

MANLOVE ENGINEERING, LLC FIRM PROFILE



ABOUT US

Founded in 2012, Manlove Engineering is a full-service electrical engineering firm specializing in design, project management, and consulting solutions for the solar photovoltaic, renewable energy, and energy management industries. Based in southeastern Pennsylvania, Manlove Engineering serves public and private sector clients in the Mid-Atlantic and Northeast regions of the United States.

Manlove Engineering provides each of its clients with a comprehensive set of service offerings tailored to their specific goals. From design documents to complete turnkey solutions, Manlove Engineering can navigate your project from conception and feasibility, through engineering and contracting, and ultimately construction and commissioning. The depth of Manlove Engineering's expertise in all aspects of energy generation, conservation, storage, and management is integral to the firm's success in providing its clients with a superior return on investment.

Manlove Engineering's clients include solar developers, power purchase agreement (PPA) providers, utilities, general contractors, electrical contractors, building owners, property managers, home builders, government agencies, municipalities, non-profit organizations, architects, and engineering firms.

Manlove Engineering, LLC is organized and operates as a single-member limited liability company in the Commonwealth of Pennsylvania. All engineering services offered and/or performed by Manlove Engineering, LLC shall be considered strictly within the Commonwealth of Pennsylvania. Any engineering services offered and/or performed outside Pennsylvania shall be considered to be offered and/or performed by Michael P. Manlove, P.E., an individual licensee operating as a sole proprietorship.

Manlove Engineering, LLC

174 Mine Road
Hershey, PA 17033

302.545.9010 phone
info@manloveengineering.com

manloveengineering.com

MANLOVE ENGINEERING, LLC FIRM PROFILE



PRINCIPAL

Founder and Principal of Manlove Engineering, Michael P. Manlove, P.E. works directly with each client to understand their specific goals and tailor innovative solutions to ensure their success. Mr. Manlove has extensive experience in the energy industry. He has overseen the conception, design, construction, and commissioning of multiple megawatts of solar generation spanning ten states and multiple foreign countries in the residential, commercial, industrial, and public sectors. Past projects have included net-metering, stand-alone generation, community energy/aggregated metering, micro-grids, and fully islanded/off-grid systems.

Mr. Manlove has the specific expertise to provide his clients with sound guidance through the engineering, financial, and regulatory steps needed to meet their return on investment goals. He understands the specific challenges of solar, renewable energy, and energy management projects including complex financial incentives, electrical codes, and utility guidelines.

Previously, Mr. Manlove was the Director of Engineering for Flexera, Inc., a Delaware based electrical engineering, solar photovoltaic, energy auditing, and lighting firm. During his four year tenure with Flexera, Mr. Manlove personally directed the design, installation, and commissioning of several hundred solar photovoltaic and renewable engineering projects. Highlighted projects include The Refuge at Dirickson Creek, Cripple Creek Golf & Country Club, the Sussex County Emergency Operation Center, the Worcester County Recreation Center.

Mr. Manlove's academic involvement includes serving as an adjunct faculty member at Delaware Technical Community College. Since 2009, his roles have included course development and teaching in the renewable energy, sustainable development, solar photovoltaic and energy efficiency fields.

Mr. Manlove received his Bachelor of Mechanical Engineering degree from the University of Delaware. He is an NCEES Records Holder, NCEES Model Law Engineer, and is a licensed Professional Engineer in the following states and jurisdictions:



- Connecticut
- Delaware
- Maryland
- Massachusetts
- New Jersey
- New York
- Pennsylvania
- South Carolina
- Virginia
- U.S. Virgin Islands
- Washington, DC

Manlove Engineering, LLC

174 Mine Road
Hershey, PA 17033

302.545.9010 phone
info@manloveengineering.com

manloveengineering.com

SERVICES OVERVIEW

Manlove Engineering truly is a different kind of engineering firm. Since our founding, we have strived to provide innovative engineering services to the solar photovoltaic, renewable energy, and energy management industries. Unlike other firms that broadly serve many industries, we diligently work to provide our clients with the specialized and contemporary expertise necessary to successfully complete their energy projects.

In keeping with our industry focuses, we provide *Electrical Engineering, Consulting,* and *Project Management Services* for the following types of energy projects:

- **Solar Photovoltaic Systems**
 - Grid-Tied Systems
 - Grid-Tied with Battery Back-Up Systems
 - Off-Grid Island Systems
 - Micro-Grid Systems
 - Central, String, & Micro Inverter Architectures
 - 600V & 1000V DC Voltage Systems
 - Roof Mounted Systems
 - Ground Mounted Systems
 - Solar Carport Array Systems
 - Electric Vehicle Charging Stations
 - Single & Dual Axis Tracking Systems
 - Solar Street Lights
 - Building Integrated PV (BIPV)
 - AC Coupled Systems
 - DC Coupled Systems
- **Critical Backup Power Systems**
 - DC Generators
 - AC Generators
 - Island Inverter & Battery Bank Systems
 - Solar Photovoltaic Integration
 - Hydrogen Fuel Cells Integration
 - Combustion Generator Integration
 - Load-Shedding Systems
- **Power Distribution Systems**
 - DC Power Systems
 - AC Power Systems
 - Multi-Tenant Metering Systems
- **Energy Generation & Usage Monitoring Systems**
 - Revenue Grade Metering Systems
 - Web-Enabled Monitoring Systems
 - Data Acquisition Systems
 - Monitoring Kiosks Integration
 - Client Website Integration
 - Client Marketing Integration
 - Multi-Tenant Metering Systems
- **Hydrogen Fuel Cells**
 - Small Critical Load Backup Systems
 - Large Stationary Power Systems
 - Combined Heat & Power Systems
 - Telecommunication Site Power Systems
 - Network Infrastructure Power Systems
- **Small Wind Turbines**
 - Grid-Tied Systems
 - Off-Grid / Island Systems
 - Micro-Grid Systems
 - Tower Siting
- **Electric & Plug-In Hybrid Vehicles**
 - Fleet Charging Stations
 - Community Charging Stations
 - Commercial Charging Stations
 - Solar PV & EV Integration
 - Solar Carport & EV Integration

ELECTRICAL ENGINEERING SERVICES

All successful energy projects begin with design. Manlove Engineering seeks to provide electrical engineering and design services that allows their clients to make informed decisions and achieve their maximum return on investment. Above all, we strive to understand your goals and to tailor specific engineering solutions to meet your unique demands.

Highlighted Electrical Engineering Services provided to the solar photovoltaic, renewable energy, and energy management industries include:

- **Property Analysis**
 - Solar Resource Analysis
 - Shading Analysis
 - Site Analysis
 - Electrical System Analysis
 - **Design Document Preparation**
 - PE Signed & Sealed Electrical Design Documents
 - Single Line Electrical Schematics
 - Three Line Electrical Schematics
 - Site Plans
 - Equipment Location Plans
 - Roof Mount Layout Plans
 - Ground Mount Layout Plans
 - Underground Wiring Plans
 - Specifications Books
 - Construction Quality Oversight
 - As-Built Documentation & Drawings
 - **Design Code Compliance**
 - NFPA & National Electrical Code (NEC)
 - AHJ Building Department Codes
 - Utility Interconnection Design Standards
 - Grant & Rebate Program Design Standards
 - Federal & State Tax Program Design Standards
 - **Design Process Management**
 - Serve as Project Primary Engineer
 - Serve as Design Team Primary Point of Contact
 - Prescribe Scopes of Work for Consultant Engineers
 - Direct Scopes of Work for Consultant Engineers
 - Manage All Project Design Documents
 - Manage All Project Design Specifications
 - Provide Civil Engineering Coordination
 - Provide Geotechnical Engineering Coordination
 - Provide Structural Engineering Coordination
 - Provide Architectural Design Coordination
- **Project Cost Analysis**
 - Development Budget Estimating
 - Construction Budget Estimating
 - Value Engineering Analysis
 - Levelized Cost of Energy Analysis (LCOE)
 - Financial Feasibility Studies
 - **Energy Generation & Usage Monitoring Design**
 - Revenue Grade Metering System Design
 - Web-Enabled Monitoring System Design
 - Data Acquisition System Design
 - Monitoring Kiosks Integration
 - Client Website Integration
 - Client Marketing Integration
 - **Utility Interconnection Engineering**
 - Net-Metering System Design
 - Community Energy Facility System Design
 - Aggregated Metering System Design
 - *Continued on next page...*

MANLOVE ENGINEERING, LLC

FIRM PROFILE



- Grid Tied Back-Up System Design
- Off-Grid / Island System Design
- Micro-Grid System Design
- **Sustainable Design**
 - Building Lifecycle Analysis
 - Energy Usage & Demand Analysis
 - Net Zero Energy Analysis
- **Interconnection & Permitting Support**
 - Facilitate Project Approvals
 - Provide PE Signed & Sealed Electrical Design Documents
 - Provide Necessary Certifications
 - Provide Authorities with Point of Contact
- **Production & Operation Planning**
 - Operation & Maintenance Specifications
 - Equipment Lifecycle Analysis
- **Project Commissioning**
 - Commissioning Procedure Formation
 - Commissioning Procedure Approval
 - Warranty Compliance Management
 - Remote & Web-Based Monitoring System Configuration
 - As-Built Documentation

CONSULTING SERVICES

Everyone needs sound advice. With years of experience in the energy industry, Manlove Engineering is your consulting partner. We are ready to get your project off the ground, connect the missing links to move it forward, and provide the independent analysis needed so you can make the right decision all the way to completion. From conception to commissioning, we are here help you.

Highlighted Consulting Services provided to the solar photovoltaic, renewable energy, and energy management industries include:

- **Project Development**
 - Preliminary System & Site Design
 - Conceptual Renderings & Layouts
 - Energy Usage & Utility Tariff Analysis
 - Financial Rebate & Incentive Analysis
 - Interconnection Analysis
 - Permitting & Regulatory Analysis
- **Feasibility Studies**
 - Engineering Feasibility Studies
 - Financial Feasibility Studies
 - Interconnection Feasibility Studies
 - Energy Generation Modeling
 - Levelized Cost of Energy Analysis (LCOE)
- **Energy Usage & Demand Studies**
 - Energy Usage Analysis
 - Demand & Load Analysis
 - Load Profile Analysis
 - Critical Load Analysis
 - Net-Metering Analysis
- **Community Energy Facility Analysis**
 - Aggregated Metering Analysis
 - Multi-Tenant Metering Analysis
- **Project Cost Analysis**
 - Development Budget Estimating
 - Construction Budget Estimating
 - Value Engineering Analysis
- **Interconnection & Permitting Support**
 - Facilitate Project Approvals
 - Provide PE Signed & Sealed Electrical Design Documents
 - Provide Necessary Certifications
 - Provide Authorities with Point of Contact
 - *Continued on next page...*

Manlove Engineering, LLC

174 Mine Road
Hershey, PA 17033

302.545.9010 phone
info@manloveengineering.com

manloveengineering.com

MANLOVE ENGINEERING, LLC

FIRM PROFILE



- **Owners Representation Services**
 - Independent Design Review
 - Project Management Services
 - Construction Administration Services
- **Third Party Certifications**
 - Third Party Grant Certifications
 - Third Party Tax Credit Certifications
 - Third-Party Construction Inspections
 - Third-Party System Commissioning

PROJECT MANAGEMENT SERVICES

While all successful energy projects begin with design, their ultimate execution depends on competent project management throughout. Due to their complex nature, energy projects are best guided by knowledgeable and experienced project managers. Manlove Engineering has years of experience overseeing the design, procurement, and construction of hundreds of energy projects and possesses the specialized expertise necessary to guide your project every step of the way.

Highlighted Project Management Services provided to the solar photovoltaic, renewable energy, and energy management industries include:

- **Project Planning**
 - Development Budget Preparation
 - Construction Budget Preparation
 - Gantt Chart Schedule Preparation
 - Project Milestone Selection
 - Value Engineering Design Review
 - Permitting & Regulatory Analysis
- **Contractor Bidding & Selection**
 - Construction Contract Preparation
 - Qualified Bidder List Formation
 - Request for Proposal Preparation
 - RFP Bidding Oversight & Review
 - Contractor Selection Advisement
- **Construction Management**
 - Construction Schedule Management
 - Construction Budget Management
 - Owner's Representation
 - Direct Construction Progress Meetings
 - Conduct Construction Progress Inspections
 - Conduct Quality Assurance Inspections
- **Construction Administration**
 - Shop Drawings Submission Review & Approval
 - Equipment Specification Submission Review & Approval
 - Request for Information (RFI) Submission Review & Response
 - Progress Payment Application Review & Approval
 - Change Order Review & Approval
- **Project Commissioning**
 - Commissioning Procedures Formation
 - System Start-up & Testing Oversight
 - Warranty Compliance Management
 - Remote & Web-Based Monitoring System Configuration
 - Punchlist Formation Inspections
 - Punchlist Approval Inspections
 - As-Built Documentation

Manlove Engineering, LLC

174 Mine Road
Hershey, PA 17033

302.545.9010 phone
info@manloveengineering.com

manloveengineering.com

MANLOVE ENGINEERING, LLC
FIRM PROFILE



CONNECT

To learn more about how Manlove Engineering can assist you on your next project and to view our portfolio, please visit manloveengineering.com or contact:



Michael P. Manlove, P.E.
Principal
Manlove Engineering, LLC
174 Mine Road
Hershey, PA 17033
302.545.9010 phone
michael.manlove@manloveengineering.com

Manlove Engineering, LLC

174 Mine Road
Hershey, PA 17033

302.545.9010 phone
info@manloveengineering.com

manloveengineering.com