

BROWARD ENERGY MANAGEMENT (BEM)

We specialize in electrical power systems analysis, power quality solutions, and energy management for industrial facilities, renewable energy, industrial, mining, oil and gas industries, educational institutions, and commercial facilities.



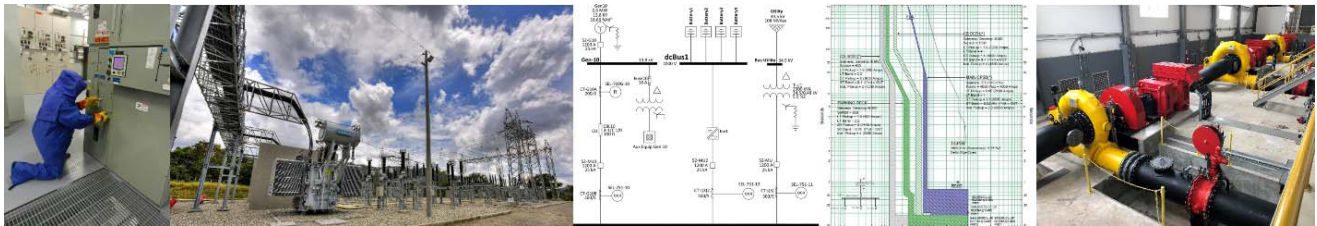
Our team of professionals is certified as Florida P.E., Certified Energy Managers, and Certified Power Quality Professionals with over 100 successful projects in the U.S. and internationally.



BROWARD ENERGY MANAGEMENT, founded in 2007 in Fort Lauderdale, Florida, U.S.A., is an engineering company specializing in electrical power systems analysis, power quality solutions, and energy management for renewable energy plants, industrial, mining, oil, and educational institutions.

We deliver exceptional engineering services and unique solutions.

Our professionals are highly specialized in electrical power systems design and energy management systems.



CORE COMPETENCIES

- **Electrical design and engineering**
- **Electrical Power Systems Studies:**
 - Arc Flash Analysis
 - Ground Grid Design
 - Lightning Protection Systems Design
 - Load Flow Analysis
 - Short Circuit Analysis
 - Protection and Coordination Analysis
 - Transient Stability Analysis
 - Motor Starting Analysis
 - Harmonics Analysis
 - Reliability Analysis
 - Electromagnetic interference studies
 - Electromagnetic exposure studies
- **Electrical Fault Analysis**
- **EPC Substations | Transmission Lines**
- **Electrical Power Generation Plants Design**
 - Low Voltage System Design
 - Medium Voltage System Design
 - High Voltage Systems Design
- **Solar Energy Systems Design**
- **Compliance Reporting**
- **MV and HV Transmission Line Design**
- **Interconnection with Grid Power Lines**
- **High Voltage Transmission and Medium Voltage Distribution Power Systems Design**
- **High Voltage Transmission and Medium Voltage Distribution Power Systems Design**



Power System Studies – Energy Management Projects:

- **Short Circuit, Protection and Coordination, and Arc Flash Study - 2021**

Type of operation: Resort facilities
 Location: Walt Disney World Dolphin Resort, Orlando, FL.



The studies included:

- Short Circuit
- Arc Flash Study
- Protection Coordination

- **Short Circuit, Protection and Coordination, and Arc Flash Study - 2121**

Type of operation: Back-up generation power system
 Location: U.S. Virgin Island Court House



The studies included:

- Short Circuit
- Arc Flash Study
- Protection Coordination

- **Short Circuit, Protection and Coordination and Arc Flash Study -2021**

Type of operation: Industrial Operation
 Locations: Land O'Lakes industrial facilities- Plainfield, IN
 Land O'Lakes industrial facilities- Trumann, AR
 Land O'Lakes industrial facilities- Pocatello, ID
 Land O'Lakes industrial facilities- Dallas, TX
 Land O'Lakes industrial facilities- Houston, TX



The studies included:

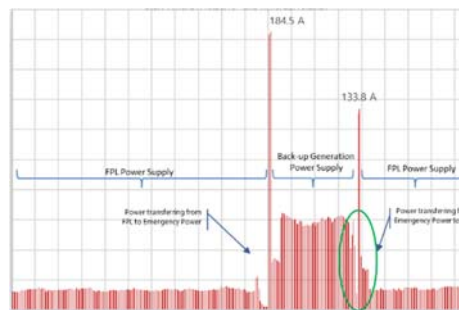
- Short Circuit
- Arc Flash Study
- Protection Coordination

- **Power Quality Analysis Cleveland Clinic Martin North Hospital**

Type of operation: Hospital Facility
 Locations: Stuart, FL



The study included:



- Analysis of recurrent power disturbance event
- Use Dranetz power analyzer



- **Review of Protective Relay Settings Shades Mountain Filter Plant Birmingham, Alabama- 2021**



Type of operation: Water treatment plant
 Location: Birmingham, Alabama
 The studies included:

- Review of Protective Relay Settings Shades Mountain Filter Plant

- **Short Circuit, Protection and Coordination, and Arc Flash Study - 2021**



Type of operation: Industrial facilities
 Location: The Martin Brower Company, LLC, Pompano Beach, FL.
 The studies included:

- Short Circuit
- Arc Flash Study
- Protection Coordination

- **Short Circuit, Protection and Coordination, and Arc Flash Study - 2021**



Type of operation: Resort facilities
 Location: Sandals Royal Bahamian Resort, Bahamas
 The studies included:

- Short Circuit
- Arc Flash Study
- Protection Coordination

- **Review of Electrical Protection of the Taurus 60 Gas Turbine Generator Sets & 70MVA-230/13.8 kV. Step-up Transformer - 2021**



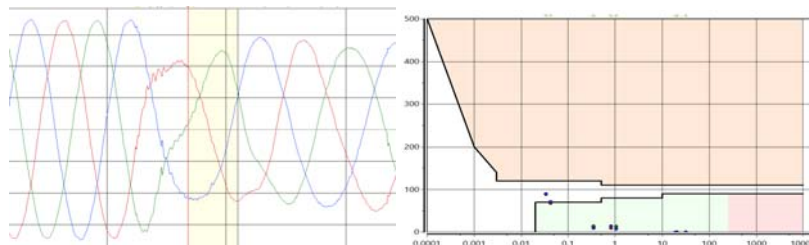
Type of operation: Thermal Power plant | 70 MVA 230/13.8 kV Transformer
 Location: Mexicali, Mexico
 The studies included:

- Protection Coordination

- **Power Quality Analysis City of Boca Raton Utility Services – Building 1B**




Type of operation: Utility Services Department
 Locations: Boca Raton, FL
 The study included:




- Analysis of recurrent power disturbance event
- Use Dranetz power analyzer



- **Power Plant 4 x 8.1 MW @ 13.2 kV – Nov-2020** 


Type of operation: OEM
Location: Maven Power - Houston, Texas – USA
Electrical studies for 32 MW @ 0.48 / 4.16 kV power plant. The studies included:

 - Short Circuit
 - Arc Flash Study
 - Protection Coordination

- **Power Plant 2 x 2 MW @ 0.48 kV / 4.16 kV Phase I CDP – April-2020** 


Type of operation: BPX Energy Colorado Project
Location: Reeves City, Texas – USA
Electrical studies for 4 MW @ 0.48 / 4.16 kV power plant. The studies included:

 - Short Circuit
 - Arc Flash Study
 - Protection Coordination

- **Power Plant 7 x 2 MW @ 0.48 kV / 4.16 kV Phase II CDP – April-2020** 


Type of operation: BPX Energy Colorado Project
Location: Reeves City, Texas – USA
Electrical studies for 14 MW @ 0.48 / 4.16 kV power plant. The studies included:

 - Short Circuit
 - Arc Flash Study
 - Protection Coordination

- **Power Plant 875 kW @ 0.48 kV / 4.16 kV Phase I SWD – March-2020** 


Type of operation: BPX Energy Colorado Project
Location: Reeves City, Texas – USA
Electrical studies for 875 kW @ 0.48 / 4.16 kV power plant. The studies included:

 - Short Circuit
 - Arc Flash Study
 - Protection Coordination

- **Power Plant 4 x 2 MW @ 0.48 kV / 4.16 kV Phase II SWD – March-2020** 

Type of operation: BPX Energy Colorado Project
Location: Reeves City, Texas – USA
Electrical studies for 8 MW @ 0.48 / 4.16 kV power plant. The studies included:

 - Short Circuit
 - Arc Flash Study
 - Protection Coordination

- **Chromalloy – Industrial Manufacturing facilities – March-2020** 

Type of operation: Manufacturing of gas turbine engines parts
Location: Tampa, Florida – USA
The studies included:

 - Assessment of existing **arc flash study** for remediation solutions



- **WestRock Recycling industrial facilities – October-2019**

Type of operation: Recycling industrial facilities
 Location: Tampa, Florida – USA



The studies included:

- Short Circuit
- Arc Flash Study
- Protection Coordination

- **Technical – Economic Feasibility Analysis for Lighting Retrofit Project for the Library Alvin Sherman Parking Garage – Sustainability Project – 2018**



Type of operation: Nova Southeastern University
 Location: Davie, Florida – U.S.A.

Technical and economic analysis for the new luminaires of 66-Watt CREE IG Series LED Parking Garage Luminaire for the NSU Library Alvin Sherman Parking Garage in replacement of the existing 150-Watt High-Pressure Sodium Lamps. The Nova Southeastern University, Davie, Florida – U.S.A.



- **Technical – Economic Feasibility Analysis for Lighting Retrofit Project for the Health Professions Division (HPD) Parking Garage – Sustainability Project – 2018**



Type of operation: Nova Southeastern University
 Location: Davie, Florida – U.S.A.



Technical and economic analysis for the new luminaires of 66-Watt CREE IG Series LED Parking Garage Luminaire for the NSU HPD Parking Garage in replacement of the existing 150-Watt High-Pressure Sodium Lamps. The Nova Southeastern University, Davie, Florida – U.S.A.

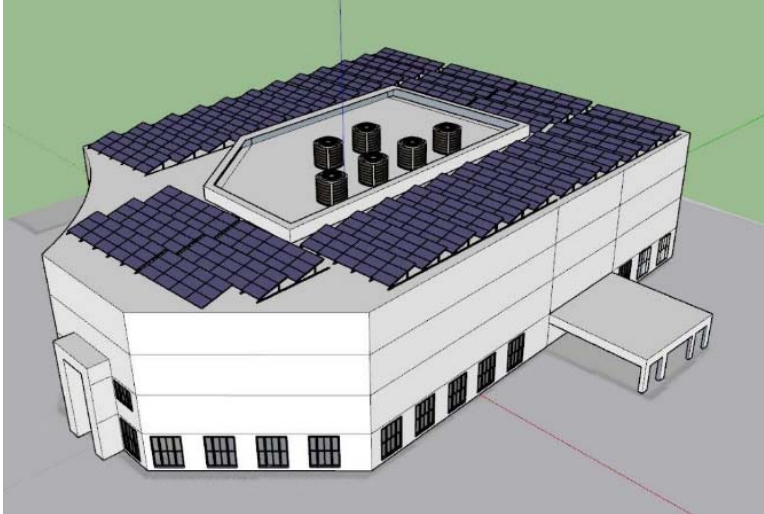


- **Solar Photovoltaic System – 2018**

Type of operation: Nova Southeastern University
Location: Miami, Florida – U.S.A.



The studies included:



- Feasibility Study for Solar Photovoltaic System at the Nova Southeastern University, Miami, Florida – U.S.A.

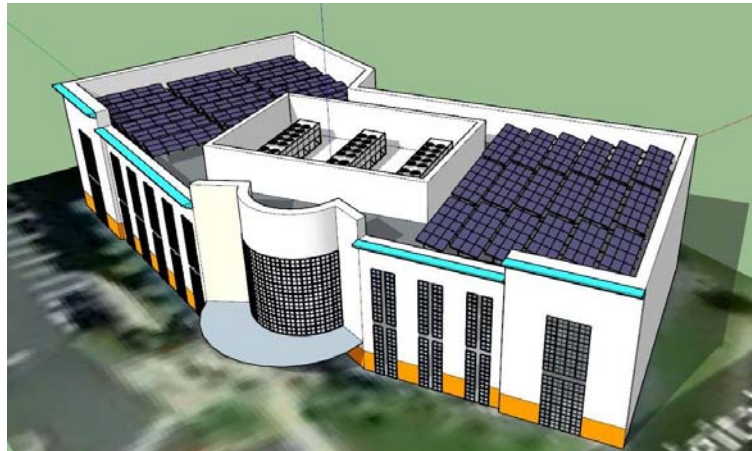
- **Solar Photovoltaic System – 2018**

Type of operation: Nova Southeastern University
Location: Orlando, Florida – U.S.A.



The studies included:

- Feasibility Study for Solar Photovoltaic System at the Nova Southeastern University, Orlando, Florida – U.S.A.



▪ **Engineering Design for 220 kV Underground Cable Transmission Line of 5 km – 2018**

Type of operation: Utility Company | ISA Transelca SAS
Location: Magdalena, Colombia.



Engineering design for 220 kV Underground Cable transmission line interconnects Puerto Drummond Coal Port terminal to National Grid Rio Cordoba Electrical Substation. The study included:

- Electrical and civil designs
- Constructability analysis
- Construction schedule
- Budget development



▪ **Power Plant 4 x 5.6 MW @ 13.8 kV – 2017**

Type of operation: Electric Fracturing Plants identified as Clean Fleet 1
Location: Houston, TX, U.S.A.



Electrical studies for 4 x 5.6 MW @ 13.8 kV power plants supply power to the oil electric fracturing plants (Clean Fleet 1). The studies included:

- Load Flow
- Short Circuit
- Protection Coordination
- Arc Flash Study.

▪ **Power Plant 30 MW @ 13.8 kV / 69 kV – 2017**

Type of operation: Utility Company
Location: Bryan, Texas – U.S.A.



Electrical studies for 30 MW @ 13.8 / 69 kV power plants supply power to the grid. The studies included:

- Load Flow
- Short Circuit
- Protection Coordination
- Arc Flash Study.



▪ **Power Plant 60 MW @ 13.8 kV / 110 kV – 2017**

Type of operation: Utility Company | Termo Mechero Morro
Location: Yopal, Casanare – Colombia



Electrical studies for 60 MW @ 13.8 / 110 kV power plant and 18 km of 110 kV Transmission line to supply power to the grid. The studies included:

- Load Flow
- Short Circuit
- Arc Flash Study
- Protection Coordination
- EPC Technical Project Management (project owner's side)
- Commissioning Management.



▪ **Power Plant 4 x 5.6 MW @ 13.8 kV – 2017**

Type of operation: Electric Fracturing Plants identified as Clean Fleet 1
Location: Houston, TX, U.S.A.



Electrical studies for 4 x 5.6 MW @ 13.8 kV power plants supply power to the oil electric fracturing plants (Clean Fleet 2). The studies included:

- Load Flow
- Short Circuit
- Protection Coordination
- Arc Flash Study.



- **Solar Power Plant 2 MW @ 0.48// 34.5 kV – 2017**

Type of operation: IPP
Location: Volcan, Panama



The studies included:



- Harmonic Analysis
- Short Circuit
- Protection Coordination
- Integration to the national grid.

- **3x24 MVA – 13.8/115 kV substation and 15 km double circuit 115 kV transmission line from Termomechero 60 MW power plant to substation Yopal. – 2017**

Type of operation: Utility Company | ENERCA
Location: Casanare, Colombia.



EPC of 3x24 MVA – 13.8/115 kV substation and 15 km double circuit 115 kV transmission line from Termomechero 60 MW power plant to substation Yopal. The contract included:

- EPC
- Commissioning



▪ **Power Plant Electrical 5 x 4- MW | 161/11kV Utility Power Substation – 2016**

Type of operation: Gold Mining Operation
Location: Goldfield Tarkwa, Ghana



The studies included:

- Short Circuit
- Ground Grid Design
- Lightning Protection System Design

▪ **Power Plant Electrical 5 x 4- MW | 161/11kV Utility Power Substation – 2016**

Type of operation: Gold Mining Operation
Location: Goldfield Damang, Ghana



The studies included:

- Short Circuit
- Ground Grid Design
- Lightning Protection System Design
- Overhead transmission line



- **Power Plant Electrical 2 x 40- MW – 34.5 | Utility Power Transmission Line – 2015**
Type of operation: ECOPELROL - Oil Industry / Utility Company
Location: Departamento del Meta, Colombia



Electrical studies for integration of two 5 x 8 MW power plants to supply power to the oil field operations (PAD-5 and PAD-7) The studies included:



- Load Flow
- Short Circuit
- Protection Coordination
- Ground Grid Design
- Lightning Protection System Design
- Transient Stability
- Harmonics Study
- Arc Flash Study

- **Power Plant Electrical 5 x 5.5- MW | 161/11kV Utility Power Substation – 2015**
Type of operation: Gold Mining Operation
Location: Asanko Gold Mine, Ghana



The studies included:

- Short Circuit
- Ground Grid Design
- Lightning Protection System Design

- **Higher Education Institution - 2015**

The Nova Southeastern University's (NSU) Center for Collaborative Research (CCR) power system is electrical studies. The studies included:



- Load Flow
- Short Circuit
- Protection Coordination
- Arc Flash Study



- **2 MW @ 0.48 kV Power Plant - 2015**

Type of operation: Industrial facility
Location: Port Prince, Haiti.



Electrical studies for integrating a 2 MW @ 0.48 kV power plant to supply power to food manufacturing industrial operation. The studies included:

- Load Flow
- Short Circuit
- Protection Coordination
- Ground Grid Design
- Lightning Protection System Design
- Harmonics Study

- **Transmission Specifications for Interconnection of New 250 MW Power Plant – 2015**

Type of operation: Utility Company
Location: Eastern Region, Saudi Arabia.



There are technical specifications for 128 km of 110/230 kV overhead transmission lines for a 250 MW power plant. The technical specification includes aspects like:

- Electrical Schematic
- Conductor Selection
- Isolation Study
- Grounding System
- Constructive Aspects
- Route Selection and Engineering Survey
- Templating and Optimal Structure Location

- **Power Plant Electrical 5 x 5.5- MW | 161/11kV Utility Power Substation – 2015**

Type of operation: Gold Mining Operation
Location: Asanko Gold Mine, Ghana



The studies included:



- Short Circuit
- Ground Grid Design
- Lightning Protection System Design



▪ **Power Plant 3 x 1.4 MW - 2014**

Type of operation: Power Plant | Crude oil pumping station
 Location: Puerto Gaitán, Colombia



Electrical studies for integration of 3 x 1.4 MW power plants to supply power to a crude oil pumping station. The studies included:

- Load Flow
- Short Circuit
- Protection Coordination
- Ground Grid Design
- Lightning Protection System Design
- Transient Stability Analysis
- Harmonics Study
- Arc Flash Study



▪ **Power Plant 2 x 40 MW Wartsila – 2014**

Type of operation: Power Plant | Oil Field Operation
 Location: Departamento del Meta, Colombia



Electrical studies for integration of 5 x 8 MW power plants to supply power to the oil field operations (PAD-5) and integration of 5 x 8 MW power plant to provide power to the oil field operations (PAD-7). The studies included:



- Load Flow
- Short Circuit
- Protection Coordination
- Ground Grid Design
- Lightning Protection System Design
- Transient Stability Analysis
- Harmonics Study
- Arc Flash Study.



▪ **Cogeneration Power Plant 3.6 MW @ 34.5 kV) – 2013**



Type of operation: Cogeneration Power Plant for Ceramic Industrial Operation
Location: Canavita, Colombia

Electrical studies for integration of 3.6 MW – 34.5kV cogeneration plant to operate parallel with the local utility company to supply power to the ceramic mill industrial complex. The studies included:

- Load Flow
- Short Circuit
- Protection Coordination
- Ground Grid Design
- Lightning Protection System Design
- Transient Stability Analysis
- Harmonics Study
- Arc Flash Study



▪ **Power Plant 4 x 1.04 MW – 2013**



Type of operation: Cement plant operation
Location: Cartagena, Colombia

Electrical studies for 4 x 1.04 MW – 4.16 kV power plant integration to supply the cement plant operations. The studies included:



- Load Flow
- Short Circuit
- Protection Coordination
- Ground Grid Design
- Lightning Protection System Design
- Transient Stability Analysis
- Harmonics Study
- Arc Flash Study
- 1900 kW Ball mill motor acceleration analysis



▪ **Higher Education Institution - 2011**

Type of operation: Solar Plant
Location: Fort Lauderdale, FL – U.S.A.



Study of Economics and Operational Performance of Solar Photovoltaic System at the John U. Lloyd Beach State Park.



▪ **Power Plant Expansion 2 x 1.04 MW – 2012**

Type of operation: Oil field operation
Location: Arauca, Colombia



Electrical studies for integration of 2 x 1.04 MW – 4.16 kV power plant expansion to supply power to the oil field operations. The studies included:

- Load Flow
- Short Circuit
- Protection Coordination
- Ground Grid Design
- Transient Stability Analysis
- Lightning Protection System Design
- Harmonics Study
- Arc Flash Study



▪ **Motor Acceleration Analysis 2 x 5.5 MW sag Mill motors – 2012**

Type of operation: Ore Mine Project
Location: Sierra Leone, Africa



Power system analysis for sizing the power plant to support the gold mine operation, including motor starting study for 2x5.5MW Sag Mill motor + 2x4.4MW Ball Mill with 8 x 8.2MW and a mine site base load of 16.1 MW:



- Load Flow
- Short Circuit
- Protection Coordination
- Motor Starting Analysis

▪ **Higher Education Institution - 2011**

Type of operation: High Education Institute
Location: Fort Lauderdale, FL – U.S.A.



Electrical studies of Nova Southeastern University Auditorium Building. The studies included:

- Load Flow
- Short Circuit
- Protection Coordination
- Arc Flash Study



▪ **Higher Education Institution - 2011**

Type of operation: High Education Institute
Location: Fort Lauderdale, FL – U.S.A.



Electrical studies of Nova Southeastern University Lower School Building. The studies included:



- Load Flow
- Short Circuit
- Protection Coordination
- Arc Flash Study

▪ **Thermal Storage Plant Higher Education Institution – 2011**

Type of operation: High Education Institute
Location: Fort Lauderdale, FL – U.S.A.



Electrical studies of the Central Energy Plant, recognized as one of the largest thermal energy storage systems in the United States. The studies included:

- Load Flow
- Short Circuit
- Protection Coordination
- Arc Flash Study



- **Active 6 MVar Harmonic Filter System - 2011**
Type of operation: Low Alloy Steel Mill operation
Location: Barranquilla, Colombia.



The studies included:



- Harmonics analysis to design a 6 MVAR Dynamic Harmonic Filtering system to operate with existing 2 x 18 MW power plant and 2 x 4 MW DC-driven rolling mill.
- Assisting the customer in the project to purchase power from the grid at 110kV level – 30 years' contract.

- **Power Plant 4 x GE frame 5 - 18 MW (72MW) – 2009**
Type of operation: Low Alloy Steel Mill operation
Location: Barranquilla, Colombia.



The studies included:

Electrical studies for integration of 72 MW – 13.8 kV / 110 kV – power plant with the local utility company to supply power to the industrial complex. Studies included:

- Permits to operate parallel with the grid at 13.8kV and 110kV, study and performance evaluation of the most extensive active harmonic and reactive power system in Latin America (6000 kVA) – 13.8kV.
- Assisted the client in technical negotiation with the local utility company to connect to the public grid.
- Feasibility study for a 4 x 16 MW + 2 x 15 MW combined cycle power plant to supply power to an industrial operation and sell energy back to the grid.



- **Power Generation and Distribution System and 3 x 1.5 MW power plant – 2009**



Type of operation: Resorts and Service facilities
Location: Anguilla, British Overseas Territories.

The studies included:

Electrical studies for integration of 3 x 1.5 MW @ 480V power plant to supply power to the Viceroy Resorts & Residences project.



- **Power Plant 2 x 16 MW @ 34.5 kV – 2009**



Type of operation: Gold Mining
Location: Bogoso, Ghana.

The studies included:

Electrical studies for integration of 2 x 16 MW @ 13.2kV with 13.8/34.5 kV step-up transformer to supply power to the gold mine operation:

