

ISO 50001— From Implementation to Integration

*Andrew Cooper P. Eng, B. Comm., C.E.M., C.M.V.P.
Energy Specialist, New Afton Mine, New Gold, Inc.*

ABSTRACT

In March 2014, New Gold's New Afton Mine, located in British Columbia, Canada, became North America's first mine to be International Standardization Organization (ISO) 50001 certified. This was in addition to several energy performance improvement initiatives, optimizing an energy management information system and an ISO 50001 surveillance audit in November of the same year. These improvements made 2014 a remarkable year for energy management at New Afton mine. We then asked ourselves, "We that are ISO 50001 certified, what is next?"

To help answer this, the consultant who assisted the mine with the ISO 50001 implementation was asked his opinion about energy management at New Afton. He concluded that while energy management absolutely needed to continue to be driven and managed by the mine's energy specialist, the success of the program remained dependent on his actions. This was not the desired outcome, nor the understood intent of the standard. To ensure that the success of the program was not dependent on any one person, a "Phase II" plan was developed to more fully integrate energy management into the systems and culture of the organization. This article details the lessons learned and benefits realized from the integration of ISO 50001. It examines how to move from "Implementation to Integration."

INTRODUCTION

New Afton's vision for energy management states: "Energy management at New Afton is self-sustaining. It is what is done by all

employees on a day to day basis as part of what we do at New Gold. There is a high level of energy awareness at New Afton and everyone works to continually improve energy performance in everything they do. Energy matters at New Afton.” [1] This is stated in the mine’s Energy Policy. It is a fundamental goal that New Afton is trying to achieve with its energy management program. At the 2013 World Energy Engineering Congress (WEEC), just prior to our initial ISO 50001 certification audit, we were filled with hope, optimism and the trepidation of being the first mine in North America to be ISO 50001 certified. This management system model makes it easier for organizations to integrate energy management into their overall efforts, thus improving quality and environmental management.

Two years later, buoyed by the successes realized at New Afton, we are still filled with hope, optimism and in trepidation that we can continue to improve our energy performance and not lose our ISO 50001 certification due to inaction.

Dr. John C. Maxwell once said, “Success is not measured by what you’re leaving to, but by what you’re leaving behind.” This motivates me daily. It is the systems you establish which endure long after you leave, maintained by people you have developed which determines if your ISO 50001 implementation has been a successful and enduring initiative. I wonder... when I am no longer the energy specialist, will the ISO 50001 certification be maintained?

Most importantly, with a concerted team effort, focus and determination, an ISO 50001 compliant energy management system can be implemented and the results will prove valuable.

BACKGROUND

At the New Afton Mine from 2012 to 2014, we focused on implementing ISO 50001 by initially preparing for the certification audit and the surveillance audit. During the surveillance audit at the end of 2014, I felt like the circus performer spinning plates on sticks, carefully orchestrating the performance, but aware that that the plates might soon fall.

I talked with Lauri Gregg from LCG Energy Management Group in Ontario, Canada. Lauri had been our consultant for the implementation and requested that he assist during the surveillance audit. Lauri

had helped numerous companies successfully implement ISO 50001. He told me that ISO 50001 at New Afton was “Andrew’s thing” and that everyone was happy to offer support since he would ensure it happened. Ultimately, I was the only one accountable for ISO 50001 compliance, not the people who actually used the energy.

Lauri was absolutely correct. This started a self-realization process and initiating the move from “implementation to integration.”

LESSONS LEARNED

This realization was the segue to the first lesson learned. *Lesson #1: there is a big difference between implementation and integration.* The saying “If you want something done properly, you must do it yourself,” does not apply. If you want this done properly, you must do it together.

New Afton was fortunate to be in British Columbia, where BC Hydro, the local electrical utility, funded a full-time energy manager at the mine as part of their Power Smart program. This was a blessing as there was a funded position focused on the implementation and not sidetracked by production challenges. It was also a curse since the mine failed to utilize the energy team to their fullest potential for the implementation. The energy specialist was focused on the implementation and was making things happen.

Our energy team is comprised of members from each department including mining, human resources, milling, safety, maintenance and finance. This provided representation across the company. Each department had an important role. The energy team met regularly, but lacked clear direction and initiative for energy management. This began to change during our 2015 energy review workshop in March of that year. I mentioned to the workshop facilitator that while the energy team knew what ISO 50001 was about, they lacked understanding of its actual requirements. This was more on point than I then realized. This led to *Lesson #2: establish accountability by setting objectives.*

Based on the outcomes from our 2015 energy workshop, and working with managers and human resources, we have established plans for energy team members to achieve ISO 50001 compliance in their area and how goals would be objectively measured. During 2016, the energy team would be trained as to how to succeed in complying

with ISO 50001. Until recently, the energy specialist at New Afton was held accountable for managing energy performance. During one of those “eureka” moments, I realized that while I may be able to influence the employees using the energy, for there to be greater focus on energy performance improvements, the managers needed to be held accountable. The general manager needed to be accountable for the energy performance of the mine and the chief operations officer (COO) needed to be accountable for the energy performance of the company.

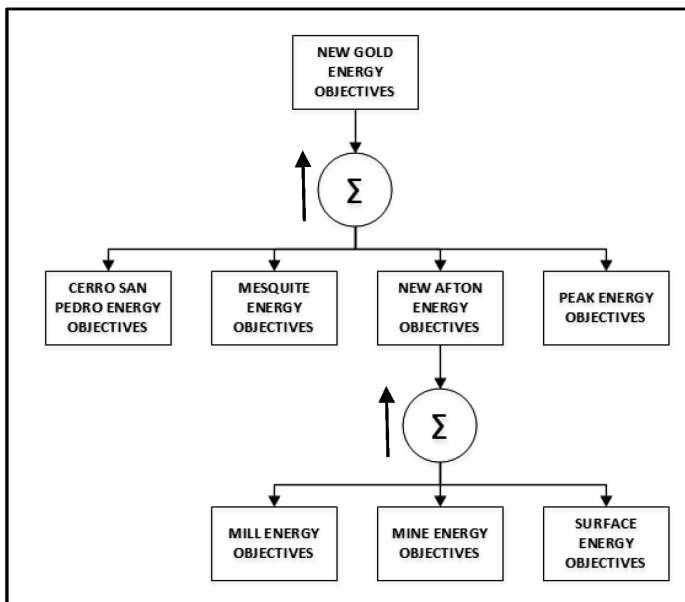


Figure 1. Energy objectives “cascading upward.”

I met with the mine’s general manager to inform him of my intentions and obtain his approval to establish greater accountability. He was very supportive, open to being accountable for the energy performance of the mine and open to having the managers accountable for the energy performance of their respective areas. Afterwards, energy objectives were included in the management team’s performance contracts. Management bonuses are partly dependent upon achieving energy objectives and there is greater focus on energy use.

The next step was a “Corporate Energy Management Assess-

ment” [2], a workshop performed with the corporate executive team to work on a corporate energy strategy based on the successes realized at New Afton. Key corporate personnel would be dedicated to a whole day’s effort, so the effort would need to be valuable, worthwhile and appealing to the executives. The focus was on the company’s energy expenditures and potential cash flow increases resulting from energy efficiency improvements. Other cited benefits included improved social responsibility and the reductions in greenhouse gas (GHG) emissions.

The ultimate goal was to have corporate support for an overall company energy performance objective with consistency across the various mines. An action plan to achieve this was developed. Energy objectives would “cascade upward” with the mine area objectives totaling to be the overall mine objectives and the sum of the various mine’s objectives totaling to be the company objective. A management by objectives (MBO) plan was established, but in reverse (Figure 1).

Our initial successes resulted from focusing our team efforts. The self-imposed deadline for ISO 50001 implementation was the point of focus which was lost after the initial certification. As time passed, there was another audit looming in the future. For us it was an ominous realization that we had lost focus on the “integration” of ISO 50001. *Lesson #3: focus on the plan.*

As a marathon runner, I know the importance of having an end point or goal in mind. Without it, you run daily with no real purpose. I call these “nothing runs” as they may help your fitness and manage weight, but they do little to improve your running style or endurance at speed. Applying this principle to my situation was the key to getting focused. The goal... successful integration of ISO 50001, with the 2015 surveillance audit and the 2016 re-certification audit being our measure of success.

BENEFITS REALIZED

While the lessons learned are among the benefits, the primary benefit is the cost savings achieved by implementing ISO 50001. The industry’s key question, “Would we have achieved these savings with a focused energy management effort and without ISO 50001?” One study identifies savings due to ISO 50001 and the Superior Energy

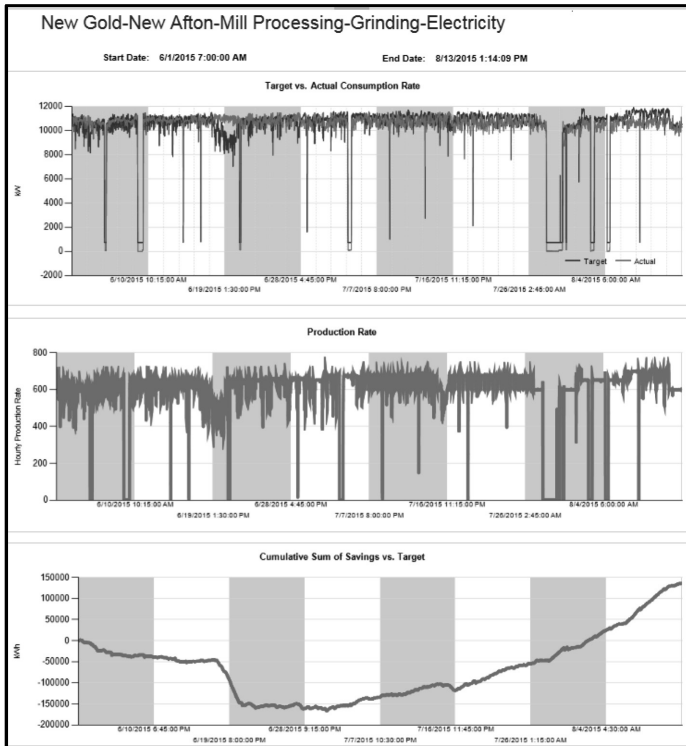


Figure 2. EMIS showing improvement in grinding energy performance.

Performance program at approximately 6% (3). Lacking a definitive answer, I will consider our energy performance improvement at New Afton mine.

During 2014, the first full year of ISO 50001 certification, the mine experienced varying successes with its energy management program.

Energy consumption increased from 2013 to 2014 (Figure 3) as expected as load was added (e.g., upgrading the surface ventilation supply fans) and there was an increase in the volume of ore processed by the mill.

However, GHG emissions decreased primarily as a result of reduced diesel consumption, our contribution to alleviating global warming (Figure 4).

Energy intensity (i.e., the energy used to mill a tonne of ore) was reduced by 11.4%, meaning the mine became more efficient and that was our ultimate goal (Figure 5). Our energy savings initiatives

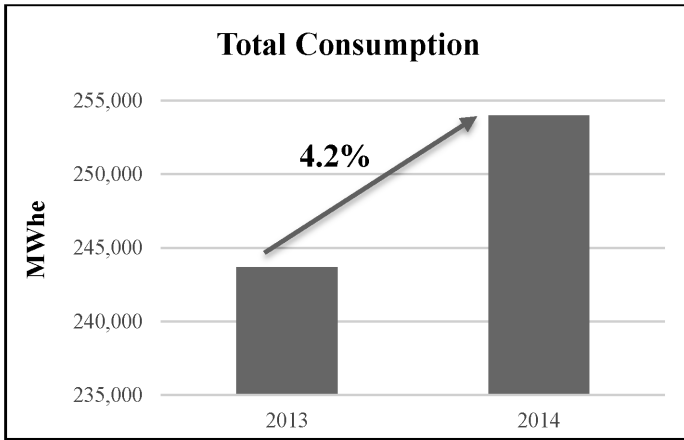


Figure 3. New Afton 2013 and 2014 energy consumption.

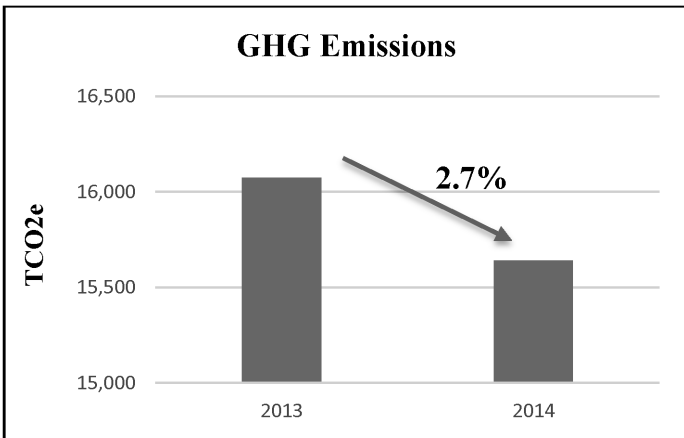


Figure 4. New Afton 2013 and 2014 greenhouse gas emissions.

contributed to this reduction. In addition, we exceeded our 2014 objective by more than 150%, avoided the generation of 250 tonnes of CO₂, and saved enough energy to supply 1,770 typical homes in British Columbia for a year. These savings were equivalent to 7.3% of the mine's total 2013 consumption.

New Afton was a "new mine," having started production in June 2012. This defied the idea that "new facilities are energy efficient and it's a challenge to find savings." Many new "efficient" designs

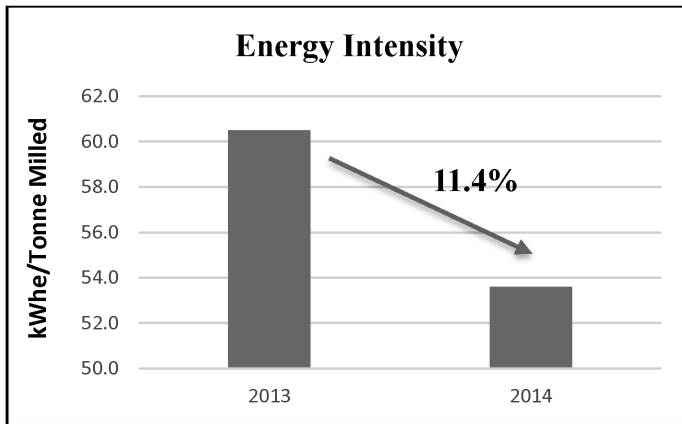


Figure 5. New Afton 2013 and 2014 energy intensity.

are actually copied versions of previous, less efficient designs as it is more profitable for engineering firms to replicate previous designs rather than incorporate new technologies. *Lesson #4: To become more energy efficient, companies must push the boundaries, make greater efforts to “design in” efficiency, focus more on long term return-on-investment and GHG reductions as opposed to initial capital cost.*

The mine’s electrical reduction objective in 2015 is 5.1 GWh and we are on track for 9 GWh. Despite the commissioning of a new 4,000 HP tertiary grinding circuit in April 2015, our 2015 year-to-date energy intensity is less than our 2014 average energy intensity, enabling continued support of the energy management program.

Another benefit is the energy management information system (EMIS) installed prior to ISO 50001 with the intention of implementing ISO 50001. The EMIS encompasses the primary and sub metering, the OSIsoft PI system data historian and the RtEMIS visualization and reporting tool. *Lesson #5: Find a way to baseline and measure performance.*

Having energy data readily available facilitates energy assessments and measurement and verification (M&V). The seamless interaction between the OSIsoft PI data historian, where our energy data is stored, and Excel was a major improvement. All of our energy performance models for our significant energy uses were in Excel using PI data. These models are then stored in PI to help us compare actual usages to baseline energy performance.

RtEMIS, from RtTech, displays energy performance information, and has helped with awareness, facilitating discussion about energy performance. One encouraging comment by the mill manager during one of our weekly energy discussions was, "I can't wait to see the energy curves next week," as they had just completed an operational improvement and were about to begin production.

The greatest benefit of our efforts has been the increased awareness of energy efficiency at all levels. This is particularly important as it is people, not systems, who manage energy. The focus on training and awareness is how ISO 50001 differentiates itself. Crews and staff alike consider energy efficiency during the daily safety meetings, with our E-Day [4] concept. Suggestions are received, analyzed and processed. If applicable, we target campaigns that concern subjects such as compressed air plus quarterly updates with all employees at "town hall" meetings. All new employees and contractors entering the site sit in an energy orientation program.

The benefits of this effort are showing. The largest energy savings in 2014 were not from the energy implemented efficiency improvement projects, they were from employee actions. In fact, 84% of the 2014 savings resulted from employee suggestions and initiatives.

GOING FORWARD

Educating the energy team on the requirements of the ISO 50001 standard is the primary objective going forward.

As an energy specialist, it is easy to believe everyone is as excited about managing energy as you. The mine's general manager where I previously worked, would lead tours and be asked, "How many people work here?" His quip was, "Oh, about 10%." Despite his humor that left the impression that many workers were not doing enough.

There will be times when you might become frustrated, yet with patience and persistence, sustainable energy management is achievable. The key to success is empowering others and getting them on your team. That is the best way to ensure that energy management becomes embedded in the company's culture... the only way to that energy management becomes self-sustaining... the only way to be assured your facility's energy is being managed when you are away.

SUMMARY

Energy management programs evolve from implementation to integration. If you hope to improve the way you manage energy, what options do you have?

Programmed energy monitoring is a key and whether or not you fully implement an EMIS, use data history software. Assign accountability, establish your energy team and get them involved. The more management is accountable for energy performance and the more the energy team manages energy performance, the faster the program will integrate and become part of the culture at your company.

It has been said, "It is too expensive," "The management team here will never support it," and "We won't find any savings in our new facility." These perceptions overlook the benefits disguised as hard work. It is about believing that you can do it and maintaining a positive attitude.

It is about making things happen. Will it be easy? No, it will probably be difficult. Will it be worth it? I believe it will be as your energy performance, as well as your operational systems will improve as it did for us.

Is ISO 50001 the best tool? That depends... get advice, talk to colleagues, listen to presenters at conferences or seminars and decide if it might help you achieve your long term energy objectives. Whether or not you pursue certification, ISO 50001 is an excellent standard for developing an energy management system.

References

- [1] Cooper, A. Facilitated by Prism Engineering Ltd., Vancouver, British Columbia. <http://www.prismengineering.com>.
- [2] Therkelsen, P., Sabouni, R., McKane, A., and Scheihing, P. (2013). Assessing the Costs and Benefits of the Superior Energy Performance Program.
- [3] ACEEE (2013). Summer Study on Energy Efficiency in Industry. Niagara Falls, NY. http://www.cleanenergyministerial.org/Portals/2/pdfs/GSEP_Assessing%20Costs%20and%20Benefits%20of%20GSEP_LBNL-6349E.pdf.
- [4] Developed in conjunction with PASS Inc. Positive Attitude Safety System. <http://www.passinc.net>.

ABOUT THE AUTHOR

Andrew Cooper is a professional engineer and the energy specialist at New Gold's New Afton Mine in Kamloops, British Columbia,

Canada. Andrew holds degrees in electrical engineering and business specializing in management and finance. He began his career as an engineer in South African gold mines and later in the steel and petrochemical industries.

Andrew moved to Canada with his wife, Kim, to be the electrical engineer at Sifto Salt Mine in Goderich, Ontario, the world's largest underground salt mine and was promoted to engineering manager. Andrew is an AEE Certified Energy Manager and a Certified Measurement and Verification Professional.

With the backing of the New Afton management team, Andrew has been instrumental in establishing an energy management information system and in managing the ISO 50001 Energy Management System initiative. He has also initiated and managed energy efficiency studies and projects. He is passionate about making energy management sustainable for organizations, Andrew can be contacted at andrew.cooper@newgold.com.