

DEPARTMENT OF ENERGY ENGINEERING

**Integrated engineering services for energy performance,
decarbonization and energy innovation**

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Document objective

Clearly present the full range of services offered by the Department of Energy Engineering, organized around two commercial service lines:

- ☐ high-performance buildings; and
- ☐ - industrial energy performance.

Director of the Department of Energy Engineering

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1. Positioning of the Department of Energy Engineering

Enviro-Experts supports owners, managers, developers, institutions and industrial companies in improving energy performance, reducing operating costs, decarbonizing assets and identifying applicable financial incentives.

Mission

Support our clients toward measurable, durable and profitable energy performance by combining engineering, innovation, technical rigor and a practical understanding of operational realities.

Two complementary service lines

Service line	Target clients	Main objective
High-performance buildings	Multiresidential, commercial and institutional buildings, developers and property managers	Reduce costs, improve comfort, decarbonize systems and support certifications or financing.
Industrial energy performance	Plants, processes, warehouses, manufacturing facilities and industrial sites	Optimize processes and utilities, reduce energy use and GHG emissions, improve productivity and help finance projects.

2. Our support approach

Integrated approach

Step	Objective	Expected result
1. Initial diagnostic	Understand the building, process, energy uses and operating constraints.	Clear scope and prioritized issues.
2. Energy and technical analysis	Quantify consumption, losses, GHG emissions and relevant measures.	Energy balance and identified measures.
3. Techno-economic analysis	Compare scenarios based on costs, savings, risks, incentives and payback.	Structured investment decision.
4. Financing file	Prepare calculations, supporting documentation and financial assistance applications.	Credible and admissible file.
5. Implementation and support	Support teams, suppliers and decision-makers during implementation.	Measures deployed with quality control.
6. Monitoring and continuous improvement	Measure results, detect drifts and maintain gains.	Verified and sustained savings.

3. Energy performance and decarbonization of buildings

This service line is intended for owners, managers and developers of multiresidential, commercial and institutional buildings. It covers audits, energy modeling, HVAC, decarbonization, renewables, energy monitoring, certifications, commissioning, advanced controls, incentives and innovation.

Synthesis of building services

Service	What we do	Client benefit
Audits and diagnostics	Analyze energy uses and prioritize measures.	Reduced costs and access to incentives.
Modeling and APH Select / CMHC	Performance scenarios and simulation.	Stronger decisions and financing files.
HVAC, ventilation and DHW	Optimization, modernization and comfort.	Savings, comfort and reliability.
Decarbonization and greenhouse gases (GHG)	Carbon assessment, conversion and electrification.	Clear transition pathway.
Renewables and storage	Solar, geothermal, storage and microgrids.	Resilience and carbon reduction.
Energy monitoring	Submetering, EnPI/EPI, M&V and drift detection.	Savings maintained.
ISO 50001	EnMS, energy review and documentation.	Structured continuous improvement.
Benchmarking and disclosure	ENERGY STAR, LEED, BOMA BEST and compliance.	Demonstrated performance and asset value.
Cx / RCx	Commissioning and functional optimization.	Corrected gaps and reliable systems.
BMS/BAS, AI, IoT	Automation, trend analysis and predictive maintenance.	Smart operation.
Incentives and analyses	Eligibility, ROI and files.	Lower net cost and faster decision.
Energy R&D	Prototypes, tests and validation.	Advanced and fundable solutions.

3.1. Energy audits and diagnostics - ASHRAE I, II and III

Assess a building's energy uses in order to identify the most relevant measures and prioritize investments.

What we do	Client benefits	Typical deliverables
• Analyze utility bills, consumption profiles and energy uses • Visit facilities and identify the main savings opportunities • Conduct technical and financial evaluation of energy efficiency measures	• Measurable reduction of operating costs • Clear prioritization of work • Credible technical file for management and incentive programs	• Audit report • Prioritized list of measures • Savings, CAPEX, payback and avoided GHG emissions

3.2. Energy modeling, simulation, APH Select / CMHC and applicable code compliance

Model the energy performance of new or existing buildings to compare scenarios, demonstrate expected gains, support financing files and verify compliance with applicable energy requirements.

What we do	Client benefits	Typical deliverables
• Energy modeling with eQUEST, HOT2000, RETScreen or other applicable tools, depending on the building type and target program • Evaluate envelope, HVAC, DHW, ventilation, lighting, controls and energy system scenarios • Compare reference and proposed buildings, when required	• Better-informed design decisions • Quantitative proof of energy gains • Stronger preparation of financing files	• Energy models • Simulation reports • Performance scenarios • Energy compliance analysis

What we do	Client benefits	Typical deliverables
• Verify compliance with applicable energy requirements: NECB, ASHRAE 90.1, Québec Construction Code or program-specific requirements • Support APH Select files for Canada Mortgage and Housing Corporation (CMHC), when applicable	• Reduced risk of energy non-compliance • Clear comparison of technical options before investment	• Comparative results: reference building / proposed building • Technical data for APH Select / CMHC or other applicable programs

3.3. HVAC, ventilation and DHW system performance

Optimize heating, ventilation and air conditioning (HVAC) systems, as well as domestic hot water (DHW), to improve comfort and reduce costs.

What we do	Client benefits	Typical deliverables
• Diagnose equipment, networks, sequences and setpoints • Optimize schedules, flows, temperatures and control strategies • Modernization and targeted replacement recommendations	• Improved comfort and indoor air quality • Reduced consumption • Increased equipment reliability	• Technical findings • Corrective measures • Modernization plan

3.4. Decarbonization and GHG reduction

Build an emissions reduction pathway by combining energy efficiency, fuel switching and electrification.

What we do	Client benefits	Typical deliverables
• Carbon assessment and identification of emission sources • Analysis of conversion, electrification and heat recovery measures • Decarbonization roadmap by priority and feasibility	• Reduced direct and indirect emissions • Better preparation for ESG requirements • Investments aligned with climate objectives	• GHG assessment • Roadmap • Reduction scenarios

3.5. Renewable energy, storage and microgrids

Evaluate the integration of renewable and storage solutions adapted to buildings and energy sites.

What we do	Client benefits	Typical deliverables
• Solar, geothermal, biomass, storage or microgrid studies • Grid connection, self-consumption and load profile analysis • Technical, financial and environmental evaluation	• Reduced energy dependence • Progressive decarbonization • Increased resilience of facilities	• Feasibility study • Production analysis • Payback and integration scenarios

3.6. Energy monitoring and continuous improvement

Implement indicators and dashboards to monitor results, detect drifts and maintain savings.

What we do	Client benefits	Typical deliverables
• Submetering, data collection and energy performance indicators (EnPI/EPI) • Dashboards, alerts and periodic reports • Measurement and verification (M&V) of savings using IPMVP good practices	• Savings maintained over time • Drifts detected quickly • Data-based decisions	• Dashboard • Periodic reports • Corrective action plan

3.7. Energy management system - ISO 50001

Structure energy performance within a continuous approach integrated into management practices.

What we do	Client benefits	Typical deliverables
• Maturity diagnostic and energy review • Definition of roles, indicators, baselines and action plans • Documentation, training and certification support	• Continuous improvement of energy performance • Team engagement • Increased credibility with clients and lenders	• Energy review • EnMS procedures • ISO 50001 implementation plan

3.8. Benchmarking, certifications and energy disclosure

Compare asset performance, prepare energy disclosures and support certification processes.

What we do	Client benefits	Typical deliverables
• Benchmarking with ENERGY STAR Portfolio Manager or equivalent tool	• Better visibility of performance	• Performance sheets
• Support for LEED, BOMA BEST and other certification pathways	• Reduced risk of non-compliance	• Compliance reports
• Data compilation and preparation of energy disclosures	• Enhanced real estate asset value	• Supporting documentation

3.9. Commissioning and retro-commissioning

Verify, optimize and restore system performance so systems operate in accordance with owner requirements.

What we do	Client benefits	Typical deliverables
• Commissioning of new buildings and major renovations	• More reliable and efficient systems	• Cx/RCx plan
• Retro-commissioning of existing buildings	• Improved comfort	• Deficiency log
• Functional testing, trends, adjustments and correction of deficiencies	• Reduced waste and complaints	• Performance report

3.10. BMS / BAS, AI, IoT and advanced controls

Optimize systems in real time using building management systems (BMS), building automation systems (BAS), sensors, artificial intelligence (AI), the Internet of Things (IoT) and trend analysis.

What we do	Client benefits	Typical deliverables
• Analyze BMS/BAS sequences and operating trends • Anomaly detection, AI, IoT and predictive maintenance • Optimize setpoints, schedules and control strategies	• Reduced consumption and demand peaks • Increased team responsiveness • More stable equipment operation	• Trend analysis • Optimized sequences • Operational dashboards

3.11. Incentives, feasibility and techno-economic analyses

Evaluate project eligibility and structure technical and financial files to support investment decisions.

What we do	Client benefits	Typical deliverables
• Analyze applicable programs • Calculate savings, GHG emissions, CAPEX, OPEX and payback • Prepare documents required for financial assistance applications	• Reduced net cost • Improved ROI • Stronger file for management and lenders	• Eligibility analysis • Technical file • Project financial table

3.12. Energy R&D and innovation

Develop, test and validate advanced solutions adapted to buildings and energy systems.

What we do	Client benefits	Typical deliverables
• Prototyping and testing of energy solutions	• Reduced technological risks	• Test protocol
• Collaboration with suppliers, universities and research centers	• Structured and fundable innovation	• Validation report
• Performance validation before implementation	• Competitive advantage	• Innovation file

4. Industrial energy performance

This service line is intended for industrial and manufacturing companies seeking to reduce energy costs, optimize processes, recover waste heat, reduce GHG emissions, improve reliability and finance efficiency or innovation projects.

Synthesis of industrial services

Service	What we do	Client benefit
Industrial audits	Diagnostic of processes, utilities and energy uses.	Prioritized action plan.
Process optimization	Settings, sequences and operating parameters.	Real operational gains.
Energy integration and recovery	Thermal sources and needs, waste heat.	Recovered energy and reduced GHG emissions.
Decarbonization and electrification	GHG assessments, conversion and roadmap.	Structured transition.
Industrial refrigeration	Compressors, defrosting, pressures and rejected heat.	Useful cooling at lower cost.

Service	What we do	Client benefit
Energy monitoring	Dashboards, EnPI/EPI, M&V.	Gains maintained.
ISO 50001	EnMS, roles, indicators and procedures.	Durable energy culture.
Reporting and compliance	Data, GHG, reports and verification.	Reduced non-compliance risk.
Automation and control	BAS, PLC, SCADA, sensors and sequences.	Equipment controlled according to actual needs.
Techno-economic analyses	CAPEX, OPEX, ROI/payback, GHG and risks.	Reliable investment decisions.
Incentives	Programs, eligibility and files.	Reduced net cost.
Industrial R&D	Pilot tests, prototypes and innovation.	Adapted and validated solutions.

4.1. Industrial energy audits - ASHRAE I, II and III

Diagnose industrial energy uses, processes and utilities to identify savings, risks and priority measures.

What we do	Client benefits	Typical deliverables
- Analyze bills, processes, utilities and operating profiles - Technical visits, targeted measurements and energy balances - Quantification of savings, GHG emissions, costs and investment priorities	- Better-supported investment decisions - Reduced energy losses - Prioritized and measurable action plan	- Audit report - End-use balance - Measures, CAPEX, payback and potential incentives

4.2. Energy optimization of processes

Improve operating parameters, operating sequences and process stability to reduce energy consumption, losses and variability without compromising production or quality.

Statistical Process Control - SPC - helps track process stability, detect drifts using control charts and reduce losses, rework and scrap before nonconformities occur.

What we do	Client benefits	Typical deliverables
• Analyze temperatures, pressures, flows, speeds and cycles • Adjust setpoints, automation and control sequences • Factory testing and validation of gains • Analyze process variability, drifts and capability using control charts, trends and statistical indicators, when applicable	• Productivity and quality maintained or improved • Lower losses, scrap and variability • Concrete operational savings • More stable processes, better-controlled quality and reduced rework or scrap	• Optimization plan • Revised parameters • Measured results • Control charts, drift analysis and process stability report

4.3. Energy integration and heat recovery

Recover and use available thermal flows to reduce heating, cooling or steam requirements.

What we do	Client benefits	Typical deliverables
• Map thermal sources and needs • Analyze steam, condensate, hot water, flue gases and exhaust air • Study heat exchangers, recovery loops, heat pumps and storage	• Reduced fuel use and GHG emissions • Better use of energy already paid for • Lower loads on boilers and cooling systems	• Thermal balance • Integration diagrams • Techno-economic analysis

4.4. Decarbonization and electrification

Reduce GHG emissions by combining efficiency, heat recovery and conversion to lower-carbon solutions.

What we do	Client benefits	Typical deliverables
• GHG assessments and identification of emission sources	• Reduced dependence on fossil fuels	• GHG assessment
• Conversion studies: industrial heat pumps, electric boilers and electrified processes	• Structured carbon pathway	• Conversion scenarios
• Transition roadmaps and analysis of electrical constraints	• Better preparation for client and ESG requirements	• Roadmap

4.5. Industrial refrigeration

Produce the required cooling with less energy, greater reliability and better control of process conditions.

What we do	Client benefits	Typical deliverables
• Analyze compressors, evaporators, condensers and defrosting	• Reduced electricity consumption	• Refrigeration diagnostic
• Optimize pressures, sequences and capacity modulation	• More stable temperatures	• Optimization measures
• Recover and reuse rejected heat	• Improved process reliability and quality	• Heat recovery plan

4.6. Energy monitoring and continuous improvement

Measure, analyze and correct drifts to maintain industrial energy savings over time.

What we do	Client benefits	Typical deliverables
• Submetering, energy performance indicators (EnPI/EPI) and baselines	• Sustained savings	• Dashboard
• Dashboards and drift alerts	• Drifts detected quickly	• M&V reports
• Measurement and verification of gains after implementation	• Performance evidence for management and incentive programs	• Continuous improvement plan

4.7. Energy management system - ISO 50001

Transform energy monitoring into a structured, documented management system focused on continuous improvement.

What we do	Client benefits	Typical deliverables
• Energy review, significant energy uses (SEUs), energy performance indicators (EnPI/EPI) and baselines	• Durable energy culture	• Energy review
• Objectives, targets, roles, responsibilities and procedures	• Continuous improvement of results	• ISO 50001 documentation
• Training, documentation and certification preparation	• Increased credibility with clients, lenders and programs	• Implementation plan

4.8. Energy reporting and compliance

Prepare, validate and present energy and environmental data required by authorities, clients, lenders or programs.

What we do	Client benefits	Typical deliverables
• Applicability analysis and applicable requirements	• Reliable and traceable data	• Compliance file
• Compilation and validation of energy and GHG data	• Reduced risk of non-compliance	• GHG calculations
• Preparation of reports, forms and supporting documents	• Files ready for verification or submission	• Supporting documentation

4.9. Automation and advanced control

Optimize equipment operation in real time using sensors, automation, building automation systems (BAS), programmable logic controllers (PLC), supervisory control and data acquisition (SCADA) systems, and energy dashboards.

What we do	Client benefits	Typical deliverables
• Analyze sequences, sensors, alarms and measurement points • Optimize starts, stops, modulation and control loops • Support BAS, PLC, SCADA and dashboard integration • Integrate drift indicators, statistical alarms and control charts into dashboards or SCADA systems, when applicable	• Operation at the right speed and at the right time • Reduced demand peaks and consumption • More stable and less manual processes	• Optimized sequences • List of measurement points • Dashboards / SCADA

4.10. Techno-economic analyses

Compare technical solutions based on savings, costs, risks, GHG emissions and profitability.

What we do	Client benefits	Typical deliverables
• CAPEX, OPEX, avoided costs, service life and technical risks	• Better-justified investments	• Comparative table
• Scenario comparison and life-cycle analysis, when relevant	• Prioritization of the most profitable measures	• Financial analysis
• Integration of potential grants and incentives	• Clear decision for management and banks	• Investment recommendation

4.11. Grants and financial incentives

Identify applicable programs and structure applications to reduce net investment and accelerate decisions.

What we do	Client benefits	Typical deliverables
• Program screening and eligibility analysis	• Reduced net cost	• Eligibility matrix
• Required energy and GHG savings calculations	• Improved profitability	• Submission file
• Preparation of technical files and exchanges with program administrators	• Complete and credible files	• Application follow-up

4.12. Industrial R&D and innovation

Develop, test and validate innovative solutions to improve processes, reduce energy use and accelerate industrial transition.

What we do	Client benefits	Typical deliverables
• Design pilot tests, prototypes and demonstrations • Instrumentation, measurements and performance validation • Technical support for innovation and funding files • Statistical validation of pilot tests and process performance, including analysis of variability and repeatability of results	• Reduced risks before full implementation • Solutions adapted to plant reality • Measured data to decide and convince	• Test protocol • Validation report • R&D / innovation file

5. Grants, financial incentives and programs to verify

Program criteria, amounts, dates and terms may change. Each project must be reviewed for eligibility before any financial assistance is promised or any firm estimate is provided. The links below are official verification points.

Main programs to review

Program	Generally supported	Relevant services	Official link
Hydro-Québec - Solutions efficaces	Electrical efficiency and demand-management projects for businesses.	Buildings, industry, controls, refrigeration, processes and efficient equipment.	Verify
Hydro-Québec - Energy Analysis	Financial support to complete an energy analysis and prioritize measures.	Audits, techno-economic analyses and demand management.	Verify
Hydro-Québec - Energy Management System	Structuring electricity consumption data to support management and day-to-day actions.	Energy monitoring, ISO 50001, energy information systems and dashboards.	Verify
Énergir - Business Energy Efficiency	Energy efficiency programs for business clients and large companies.	Studies, implementation, boilers, heat recovery and energy management.	Verify
Énergir - Studies and Implementation	Support for implementation of energy efficiency measures related to natural gas.	Heat recovery, thermal processes, heating, steam and energy monitoring.	Verify
Québec - ÉcoPerformance	Financial assistance for energy efficiency, energy conversion and GHG reduction.	Decarbonization, electrification, conversion, heat recovery and processes.	Verify
Québec - Technoclimat	Technology demonstration in energy and GHG emission reduction.	R&D, industrial innovation, clean technologies and pilot projects.	Verify

Program	Generally supported	Relevant services	Official link
NRCan - Green Industrial Facilities and Manufacturing Program	Financial assistance for industrial energy efficiency and energy management projects.	Industry, audits, ISO 50001, optimization and decarbonization.	Verify
NRC IRAP	Advice and funding for Canadian SMEs developing innovative technologies or services.	R&D, innovation, automation and clean technologies.	Verify
SR&ED - CRA	Tax incentives for scientific research and experimental development carried out in Canada.	R&D, testing, prototypes and experimental development.	Verify

6. Correspondence between services and potential programs

Summary matrix

Service	Potential programs to verify
Energy audits	Hydro-Québec Energy Analysis, Hydro-Québec Solutions efficaces, Énergir, ÉcoPerformance, NRCan GIFMP
Process optimization	Hydro-Québec Solutions efficaces, Énergir, ÉcoPerformance, NRCan GIFMP, sometimes Technoclimat / NRC IRAP
Heat recovery	Énergir, ÉcoPerformance, Hydro-Québec Solutions efficaces, NRCan GIFMP
Decarbonization / electrification	ÉcoPerformance, Hydro-Québec Solutions efficaces, NRCan GIFMP, Technoclimat depending on innovation
Industrial refrigeration	Hydro-Québec Solutions efficaces, ÉcoPerformance depending on GHG impacts, NRCan GIFMP
Energy monitoring / ISO 50001	Hydro-Québec Energy Management System, ÉcoPerformance energy management, NRCan GIFMP
Automation and advanced control	Hydro-Québec Solutions efficaces, demand management options, ÉcoPerformance, NRCan GIFMP
Techno-economic analyses	May be supported when linked to an eligible energy analysis
Grants and financial incentives	Cross-functional support service
R&D / innovation	Technoclimat, NRC IRAP, SR&ED, Hydro-Québec technology demonstration depending on project

7. Typical deliverables and service delivery modes

Possible deliverables

Category	Examples of deliverables
Diagnostics and audits	Audit report, energy balance, inventory of energy uses and prioritized measures.
Calculations and analyses	Savings in kWh, GJ or m ³ , avoided costs, GHG emissions, CAPEX, OPEX, payback period and net present value (NPV), as required.
Modeling	eQUEST / HOT2000 / RETScreen models or equivalents, scenarios and results.
Energy monitoring	Dashboards, energy performance indicators (EnPI/EPI), baselines, periodic reports and alerts.
Incentives	Eligibility analysis, forms, supporting documentation, calculations and application follow-up.
Implementation	Technical support to teams, suppliers, tendering processes and compliance validation.
M&V	Measurement and verification plan, tracking of gains and before/after comparison.
R&D / innovation	Test protocols, instrumentation, performance validation and innovation file.

Service delivery modes

Mode	When to use it	Added value
One-time mandate	Audit, feasibility study or incentive analysis.	Fast response to a specific need.
Project support	Design, financing, implementation and commissioning.	Technical continuity from diagnostic to execution.
Recurring monitoring	Dashboards, ISO 50001, M&V and continuous improvement.	Maintains savings and corrects drifts.
Strategic support	Decarbonization roadmap or energy master plan.	Prioritized view of medium- and long-term investments.

8. Technical profile and professional credibility

The department is led by:

Dr. Joël M. ZINSALO, ing., P.Eng., M.Sc.A., CMVP®, Ph.D.

Director of the Department of Energy Engineering - Enviro-Experts Génie-Conseil

- Engineer, member of the Ordre des ingénieurs du Québec - OIQ.
- Professional Engineer - P.Eng., licensed with Professional Engineers Ontario - PEO.
- CMVP® - Certified Measurement & Verification Professional.
- Member of the Association of Energy Engineers (AEE).
- ASHRAE Full Member.
- Expertise in energy efficiency, HVAC, refrigeration, energy modeling, measurement and verification (M&V), ISO 50001, decarbonization, energy integration, industrial processes and energy R&D.
- Commercial positioning: Enviro-Experts acts as a technical partner to transform energy challenges into measurable, financeable and implementable projects.

9. Contact information and call to action

For an energy project, the recommended first step is a technical scoping discussion to identify the building or process type, objectives, constraints, potential programs and data required to launch the analysis.

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