CANADIAN
Consulting Engineering
AWARDS

CATEGORY A. Buildings

HVAC for New Ambulatory Care Centre at Pierre Boucher Hospital in Longueuil, Quebec

2011

PROJECT ENTRY

DESSAU

Section 1

Project Highlights

DESSAU

HVAC for new Ambulatory Care Centre at Pierre-Boucher Hospital

Dessau was mandated to design new HVAC systems (heating, ventilation, and air conditioning) for a vital rehabilitation and expansion project at the Pierre-Boucher Hospital, which is the largest health care facility on Montreal's South Shore. The project involved a 100,000 ft^2 expansion and a 90,000 ft^2 rehabilitation of the existing hospital. Aside from designing integrated HVAC systems in a sensitive occupied environment, Dessau's challenge was to significantly reduce the hospital's energy consumption.

Originality and Innovation

Dessau's designers knew that they needed to undertake a creative integrated design approach since hospitals are one of the heaviest energy consumers among Canadian buildings. One reason for their high energy consumption is the significant rate of outside air, ventilation and filtration that they require to ensure air quality and comfort in accordance with applicable codes and standards. Another reason is their use of medical equipment and high-density lighting systems that require a lot of energy and increase cooling loads. Simulation models for a number of proposed design options were prepared using EE4 and DOE2.1e simulation software. This specialized software takes into account weather data, building envelope parameters and complex building HVAC system interactions that are almost impossible to estimate by way of traditional methods. By analyzing the building's behaviour on an hourly basis, designers were able to determine the most energy-efficient and cost-effective HVAC system. These simulation models helped the designers interweave a combination of **original technologies so efficient that no new heating equipment was necessary despite the 100,000 ft^2 expansion of the hospital**.

Rather than add or replace boilers to meet the expanded building's increased heating loads, an efficient heat recovery system was installed. One of the notable features of this system involves an innovative piece of equipment, known as a direct-contact condensing stack economizer, which recovers heat from boiler combustion gases that would normally be evacuated from the building through a chimney. This novel recovery system **boosts the existing boilers' global efficiency from 83 % to 92%**, providing an additional 3,000 MBH (880 kW) of heating capacity. Other original HVAC techniques include a **recovery chiller** that transfers excess heat from the center of the building to the heating coils in the ventilation systems, as well as **enthalpy wheels**, which recover heat and humidity typically lost in exhaust air.

The combination of HVAC rehabilitation, expansion and integration work provided the design team with an excellent opportunity to integrate widespread novel energy efficiency measures, which were successfully implemented and resulted in a **30% reduction in energy consumption**.

Revit MEP software was used to design 3D models of all mechanical rooms. These detailed designs provided unparalleled clarity prior to any site work being undertaken and helped avoid additional delays and costs due to worksite adjustments and potential construction conflicts.

Since its completion, the Pierre-Boucher Hospital project has garnered significant attention in industry circles, particularly after it was awarded 1st place at the 2011 ASHRAE Technology Awards in the "Health Care Facilities" Category. The ASHRAE Technology Awards are North America's foremost distinction "*in recognition of outstanding achievement in the design and operation of energy-efficient buildings*".

Complexity

Dessau had to map out a series of **complex intervention techniques** in order to **maintain functional services at the 340-bed hospital during all construction work**, especially in terms of the renovation of the existing hospital wing, which houses an operating block, laboratories, a sterilization center and an intensive care unit. At no point during the 30-month renovation could any of the upgrade work interfere with the above-mentioned hospital operations. Balancing these elements in such a critical environment represented the main project challenge, as extensive upgrade work was required to bring the existing building in line with today's more demanding codes and standards.

Rigorous confinement and protection measures to fight contamination were also a major challenge as negative and positive pressures between working and occupied areas were maintained at all times to avoid dust and debris contamination in sterilized locations. The construction and installation of temporary ventilation ducts, as well as the relocation of existing services, had to be carefully planned and coordinated throughout the project. The ''Guide to Indoor Air Quality in Quebec Hospitals'', published by the Quebec Ministry of Health, was used for one of the first times during the course of this major project. The section titled "Measures and Procedures for the Prevention and Control of Airborne Contamination in Hospital Environments" has now become a world-renowned reference document.

Adding to the complexity of the project was the need for seamless coordination between various professional disciplines—architectural, mechanical, electrical, structural & civil, and specialized medical equipment personnel—not to mention the sheer **logistics of moving all the medical equipment**. Given the scope of engineering works carried out by Dessau, many construction work packages were necessary in order to guarantee the successful completion of the project. A total of **104 multidisciplinary drawings in A0 format (large size) had to be created**, detailing systems that included heating, ventilation, air conditioning, plumbing, medical gases, automation, refrigeration and pneumatic transport.

Environmental Impact

Dessau stood out by offering integrated solutions underpinned by high-performance **energy efficiency and sustainable development principles,** selecting designs based on a **Life Cycle Cost approach**. According to results obtained through Natural Resource Canada's CBIP screening tool, an **energy consumption reduction of 5,257,200 kWh_{eq} (corresponding to 30%)** was achieved. This reduction equals the consumption of **over 325 cars** or **225 single family residences** during an entire year. The efficient **HVAC design also reduces greenhouse gas emissions by 1,152 tons/year**, while the direct-contact condensing stack economizer helps reduce atmospheric pollution from boiler combustion gases. Also, the reuse of the existing building and its structural components greatly reduced the amount of waste produced, as well as energy and resources consumed.

Social and Economic Benefits

The enhanced energy performance of these innovative electromechanical systems generated savings of **$210,000 a year on energy bills** and also qualified the project for major **federal and provincial financial incentives totalling more than $250,000**. The energy efficient equipment savings resulted in a **net payback period of 3.6 years**. In addition to greatly reducing energy consumption and associated costs, the new HVAC designs also improved comfort levels throughout the building by way of dual duct systems, which provide greater temperature control by supplying each room according to its needs via mixing boxes.

By achieving its primary objective of upgrading the quality of services offered, the project also helped greatly improve the quality of life within the building, for hospital employees, users and visitors alike.

Client Satisfaction

In the process of designing this modern hospital, Dessau distinguished itself by offering its client integrated solutions that incorporated energy efficiency and sustainable development principles while being cost efficient and feasible. Deadlines were strictly met thanks to an accelerated work schedule and construction budgets were respected through rigorous daily follow-ups.

Client needs were not only met but clearly exceeded, as the project helped enhance comfort in the existing area of the hospital without incurring additional costs. The Pierre-Boucher Hospital can now efficiently serve the needs of a growing population on Montreal's South Shore with enhanced comfort at a minimal cost. Pierre-Boucher Hospital management expressed its satisfaction by calling on Dessau's services for subsequent mandates.

Full Project Description

DESSAU

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1 PROJECT PRESENTATION

Located in the City of Longueuil on Montreal's South Shore, the Pierre-Boucher Hospital has been providing health care services for over 25 years. Over this span, the hospital has earned a solid reputation for the quality and effectiveness of its services and overall practices.

Pierre-Boucher Hospital

As a result of a significant increase in ambulatory service needs at the hospital, the Quebec Ministry of Health decided to expand the facility by over 100,000 ft^2 to incorporate a new hospital wing featuring an operating block and laboratories. The Pierre-Boucher Hospital administration also used this opportunity to reorganize over 90,000 ft^2 of the existing hospital.

The design team was mandated to rehabilitate and expand the building while meeting stringent sustainable development and energy efficiency criteria.

2 ORIGINALITY AND INNOVATION

2.1 INNOVATIVE DESIGN METHOD

Hospitals are one of the heaviest energy consumers among Canadian buildings. One reason for their high energy consumption is the significant rate of outside air, ventilation and filtration that they require to ensure air quality and comfort in line with applicable codes and standards. Another reason is their frequent use of medical equipment and high-density lighting systems that require a lot of energy and, as a result, increase cooling loads. Despite harsh winters, most Canadian hospitals experience year-round internal cooling loads. Furthermore, extreme winter and summer temperatures in the Montreal region render energy management even more complicated.

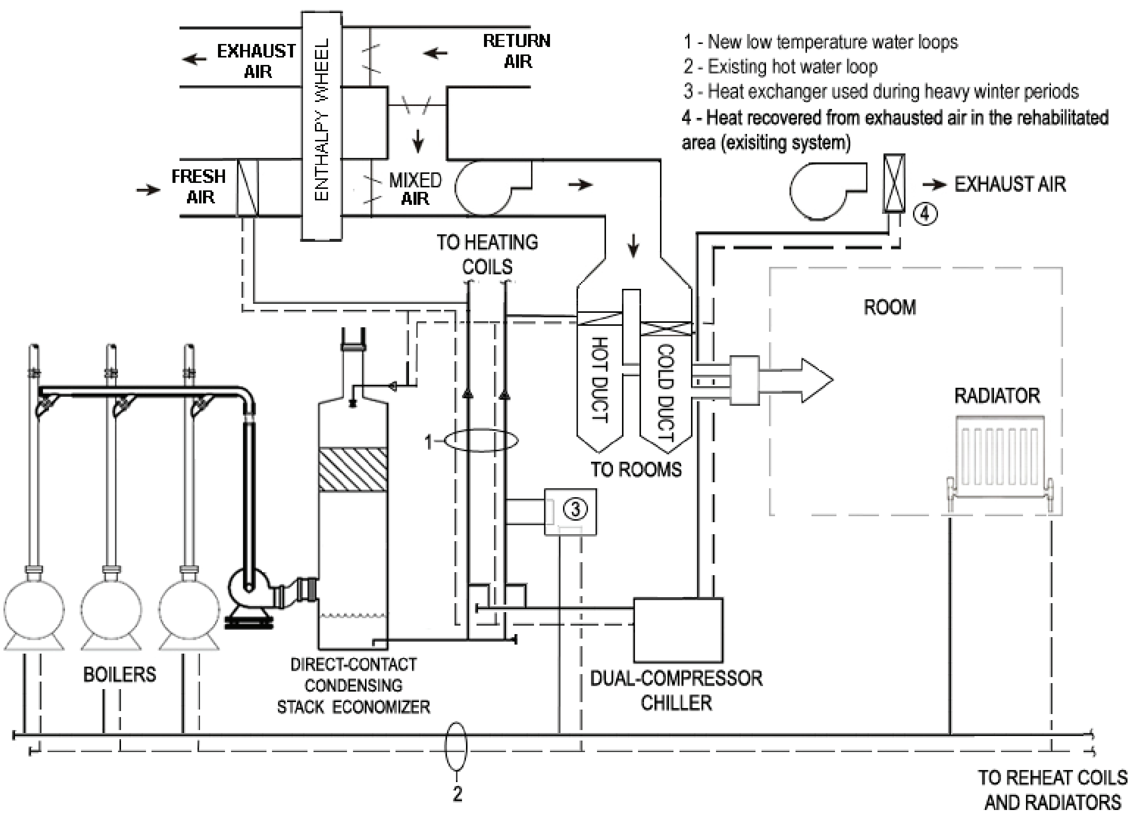
In light of the project's challenges, Dessau's designers knew that they needed to undertake a creative integrated design approach and decided to create two distinct models for the proposed project. The first model was a reference building; a typical construction with architectural and electromechanical systems built in accordance with Canada's Model National Energy Code for Buildings (MNECB). The second model was the proposed building, which was tested against building-specific needs and a host of foreseeable scenarios, some of which are described below. Energy simulation models were carried out with EE4 and DOE2.1e simulation software. EE4 is an analysis program created by the Canadian government, powered by DOE2.1e. Although essential for designing energy efficient buildings, energy simulation software is still rarely used in Quebec.

The software simultaneously takes into account weather data (temperature, humidity, wind, solar radiation, etc.), building envelope parameters (thermal resistance of walls, roof, windows, etc.) and complex building HVAC system interactions that are almost impossible to estimate using traditional calculation methods. By analyzing the building's hourly energy use, designers were able to establish what type of HVAC system would be most energy efficient and cost effective. Data provided by the building simulations also proved to be essential for designing and sizing the HVAC equipment.

Simulation models helped the designers effectively interweave a combination of original HVAC technologies that proved to be so efficient that no new heating equipment was necessary despite the 100,000 ft^2 building expansion.

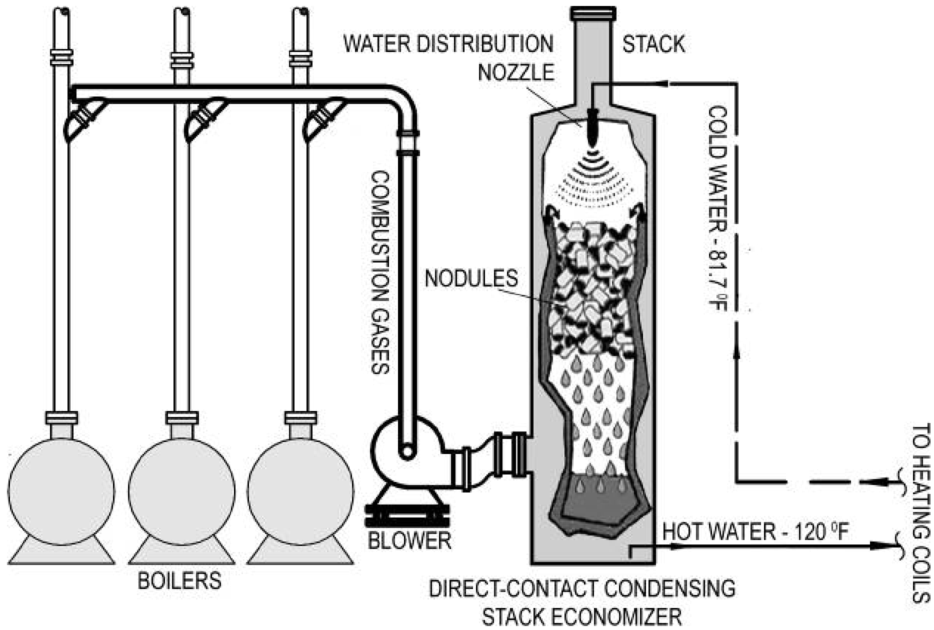
2.2 A UNIQUE HVAC DESIGN

Rather than add or replace boilers to meet the expanded building's increased heating loads, an efficient heat recovery system was installed (see diagram below). A direct-contact condensing stack economizer was added to the three existing 300 BHP (2,943 kW) natural gas steam boilers. The direct-contact economizer recovers heat from boiler combustion gases that would normally be evacuated from the building, increasing the boiler's global efficiency from 83 % to 92 % and providing an additional 3,000 MBH (879 kW) of heating capacity.



Pierre-Boucher Hospital HVAC Diagram

The extremely high efficiency of the direct-contact economizer is due to a rather simple operating principle: water comes into direct contact with combustion gases. This innovative equipment is basically a vertical cylindrical reservoir, with one section that consists of a "transfer zone" filled with stainless steel nodules (see diagram below). Cold water is sprayed from above while combustion gases are injected from below. As it falls, the water extracts energy from the rising hot gases.



Direct-Contact Condensing Stack Economizer

The stainless steel nodules slow the water's descent and disperse the flow in order to increase the water's contact surface area and facilitate energy transfer. Maximum energy is extracted from the combustion gases before their release into the atmosphere. The direct-contact condensing stack economizer installed at the Pierre-Boucher Hospital operates with an average energy efficiency of 92%. As indicated in the adjoining table, the instantaneous efficiency can increase up to 95% when the return temperature of the heating system reaches 85°F.

Outdoor temp. (°F)	Supply water temp. (°F)	Return water temp (°F)	Instant efficiency
40	90	84.5	95.0 %
20	102	96	93.0 %
0	114	106.5	91.5 %
-20	127	118	90.0 %

Furthermore, a new dual-compressor centrifugal chiller (225 tons and an EER of 13.6) was added to help cool the expanded area. Traditionally, chillers reject heat outside by means of air condensers or cooling towers. However, in this case, rejected heat on the condenser side is reinjected into a low-temperature heating loop. As explained earlier, hospitals have significant internal cooling loads throughout the year. Nonetheless, heating is still required for building

Recovery Chiller

outskirts and fresh air ventilation. The dual-compressor centrifugal chiller basically transfers excess heat from the center of the building to heating coils in the ventilation system, where it is needed.

Low-temperature water loops were installed to supply the new dual-duct heating coils and fresh air preheating coils. Because of their low temperature, the loops can be preheated with energy recovered from the boiler combustion gases, as well as heat rejected from the new chiller. As a last resort, during heavy winter periods, the low-temperature heating loop can be heated directly by the boilers via a steam-to-water heat exchanger.


Enthalpy Wheel

Enthalpy wheels were also installed on the new ventilation units. These wheels recover latent and sensible heat that is usually lost in exhaust air. With an efficiency rate of 70%, these wheels help reduce annual heating, cooling and humidity demands. Particular wheels were selected in order to limit air velocity to 600 ft/min, thus enhancing heat exchange. In order to prevent frost from forming on the wheels, glycol preheating coils were installed. Enthalpy wheels are programmed to work when outdoor temperatures drop below 50˚F or rise above 77˚F.

Increased Efficiency through an Integrated HVAC Approach

It should be noted that reorganizing an existing HVAC system to meet new needs is never a simple task. By visualizing building systems as interrelated, rather than separate components, Dessau's engineers created an integrated design which led to increased efficiency. For example, the design team had to address the issue of how an enthalpy wheel would work alongside a dual-duct ventilation system. Standard practices disable the enthalpy wheel when mixed air temperature meets the cold duct temperature set point. The main idea is that preheating air that is about to be mechanically cooled is wasteful. However, this is not the case when a dual-compressor chiller is used to recover energy extracted from the cold duct to supply heat to a low-temperature water loop. By letting the enthalpy wheel recover as much air, heat and humidity as possible, these loads are significantly reduced (on the hot duct side), while "extra" cooling (on the cold duct side) is simultaneously providing heat with a COP of 4.0 to the system. Once again, energy simulation models helped find innovative energy strategies to assure maximum efficiency.


Water Pumps

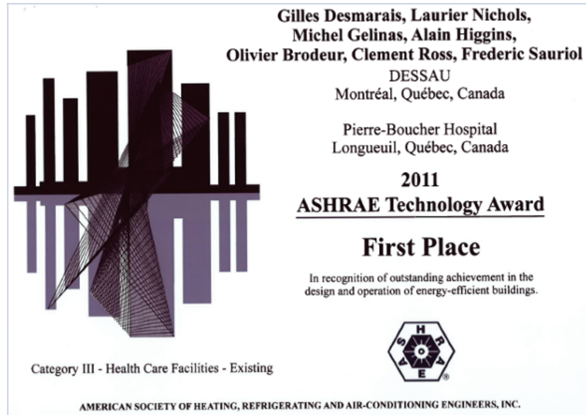
Pumps

The water pumps are equipped with variable frequency drives in order to modulate motor speed and water flow depending on the actual load, generating additional energy savings.

2.3 RESULTS

Energy simulations were later validated by comparing them to the building's actual energy consumption, based on the hospital's natural gas and electricity bills received since the project was finalized in 2009. Variations between the simulation models and the actual building were found to be no higher than 2.4%.

The unique HVAC design installed at the Pierre-Boucher hospital reduces energy consumption by 30% compared to a standard similar building, consequently saving over $210,000 a year on energy bills. When including government subsidies, the return on investment for energy-saving equipment is only 3.5 years.



Gilles Desmarais, Laurier Nichols, Michel Gelinas, Alain Higgins, Olivier Brodeur, Clement Ross, Frederic Sauriol
DESSAU
Montréal, Québec, Canada

Pierre-Boucher Hospital
Longueuil, Québec, Canada

2011
ASHRAE Technology Award

First Place

In recognition of outstanding achievement in the design and operation of energy-efficient buildings.

Category III - Health Care Facilities - Existing

AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS, INC.

The remarkable results generated by this project have garnered significant attention in industry circles, particularly after it was awarded **1st place at the 2011 ASHRAE Technology Awards** in the "Health Care Facilities" Category. The award is bestowed by the **American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE)**, an international scientific organization renowned for its publications of standards and guidelines, which are referenced in many building construction codes across the world. The ASHRAE Technology Awards represent North America's foremost distinction "*in recognition of outstanding achievement in the design and operation of energy-efficient buildings*". A lengthy feature article on the project was published in the March 2011 edition of the *ASHRAE Journal*, a prestigious industry publication.

ASHRAE'S BEST

FIRST PLACE: HEALTH CARE FACILITIES, EXISTING

Heating pumps equipped with variable frequency drives that modulate motor speed and water flow depending on load.

HOSPITAL RETROFIT

By Gilles Desmarais, eng., Member ASHRAE

Due to a significant growth in ambulatory service needs, Montreal's Pierre-Boucher Hospital required a 100,000 ft^2 (9290 m^2) expansion including a new hospital wing, an operation block and laboratories. During the planning, it also was decided to reorganize more than 90,000 ft^2 (8361 m^2) of the existing hospital. Designers created efficient HVAC systems that reduce energy consumption by roughly 30% for the new expansion area and 10% for the rehabilitated portion of the hospital.

These energy savings translate into a yearly reduction of 1,152 tons of greenhouse gases and generate $210,000 annual savings on energy bills. The overrun costs generated by energy-efficient equipment are essentially a sound investment as they result in a net payback period of 3.6 years, when considering available subsidies.

An evaluation of the heating, cooling and humidification loads was completed for the new extension and renovated portion of the existing building. Initially, the loads were calculated empirically or using methods such as the bin method. These calculations were confirmed using simulation software. Energy simulations allow designers to validate calculations and outlining of hourly cooling and heating loads, as well as coincident loads associated with the building's morphology.

About the Author

Gilles Desmarais, eng., is director of expertise, Dessau, Montreal.

32 ASHRAE Journal ashrae.org March 2011

As a whole, the original design approach guided designers towards a unique combination of unconventional technologies that collectively generate substantial savings. This type of efficient HVAC system could easily be applied to similar projects. Many outdated hospitals in Quebec need major rehabilitation work and, hopefully, the Pierre-Boucher Hospital will serve as a flagship project for similar initiatives in the future.

3 COMPLEXITY

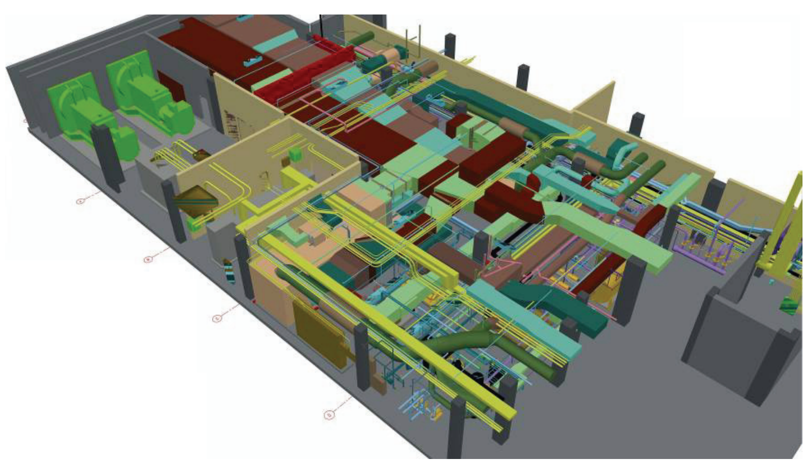
3.1 WORKS CARRIED OUT IN AN OCCUPIED BUILDING

Dessau had to map out a series of **complex intervention techniques** in order to **maintain functional services at the 340-bed hospital during all construction work**, especially in terms of the 90,000 ft^2 renovation of the existing hospital wing, which houses an operating block, laboratories, a sterilization center, as well as an intensive care unit. At no point during the 30-month renovation could any of the upgrade work interfere with the above-mentioned hospital operations. Balancing these elements in such a critical environment represented the main project challenge, as extensive upgrade work was required to bring the existing building in line with today's more demanding codes and standards.

Rigorous confinement and protection measures to fight contamination were also a major challenge as negative and positive pressures between working and occupied areas were maintained at all times to avoid dust and debris contamination in sterilized locations. The construction and installation of temporary ventilation ducts, as well as the relocation of existing services, had to be carefully planned and coordinated throughout the project. The ''Guide to Indoor Air Quality in Quebec Hospitals'', published by the Quebec Ministry of Health, was used for one of the first times during the course of this major project. In fact, Dessau's professionals contributed to the preparation of many of the guide's standards. The section titled "Measures and Procedures for the Prevention and Control of Airborne Contamination in Hospital Environments" has now become a world-renowned reference document.

Adding to the complexity of the project was the need for seamless coordination between various professional disciplines—including civil, structural, electrical, mechanical and architectural, as well as specialized medical equipment personnel—not to mention the sheer **logistics involved in moving all the medical equipment**.

Furthermore, Revit MEP software was used to **design 3D models of all mechanical rooms.** These detailed designs provided unparalleled clarity prior to any site work being undertaken and **helped avoid additional delays and costs** due to worksite adjustments and potential construction conflicts. The design team developed **detailed sets of parametrization subroutines to adapt 3D models for printing purposes**. These time-saving tools are especially valuable when printing 2D drawings for subcontractors and preparing conventional tender documents based on 3D models.



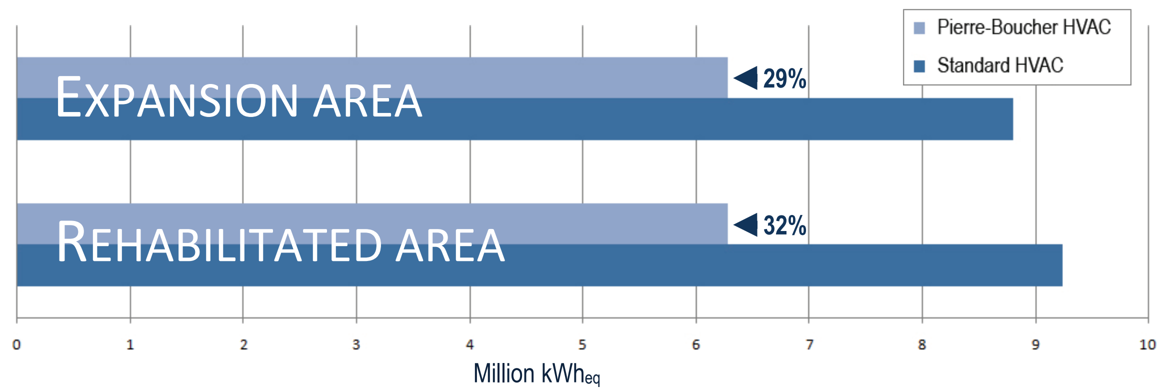
3D Mechanical Design

Given the scope of engineering works carried out by Dessau, many construction work packages were necessary in order to guarantee the successful completion of the project. A total of **104 multidisciplinary drawings in A0 format (large size) had to be created**. These drawings included elements related to heating, ventilation, air conditioning, plumbing, medical gases, automation, refrigeration and pneumatic transport.

4 ENVIRONMENTAL IMPACT

4.1 CONSERVING ENERGY

Pierre-Boucher's innovative and efficient HVAC design helps global efforts for energy conservation by significantly reducing energy use. When compared to an equivalent hospital built with standard HVAC systems, the efficient design reduce energy consumption by about 30% (see graph, below). **The 5,000,000 kWh$_{eq}$ reduction is equivalent to the consumption of over 325 cars during one year or 225 single family residences.**



4.2 BUILDING ENVELOPPE

The reuse of the existing building and its structural components also provided an important environmental benefit. Despite the large number of constraints, designers pushed for the reuse of the building envelope, which greatly reduced the amount of waste produced, as well as energy and resources consumed. Special attention was also devoted to the expansion area envelope's thermal resistance and window transfer coefficient in order to further help reduce energy waste as much as possible. The adjoining table compares the expansion area envelope's thermal resistance and window transfer coefficient to standard practices.

ENVELOPE	PIERRE-BOUCHER HOSPITAL	ASHRAE STANDARD 90.1	IMPROVEMENT (%)
Roof	R-35	R-19	46
Walls	R-25	R-13 + R-3.8 ci	48
Fenestration	U-0.37	U-0.57	33

4.3 REDUCING EMISSIONS

The efficient design reduces yearly natural gas consumption by 64% for the expansion area and by around 40% for the rehabilitated area of the hospital. **The significant natural gas reduction contributes to reducing greenhouse gas emissions by 1,152 tons/year** and the direct contact economizer also helps reduce atmospheric pollution from boiler combustion gases.

5 SOCIAL AND ECONOMIC BENEFITS

5.1 REDUCING ENERGY COSTS

The energy savings achieved by the Pierre-Boucher Hospital are shown in the table below:

	ENERGY CONSUMPTION (KWH_{EQ})		YEARLY SAVINGS		
	Standard Design	Pierre-Boucher Hospital Design	Energy	%	Financial
New Hospital Expansion	8,799,300	6,283,182	2,516,118	29 %	$98,700
Existing Hospital Rehabilitated Area	8,565,881	5,824,799	2,741,082	32 %	$100,780
Total Consumption	**17,365,181**	**12,107,981**	**5,257,200**	**30 %**	**$209,480**

This innovative energy-efficient project received **$252,784** in subsidies from provincial utility providers (electricity and natural gas), as well as Natural Resources Canada under the *Commercial Building Incentive Program* (CBIP) and *Energy Innovators Initiative* (EII).

The mechanical design generates **yearly savings of approximately $210,000**. Project construction costs totalled $41 million, of which $1,000,000 was dedicated to energy-efficient systems. **The energy-efficient equipment savings resulted in a net payback period of 3.5 years.**

5.2 REDUCING OPERATION AND MAINTENANCE COSTS

Thanks to the direct-contact economizer, the Pierre-Boucher design team maximized the capacity of the existing boiler room and avoided the installation of extra heating equipment despite a 100,000 ft^2 expansion area. By steering clear of an extra boiler, equipment maintenance is simplified and operation costs are reduced. Since the direct-contact economizer is a low-pressure apparatus, it does not require constant monitoring from the plant operator, which additionally reduces operation costs.

5.3 THERMAL COMFORT

Dual duct systems are renowned for providing greater individual comfort and temperature control by supplying each room according to its needs via mixing boxes. They are ideal in hospitals that have many different types of rooms with varying requirements. However these systems are typically greedy energy consumers, since one must heat and cool air separately. By making use of an efficient thermal transfer method powered by heat recovery chillers in the mechanical room, Dessau's designers managed to secure the comfort and precision of a dual duct system without the excessive energy consumption. Thus, in addition to saving energy, the innovative Pierre-Boucher HVAC design also improved individual comfort compared to a standard HVAC system.

6 MEETING CLIENT'S NEEDS

Dessau's team made sure that **deadlines were strictly met** thanks to an accelerated work schedule that was respected through careful work planning, attention to detail and close monitoring. In order to control the construction budget, close daily follow-ups were carried out by the Dessau project manager. All engineering costs were maintained at ±7% of the estimated budgets.

The Pierre-Boucher Hospital's innovative HVAC systems generate energy savings in the neighbourhood of $210,000 a year for the client, notwithstanding the fact that these savings are likely to grow in light of rising energy costs.

However, the client not only benefited financially from the efficient systems. Today, the Quebec Health Ministry standards for fresh air requirements are far more extensive than those in place when the Pierre-Boucher Hospital was first built. Therefore, the expansion work was perceived as an opportunity to install bigger ventilation units that would supply the expansion building, as well as parts of the existing building. It is interesting to note that system improvements were efficient enough to bring about a significant 17,700 CFM increase of fresh air in the existing area without any additional energy costs. In fact, in spite of increased fresh air rates, energy savings were still achieved for the existing area. Humidifiers were also added to boost relative humidity to the now required minimum of 30% throughout the hospital. **Client needs were not only met but clearly exceeded, as the project helped enhance comfort in the old existing area of the hospital without extra energy costs.**

The Pierre-Boucher Hospital administration shared Dessau's pride when the project was awarded 1st place in the category of ''Existing Health Care Facilities'' at the 2011 ASHRAE Technology Awards. But the greatest source of satisfaction for Dessau's client is that the Pierre-Boucher Hospital can now efficiently serve the needs of the area's growing population, with enhanced comfort at a minimal cost.

6.1 CLIENT REFERENCE LETTER

A letter addressed to Dessau from the hospital's Technical Services Director attests to the client's satisfaction and is included at the following page.

Centre de santé et de services sociaux
Pierre-Boucher

Édifice Du Tremblay
1215, chemin Du Tremblay
☐ bureau 220 ☐ bureau 310 ☐ bureau 320
Longueuil (Québec) J4N 1R4

Téléphone : 450 468-8111
www.santemonteregie.qc.ca/cssspierreboucher

Le 18 avril 2011

Monsieur Frédéric Sauriol, ing.
Dessau
375, boulevard Roland-Therrien
Bureau 400
Longueuil (Québec) J4H 4A6

Objet : Lettre d'appui de candidature
Prix canadiens du génie-conseil 2011
Systèmes CVCA du nouveau Centre ambulatoire
de l'Hôpital Pierre-Boucher

Monsieur,

Par la présente, la direction des services techniques du CSSS Pierre-Boucher désire appuyer la candidature de Dessau aux Prix canadiens du génie-conseil 2011 concernant la réalisation des systèmes CVCA du nouveau Centre ambulatoire de l'hôpital Pierre-Boucher. Votre concepteur principal, M. Gilles Desmarais, ingénieur, votre équipe de concepteurs ainsi que le personnel de surveillance de chantier ont été des éléments déterminants du succès de ce projet complexe en milieu hospitalier.

Nous désirons également souligner l'esprit d'innovation dont votre équipe de professionnels a fait preuve en concevant des systèmes CVCA très performants en termes de consommation énergétique qui ont permis de réaliser d'importants investissements supplémentaires autofinançables.

Veuillez agréer, Monsieur, l'expression de nos meilleurs sentiments.

La directrice des services techniques,

Nathalie Chauvin

N° de projet :

	VÉRIFICATION	PARAPHE	CLASSEMENT
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