

Pictured on this page: Pierce Boston Luxury Apartments Boston, MA LEED Silver® Photo Credit: Jeremy Bittermánn

Our mission is to be our customers' first choice for energy efficiency and sustainability solutions by identifying and implementing energy and water saving measures, infrastructure upgrades, and sustainable design strategies for highperformance environments.

ABOUT NORESCO

Founded in 1984, NORESCO is a leading energy services company that provides demand-side management and sustainability consulting services.

NORESCO influences many levels of the built environment – from optimizing new and existing buildings, to improving regional utility programs, to developing national energy codes and standards. We bring thought leadership and hands-on engineering expertise to every project. Our high-performance building solutions draw on cutting-edge innovations and proven technologies. We offer services for new and existing buildings including:

Energy and Efficiency Consulting

- Energy Savings Performance Contracts
- Energy Audits and ENERGY STAR® Benchmarking
- Energy Procurement Consulting
- Renewable Energy Consulting
- Retrofit Implementation

Sustainability Consulting

- Healthy Building Assessments
- Green Building Certification and Wellness Consulting
- Energy and Daylight Modeling
- Lifecycle Assessment Modeling
- Energy and Sustainability Master Planning

Building Performance

- Building Performance Testing
- Indoor Air Quality Testing
- New Building Commissioning and Retro-Commissioning
- Building Enclosure Commissioning
- Testing, Adjusting and Balancing



500+ employees nationwide



40 years of industry experience



10,000+ facilities served in the U.S. and worldwide



25 million metric tons of CO₂ emissions reduction



1.4 million acres of forest worth of CO₂ reductions



50 billion

0

gallons of water savings

Pictured on the right: Toyota Georgetown Production Facility Georgetown, KY LEED Platinum® photos © Cory Klein Photography

CERTIFICATION CONSULTING

CERTIFICATION CONSULTING starts by gaining a thorough understanding of the client's goals so that we select the healthy-building rating system that best aligns with their desired outcomes. Our team helps clients and project teams prioritize sustainability goals based on objectives, available resources and project constraints.







NORESCO's certification consulting services identify and integrate viable sustainable design strategies into new construction and existing buildings. We advise and work with the building owner and project team each step of the way to ensure our clients obtain their sustainability certifications goals.

Our approach addresses the need to ensure all members of the project team have a clear understanding of the certification process and the project's certification goals whether it be LEED, WELL, Green Globes, or Fitwel, among others.

Our dedicated certification consulting team members are exemplary professionals at the top of their field and bring the highest level of knowledge and experience to every project in which they participate. NORESCO consultants take pride in sharing their skills and lessons learned with our clients in a concentrated effort to develop projects that will ultimately serve as models for innovative sustainability features, time efficiency, and cost effectiveness.

500+ Buildings

certified under the LEED Green Building Program

50+Projects

certified/pursuing WELL Certification



RATING SYSTEMS:

- LEED[®] Green Building Program
- WELL Building Standard®
- Enterprise Green Communities
- Green Globes
- Living Building Challenge
- Fitwel™
- RESET™
- Collaborative for High Performance Schools (CHPS)
- Building Research Establishment's Environmental Assessment Method (BREEAM)
- ENERGY STAR Residential New Construction Program

45 Projects certified/pursuing Fitwel Certification

Pictured on the right: Toyota York Supplier Center | York, MI LEED Platinum[®] and Net-Zero Energy photos © Cory Klein Photography

ENERGY & DAYLIGHT MODELING

ENERGY & DAYLIGHT MODELING provides a detailed simulation of a building's proposed design to predict the building's anticipated energy use. Models also help design teams understand how design decisions can further impact natural light and thermal comfort, as well as maximize the opportunity for passive design strategies.





Our team provides integrated, whole-building modeling to identify architectural, mechanical, and electrical energy-saving design strategies, taking into account the complex interactions between the building components and management systems.

Our building performance experts help design teams weigh strategies for:

- improving building performance
- achieving building energy goals
- reducing potential glare issues

- complying with local energy requirements
- demonstrating savings to qualify for incentives
- maximizing passive design measures

NORESCO regularly provides early-stage modeling for projects during the conceptual and schematic design phases, which more easily translates our modeling services into real energy savings.

Working with a design team from the start of a project provides an opportunity to explore a variety of design parameters and alternatives that might not otherwise be considered, including passive design elements such as building orientation, size of facility, function of the design, geometry/ shape, building envelope materiality, window-to-wall ratio, shading and daylighting, sizing of mechanical equipment, zoning for better control systems and more.



Approved NYSERDA Primary Energy Consultant



Help project teams weigh alternative strategies

Pictured on the right: City of New York - Public Safety Answering Center II New York, NY Photo Credit: NYC Department of Design and Construction

NEW BUILDING COMMISSIONING

COMMISSIONING is the process of verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, tested, operated, and maintained to meet the owner's project requirements. Commissioning efforts result in improved building performance, longer equipment lifespan, training of building staff and occupant comfort.





As one of the largest energy services companies in the United States, NORESCO guarantees the efficiency and performance of many of the facilities and equipment we commission. Thus, commissioning isn't a secondary service offering; it is essential to our success as it directly impacts building performance and ultimately, our bottom line.

With more than three decades of commissioning experience, NORESCO has pioneered diagnostic methods and tools that form the basis of today's building commissioning best practices. Our staff is highly experienced in identifying and correcting potential problems encountered during commissioning, including equipment failure modes, controls systems issues, and human error. Our focus is always on working proactively to prevent problems and implement solutions. The benefits of a properly commissioned building include:

- Confidence that installed systems and equipment are operating at peak performance
- Improved energy efficiency and healthier workplace environments leading to greater productivity
- Lower operating costs to owner over the life-cycle of the building and building systems
- Confirmation that systems will perform more efficiently as a result of proper operations and maintenance personnel training

• Satisfaction of code requirements, sustainability guidelines, and/or the achievement of certification credits if applicable

\$9.2 Million

commissioning revenue in 2023

360 + commissioning projects in 2023

75+

person team capable of providing commissioning

Pictured on the right: LG Electronics - North American Headquarters Englewood Cliffs, NJ LEED Platinum® Photo Credit: ©Christopher Payne/Esto

BUILDING ENCLOSURE COMMISSIONING

BUILDING ENCLOSURE COMMISSIONING (BECx) is the process of ensuring that the building enclosure is designed, constructed and maintained in a way that meets project requirements. Ideally, BECx starts early in the design process and continues through to occupancy.





he building enclosure is a unique and complex assemblage of materials and systems intended to separate the inhabited building interior from the exterior environment. A successful BECx process requires a thorough understanding of materials, properties and interactions between various components and systems. As such, satisfactory building enclosure performance is most effectively achieved through diligent attention during both the design and construction stages of the project.

The benefits of a high performing building enclosure resulting from successful BECx include:

- lower construction costs through properly sizing equipment and fewer change orders
- lower operating and maintenance costs
- improved water and air leakage resistance
- improved indoor air quality
- improved occupant comfort
- reduced energy consumption
- validation of warranties

NORESCO has worked with a wide range of clients and building types to provide building enclosure commissioning. Our recent experience includes projects with:

- Toyota Motor Corporation
- The City of New York

- LG Electronics
- The City and County of Denver



Improved durability and water leakage resistance



Pictured on this page: Pierce Boston Luxury Apartments Boston, MA LEED Silver® Photo Credit: Jeremy Bittermann

ENERGY AUDITS & IMPLEMENTATION

ENERGY AUDITS are key to identifying and developing energy conservation measures that can reduce a building's energy use and operating expenses. These analyses break down the total energy use and cost for the facility into various end uses, and provides the client with a roadmap to the potential for savings.





We have performed energy audits on more than 10,000 facilities worldwide, including federal courthouses, police and emergency personnel facilities, corporate headquarters, data centers, and municipal office complexes. Whether we are helping to improve the performance of a multi-building portfolio or auditing a single facility, our diagnostic testing comprehensively investigates the dynamic interaction between building system components to uncover wasted energy and identify operational performance problems.

Our energy audits and analyses range from preliminary walk-throughs to detailed investment-grade audits, which identify energy conservation measures and quantify energy cost and carbon reduction savings. Our levels of auditing and analyses are based on the recommended practices of ASHRAE:

- Walk-Through Energy Audit/ ASHRAE Level I Energy Audit
- ASHRAE Level II Energy Audit
- ASHRAE Level III Energy Audit (Investment Grade Audit with calibrated energy model)

An important component of many energy projects is the ability to secure sources of funding, such as utility rebates, incentives, environmental credits, and state/federal grants. **NORESCO has helped our customers secure more than \$100 million in rebates and incentives**, and regularly works on their behalf to secure all financial incentives to help offset as much of the project cost as possible.

\$5+ Billion

in guaranteed energy savings since our founding

70+ certified energy managers firm-wide



keep energy use at the lowest possible level

Pictured on the right: Columbia University New York, NY

RETRO-Commissioning

RETRO-COMMISSIONING is the process of assessing, analyzing, and improving the operational performance and occupant comfort of an existing building. Retro-commissioning helps bring buildings back in line with the original design intent and produces energy savings, increased occupant comfort, and short-term economic paybacks that are generally less than three years.





NORESCO delivers an industry-leading approach to retro-commissioning. We blend activities from prescriptive energy audits, such as those defined by ASHRAE, with best practices and project-proven approaches to deliver comprehensive building analyses and testing at a cost-effective price.

NORESCO analyzes all the components that can have an effect energy consumption and demand, occupant comfort, and operations and maintenance. We follow the systems from beginning to end, starting with the building automation system (BAS) or on-board controls.

Due to our diverse background in design, construction, and operations, we are capable of implementing advanced controls strategies, aggressive energy-savings algorithms, sensor calibrations, and data trending and tracking in the field during our assessment. This provides the added value of integrating multiple services into one and ensuring that once problems are identified, effective solutions can be implemented quickly and accurately with monitored results.

Additionally, NORESCO is prequalified to receive rebates under numerous incentive programs including:

- NYSERDA Flextech Consultant
- ComEd RCx Service Provider

- Xcel Energy Recommissioning Trade Partner
- Centerpoint Energy RCx Service Provider

5 - 15% Savings

of a building's average annual energy cost after RCx

10,000+ building energy assessments analyzed worldwide



optimize building performance

Pictured on the right: New Mexico Junior College - Allied Health Building Hobbs, NM LEED Silver®

TESTING, ADJUSTING AND BALANCING

TESTING, ADJUSTING, AND BALANCING is a method of regulating HVAC air supply, return, and exhaust, or the flow of water, to achieve a neutrally balanced, comfortably conditioned building. By utilizing specialized equipment to test, adjust, and balance systems, buildings can achieve optimal performance and increase occupant comfort.





NORESCO is NEBB-certified testing, adjusting and balancing firm for both airside and waterside systems. To assist with performing these activities, NORESCO maintains its own equipment and testing instruments that meet NIST-traceable and NEBB-calibration standards.

Our field staff is made up of experienced controls engineers and test, adjust and balance technicians. We are experienced in using direct digital controls as trending systems and also have our own extensive inventory of data logging equipment to measure sustained correct performance over time. If a building is malfunctioning, trend logging is one of the best ways to identify and diagnose less than optimal performance.

Additionally, NORESCO has long assisted building owners, including hospitals and their engineering staff, troubleshoot HVAC systems to optimize efficiency and maintain compliance with regulatory requirements such as those from the Joint Commission, Centers for Medicare & Medicaid services and the Department of Health to reduce the risk of spreading airborne containments.

We also regularly assist clients with measuring air-changes per hour to ensure an adequate amount of outside air. Inadequate amounts of outside air can increase the presence of pollutants such as VOCs (volatile organic compounds) and particulate matter (PM2.5 and PM10).



NEBB Certified Testing, Adjusting and Balancing Firm



air and water balancing for optimal performance

Pictured on the right: UTC Digital Accelerator Laboratory Brooklyn, NY LEED Certified® Photos © Garrett Rowland, courtesy of Gensler

HEALTHY BUILDING ASSESSMENTS

HEALTHY BUILDING ASSESSMENTS focus on identifying and integrating strategies that positively contribute to building occupants' health and wellness. Our experts take a holistic approach to health in the workplace by addressing behavior, operations and design.





NORESCO understands how important it is that workplaces and buildings positively impact occupants and their health and well-being. We have a team of specialists who work to identify healthy building strategies that can be applied to commercial and residential buildings.

NORESCO's on-site wellness audits begin with visual inspections to assess proper ventilation and filtration, gain an understanding of housekeeping practices, clarify occupant flow and review spatial planning and programming. After performing visual inspections, NORESCO completes a rigorous testing protocol to evaluate the quality of the air/ventilation rates, water, light, temperature and humidity. The results of these tests are used to provide clients with actionable solutions on what is needed to create and/or maintain a healthy building. Some of the items evaluated during the assessments include:

- Indoor Air Quality: Proper Ventilation and Filtration
- Thermal Comfort: Temperature and Humidity Control
- Occupancy Flow: Re-Opening Buildings and Managing Tenants
- Maintaining the Building: Periodic and Preventative Maintenance
- Regular Housekeeping: Using Green Buildings Standards as Benchmarks
- Energy Efficiency: Tightening Non-Essential Operations
- Tenant Lease Requirements and Current Preventive Maintenance Strategies



ensure proper ventilation and filtration



development of corporate IAQ engineering standards



spatial planning and 6-foot workspace plan

Pictured on the right: West Edge Mixed-Use Project Los Angeles, CA photo courtesy of Hines

PERFORMANCE TESTING

PERFORMANCE TESTING measures actual space conditions within a building and provides quantitative data to ensure the building is performing as intended. Our engineers use the data collected to develop recommendations for building strategies that increase desired health benefits for occupants.







NORESCO's building performance testing services are a comprehensive way of evaluating if sustainability and wellness strategies are operating as intended.

Building performance testing can help identify issues in existing buildings and inform owners and building managers of the level of improvements required to meet optimum health levels.

Additionally, NORESCO staff has been conducting WELL Performance Verification since 2016 and has provided these services on more than 25 projects around the globe. As an International WELL Building Institute[™] (IWBI) approved WELL Performance Testing Organization, our team has unmatched experience in providing this service. We will work with project teams to coordinate the performance verification schedule with consideration of the project close out process and building occupancy to provide efficient and accurate results.

SERVICES AVAILABLE:



Water Quality Testing



Light Quality Testing



Acoustic Quality Testing



Indoor Air Quality Testing



approved WELL Performance Testing Organization





Pictured on the right: DaVita World Headquarters - Tower II Denver, CO LEED Platinum®

INDOOR AIR QUALITY TESTING

AIR QUALITY TESTING provides building owners, tenants and occupants with the information needed to establish a baseline for indoor air quality and develop and implement upgrades to help verify optimal filtration, ventilation, airflow, and controls.





NORESCO provides indoor air quality testing for particulate matter (PM2.5 and PM10), total volatile organic compounds (VOCs), carbon monoxide, formaldehyde, ozone and nitrogen dioxide.

The intent of IAQ Testing for PM2.5 and PM 10 is to gain valuable data used to understand and control indoor pollutants that can impact occupant health. These particles can vary in size, shape and composition; however, particles that are 10 micrometers in diameter or smaller are of the greatest concern because these particles can be inhaled. Once inhaled, particles can affect the heart and lungs and in some cases cause serious health effects.

NORESCO follows rigorous testing procedures throughout a building, and testing locations are carefully selected to ascertain the concentrations in areas with the least ventilation and potentially the greatest presumed contaminant source strength. The testing is done within the breathing zone, between 3 and 6 feet above the floor, during normal occupied hours with the HVAC system operating with normal daily start times at the minimum outside air flow rate.



CO

nditions to improve	
gnitive function	



testing for radon, formaldehyde, volatile organic compounds



healthy, resourceefficient, and environmentallyconscientious

Pictured on the right: Toyota Georgetown Production Facility | Georgetown, KY LEED Platinum® and Net-Zero Energy photos © Cory Klein Photography

RENEWABLE ENERGY CONSULTING

RENEWABLE ENERGY CONSULTING helps investigate, analyze, prioritize, and recommend different renewable energy technologies. Our focus is on developing solutions that not only offer substantial utility cost savings, but also increase reliability and resiliency without impacting operations.





NORESCO is committed to making renewable energy a viable option to businesses and is leading the way in the creative use of wide-scale development and implementation of renewable technologies. Together with our customers, we have had the privilege of developing and implementing a dynamic array of projects, including solar and wind technologies and an advanced biomass boiler plant. NORESCO is committed to promoting and seeking out more renewable energy projects in the future.

NORESCO's renewable energy portfolio includes:

- Photovoltaics (roof and ground mounted)
- Biomass conversion systems
- Micro-grids/Battery storage

- Geothermal/Ground source heat pumps
- Wind
- PPA consulting and management

Many of our projects have taken advantage of rebates and grants that promote renewables. For example, NORESCO helped secure \$2.35 million in grants from the Department of Energy and the Massachusetts Renewable Energy Trust to help make two New England projects a reality. We review all opportunities to apply other funding sources, renewable energy credits, emission reduction credits, and tax incentives, in order to help improve the economics of renewable technologies.

22,700 kW+ of solar photovoltaic arrays installed

475 MW+

in distributed generation and cogeneration projects installed



Complement existing systems or achieve energy independence

Pictured from left to right: Mariposa Apartment Complex | Denver, CO LEED Platinum® Photos courtesy of Daniel O'Connor Photography

ENERGY ADVISING AND PROCUREMENT

ENERGY PROCUREMENT is the process of planning, developing, and executing an energy procurement strategy in the face of constantly changing markets. The goal of a successful energy procurement project is to secure the lowest possible pricing and develop contract terms that align with our client's long-term goals.





Our team has built an energy procurement portfolio of more than 150 public and private-sector entities, which in turn have facilitated the delivery of more than \$400 million in retail energy transactions. Our process centers on an in-depth analysis of each client's unique energy use and relies on NORESCO's market intelligence and resources including:

- Expertise with understanding available product options and indicative pricing
- Proficiency with energy contract terms and conditions to maximize the interests of our clients
- A thorough analysis and engineering-based understanding of a facility's load factor and operating capability to perform
- A keen understanding of retail supply companies, including their respective strengths, staff, offerings, processes, and competitiveness in different markets
- Access to available market data that we can translate and communicate to owners

150+

clients in public and privatesector entities



Weekly Energy Market Updates



OTHER SUPPLY SIDE SERVICES AVAILABLE:

- Renewable Energy Consulting and Sourcing
- Online Auctions
- Forensic Energy Analysis
- Energy Dashboard Platform
- Utility Bill Auditing and Tariff Analysis
- Market Intelligence

400+ Million

in retail electricity and natural gas transactions

Pictured on the right: Hines West Edge Mixed-Use Development | Los Angeles, CA Photos courtesy of Hines

DECARBONIZATION ROADMAPS

DECARBONIZATION ROADMAPS help building owners, tenants and organizations as well as state and local jurisdictions identify measures, compliance pathways, metric tracking, and milestones for reaching specific emission reduction goals for residential, institutional and commercial buildings.





NORESCO has experience analyzing residential, institutional and commercial building stock to develop organizational and/or building-centric strategies and metrics focused on achieving decarbonization targets. New construction decarbonization is one pathway to ensure emission reductions; however, tackling the transformation of existing buildings brings significant technical and financial challenges.

NORESCO-developed roadmaps lay out the vision and compliance pathways for owners using nearand long-term actions focused on energy efficiency measures, alternative mechanical systems and renewables/battery options. These strategies can also be used to support investor owned utilities (IOUs), building code and standards advocacy and compliance programs.

Roadmaps begin by analyzing current and/or similar building stock and available system technologies. NORESCO then performs building simulations to compare existing mechanical systems to alternate technologies and the potential impact of efficiency measures. A key component of the roadmap is developing metrics for success and managing operations to ensure and measure operational adoption and behavioral impact. The roadmap will take into consideration cost burdens, feasibility of implementation and is formulated into a living document for managers and owners or state and local jurisdictions to gain feedback, develop implementation plans or compliance programs, and enable policy and building code changes in support of decarbonization.



technical lead on the City and County of Denver's Renewable Heating and Cooling Plan



determine cost effective pathways with stakeholders

Pictured on the right: LG Electronics - North American Headquarters Englewood Cliffs, NJ LEED Platinum® Photo Credit: ©Christopher Payne/Esto

DECARBONIZATION ASSESSMENTS

DECARBONIZATION ASSESSMENTS help owners and occupants evaluate their building's carbon emissions impact by evaluating its equipment, operations, energy sources, consumption patterns, and overall efficiency. They are a systematic process of analyzing all aspects of energy usage and identifying opportunities for improvements. They serve as a valuable tool, or roadmap, for organizations seeking to optimize their energy usage, reduce their carbon footprint, and minimize their environmental impacts as they make progress towards their sustainability goals, initiatives and commitments.



NORESCO's team brings extensive experience working with current clients to electrify their buildings and reduce GHG emissions.

Our approach to decarbonizing buildings involves reducing both operational and embodied carbon emissions as well as integrating renewable energy technologies. For operational carbon, we first pursue load reduction by optimizing building performance and improving energy efficiency through upgrades such as high performance envelope, energy-efficient equipment, and smart building controls, and then transition to electric-powered systems to eliminate on-site fossil fuels and enable deployment of clean and renewable energy technologies. To address embodied carbon, we help our clients specify low GWP refrigerants, select low-carbon materials through construction and make recommendations to retrofit existing buildings to minimize new material use.

We support the clean energy transition by optimizing on-site energy generation and storage, purchasing off-site renewables and offsets, and advocating for cleaner grid policies. This comprehensive strategy aims to lower the carbon footprint of buildings in support of our combined global decarbonization efforts.



FRAMEWORK FOR GHG REDUCTIONS



Energy Load Reductions



Improved Energy Efficiency



Building Electrification



On-Site Energy and Storage



Clean Energy Procurement

Pictured from left to right: Mariposa Apartment Complex | Denver, CO LEED Platinum® Photos courtesy of Daniel O'Connor Photography

CODE DEVELOPMENT AND COMPLIANCE

ENERGY CODE DEVELOPMENT AND COMPLIANCE has been one of NORESCO's core service offerings since it's founding and our team remains extremely active in developing new code requirements as well as reviewing code language for clarity and enforceability. This work has been done for numerous types of clients including public agencies, local jurisdictions and utility companies.





Our Codes & Standards team leverages policy and engineering expertise to write innovative building energy efficiency standards and help policy-setting authorities move building codes toward carbon neutrality. The code development process involves a diverse range of activities including:

- Decarbonization roadmapping
- Analyzing lifecycle cost-effectiveness
- Technical writing and publication

- Electrification analysis/implementation planning
- Energy simulation and building stock analysis
- Stakeholder outreach and facilitation

In addition to developing energy codes and standards, NORESCO develops tools, training and resources to improve energy code compliance. The tools and resources help jurisdictions with limited bandwidth enforce, while also helping permit applicants understand, compliance options for their projects. NORESCO provides training that doesn't simply highlight changes in the code, but also educates building department staff and industry professionals on which code provisions have significant energy impacts. NORESCO has helped develop many leading industry standards including:

• California's Title 24 Building Energy Efficiency Standards

- ASHRAE 90.1 and 62.1 User's Manual
- State of Washington's Energy Code Roadmap



support standards implementation and compliance



developed energy code adoption toolkit for Colorado Energy Office



primary author of ASHRAE 90.1 and 62.1 User's Manual



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