K. Scott Sine
Director, Engineering & Energy Services
PE (PA), LEED Legacy, CEM, CMVP
What We Bring to NYS Marketplace

Hardware & software **agnostic** solutions
Proprietary pre-analytics for CHP/DER/microgrids
Broad in-house engineering & technical capabilities
Flexible project arrangements
Unique financing & project opportunities
  - Electricity sales, RECs, PPAs, on-bill financing, etc.

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We Bring Unique Flexibility in Projects & Capabilities
Audience-members wanted for a team

For mutually-beneficial relationships -
- Generation suppliers: all types of CHP, solar & wind
- Storage suppliers: battery, thermal & H2

GCs & AEs for relationship-based project delivery

We work in whichever way best suits the project
- No job is too small or too big

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Always Open to New Relationships
TMI’s Broad Capabilities

ENGINEERING SERVICES
- In-house Professional Engineers
- Design-Build, Hybrid, Turnkey, Etc.
- 3D/4D/5D BIM & VDC
- Studies & Energy Audits

MICROGRIDS & DER
- Microgrids/Nanogrids/DER/CHP
- Pre-analytics
- Controls spec & program
- Electricity Sales & PPAs
- Energy/Electricity/Energy Storage as-a-Service

COMMISSIONING & BALANCING
- Continuous & Retro-Commissioning
- LEED, CEM, NEBB & TABB services

BUILDING AUTOMATION

CONSTRUCTION
- Laser Scanning
- Mechanical Construction Management

MODULARIZATION & FABRICATION

OPERATION & MAINTENANCE SERVICES

Focused on Facility Energy & Efficiency Services
Microgrid Experience

Worldwide microgrids
• 50+ microgrids > 1 MW installed in 23 countries
• 400 MW and 77 MWh of installed & under construction
• Wind, solar, diesel, CHP, battery & H2
• Many islanded with full virtual inertia droop control

NY Metro microgrids
• 50+ MW of DER & microgrids installed in metro area
• Simple islanding to accommodation of future add-ons

NYS microgrid sweet spot
• 1 to 15 MW

Lots of Microgrid Experience
ENGIE Group (France)

$60.8B in 2018 revenues - 160,000+ employees worldwide
World’s #1 supplier of energy efficiency services
#1 independent power producer with 125 GW
230 heating and cooling district networks
History traces back to 1800s

Looking to be the Leader in Worldwide Energy Transition
ENGIE North America

$3.8B in 2018 revenues - 5,000 employees

#4 electricity supplier to U.S. C&I customers
  - CT, DE, ME, MD, MA, NH, NJ, NY, OH, PA, RI
  - Also Renewable Energy Certificates (RECs) & on-bill financing

Operates >10 GW wind & >1.7 GW solar PV
  - Manages $21.8 B annual energy spend for 1,000+ clients
  - Owns ENGIE Storage (former Green Charge)

Established 1974

Leading U.S. Electricity, Energy & Energy Services Supplier
TMI is part of ENGIE MEP Services family (Est. 1988)
- 6 companies – 700 employees – 11 locations
  - NY, MA, PA, NJ, CT
- > $250MM in 2018 revenues

TMI
- Lead for all ENGIE North America CHP projects
- Established 1976 - HQ in Queens
- 50+ MW of Microgrid/DER projects in metro NY
- Building & HVAC services & upgrades

TMI Reputation for Service, Integrity & Quality
Some TMI-ENGIE MEP Clients

- Vanguard
- PPL
- FreshDirect
- Regeneron
- Marriott
- New Balance
- Coca-Cola
- Samuel Adams
- United Technologies
- Lehigh Valley Health Network
- Bank of America
- Sanofi Pasteur
- Shire
- RiverSpring Health
- WBUR
- DePuy Synthes
- The Port Authority of NY & NJ
- GlobalFoundries

Other clients include:
- UConn
- University of Connecticut
- University of New York and New Jersey
- ESPN
- Geisinger
- Columbia University
- Nestle
- Goldman Sachs
- Ginkgo Bioworks
- Takeda Oncology
- ESPN
- Fabri-Kal
- Versum Materials
**Unique Project Delivery Process**

**Fast & cost-efficient project start**
- Customized models determine microgrid alternatives
- Analytics include facility efficiencies & absorption plus DERs
- Rapid definition of facility integration & project options
- Development of investment grade pricing set

**Relationship-based project delivery**
- 4Cs – cooperate, collaborate, coordinate & communicate

**Build & commission to meet engineering requirements**

Making Microgrid Projects Simple & Successful
Analytics Services

Modeling platforms
- Company-wide:
  - HOMER: sizing & economics
  - MATLAB: sizing, economics & operation
  - PVWatts: DER output
  - Concorda PSLF: operation
- TMI: proprietary – efficiencies, economics, DERs, absorption, service
  - Understanding peak usage is critical
  - Every microgrid is unique: interconnection, old services, wiring, gas availability, etc.

Projects we’ve conducted microgrid analytics for
- Company-wide (excl. TMI): 150+ analytics with 85% multi-DER
- TMI: 25+ analytics with <15% considering multi-DER

Extensive Modeling Experience & Capabilities
Controls are a design priority – not an afterthought.

Controls agnostic

- Open-protocol, non-custom controls
- Imperative controls receive priority attention from concept to end
- Engineers & controls must actively collaborate
- Customization of control routines must be built into strategic planning
- Ex-service mechanics used as programmers
Dispatching & System Responsibility

- Long-term responsibility for system operation
- Guaranteed service cost for life of PPA
- 24-7 monitoring
- Automatic dispatching

Unparalleled Microgrid Customer Support
Case Studies

Case study #1:  
Alameda County Santa Rita Jail Microgrid (Dublin, CA)

Case study #2:  
Comoros Hybrid Power Microgrid (Union of the Comoros)

Case study #3:  
The Hebrew Home Distributed Generation Resiliency (Bronx, NY)
Alameda County Santa Rita Jail (Dublin, CA)

Site/System:
- 18 housing units (1 million sq ft) located 25 miles east of San Francisco
- 4,000 inmates, 500+ staff, built in 1980s
- Issues: power quality & reliability, diesel air quality issues

ENGIE Services U.S. (Chevron Energy Solutions) - EPC contractor
- Design & installation of complete, integrated microgrid system

DER:
- 2.4MVA diesel generators (pre-existing)
- 1.2MW solar PV (2002)
- 1.0MW fuel cell co-gen (2006)
- Four high-efficiency boilers (2009)
- Two domestic hot-water heat exchangers (2009)
- 4,500 mmbtu solar thermal system (2012)
- 12kW wind power (2012)
- 2MW/4MWh battery energy storage (2012)
- Master controller (2012)

Results:
- Protects critical facility by auto-islanding with multiple energy sources
- Peak reduction & load shifting with storage
- Autonomous smart operation
Configuration

• Grid-connected with blackstart/island capability

Modeling tools:

• HOMER – equipment sizing for economics & dispatch
• PVWatts – approximated of site solar production profile
• PSLF – for understanding microgrid dynamic response
• Applied Power Technologies DER Management Tool – energy cost reductions
Alameda County Santa Rita Jail (cont’d)
**Union of the Comoros Hybrid Power Microgrid**

**Site/Systems**
- Union of the Comoros - Islands off of Tanzania with 400,000 inhabitants
- Three microgrids under construction with **completion end of 2019**
- For grid stability and reducing reliance on existing diesel generators

**ENGIE EPS is the EPC contractor**
- Design & installation of complete, integrated microgrid system

**DER**
- 15.6MW diesel generators (pre-existing)
- 6.9MW solar PV
- 10.8MW/9.5MWh lithium-ion battery energy storage

**Configuration**
- Always islanded
Union of the Comoros Microgrid (cont’d)

Modeling tools:
- HOMER – equipment sizing for economics & dispatch
- PVWatts – approximated of site solar production profile
- PSLF – for understanding microgrid dynamic response
Hebrew Home at Riverdale DG Resiliency (Bronx, NY)

Site/Systems
- Retirement home on 32-acre campus with 1,000,000 SF
- Completion 2Q2019

TMI is the construction manager for this IPD project
- Responsible for complete microgrid installation & integration

DER
- Two 800kW natural gas engine-generators with HRSGs
- 250-ton steam absorption chiller
- Accommodations for future solar/battery

Configuration
- Grid-connected with blackstart/standalone capability

Modeling Tools
- TMI proprietary
Results:
• Campus microgrid
• Auto-islanding capability
• Accommodations for future solar and storage DER
Interested Partners Contact:
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Website: www.trystatemech.com

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