ENVIRO-EXPERTS
GÉNIE-CONSEIL

Department of ENERGY ENGINEERING

Integrated Engineering Services for:

- Energy efficiency in buildings and industrial processes,
- Building mechanics (HVAC),
- Industrial refrigeration,
- Industrial process energy integration,
- Renewable energy and energy storage,
- Research & Development in advanced energy technologies.

Our Mission: To guide our clients toward performance, decarbonization, and carbon neutrality by combining engineering, innovation, and sustainability.

SYSTÈME CERTIFIÉ BNQ ISO 9001:2015
Certificat N° : 62227-1-01

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Department of ENERGY ENGINEERING

Engineering services in: building and industrial process energy efficiency, building mechanics (HVAC), industrial refrigeration, process energy integration, renewable energy and storage, and research & development in energy technologies.

ENVIRO-EXPERTS: Your Partner for a Successful Energy Transition

The energy transition is both a necessity and a strategic opportunity for businesses, institutions, and industries. Reducing operating costs, improving asset performance, and minimizing environmental impact have become essential levers for competitiveness and sustainability.

At **ENVIRO-EXPERTS**, we transform your energy challenges into sustainable opportunities through tailored, cost-effective, and innovative solutions.

Whether you want to lower your energy bills, optimize your buildings and industrial processes, or integrate renewable energy, our Energy Engineering Department supports you from audits to implementation, including decarbonization and carbon neutrality strategies.

Our Mission: Your Energy Performance, Our Commitment

- Optimize the consumption of buildings and processes to reduce costs and improve performance.
- Integrate renewable energy and innovative solutions to reduce carbon footprints.
- Develop cutting-edge technologies through Research & Development.
- Maximize access to government grants and incentives.
- Enhance comfort, safety, and building performance while reducing environmental impact.

Whether you are an owner, property manager, or real estate developer, we provide solutions tailored to your sector:

🏢 Residential and multi-residential buildings

🏬 Commercial buildings (offices, retail, hotels)

🏭 Industrial facilities (factories, warehouses, manufacturing plants)

🏛️ Institutional buildings (schools, hospitals, sports centers, municipal buildings)

With **ENVIRO-EXPERTS**, benefit from turnkey support and recognized expertise for all your energy projects.

Our Services: Complete Solutions to Reduce Costs and Boost Performance
Our Energy Engineering services include:

Energy Audits and Analyses

- Comprehensive energy audits (ASHRAE Level 1 to 3)
- ISO 50001 diagnostic and compliance
- Comparative energy analyses (APH Select)
- Detailed energy diagnostics and assessments
- Real-time energy monitoring and tracking
- Energy and environmental impact studies
- Decarbonization & GHG Reduction (GHG emission reports for carbon credit eligibility – Reduction plans and process optimization – Validation of GHG reductions under ISO 14064-3 – GHG emission assessments (Scope 1, 2, and 3) – ISO 14064-1 and 14064-3 compliance – Certification of emission reductions under ISO 14064-2 – Emission inventory and factor calculations – Optimization of CCUS technologies to reduce carbon footprints)
- Preparation of full grant applications under programs such as TEQ – ÉcoPerformance and Hydro-Québec Custom Solutions

Building Performance and Optimization

- Building commissioning (Cx) and recommissioning (RCx)
- Development of energy management and optimization strategies
- Consulting for energy-efficient retrofits and new construction
- Energy modeling and dynamic thermal simulation
- Compliance with energy certifications (LEED, BOMA BEST, Energy Star)
- Building automation and technical management (BAS/BMS)

- Feasibility studies for advanced energy integration

HVAC and Industrial Refrigeration

- Design and selection of HVAC and industrial refrigeration systems
- Optimization and modernization of HVAC and refrigeration equipment
- Development and integration of advanced control strategies
- Thermal system performance and efficiency studies
- Use of low environmental-impact refrigerants

Renewable Energy and Energy Storage

- Design and integration of renewable energy systems (solar PV and thermal, wind, hydro, biomass, bioenergy, shallow and deep geothermal for heating, cooling, district heating, and electricity production via EGS systems)
- Energy storage solutions and microgrid management
- Hybridization of renewable energy with conventional systems
- Feasibility studies and ROI analyses of renewable projects
- Design and implementation of solar PV and thermal systems
- Optimization of renewable energy systems for self-consumption

Industrial Process Energy Integration

- Industrial energy integration and energy audits
- Recovery of industrial waste heat
- Cogeneration and trigeneration (heat, electricity, cooling)
- Optimization of steam and heat transfer fluid networks
- Recovery of thermal waste for hot water and heating production
- Solutions to reduce industrial carbon footprints
- Evaluation and improvement of thermal system performance

Smart Systems and Advanced Control

- Automatisation des processus énergétiques via Machine Learning et IoT.
- Optimization of lighting systems and smart controls
- Deployment of artificial intelligence solutions for energy management

- Predictive maintenance strategies for energy equipment
- Process automation using Machine Learning and IoT

Research & Development in Energy Technologies, Systems, Industrial Processes, Process Engineering, and Energy Integration

- Development of new energy technologies
- Innovation projects in energy storage and management
- Studies on new materials and emerging technologies
- Prototyping and testing of advanced energy solutions
- Optimization of industrial processes for maximum efficiency
- Integration of clean technologies and GHG reduction
- Access to grants and incentives to fund innovation projects
- Energy performance modeling and validation prior to implementation
- Advanced modeling of thermal and energy flows
- Collaboration with universities and research centers.

1. Energy Audits and Analyses

An energy audit is the equivalent of a **health check-up for your building or industrial site**. It identifies where and how energy is being consumed, pinpoints inefficiencies, and provides concrete solutions to:

- Reduce your energy costs
- ptimize your equipment and systems
- Improve occupant comfort
- Reduce your environmental footprint

Identify savings opportunities and optimize your energy consumption through:

- Comprehensive energy audits (ASHRAE Level 1 to 3)
- Comparative energy analyses (APH Select) for multi-residential building optimization
- Detailed energy diagnostics and assessments to detect waste and inefficiencies
- Real-time monitoring and tracking of energy consumption
- Energy and environmental impact studies to support effective energy strategies

Objective : Identify the best strategies to reduce your costs while improving performance and your ecological footprint.

How to know if you need an energy audit?

Your building is likely concerned if:

- Your energy bills are too high
- You want to invest in energy efficiency but don't know where to start
- Your building is uncomfortable or has significant temperature variations (overheating, cold zones)
- You must comply with new standards (NECB, LEED, BOMA BEST)
- Your HVAC equipment does not function optimally, operates poorly, or consumes too much

Each sector has its specific needs:

- ❑ **Residential buildings**: Audit focused on the building envelope and comfort (insulation, air infiltration, heating, cooling)
- ❑ **Commercial buildings (offices, retail, hotels)**: Analysis of HVAC systems, automation, and modernization
- ❑ **Industrial buildings (factories, warehouses, manufacturing plants)**: Process optimization, heat recovery, and renewable energy integration
- ❑ **Institutional buildings (schools, hospitals, sports centers, municipal facilities)**: Lower operating costs, improved comfort, and regulatory compliance

If you find yourself in any of the following situations, our Energy Audit and Analysis services can provide you with concrete and cost-effective solutions:

1.1. High Energy Costs – You Want to Reduce Them

- Your energy bills are too high and you want to pinpoint the main sources of consumption.
- You have noticed abnormal increases in consumption without a clear explanation.
- You want to reduce operating expenses by optimizing your building or equipment energy use.

Our Solutions:

- Comprehensive energy audit (ASHRAE Levels 1–3): Detailed assessment of your facilities to identify losses and propose corrective actions.
- Detailed analysis of energy end-uses: heating, cooling, ventilation, lighting, hot water, and specific equipment.
- Tailored Energy Improvement Plan: Practical, prioritized recommendations based on your needs and budget.

Your Benefits:

- Measurable reduction in energy bills
- ptimized performance of existing systems
- Rapid return on investment through targeted measures

1.2. Improving the Energy Efficiency of Your Building or Business

- Your building or facility consumes too much energy.
- You are planning renovations and want to prioritize the most profitable investments.
- You want to implement energy management and automation strategies to improve operations.

Our Solutions:

- **Detailed energy diagnostics and assessments** to understand how energy is being used.
- **Identification of priority actions**: insulation, equipment modernization, HVAC (heating, ventilation, cooling) optimization.
- **Energy modeling and thermal simulations** to measure the impact of improvements before implementation.

Your Benefits:

- Sustainable reduction in energy consumption
- Better-targeted, more profitable investments
- Upgraded systems with improved comfort for occupants

1.3. Accessing Grants and Incentives for Energy Efficiency Projects

- You've heard about funding programs but don't know how to access them.
- You're unsure which grants are available for your project.
- You want to maximize your ROI by leveraging all available incentives.

Our Solutions:

- Complete preparation of funding applications to Hydro-Québec, Énergir, TEQ, CMHC (APH Select), and other government programs.
- Required studies and energy audits to meet eligibility criteria.
- Support in implementation to ensure compliance and maximize financial assistance.

Your Benefits:

- Significant reduction of project costs through grants
- Time savings and simplification thanks to turnkey support
- Maximized return on investment with adapted financing

1.4. Compliance with New Energy Codes and Regulations

- Your building must comply with the National Energy Code of Canada for Buildings (NECB).
- You want to obtain an energy certification (LEED, BOMA BEST, Energy Star).
- Your industry is subject to environmental obligations such as GHG reduction.

Our Solutions:

- Compliance assessments with applicable codes (NECB 2017/2020, ASHRAE 90.1, local regulations).
- Energy and environmental impact studies to demonstrate compliance.
- Optimization strategies to facilitate and accelerate certification.

Your Benefits:

- Guaranteed compliance with Canadian and international standards
- Easier access to certifications that increase the value of your assets
- Reduced regulatory risks and enhanced corporate image

1.5. Anticipating and Managing Long-Term Energy Consumption

- You want to track and control energy consumption in real time.
- You need a long-term strategy to sustainably reduce energy costs.
- You want to prevent performance degradation with continuous monitoring.

Our Solutions:

- Energy monitoring and management systems to analyze usage patterns, detect waste, and identify demand peaks.
- Long-term energy optimization plans with clear, measurable targets.

- Post-audit support to ensure implementation and ongoing performance tracking.

Why Choose Our Energy Audit Services?

- Recognized expertise in energy efficiency across residential, commercial, institutional, and industrial sectors
- Personalized, detailed analyses tailored to your building's unique profile
- Turnkey support from audit through implementation
- Cost-effective and measurable solutions with rapid payback
- Easy access to grants and incentives to maximize energy savings

Contact us today to schedule an energy audit and discover how we can help reduce your costs and carbon footprint while improving your energy performance!

1.6. Services Under ISO 50001

What is ISO 50001?

ISO 50001 is an international standard that helps organizations implement an effective Energy Management System (EnMS). The goal is simple: reduce energy costs, improve performance, and lower greenhouse gas (GHG) emissions.

To help companies comply with ISO 50001 and maximize energy savings, we offer:

- **Diagnostics and Compliance with ISO 50001**
  - Initial evaluation to assess the gap between your current practices and ISO 50001 requirements
  - Development of a step-by-step compliance plan and implementation support
- **Energy Audits and Performance Analysis**
  - Energy audits (ASHRAE Levels 1, 2, 3)
  - Identification of key energy-consuming processes and opportunities for improvement
  - Development of Energy Performance Indicators (EnPIs)

- **Implementation of Energy Management Systems (EnMS)**
  - Development and deployment of ISO 50001-compliant systems
  - Real-time energy monitoring protocols
  - Integration of smart technologies and automation

- **Energy Optimization and Cost Reduction**
  - Optimization of HVAC and industrial refrigeration systems
  - Modernization of energy-intensive equipment (lighting, motors, compressors, pumps, etc.)
  - Process optimization and heat recovery

- **Training and Awareness**
  - Training for managers, technicians, and staff on energy management
  - Workshops and coaching on best practices and preventive maintenance
  - Awareness campaigns on reducing energy waste and improving behavior

- **Funding and Incentives**
  - Identification of available subsidies and incentive programs (Hydro-Québec, ÉcoPerformance, federal programs)
  - Assistance with grant writing and submission
  - Support for post-project energy savings verification

- **Certification and Compliance**
  - Support until official ISO 50001 certification
  - Internal compliance audits prior to official evaluation
  - Development of procedures and documentation for external audits

Why adopt ISO 50001 in Canada?

- Save on energy bills: measurable, long-term cost reduction
- Stay compliant: meet environmental and GHG reduction requirements
- Access grants and incentives: secure funding for energy projects

- Boost your image: enhance competitiveness with responsible energy management
- Contribute to sustainability: reduce your carbon footprint and align with climate goals

Need ISO 50001 support? Contact us for a free assessment and discover how to improve your energy performance while reducing costs!

2. **Building Performance and Optimization**

Maximize the performance of your facilities and minimize energy losses.

- Commissioning (Cx) and Recommissioning (RCx) to ensure or restore system performance.
- Building Management Systems (BMS/BAS) and automation of installations.
- Energy modeling and dynamic thermal simulations to predict and optimize building performance.
- Feasibility studies for the integration of advanced energy solutions.
- Compliance with leading energy certifications (LEED, BOMA BEST, Energy Star).

Objective: Ensure optimal building management with greater comfort, reduced energy consumption, and improved long-term durability.

Do you have a new building or a major renovation project?

✓ **Yes** → You need Commissioning (Cx) to ensure all systems function according to design specifications right from start-up.

✓ **No** → Move on to the next section.

Why choose Commissioning (Cx)?

- Ensure that all systems (HVAC, plumbing, lighting, etc.) are properly installed and fully operational according to codes and owner expectations.
- Avoid cost overruns and operational issues by validating performance during construction.
- Access grants and incentives for new building commissioning through programs such as ÉcoPerformance and Transition Énergétique Québec (TEQ).

Résultat : Votre bâtiment démarre sa vie avec des systèmes performants, fiables et rentables.
Result: Your building starts its lifecycle with reliable, efficient, and cost-effective systems.

Is your building more than 5 years old or showing signs of declining performance?

✓ **Yes** → It's time to carry out a **Recommissioning (RCx)** to improve energy efficiency and extend system lifespan.

✓ **No** → Continue monitoring performance and plan for future RCx.

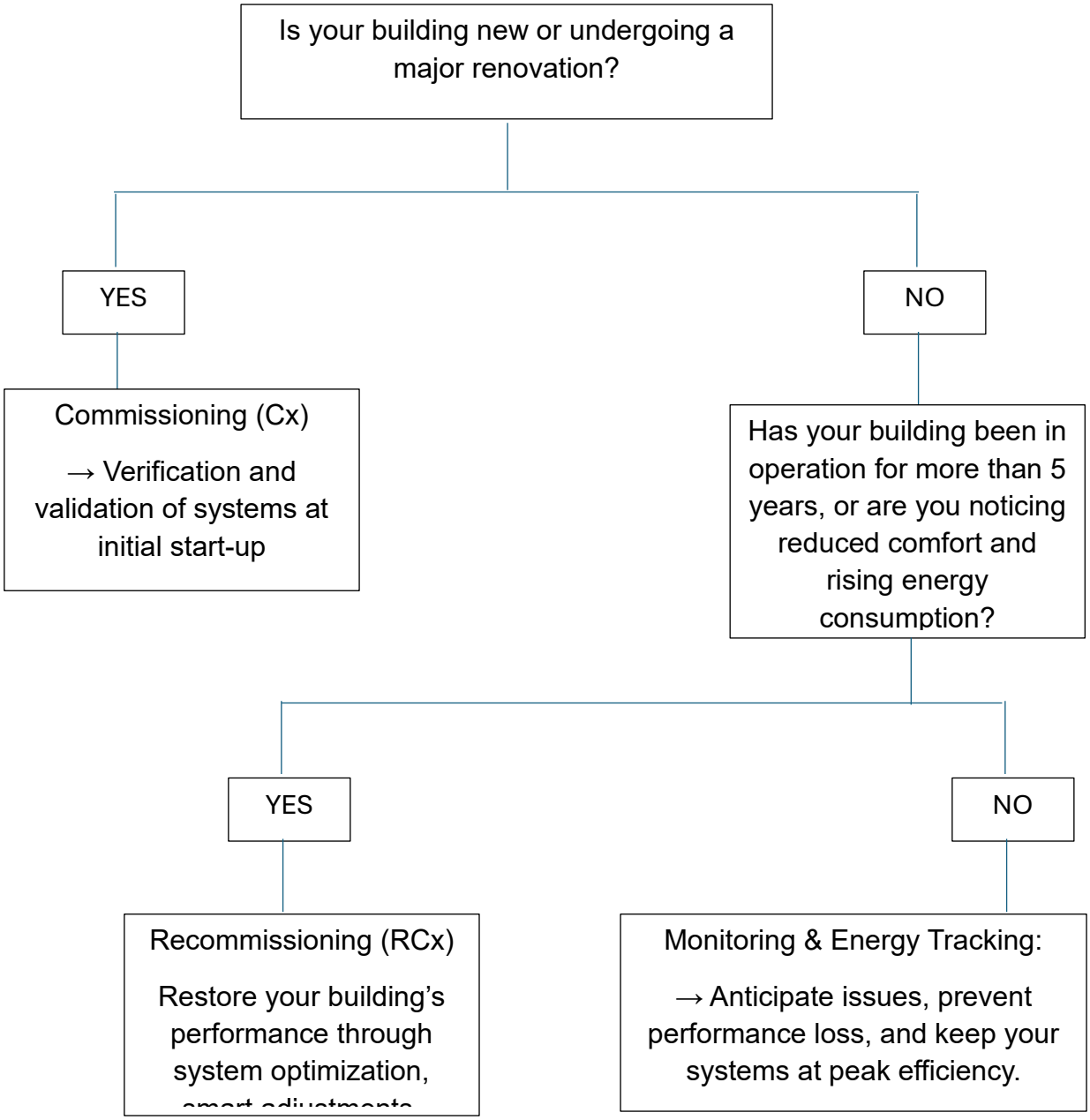
Why choose Recommissioning (RCx)?

- Identify energy losses and optimize consumption across HVAC, lighting, and other systems.
- Correct malfunctions and fine-tune system settings to reduce operating costs.
- Improve indoor comfort and air quality for occupants.
- Access financial incentives for retrofits and recover part of your investment through energy efficiency programs.

Result: Immediate energy savings, enhanced occupant comfort, and extended system longevity.

Which service does your building need?

Whether you are constructing a new facility, managing an aging building, or simply seeking to optimize performance, **our experts will guide you through Cx or RCx to maximize energy efficiency, reduce costs, and ensure long-term reliability.**


Is your building new or undergoing a major renovation?
YES
NO
Commissioning (Cx)
→ Verification and validation of systems at initial start-up
Has your building been in operation for more than 5 years, or are you noticing reduced comfort and rising energy consumption?
YES
NO
Recommissioning (RCx)
Restore your building's performance through system optimization,
Monitoring & Energy Tracking:
→ Anticipate issues, prevent performance loss, and keep your systems at peak efficiency.

3. HVAC and Industrial Refrigeration

Smart solutions to optimize heating, ventilation, air conditioning, and refrigeration.

Building mechanics (HVAC) and industrial refrigeration are essential for ensuring occupant comfort, guaranteeing product quality, and reducing operating costs.

With our services, you can:

- Reduce the energy consumption of your HVAC and refrigeration systems.
- Modernize your equipment to improve performance and durability.
- Ensure optimal comfort in your buildings.
- Meet environmental standards and reduce your carbon footprint.

We are here to help!

Our services include:

- Sizing, modernization, and installation of HVAC and industrial refrigeration systems.
- Advanced control strategies to enhance equipment performance.
- Energy optimization of thermal systems (heating, cooling, ventilation, refrigeration).
- Eco-friendly solutions using low–global warming potential (GWP) refrigerants.

Objective : Deliver optimal comfort and maximum energy performance, while reducing your operating costs.

Do you need our HVAC and Refrigeration services? : Our expertise is tailored to companies, property managers, institutions, and industries that want to guarantee an optimal indoor environment while controlling energy costs and meeting environmental standards.
You may benefit from our solutions if:

- You have existing refrigeration systems but want to improve efficiency and reduce energy costs.
- You require new refrigeration systems tailored to your industry (food, pharmaceuticals, retail, etc.).

- ➢ You wish to modernize your equipment to make it more eco-friendly and compliant with new environmental regulations.
- ➢ You need low-consumption refrigeration solutions to reduce electricity bills.
- ➢ You operate in sectors with strict temperature control requirements to ensure product quality and safety (food storage, pharmaceuticals, etc.).

3.1. Your operating costs are high, and you want to reduce them

- Your electricity or gas bills are rising, and you want to optimize your HVAC and refrigeration systems.
- Your equipment consumes too much energy and performs poorly.
- You are looking for cost-effective and reliable solutions to cut energy consumption.

Our solutions:

- Energy audit of HVAC and refrigeration systems.
- Optimization of regulation parameters and control systems.
- Deployment of energy-efficient technologies with rapid ROI.

Your benefits:

- Lower utility bills.
- Improved performance of existing systems.
- Quick return on investment.

3.2. You want to modernize your equipment to improve performance

- Your systems are obsolete and energy-intensive.
- You plan to upgrade your facilities to adopt more efficient technologies.
- You are seeking high-performance HVAC systems compliant with environmental standards.

Our solutions:

- Feasibility studies and technical recommendations for system upgrades.
- Installation of new high-efficiency HVAC and refrigeration equipment.

- Integration of smart systems for optimized management (sensors, smart thermostats, advanced controls).

Your benefits:

- Higher energy efficiency and reduced operating costs.
- Modern and reliable systems compliant with current standards.
- Enhanced comfort and system reliability.

3.3. You are planning a new construction or expansion project

- You are building a new residential, commercial, or industrial facility and require optimal HVAC and refrigeration system design.
- You want to integrate modern, high-performance air conditioning and ventilation systems from the start.
- You seek long-term energy savings beginning at the design phase.

Our solutions:

- Design and sizing of HVAC and refrigeration systems in compliance with ASHRAE, NECB, CSA, and other standards.
- Heat recovery integration to maximize efficiency.
- Planning and commissioning of equipment to ensure peak performance.

Your benefits:

- Right-sized systems from day one.
- Long-term operating cost savings.
- Increased asset value and compliance with codes.

3.4. You operate in a sector with specific refrigeration requirements

- You must maintain precise temperatures for product storage (food, pharmaceuticals, hospitality, etc.).
- You require strict temperature and humidity control to comply with quality standards.
- You want to reduce your carbon footprint by adopting low-GWP refrigerants.

Our solutions:

- Custom refrigeration solutions tailored to your industry needs.
- Advanced monitoring and management systems to guarantee stable, reliable performance.
- Eco-efficient technologies to lower consumption and GHG emissions.

Your benefits:

- Product quality and safety guaranteed.
- Reliable, stable refrigeration performance.
- Reduced environmental impact.

3.5. You want to benefit from financial incentives and subsidies

- You aim to lower the cost of HVAC and refrigeration upgrades by leveraging incentive programs from Hydro-Québec, Énergir, and Transition énergétique Québec.
- You need detailed audits and energy analyses to justify funding requests.

Our solutions:

- Support in preparing subsidy and incentive applications.
- Cost-benefit analyses of proposed solutions to maximize ROI.
- Compliance with program requirements for successful applications.

Your benefits:

- Reduced upfront costs thanks to subsidies.
- Simplified process with turnkey support.
- Optimized project ROI.

Why choose our HVAC and Industrial Refrigeration services?

- Proven expertise in building mechanics and industrial refrigeration.
- Tailored solutions adapted to each client's specific needs.

- End-to-end support: from audits to commissioning.
- Advanced technologies for maximum energy efficiency.
- An eco-responsible approach fully compliant with environmental standards.

Contact us today for a free consultation and discover how we can optimize your HVAC and refrigeration systems while lowering your energy costs!

4. **Industrial Process Energy Integration**

Why is it essential?

Industry consumes massive amounts of energy to power its processes — heating, cooling, drying, transforming, compressing, and more. Yet a large portion of this energy is wasted, escaping as heat through chimneys, boilers, compressors, or cooling systems.

Energy integration aims to recover and reuse this lost energy, optimize processes, and reduce energy bills. It involves analyzing all thermal and energy flows in a plant to cut consumption, valorize waste heat, and improve profitability.

It allows you to:

- Significantly reduce energy bills (gas, electricity, steam, compressed air).
- Reuse waste energy (flue gases, process heat, thermal losses) instead of wasting it.
- Improve equipment performance and lifespan.
- Lower your carbon footprint and access available energy subsidies.

A global and strategic approach that combines:

- **Industrial energy audits**: mapping consumption and identifying waste.
- **Thermal equipment optimization**: boilers, steam networks, heat exchangers, pumps, compressors.
- **Waste heat recovery**: transforming rejected heat into a useful resource.
- **Cogeneration / Trigeneration**: producing heat, electricity, and cooling simultaneously.
- **Integration of renewable energy into industrial processes**: biomass, solar thermal, deep geothermal.
- **Smart automation**: AI, IoT, and real-time monitoring.

Objective: Transform wasted energy into lasting savings for your industry.

Do you need our services?

Your facility may require energy integration if:

- Your energy costs are high and eroding profitability.
- Your processes generate significant unvalorized waste heat.
- You want to improve production equipment efficiency and reduce carbon emissions.
- You are seeking subsidies or incentives to optimize consumption.
- You want to integrate renewable energy solutions into your production processes.

Our Industrial Energy Integration Services

- **Comprehensive industrial energy audits**: mapping consumption and energy losses.
- **Heat recovery and valorization**: reusing rejected heat to feed other processes (e.g., preheating water, space heating).
- **Cogeneration and trigeneration**: producing electricity, heat, and cooling simultaneously for maximum efficiency.
- **Thermal network optimization**: improving the efficiency of steam, hot water, or heat transfer fluid systems.
- **Feasibility studies and simulations**: modeling thermal flows to validate savings scenarios before investment.
- **Low-carbon solutions**: replacing inefficient equipment with eco-efficient technologies.
- **Modernization and automation of industrial processes** with advanced control systems.

4.1. Your energy costs are high and rising

- Energy bills (gas, electricity, steam) are climbing without clear explanation.
- Energy consumption represents a major portion of your production costs.
- You want to reduce dependency on fossil fuels and volatile energy prices.

Solutions:

- Optimize thermal networks (steam, hot water, heat transfer fluids).

- Recover industrial process heat to preheat water or compressed air.
- Implement thermal storage and hybridization with renewables to reduce reliance on fossil fuels.

Case study: In a food processing plant, oven heat was recovered to preheat industrial cleaning water. **Result: 15–25% reduction in gas bills.**

4.2. Your thermal equipment and processes show major energy losses

- Heat is rejected into the atmosphere through chimneys, exchangers, or exhaust ducts.
- Boilers, steam networks, or compressors are oversized or underperforming.
- Cooling systems are outdated and waste energy.

Solutions:

- Thermal waste analysis to identify recovery opportunities.
- Cogeneration (CHP) or trigeneration for maximum use of primary energy.
- Optimization of ventilation and cooling systems to prevent unnecessary losses.

Case study: In a pharmaceutical plant, compressor heat was recovered to heat process water. **Result: $250,000 in annual savings and 600 tons of CO_2 avoided.**

4.3. Your industry relies on energy-intensive thermal processes

- Your operations involve heating, drying, melting, distillation, or intensive refrigeration.
- You want to improve the efficiency of industrial equipment (furnaces, dryers, exchangers, pumps).
- You aim to reduce steam, compressed air, or refrigeration consumption.

Solutions:

- Process-specific energy audits to detect inefficiencies.
- Deployment of energy recovery loops and advanced regulation.
- Modernization and automation of energy-intensive equipment for maximum performance.

Case study: In a textile plant, drying system heat was reinjected into the process. **Result: 20% energy savings.**

4.4. You want to reduce your carbon footprint and access government subsidies

- You must comply with strict environmental standards (Carbon Footprint, ISO 50001, GHG regulations).
- You want to benefit from financial incentives and energy subsidies to modernize equipment.
- You have decarbonization goals and seek renewable energy integration.

Solutions:

- Replace energy-intensive equipment with low-carbon technologies.
- Integrate industrial renewables: biomass, solar thermal, high-temperature geothermal.
- Optimize energy mix and implement strategies to reduce GHG emissions.

Case study: A pulp & paper mill replaced 50% of its natural gas use with biomass. **Result: 10,000 tons of CO_2 avoided annually.**

4.5. You are planning an expansion or modernization

- You are building a new plant or modifying processes and want to integrate efficiency from the design stage.
- You want to avoid over- or under-sizing new equipment.
- You seek to optimize energy management and automate controls for higher profitability.

Solutions:

- Eco-efficient design of new facilities.
- Energy simulations and thermal flow modeling for optimized management.
- Integration of artificial intelligence and IoT for real-time monitoring.

Case study: In a new food plant, AI was implemented to optimize consumption during production peaks. **Result: 18% savings in the first year.**

Why choose our Industrial Process Energy Integration services?

- Advanced technical expertise in energy efficiency, waste heat recovery, and thermal process management.
- Tailored approach adapted to the specific needs of your industry.
- Maximized access to subsidies and financial incentives to reduce investment costs.
- Immediate reduction of operating costs and improved competitiveness.
- End-to-end support: from audits to implementation and performance monitoring.

Take the first step toward optimizing your industrial energy processes. Contact us today to explore how we can turn waste into savings!

5. Intelligent Systems and Advanced Control

Why adopt intelligent systems?

Modern energy management goes far beyond switching off lights or replacing inefficient equipment. Buildings and industrial facilities are becoming **connected and intelligent** thanks to **Artificial Intelligence (AI)** and the **Internet of Things (IoT)**.

These technologies make it possible to:

- Collect real-time data (temperature, humidity, occupancy, electricity use, pressure, etc.).
- Understand energy consumption patterns and behaviors.
- Automatically act to eliminate waste and enhance performance.

In practice, this means your systems (heating, ventilation, cooling, lighting, hot water, etc.) continuously adjust to actual building usage or industrial process needs.

Our Intelligent Systems & Advanced Control Services

- Building Management Systems (BMS/BAS): centralized platforms to monitor and control all your installations.
- Smart sensors & IoT devices: precise, real-time tracking of consumption and performance.
- Advanced automation: automatic regulation based on real-time demand.
- Predictive maintenance with AI: anticipating failures before they occur.
- Lighting optimization: occupancy sensors, smart LEDs, and custom scenarios.
- Occupant comfort & health: dynamic control of air quality, temperature, and humidity.
- Compliance support: assistance for LEED, BOMA BEST, Energy Star, and NECB compliance.

Objective: Reduce energy costs through artificial intelligence and cutting-edge technologies.

5.1. High Energy Costs and Inefficient Operations

- Your energy bills are rising and it’s unclear why.
- HVAC systems consume too much energy and operate without advanced controls.

- Wasted energy occurs due to unoptimized usage (lights left on, overheating, overcooling).

Our solutions:

- Intelligent automation of energy systems to adjust consumption to real demand.
- Machine Learning algorithms to anticipate consumption variations and auto-adjust setpoints.
- Advanced regulation and load-shedding systems to avoid peak demand penalties.

Case Study: An office building cut its annual utility bill by **18%** by automating lighting schedules and optimizing heating/cooling setpoints.

5.2. Automating and Centralizing Building or Plant Operations

- You manage a large facility and want centralized, automated control.
- Systems operate independently, with little communication between them.
- You want to monitor and control your building remotely via connected platforms and smart sensors.

Our solutions:

- Implementation of a **Building Automation System (BAS)** to manage all equipment from one platform.
- Deployment of IoT sensors for real-time energy and equipment status monitoring.
- Interactive dashboards and smart alerts to anticipate and correct inefficiencies.

Case Study: A property manager supervises **10 buildings from a single platform**, reducing maintenance costs by **25%** and enabling immediate corrective actions.

5.3. Frequent Equipment Failures or Overconsumption

- High maintenance costs due to recurring failures.
- Difficulty predicting breakdowns in HVAC, energy production, or electrical distribution.
- Need to extend equipment lifespan and avoid premature wear.

Our solutions:

- **AI-based predictive maintenance:** algorithms analyze real-time data to detect early signs of failure.
- Continuous equipment monitoring to optimize maintenance interventions.
- Dynamic parameter adjustment to minimize wear and prolong asset life.

Case Study: In a food processing plant, predictive maintenance reduced **unplanned downtime by 40%**, saving **$120,000 annually** in maintenance and production losses.

5.4. Lighting Optimization & Occupant Comfort

- Spaces are over- or under-lit, causing discomfort and higher energy costs.
- Occupants forget to switch off lights or adjust HVAC according to actual use.
- You want an eco-efficient approach with smart lighting and automatic regulation.

Our solutions:

- Occupancy and daylight sensors to automatically adjust lighting intensity.
- Smart LED systems programmed by time, occupancy, and external conditions.
- Advanced HVAC and indoor air quality controls for optimal comfort at minimal energy use.

Case Study: A sports complex cut **electricity consumption by 30%** with smart LED lighting and occupancy sensors.

5.5. Compliance with Energy Regulations and Certifications

- You must meet strict efficiency and smart building standards.
- You aim for certifications such as **LEED, BOMA BEST, or Energy Star.**
- You want to maximize eligibility for subsidies and financial incentives.

Our solutions:

- Evaluation and compliance planning with current standards.
- Energy modeling and pre-optimization to secure high certification levels.
- Integration of smart technologies into your energy transition plan for maximum incentives.

Case Study: A hospital achieved **BOMA BEST Platinum certification** after deploying a centralized energy management system, reducing energy use by **25% in 2 years**.

Why Choose Our Intelligent Systems & Advanced Control Services?

- Proven expertise in energy automation for residential, commercial, and industrial facilities.
- Tailored, end-to-end support from system audits to advanced technology implementation.
- Profitable, measurable solutions with rapid ROI.
- Full assistance to maximize energy savings and reduce operating costs.
- Continuous optimization powered by AI and Machine Learning for proactive energy management.

Contact us today to discover how intelligent systems and advanced control can transform your energy management and deliver measurable savings!

6. Renewable Energy and Energy Storage

Invest in a clean and sustainable energy future

The energy transition relies on the integration of renewable energy sources and innovative storage solutions. These technologies reduce dependence on fossil fuels, stabilize energy costs, and minimize the carbon footprint of buildings, industries, and communities.

- Sizing and installation of solar, wind, hydro, and geothermal systems.
- Hybridization of renewable energy with conventional systems.
- Energy storage and microgrid management for increased autonomy.
- Profitability studies and ROI analyses.

Objective: Integrate sustainable energy solutions to reduce fossil fuel dependency while boosting resilience and performance.

6.1. Geothermal Systems for Heating and Cooling

When should you consider geothermal solutions?

Geothermal energy harnesses the earth's natural heat to provide efficient and cost-effective heating and cooling. It is a sustainable alternative that ensures optimal thermal comfort in residential, commercial, and industrial buildings.

You should consider geothermal systems if:

- You want to reduce heating and cooling costs. Geothermal heat pumps can cut consumption by 30–70% compared to electric, oil, propane, or gas systems.
- You are building or undergoing major renovations. Early planning simplifies integration and maximizes ROI.
- Your current system is outdated and energy-hungry. Switching from electric baseboards, oil, or gas boilers offers rapid payback.
- You want a low-carbon solution. No fossil fuel combustion means significant GHG reductions.

- Your site has geothermal potential. Horizontal or vertical loops can maximize system performance.
- You want access to subsidies. Programs from Hydro-Québec, Énergir, and Transition Énergétique Québec provide financial support.

Our services include:

- Feasibility studies and ROI analyses.
- System design and sizing.
- Vertical or horizontal loop drilling and installation.
- Integration with existing or new HVAC systems.
- Smart optimization and regulation of heat pumps.
- Maintenance and performance monitoring.

Result: Sustainable comfort, lower bills, and reduced emissions.

6.2. Deep Geothermal Energy for Power and District Heating

Deep geothermal taps into heat several kilometers below ground, delivering continuous, low-carbon, and stable energy. While still emerging in Québec, it has strong potential, especially in regions like the St. Lawrence Valley and the Canadian Shield.

Potential applications in Québec:

- Pilot geothermal power plants (EGS systems).
- Coupling with solar or hydro for enhanced grid flexibility.
- Industrial applications requiring high-temperature heat (chemical processes, industrial drying, green hydrogen).

Why consider deep geothermal?

- Reliable 24/7 energy production, unlike wind or solar.

- Lower long-term costs thanks to reduced O&M expenses and independence from fossil fuel price volatility.
- Large-scale applications: industrial parks, eco-districts, data centers, and municipal heating grids.
- Carbon reduction and compliance: helps meet climate targets, secure certifications (LEED, BOMA BEST, ISO 50001), and access subsidies.

Our services:

- Advanced feasibility studies and thermal simulations.
- Design and engineering of geothermal power plants.
- Regulatory and environmental compliance support.
- Financing strategies and incentive applications.
- End-to-end project management, from study to commissioning.

Result: A resilient, low-carbon, and profitable energy supply for industries and communities.

6.3. Solar Photovoltaic (PV)

Turn sunlight into clean, cost-effective power.

PV systems are among the most accessible renewable solutions, cutting electricity costs and boosting energy autonomy.

Why invest in PV?

- Lower utility bills: On-site generation and self-consumption reduce dependence on rising tariffs.
- Energy independence: Combine PV with storage and hybrid systems for resilience.
- Boost project value: Enhances sustainability credentials for real estate, industrial, or institutional projects.
- Access subsidies: Hydro-Québec, TEQ, green funds, and municipal programs.
- Reduce carbon footprint: PV supports CSR strategies and decarbonization.

Our services:

- Feasibility studies and ROI analyses.
- Turnkey design and installation.
- Integration with storage, hybrid systems, and smart energy platforms.
- Subsidy and certification support.
- Preventive maintenance for sustained production.

Result: Predictable savings, higher property value, and measurable GHG reductions.

6.4. Solar Thermal

Harness solar energy for hot water, heating, and industrial processes.

Solar thermal systems reduce reliance on fossil fuels by covering up to **60% of hot water** demand and contributing to space or process heating.

Ideal for:

- Residential, commercial, and institutional buildings with high hot water demand (multi-residentials, hotels, senior homes, sports centers).
- Industrial sectors (food, textile, paper, chemical) with thermal process needs.
- Organizations seeking subsidies and lower-carbon heating solutions.

Our services:

- Feasibility and system design.
- Installation of high-performance solar thermal collectors.
- Integration with boilers, radiant floors, pools, or industrial systems.
- Subsidy applications and project financing support.
- Maintenance and performance optimization.

Result: Lower heating costs, reduced emissions, and improved sustainability credentials.

6.5. Wind Energy

Leverage wind power for renewable electricity generation.

Wind systems provide a reliable solution for **self-consumption, microgrid integration, or grid sales.**

Why consider wind energy?

- Reduce energy bills with on-site generation.
- Exploit sites with strong wind resources.
- Support energy-intensive sectors (agriculture, industry, logistics).
- Sell surplus energy to Hydro-Québec or via microgrid projects.
- Develop large-scale or community-based wind farms.

Our services:

- Wind potential and feasibility studies.
- Custom system design and installation.
- Integration with solar, hydro, and storage.
- Support for subsidies and government incentives.
- Maintenance and performance monitoring.

Result: Reliable clean power, financial stability, and reduced carbon footprint.

6.6. Hydropower

Generate reliable renewable power with water.

From micro-hydro to larger projects, hydropower offers stable, long-term electricity production.

Applications include:

- Self-consumption for farms, industries, or isolated communities.
- Continuous supply for mining, sawmills, and industrial sites.

- Micro-hydro for municipalities and Indigenous communities.
- Revenue generation through grid integration.

Our services:

- Hydraulic potential assessments and feasibility studies.
- Turbine design and system sizing.
- Integration with grids and microgrids.
- Subsidy and incentive program assistance.
- Maintenance and performance tracking.

Result: Local, stable, and renewable power with predictable long-term benefits.

6.7. Biomass and Bioenergy

Turn organic and forestry residues into clean energy.

Biomass and bioenergy solutions deliver renewable heat, power, and biofuels while reducing fossil dependency.

Best suited for:

- Companies with high thermal demand (space heating, drying, industrial processes).
- Sites with access to wood residues, agricultural waste, or organic by-products.
- Industries or municipalities seeking decarbonization and stable energy costs.
- Projects targeting cogeneration or community heating networks.

Our services:

- Feasibility studies and ROI optimization.
- Design and installation of biomass boilers, biogas units, or gasification systems.
- Development of cogeneration projects (heat + electricity).
- Support for subsidies and financing programs.

Key advantages:

- Local, renewable, and cost-stable energy source.

- Reduced exposure to fossil fuel price volatility.
- Significant GHG reduction and sustainability gains.
- Access to government subsidies and green financing.

Result: Optimized energy costs, circular use of resources, and strong environmental benefits.

Contact us today for a personalized consultation and discover how renewable energy and storage solutions can transform your energy strategy.

7. Research & Development in Energy Technologies, Energy Systems, Industrial Processes, Process Engineering, and Energy Integration

Innovation Driving the Energy Transition

Innovation is at the heart of the evolution of energy technologies and the optimization of industrial processes. At **ENVIRO-EXPERTS**, our R&D services empower companies, industries, and institutions to design, test, and implement advanced energy solutions that are **sustainable, profitable, and scientifically validated**.

We work closely with universities, research centers, and industrial partners to develop breakthrough solutions that are:

- **Sustainable**: integrating renewable energy and reducing greenhouse gas (GHG) emissions.
- **Profitable**: providing optimized technologies with rapid ROI.
- **Reliable**: backed by validated scientific methods and proven engineering expertise.

7.1. Development of New Energy Technologies

- Design and prototyping of innovative energy solutions.
- Performance enhancement of renewable energy systems (solar, wind, hydro, biomass, geothermal).
- Optimization of energy storage technologies (batteries, hydrogen, thermal storage, flywheels).
- Simulation and testing of new energy systems under real-world conditions.

Benefit for clients: Access to cutting-edge technologies that **anticipate market shifts** and strengthen competitiveness.

7.2. R&D in Energy Systems and Microgrids

- Feasibility studies and development of smart grids and microgrids.
- Hybridization of renewables with conventional sources to ensure reliability.
- AI-powered energy management solutions for predictive and adaptive optimization.

- Demand-side management and self-consumption optimization.
- Electrification of systems and industrial processes to reduce carbon dependency.

Example: A microgrid pilot project combining solar PV, wind, and storage reduced grid dependence by **40% in peak hours**, cutting energy costs and emissions.

7.3. R&D in Industrial Process Integration

- Optimization of heat and steam networks to minimize energy losses.
- Advanced solutions for industrial heat recovery and storage.
- Energy flow analysis and modeling to design efficient process integration.
- Incorporation of renewables into industrial processes to replace fossil fuels.
- Development of cogeneration (CHP) and trigeneration tailored to industrial needs.
- Advanced process control strategies for maximum efficiency.

Marketing impact: Reduce operating costs by up to **20–30%** through heat recovery and optimized energy flows.

7.4. R&D in Industrial Processes and Process Engineering

- Optimization of industrial processes for improved energy yield.
- Simulation of thermal and energy flows for performance benchmarking.
- Valorization of industrial waste heat and by-products for circular economy models.
- Development of low-carbon processes and electrification of energy-intensive operations.
- Feasibility studies for renewable integration in industrial operations.

Credibility element: Projects align with **ISO 50001** and **ISO 14064** standards for energy and GHG management.

7.5. Energy Recovery and Storage Technologies

- Development of industrial heat recovery systems.
- Advanced solutions for cogeneration and trigeneration.
- Optimization of thermal storage for peak load management.
- Integration of innovative storage technologies to enhance grid stability.

Client ROI: Reduced demand charges and improved energy resilience for critical operations.

7.6. R&D in Renewable Energies

- Next-generation PV panels with higher efficiency and durability.
- Innovative solar thermal systems for industrial and residential heat.
- Enhanced wind turbine designs for low-wind-speed areas.
- Hybrid renewable systems (solar + wind + hydro) to maximize energy yield.
- Advanced biomass and bioenergy solutions for waste valorization.
- Mini-hydro innovations to boost performance of small-scale plants.
- Smart energy management algorithms for seamless renewable-grid integration.
- Marketing edge: Position your projects at the forefront of the clean tech revolution.

Marketing edge: Position your projects at the forefront of the **clean tech revolution**.

7.7. R&D in Low-Temperature Geothermal Systems

- Improved performance of geothermal heat pumps.
- Optimization of ground loops and heat exchangers.
- Advanced materials for enhanced thermal conductivity.
- Integration of geothermal with hybrid energy systems.
- Simulation of thermal transfers for optimized design.
- Application in commercial, industrial, and residential buildings.

Result: 30–70% reduction in heating and cooling costs compared to traditional systems.

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7.8. R&D in High-Temperature and Deep Geothermal Energy

- Development and optimization of **Enhanced Geothermal Systems (EGS)**.
- Innovative drilling techniques to reduce CAPEX and increase ROI.
- Geological studies of Québec and Canada to identify prime geothermal zones.
- Smart-grid compatible geothermal power plants.
- Environmental assessments and long-term thermal storage opportunities.
- Integration of deep geothermal with low-carbon district heating systems.

Strategic value: A stable 24/7 renewable energy source, independent of weather, ideal for large-scale industrial and municipal projects.

7.9. Collaboration with Universities and Research Centers

- Co-development projects with universities and innovation hubs.
- Participation in research consortia on energy efficiency and renewables.
- Joint development of emerging technologies with academic partners.
- Supervision of applied research for industry-ready solutions.
- Access to state-of-the-art test labs and validation platforms.
- Technology transfer and support for industrial-scale deployment.

Marketing hook: Gain a competitive edge by leveraging academic research **directly into** industrial innovation**.**

Why Choose ENVIRO-EXPERTS R&D Services?

- Advanced technical expertise in energy efficiency, renewables, and process engineering.
- End-to-end support, from concept to industrial implementation.

- Strong partnerships with universities and research centers for validated solutions.
- Access to funding through grants, tax credits, and government incentives.
- Commitment to carbon neutrality and leadership in the energy transition.

Contact us today to explore how our R&D expertise can turn your innovative ideas into high-performance, market-ready solutions.