

Transforming a building's purpose and uncovering crucial energy cost savings

How finding the right balance is key to retro-commissioning a heating, ventilation, and air conditioning (HVAC) system.



The Story

When a leading defence technology company found out why utility bills were so high at its large Canadian headquarters, it was a watershed moment. The objective reasons, along with proposed solutions, were in reports from an audit and engineering assessment the company commissioned. The revelations brought the company to a critical inflection point – either carry on with the inefficient operation of its building or make the tough choices that would transform the structure's energy efficiency and invigorate the organization's balance sheet.

The company's move to the 120,000+ square foot facility was a milestone that staff and stakeholders celebrated. The building seemed to perfectly meet the growing company's manufacturing and office space needs. It had previously been occupied by a high-tech manufacturing company with specific needs for features like clean rooms, and the plan was to re-purpose the vast space to a different kind of manufacturing. The plan was put in motion, and new life for the company in its re-purposed building began with abundant promise.





At first, the issues were imperceptible, like air itself. Then there were troubling signs that led to the recognition that too much energy was being consumed, resulting in high utility bills.

It was one thing to comprehend that the situation was costing the company a substantial amount of money; it was another to understand what was causing it and how to solve the problem. The company needed help from an energy solutions vendor and chose a local company with experience and a focus on bringing impartiality without pre-existing bias.

The first priority: conducting the audit and engineering assessment. This involved doing a full inventory of heating, cooling, ventilation, and lighting systems in the building and asking essential questions – how much were they used and how were they controlled? In life, maintaining balance is vital. The same holds true for a building, so engineers also asked what was the ideal balance between energy consumed and the company's specific use of the facility, and where was there potential for significant energy savings?

The reports told the story. The building was over-engineered and not fit for its current purpose. As a result, too much air was coming in, which needed to be both heated and cooled through sizeable energy consumption. The recommended solution: a retro-commissioning of the building's heating, ventilation, and air conditioning (HVAC) systems. It would precisely align these systems with the company's use and achieve the fine balance that had been so elusive.

The company's property managers absorbed the reports' findings and weighed their options. They could continue with the status quo, but doing so meant losing money that was greatly needed to invest in research and development. Or they could embrace the hard work of restoring the building's energy balance, which had its risks. The managers had to present a strong business case to executives for making the capital investment. The company was also leasing the building from owners who were wary of changing the building on this scale and had to be convinced of the project's merits. Finally, it was imperative that the company's operations were uninterrupted throughout the retro-commissioning.

Facing such immense challenges, the company looked for assurance that if it was going to put its credibility on the line at so many levels, there would be a solid return. It came in the form of a promise: with an agreement from the company to implement at least the major recommendations from the audit and engineering assessment, the energy solutions partner committed to delivering the retro-commissioning and achieving full payback of the capital investment in energy and cost savings. In less than a year.

The company launched the six-month project and systematically met each challenge.

To assist the property managers with crafting a compelling business case, the partner company ran financial models and provided requested financing that wasn't used in the end because of the size and quick timing of the payback. To enable manufacturing to continue during the project, the work was done on a space-by-space basis, with transparent communication between the partners about logistics.



There were anxious moments. At one point key personnel involved with the project left the company. It was a reality of the industry, but to offset their departure, the energy solutions partner increased its role.

Then there was the fact that the work involved shutting down some air handling units and retrofitting others, modifying ventilation pathways, and other measures right at the heart of the facility. The building owner was understandably concerned about whether the modifications would alter the structural DNA and limit use for future tenants with different requirements. The project partners listened and responded accordingly by preserving the ability to ramp up system capacity.

As a project like this proceeds and ends, there's no hiding from the numbers. Utility bills would unequivocally reveal whether the vision and implementation were sound and impactful. They did exactly that. The retro-commissioning solely enabled annual electricity savings of more than \$200,000 and annual natural gas savings of about \$70,000. As for the company's investment in the project, complete payback happened in six months – in real-time with the work.

In the longer term, the project gave the company a sense of control over its energy consumption along with the reassuring certainty of receiving predictable and reasonable utility bills.

The stellar results happened for clear reasons. The company honestly faced up to the issues and made difficult decisions to painstakingly get to the root of them. The story unfolded not long before the COVID-19 pandemic, a time when many organizations are re-purposing facilities and grappling with similar pain points. As this company's experience showed, belief and resolve go a long way in empowering a new purpose.



Do you need help determining whether your building automation and mechanical systems are still delivering energy efficiency and cost savings as designed? Do you need help maximizing comfort and air quality for occupants?

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