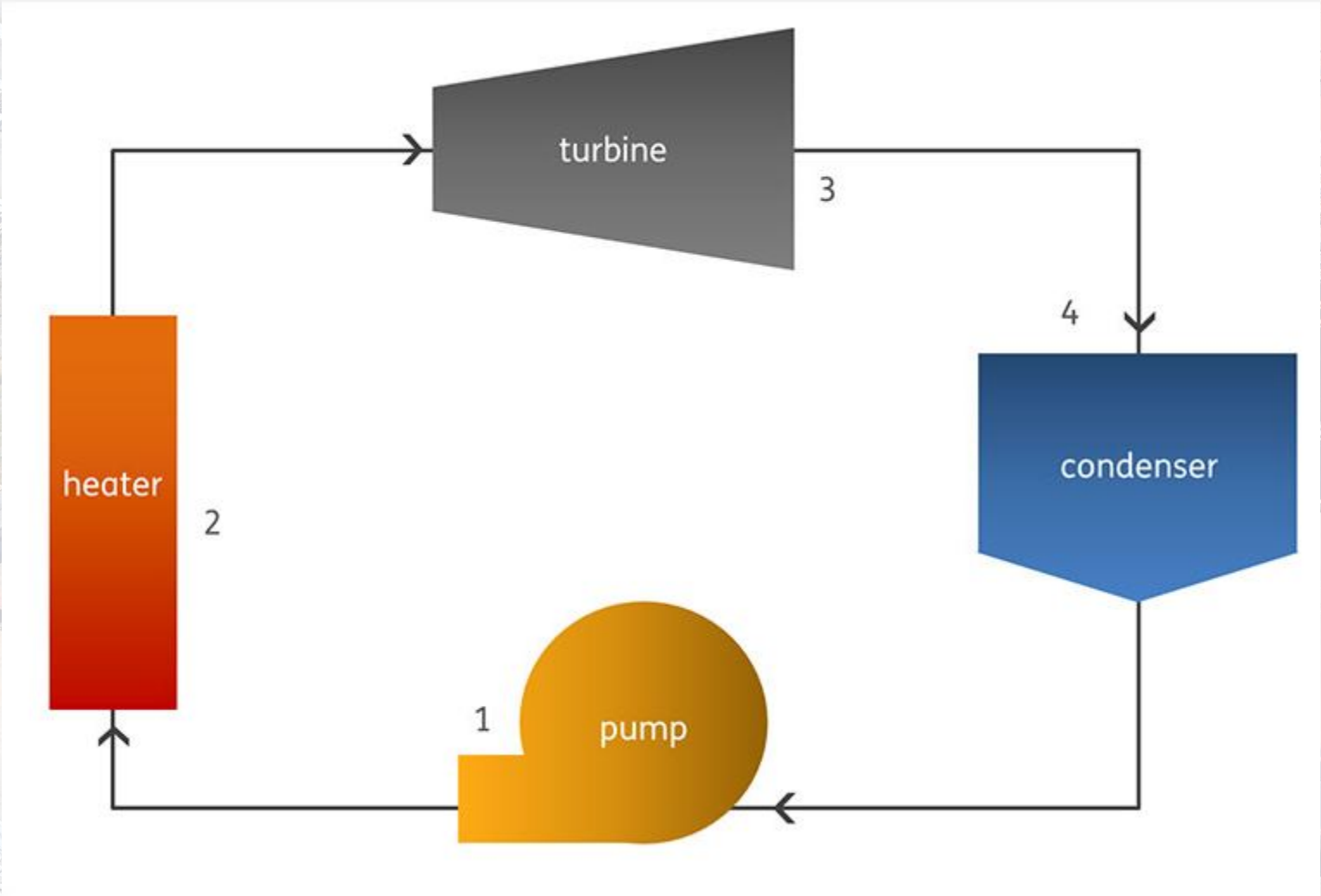
PandaPowerFunds

Process Overview – Brayton Cycle



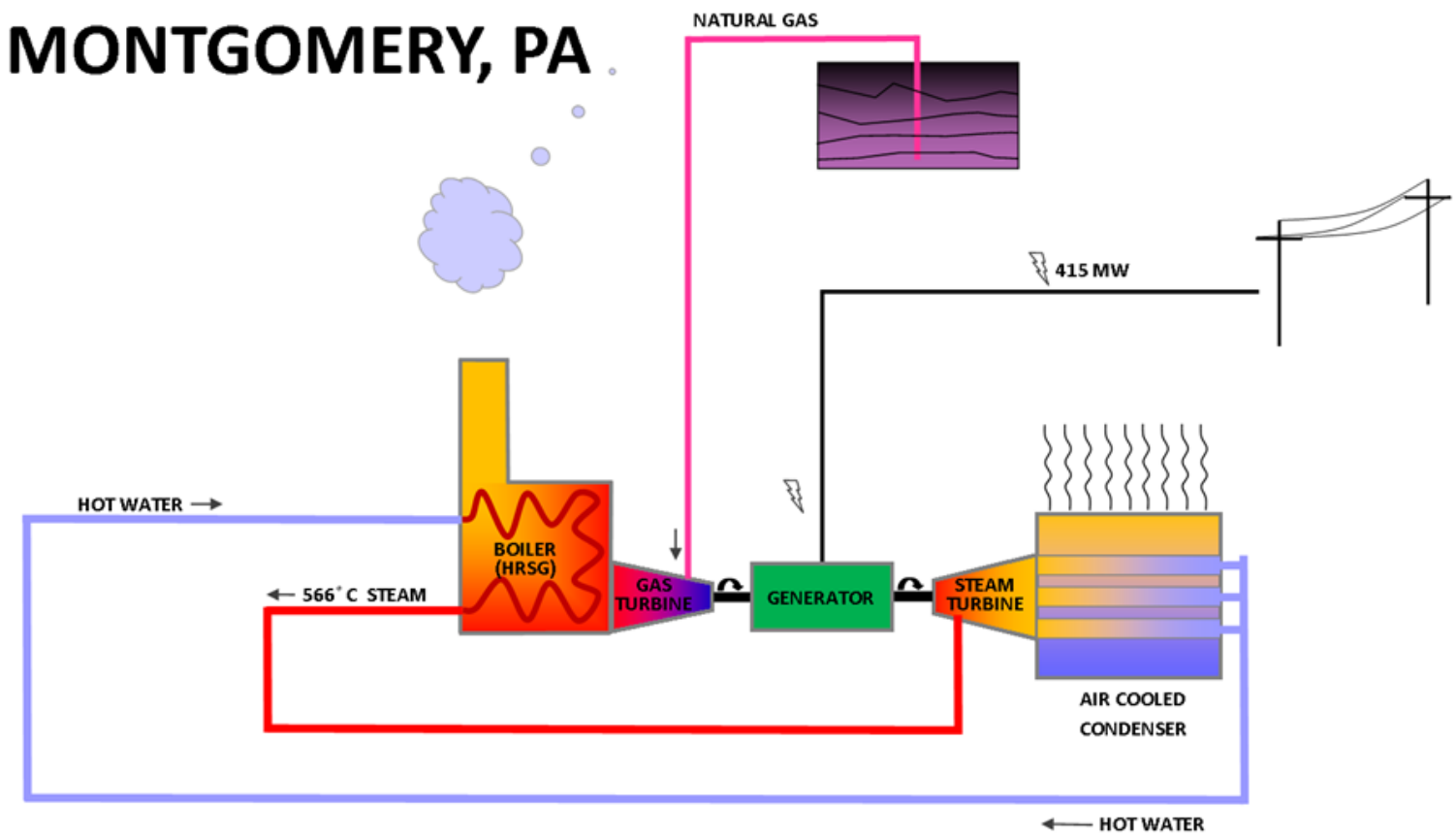
PandaPowerFunds

Process Overview – Rankine Cycle



PandaPowerFunds

Process Overview



PandaPowerFunds



PandaPowerFunds



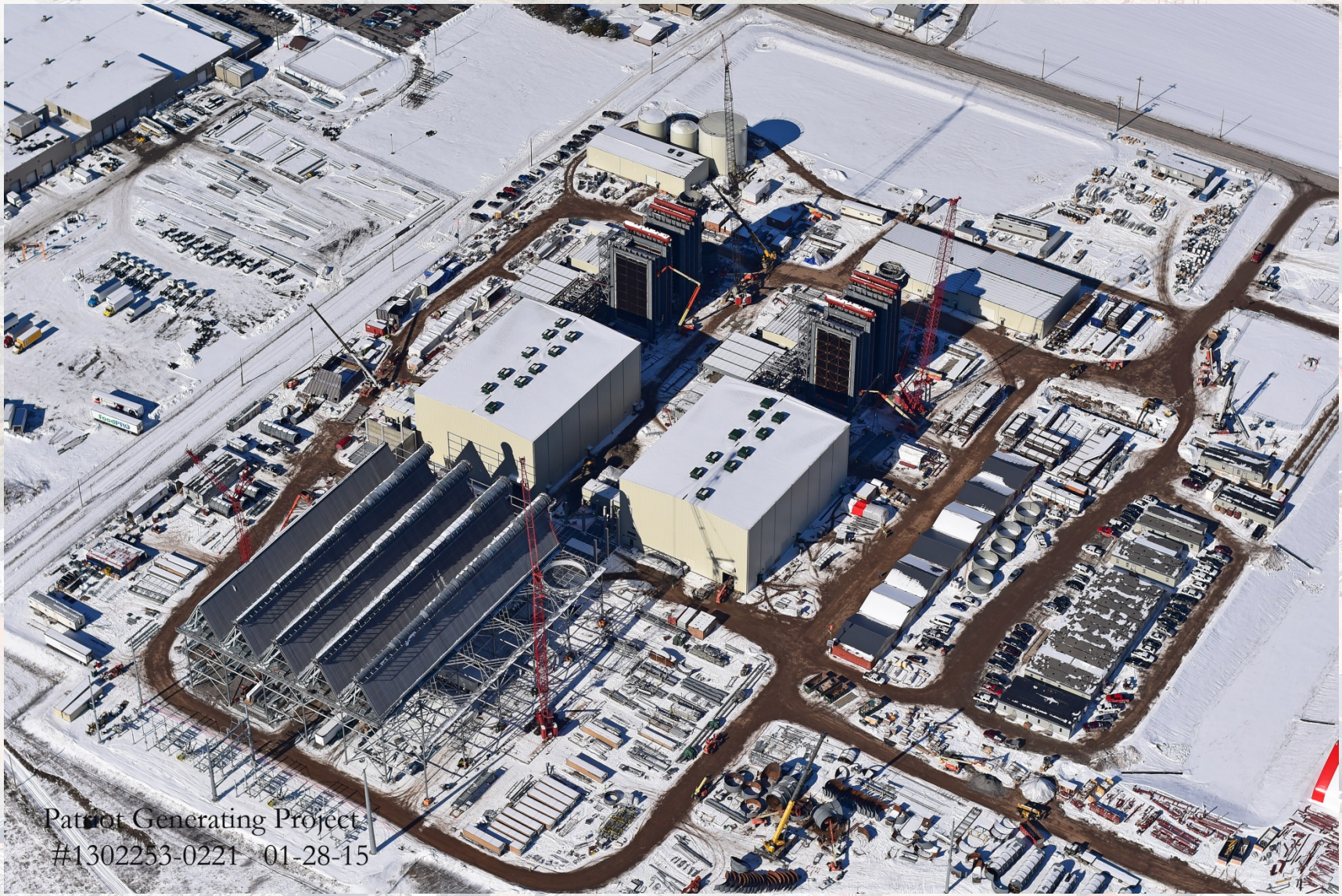
PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



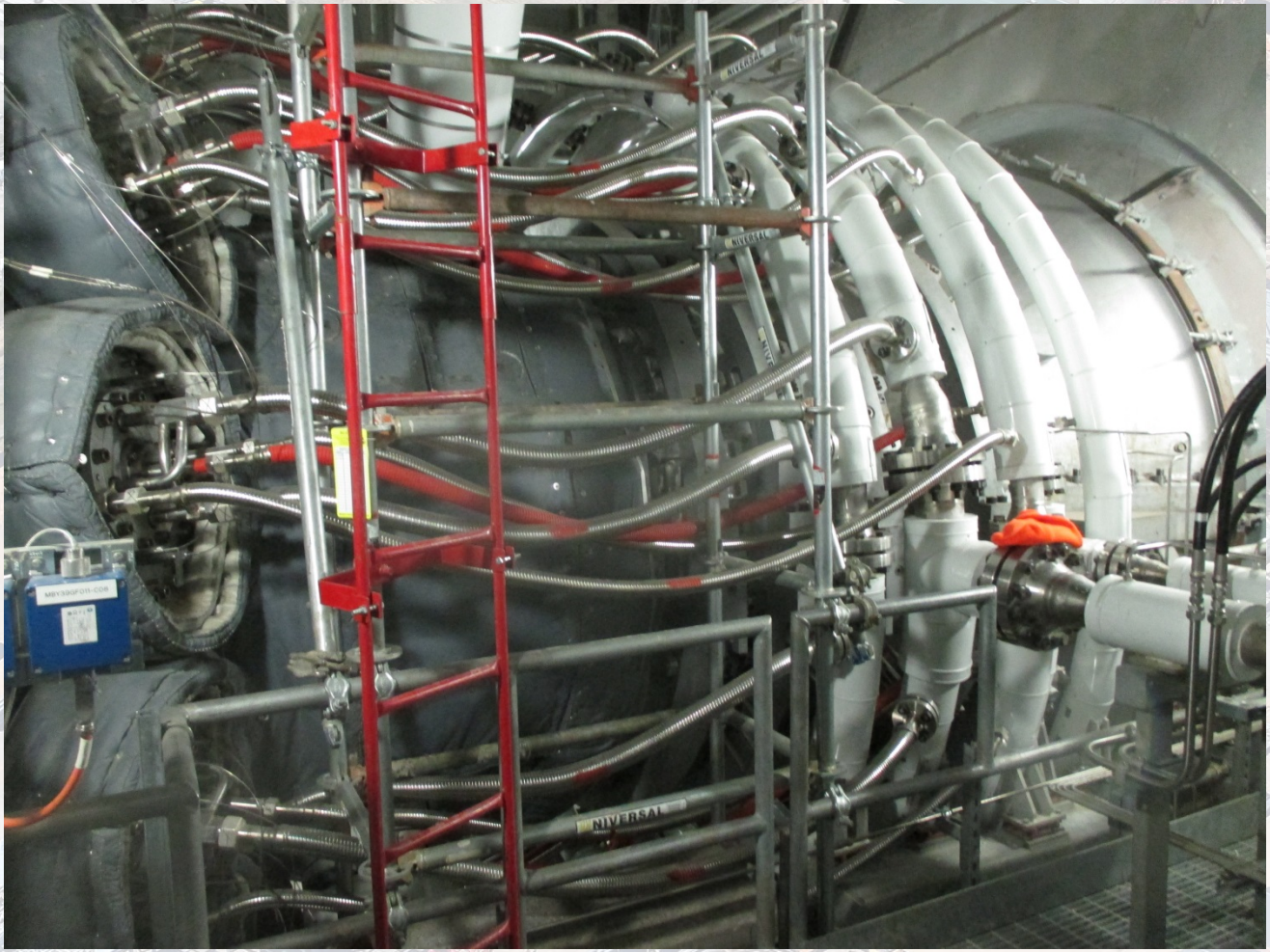
PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds



PandaPowerFunds

Project Summary

- 27 full time operations jobs
  - 16 Operations
  - 7 Maintenance
  - 4 Support
- Personnel from entire US
- Previous experience

PandaPowerFunds

Typical Day

- Assemble bid for PJM
- Purchase Gas for next day (by 10:00)
- Dispatch schedule received (by 1:30)

PandaPowerFunds

Panda Patriot



PandaPowerFunds

Contact for Panda

- Types of Services
  - Mechanical – welding/millwright
  - Electrical – installation/calibration testing
  - Insulation and Heat Tracing
  - General manpower – cleaning
- Types of Supplies
  - Pumps/valves/reducers/piping
  - Switches/cable
  - Test equipment/tools
- Contact
  - Joe Lloyd **jlloyd@pandapatriot.com 570-547-3701**

PandaPowerFunds