

Burlington's Ice Rink Energy Competition

May 9, 2014

Webinar Transcript





Landmark Designation

The program described in this case study was designated in 2013.

Designation as a Landmark (best practice) case study through our peer selection process recognizes programs and social marketing approaches considered to be among the most successful in the world. They are nominated both by our peer-selection panels and by Tools of Change staff, and are then scored by the selection panels based on impact, innovation, replicability and adaptability.

The panel that designated this program consisted of:

- Jon Connor, Federation of Canadian Municipalities
- Arien Korteland, BC Hydro
- Doug McKenzie-Mohr, McKenzie-Mohr Associates
- Edward Vine of Lawrence Berkeley National Laboratories

This transcript covers a webinar held on Friday, May 9, 2014. Additional materials about this program can be found at: <http://toolsofchange.com/en/case-studies/detail/672>.

Introduction by Jay Kassirer

I'm going to introduce our two speakers today, the first is David Taggart, Manager of Facility Assets at the City of Burlington. David joined the city in 2010, taking responsibility for energy management, as well as over 100 facility assets. He's an engineer with significant relevant experience, including designing, managing and improving energy efficiency at an Ontario university, a large Ontario consulting engineering firm and at Canada's largest airport. He is past president of the Plant Engineering and Maintenance Association of Canada, and in addition, he developed and manufactures the world's first high-efficiency condensing gas furnace.

He'll be joined today as well by Ahmed Azhari, the Coordinator for Energy Project management at the City of Burlington, where he's been since 2013, and where he works on sustainable design and energy management. Ahmed is a professional engineer in the Province of Ontario and he also has LEED (Leadership in Energy and Environmental Design) accreditation as an accredited LEED professional. Please join me in welcoming David and Ahmed. Over to you both.

Ahmed Azhart, Coordinator, Energy Project Management, City of Burlington, Ontario

Hello everyone. Thanks for joining us this afternoon to learn more about the Burlington Ice Rink Energy Competition. I'll start off with some background about the competition, and the process guide which was set in place to ensure successful delivery of the competition. We'll then look at the results and who was the award winner. Last, we'll share some lessons learned and take questions.

[Slide] A competition can inspire participants to reduce their operating costs and their environmental footprint by challenging them to improve their facility's energy efficiency.

Most importantly, an energy efficiency competition benefits all participants and sponsors by providing a source of momentum. Once participants see the financial benefit of their energy efficiency efforts, they are far more likely to continue making improvements, even after the competition has ended. Significant cost savings in energy use in most cases is the single largest controllable cost of operation. Reducing energy use can significantly improve any bottom line. Positive publicity and media exposure – launching an energy efficiency competition demonstrates innovation, a commitment to protecting the environment, and the responsible use of resources, all of which can generate positive publicity. Further in this presentation, you will see how this competition helped Burlington in media exposure and positive publicity.

Networking opportunities: participants benefit from the chance to share best practices and ideas for overcoming obstacles to improve energy efficiency. This exchange of information can help generate new ideas and working relationships. Training opportunities: prior to competition, participants usually receive training in best practices for energy management.

[Slide] Every competition needs a playing field. The first element of the playing field was to select a timeframe for the competition, which was chosen to be between February 1 and March 31, 2013.

The second playing field element was to come up with a standard normalized energy use intensity formula, which will define the basis of energy deduction for facilities. The formula looks at the equivalent kilowatt-hour for electricity and natural gas consumption, over the facility area time, and the operating hours for each facility [formula used = electricity + natural gas consumption / facility area (ft²) x facility operating hours].

[Slide] The third playing field element limits participation to arena buildings only. We had eight participating arenas in the City of Burlington, including Aldershot, Waterfront, Central, Mainway, Appleby, Skyway, Mountainside, and Milton.

I will pass it on to David now to take you through the process guide of this competition.

David Taggart, Manager of Facility Assets, City of Burlington, Ontario

[Slide] Thank you and good afternoon. We felt that 15% was a reasonable and achievable target to set [achieve 15% reduction in energy use intensity], given our estimates of what arenas could do if they just had more attention to detail and more focus on utility consumption.

We set up measurements, which, as you could see from the formula earlier, were based on utility data and adjusted by weather factors and use factors. We came to focus on specific and well-defined conditions. That formula provided it. The nice thing about that was that, if you noticed in the formula, any arena could win, as long as their percentage of improvement was the best.

It was a fair playing field. We also, of course, tried to make it timely and considerate. We had just completed an energy audit for all of our facilities, and there was a great list of opportunities that came out of that, and we were completing an energy management plan that had great distribution and focus. We also timed it well. We did training, and then immediately went into the competition, so they were able to put their learning to practice right away.

[Slide] We were able to dedicate resources to this. Mainly, it was a focus by our corporate energy coordinator to project manage and communicate and coordinate all the activities that were required, and to work with the other departments because our area, where we have our energy coordinator, is independent of and separate from the Parks and Recreation people who we were trying to influence and whose behavior we wanted to influence. We have no direct management requirements that we can put on them, and also, they have their own utility budgets independent of us. Truly, it had to be an influencing situation. We also involved a few others in our department.

In fact, two of us who have a background in this made ourselves available and cruised around and sat in on events, to add influence and show our level of interest. We also attended all the training sessions— there were five of them, and because of doing that we became really inculcated in the content. Then there was the financial aspect ... we were ready to pay for the training and various other basic expenses. Most of it turned out to be just our own staff time, which we would have put into something similar anyway.

[Slide] Fortunately, as you can see from the next slide, we were able to get involvement from Natural Resources Canada (NRCan), and the Ontario Power Authority (OPA), and Union Gas who contributed to it, and also to contribute content as in handouts and various other things to take away. Now, you will probably notice as we go through this, that we're calling this an energy competition, and certainly that was a focus for both electricity and natural gas, but for us, we consider the other utility (water) the equivalent of energy, and we focused on all three. By reducing consumption in those, we also moved towards reducing CO₂ emissions, and the overall impact of our utilities or our natural environment.

It was a win-win situation. It not only saved money, but it was good for the environment and it fit the city's strategic plan, as well as those of our resource contributors that pitched in with us. The Dollars to \$ense workshop that you can see there on the screen, is the training program that we selected, and contributed to the content of it so that it was made very specific to our city, to our buildings, and very relevant when the folks went through the training.

We also involved our city communications and reprographics to staff to help make signage, to advise and involve the public and the users. They also publicized this on our city website.

[Slide] Here's a typical example of one of the training sessions that was held at City Hall, a lunch and learn, and you can see the two trainers there up front, Garth White and Steve Dixon, who are the Dollars to \$ense trainers that we picked. We also involved local energy champions in various departments and areas to encourage attendance as we moved around into other areas of the city. We did a training road show at multiple sites over a number of days. [Slides] You can see a few pictures here. One of the sites is what we call Roads and Parks Maintenance, another was Appleby Arena. There were a total of five locations involved.

You get interest and involvement from folks when you come to their back yard and work with them locally and also when you provide the staff with ways they can save money for themselves personally. We showed them how they could save hundreds of dollars on their personal utility bills, and it's the same process and approach that would save money for us. We figured that if we could change the way they looked at things at home, they would bring that mindset to work, and vice versa.

[Slide] This chart was set up during one of the training sessions to outline the learning objectives. In other words, we said we're here to tell you certain things, but also to ask

what you want to learn from us, once again involving them in the process and helping to change their behavior and satisfy their desires and needs for this area.

[Slide] We dedicated resources to doing basic things like turning lights off; that's common sense. But managing utility-consuming equipment obviously is a strong focus. During training we visited each arena with our staff, to help set up the most applicable building automation systems, which would turn the lights off automatically and also control the arena refrigeration control system better.

There's a charge in our electrical bills termed "demand," which adds significant cost because of peaks that occur at certain times in the month. This is a bit of a difficult concept to understand, but we were able to train our operators in how that works in their world, and then how to change behaviors and the way they program equipment, in order to lower peak demand and also save money.

[Slide] Another basic thing is to keep the doors closed. We encouraged people to do these common sense things, like keeping the cold where it belongs (in the rinks), and keeping the heat out. As much as possible, we influenced not just our staff but also users and the general public to keep the cold inside the rink. "Don't leave that door open because it allows cold air to spill out, and requires the refrigeration system to work harder. When you're using the ice, keep the doors closed."

[Slide] There were other resources that were involved. These handouts, provided by our partners, were very useful in the trainings. When you give something to take away and they look at it, it reinforces the learning.

[Slide] We put up signs in the arenas, so that as the general public and rink users came in, they could see what was going on and get involved.

[Slide] This slide shows the details on one of those signs. The message focuses on what we're doing in the city. The point "ensuring heaters are off when not in use," refers to the typical little electric heaters that people put under their desk when they get a little cold. We'd rather they didn't do it, but it is okay with us. Our message was, "when you're not there or when you go away, turn it off please."

[Slide] We also asked those using the arenas to help us keep changing room doors closed, turn off the lights, and anything else they could do to contribute to our competition and help their arena win.

[Slide] We put up other encouragements, too. Here's a little sign we put about closing doors. In addition to that, some of the arenas had TV-type monitors where we showed these things on a rotating basis. [Slide] For example, "hot water costs a lot. Please help us by using less."

[Slide] We helped reduce potential barriers. The operators raised concerns during the training classes that this could be more work. However, we convinced them that it really

isn't more work - It's just behaving differently. We said, "Don't complain about this as if it's not in your job description. It really is. It's just a different way of doing the things in your job description." We have a union that's cooperative, but at first they weren't clear on what the benefits would be. We've been running arenas for a long time and we know how to make ice well. We don't deny that, but we think you can make it well and also save energy.

There were concerns that there would be user complaints if we changed the way we did business. However, we gave operators the autonomy to respond appropriately. We said, "We'll do these things, but if you get a lot of complaints or things aren't working, you can change them. You're in control of how we save energy."

There were also concerns how much the users and general public would get involved. We found that they supported our approach and modified their behaviors to help us.

[Slide] Now let's move on to some of the results. These are pretty impressive. For two months, we saved \$26,000 in our arenas and that doesn't include inflation year over year. Utility rates increase at something like 6%. Really, that figure of \$26,000 should be even bigger. These were excellent results.

[Slide] The overall energy was converted into equivalent kilowatts for gas and electricity, and we calculated an overall 9% savings in consumption.

[Slide] Continuing on to the water, there was a 24% decrease. That was a surprise for us. We didn't expect to achieve results like that. Because of the competition, folks went out and found a couple of undetected leaks that were in hidden areas and fixed them. They probably wouldn't have found them otherwise, so they've learned some things about what to look for.

[Slide] The savings in electricity and natural gas resulted in a 45 metric tonne reduction in greenhouse gas emissions; 20 of that was from gas and 25 from electricity. That's the equivalent of nine cars taken off the road for a year, from just a two-month competition. We were able to document those results well, and to extrapolate them over a yearly basis.

[Slide] The result is that we really did change people's energy consciousness and behavior, and have embedded a culture of conservation in their thinking and their behavior. They're familiar and comfortable with using the tools that they have, the controls and automation, to achieve results that did not sacrifice comfort levels. No sitting in the dark with your coats on to save energy.

There were no user complaints at all. None. That makes me think maybe we should have been a little more aggressive in our goals, to the point where we would get a few complaints. Because of a focus on all the equipment and much more learning on how it performs, our staff has also learned to better maintain the equipment and extend its life. And, because of this friendly competition that was in place, operators and staff continue,

beyond the competition to talk specific energy metrics among themselves on a regular basis.

[Slide] Now I'll speak to return on investment. The workshops cost overall \$25,900, but our friends at OPA, NRCan, and Union Gas covered most of that, so it only cost us \$600. For investing \$600 of our own, we generated 43 times more in savings. It would have been a two-month payback if we had spent all that money ourselves, and these arenas run seven months a year. Now that's enough from me. Let's turn it back over to Ahmed.

Ahmed Azhari

[Slide] The winning facility, Appleby Ice Centre, was recognized by a certificate of appreciation. We thought the certificate would give the competition more visibility. Appleby achieved an 18% reduction in energy, a 37% reduction in water consumption, and a \$16,500 reduction in total utility costs. Those are truly amazing results.

[Slide] This is a picture of our mayor, Rick Goldring, celebrating the success and achievement, and presenting the award to all arena staff. The presentation itself was made at Appleby.

[Slide] This is another picture of staff celebrating the win with the supervisor of arena operations, Mike Penwarden. Appleby Ice Centre has adopted many energy efficiency best practices, which helped them win the competition. The biggest contribution was from optimizing the ice surface temperature to suit the user requirements, making the ice not too soft and not too hard. Of course, turning unnecessary lights off has helped in energy reduction as well. In addition, the Zamboni hot water tank was only filled to the amount necessary for resurfacing, reducing water consumption and natural gas heating requirements. Finally, some energy saving came from adjusting the building automation system's set points and setbacks.

[Slide] As I mentioned at the beginning of this presentation, this energy competition has also helped us achieve media exposure and positive publicity. The City of Burlington won the 2013 Sustainable Communities Award, sponsored by OPA, Ontario Power Authority and Federation of Canadian Municipalities. This award recognized the City of Burlington for energy saving initiatives and promoting a culture of conservation throughout the community.

[Slide] The City of Burlington has also leveraged internal and external communication outlets to circulate information about the 2013 Sustainable Communities Award. For example, in our latest environmental and newsletter update *Take Action Burlington* we announced that we had won an award for our work on both the corporate and community energy plans. This picture was taken on January 13 of this year, where Andrew Pride, the vice president of OPA, attended the *Development and Infrastructure Committee* meeting to present the City of Burlington with the Community Conservation Award.

[Slide] I would like to leave you with a short video that was prepared by Ontario Power Authority and the City of Burlington in recognition of the 2013 Sustainable Communities Award.

[Video]

Ahmed Azhari

[Slide] I would like to share with you some of the lessons learned during this competition. First, we think that an energy competition like ours is truly the lowest cost approach to significant energy reduction. You saw in one of the slides how an investment of \$600 achieved utility cost savings of \$26,000. Changing the behavior of people and their attitude towards energy saving is by far the fastest and most efficient way to save energy. We also learned that it's vital to continuously update building operators with technical knowledge. This helps them stay ahead of the curve and makes it easier for them to accept and implement any energy efficiency programs.

I would like to thank you all for listening to the presentation. David and I are happy to take questions. Please feel free to contact any one of us, and if you wish to read more good stories about Burlington, simply visit Burlington.ca/environment.

Q&A

Q: Would a project like this be successful in arenas that don't have a building automation system (BAS) in place?

Ahmed Azhari: Absolutely. We believe this can still be achievable. Although controls would not be automated, they could still be optimized manually by facility staff, or by the facility operators. If facility staff can see how changes in their behavior affect equipment energy consumption, then this can truly be done without the need of the BAS. A BAS is just a tool that will help you achieve savings faster. But you can still achieve savings manually, by changing the behavior of those staff.

Q: Were any of these multi-use facilities, such as including pools and gyms and so on? Do you have any thoughts about doing a similar thing in those places?

David Taggart: A couple of them had multi-use capabilities, but it was more just community centers with auditoriums. There were none that had swimming pools connected. We'd love to have one of those someday so we could trade energy back and forth between them, but there are none built like that now. We do have plans in the future to have more competitions among similar buildings in other areas - for example, fire station competitions, community centre competitions, and swimming pool competitions. We'll be comparing similar buildings, and on the same sort of basis.

Q: Perhaps you could answer a question about the longer-term impacts of the competition. What have you noticed in terms of changes in attitudes, and also changes in energy use, once the competition was over?

Ahmed Azhari: The energy competition was geared to build momentum. Once participants saw the financial benefits of their energy efficiency efforts, they were far more likely to continue making improvements, even after the competition ended. In fact, we had many facility operators come to me proposing new energy efficiency measures in their facilities, which will help them stay on track and continue to reduce their utility costs. Overall, our facilities still see savings in utility reduction, through energy saving technology and through optimization in operation from staff themselves.

Also, at minimum, the City of Burlington holds an Earth Hour each year, which is an internationally accepted energy savings program, as a reminder to facility operators about energy efficiency and the importance of reducing their carbon footprint. On a regular basis, we hold technical workshops about new technologies we install in facilities to give operators a reasonable level of comfort when operating this equipment.

David Taggart: There's another piece we can add to that too, that you can see in the presentation. The mayor is involved; he went out and presented the award. Afterward, he was part of the video that we showed. In other words, from the top down in the organization, there's an interest in this, and in fact, the mayor and city council support us in these things. Not just morally; but they provide us with money and money talks. When folks see that by doing these things, you're not only making the boss happy, you get some rewards in funds, and you know, it's the old thing. You know, if all of a sudden the boss tells you that he likes golfing, all of a sudden, I like golfing a little bit myself too. It's a top-down thing, and they're very interested and supportive, and it encourages this throughout.

Q: So, you're noticing these changes in involvement and in attitude. But what's happening with the actual energy use at the facilities? Normally we would expect, with an incentive or a contest like this that when you apply it you'd get an immediate response and that then, when you take it away, there would be some return toward the level before. You hope it's not going to be all the way back to what it was before. What are you noticing with these facilities after the competition?

David Taggart: There has been some fall-off. We wish there weren't, but it hasn't been a huge fall-off. The fact that the folks regularly receive from us monthly statements as far as their energy consumption and comparative information as to where they were last year at the same time, and it comes up regularly in their monthly group meetings, department meetings, and the focus that's continued, and the fact that operators and management are regularly discussing energy as a typical topic, rather than just the Zamboni flat tire, it's become part of their culture, their language, and it's helping. In some cases, the light needs to keep on and focused. But we're happy with the results and the continuing results.

Q: Do the energy savings include a control for temperature differences? I'm talking about the weather and temperature changes from year to year, and if you're comparing to a baseline year that maybe was cold. Or let's say you have the savings that you looked at this year, how do you know it's from the program as compared to it being from a warmer year this year?

Ahmed Azhari: I mentioned this in the slide when we looked at the formula we use. The formula looks at weather-normalized data, based on the heating degree day. The baseline was 2012. And to 'hit two birds with one stone', I'll touch base on another question, how did we weather-normalize the consumption? It's a linear regression analysis, where the R^2 value was actually bigger than 0.75, which shows you that there is a pretty good correlation between the outdoor temperature and our electricity consumption. The procedure was adopted according to the International Performance Measurement and Verification Protocol.

David Taggart: Now how's that for a confusing answer? But dead on! Very technical, but it really proves that we had a way to do it, and it worked.

Q: Do you have an agreement with your finance department or treasurer to reallocate the utility savings that you get from these types of projects, to support additional energy retrofits and projects, like a reserve fund, or anything like that? Or does it all just go back into general revenue?

David Taggart: Good question. On that item, since it is a budget in the Parks and Recreation Department, they were able to provide benefits to those involved. There is not a formal process in place where savings are put into a reserve fund to generate more energy efficiency initiatives in the Parks and Recreation Group. In our group, the Corporate Strategic Initiatives Department, we do some of that, and we're trying to expand that into other areas. We're partially there in the organization, but not everywhere.

Q: You talked about the fact that you're in a union environment which is supportive. Can you talk a little bit more about constraints that may be there depending on the union environment and what additional approaches might be used to overcome any issues that might be there?

David Taggart: That's a good question that I'd also like to throw out for those others who are participating here, how they've been doing this in their worlds too. A lot of it involves, I think, a trust in recognition factors. The fact that we went out and sat with them during the training, participated together in discussions, and made ourselves available, cruised around the sites, came in and talked to them, got to know them by name and they got to know us by name, it was more that personal connection that helped, individual to individual. Then the other union things kind of fell by the wayside.... things like "this is changing my job description" or "this is going to be more work."

And the other one was, "what's in it for me?" "If I save you – as it turned out – \$26,000 am I getting a bonus or am I getting a raise?" We can't do those things in our world, but we found little ways to recognize what they had done, because recognition sometimes is as valuable as money to many people, and it's an encouragement and encourages behavior change. We found ways to give them little benefits in their own world, in little things in the shop or whatever else.

Q: Can you talk a little more about that? I'm sure people would be interested. What sort of incentives did you find are useful, that you can provide in an environment like yours?

David Taggart: That would really switch over a little bit more to the folks from Parks and Recreation, who did some things in their world, in their equipment. They went on and said, "You know what? This is good stuff. We're going to buy you more toys to play with, to improve energy efficiency." For one of our Zamboni machines that resurfaces the ice, they bought a laser control that makes the ice totally level and doesn't allow build-up of ice in certain areas, which is a common thing. The thicker the ice, the more energy is required to keep the surface temperature what you want; so this laser level control has been a neat toy that they can play with. It's only been used in one location. Now the other ones all want it and it's a bit of an incentive for them. It helps save energy too, and they're happy with it. And the ice conditions are better for the users on top of that. That's one example of the little things that were done. But that was done more by the departments themselves, who are committed to this just as much as we are in our corporate strategic initiatives group.

Q: Do you have standard operating procedures in place in the different arenas, or does each arena operator have a lot of autonomy to run things the way they want to?

David Taggart: It's a bit of both. We established standard operating procedures for set points and so on, for the ice and lighting controls and so on. But you have to recognize that each arena, each facility is different, and they've been built over a period of years and they don't all just function the same way. They have to have slightly different set points and conditions in order to achieve reasonable results. We've tried to go as much into standards as possible, but we've also allowed the supervisors and operators some autonomy, but not total autonomy.

It's the same sort of thing that we do in our buildings. All buildings with a building automation control have set points for each room that's controlled by the building automation system, but we allow local users a little bit of up and down, but not unlimited up and down. The same sort of thing as in the arenas.

Q: You've been talking about the behavior change program. Clearly the culture of the people that you're trying to influence is very important. Do you have any last advice on how to bring about a change and support a culture that is really conservation oriented, in an organization like yours?

David Taggart: Keep publicizing. Keep the focus on this from all levels of the organization. Make it a line item in someone's personal evaluation. Make it an agenda item on most meetings in your organization. Talk about energy in some way. Have presentations. Bring forth data on a regular basis, which we're doing. All the local buildings – not just arenas – every month receive information about their utility consumption that we create; we include comments and suggestions and recommendations every time. We keep it in front of people on a regular basis.

I like to use the analogy of – do you remember in the circus, there's the guy who goes out there and puts plates on a stick and gets them spinning. He puts more and more and more plates out there, and some of them begin to wobble, and begin to wobble. You have to keep going around and putting a little stir on things, to keep everything spinning reasonably well. Some of it is changing behavior and the culture, but you have to keep a focus on it all the time, with the support throughout the organization, top to bottom, as we talked about. The mayor and the council are heavily involved and interested and encouraging, both economically and in other ways.

Jay Kassirer: Thank you both, David, and Ahmed, for clearly presenting your well-executed program. I think many other people can apply similar approaches in their own municipalities.