Husky Energy Hexa-Cover® Pilot Project:

Husky Energy

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Executive Summary

Husky Energy recently completed a pilot study to assess the energy savings and the feasibility of generating carbon offsets from installing Greatario Hexa-Cover® floating tiles on tanks at heavy oil sites. Cap-Op Energy was engaged by Husky to advise on pilot design, provide project consulting, and complete this report.

The McMullen cold oil production region near Wabasca in Northern Alberta was selected for the pilot project. Hexa-Covers® were installed on a train of tanks with a parallel train used as a control. Both trains of tanks were equipped with separate fuel gas meters. The volume of oil and emulsion entering the tanks was also metered.

Using the *Quantification Protocol for Energy Efficiency Projects*, the fuel savings were calculated and the carbon-offset potential from the project was quantified. To compare the fuel gas required in both the train with Hexa-Covers® and the train without Hexa-Covers®, the energy requirement per cubic meter of oil of throughput was calculated to determine the fuel gas savings. A 10.2% reduction in fuel gas use, or a decrease of 1.75 m^3 fuel gas burned per m^3 oil entering the train of tanks was calculated. The fuel savings from this project resulted in an estimated emission reduction of 48 tCO_2e on an annualized basis. The potential offsets result from a reduction in both onsite and upstream emissions.

Table 1. Carbon Offset Potential of the Hexa-Cover® Pilot Project.

Source	$kgCO_2$	$kgCH_4$	kgN_2O	tCO_2e
B1 Fuel Extraction and Processing	2315	45.26	0.12	3.5
B4 Unit Operation	41427	111.4	1.04	44.5
Total	**43742**	**156.7**	**1.17**	**48.0**

For future Hexa-Cover® projects at Husky facilities, a different methodology would be required to quantify the offsets. The same protocol would be used but different measurements would be required to: a) decrease cost of measurement; and, b) quantify the baseline without using measurements taken from tanks without Hexa-Covers®. A multiple regression model based on heat transfer parameters could be developed to quantify the baseline emissions from project measurements and reduce measurement burden. Pilot study fuel gas measurement required new piping and meters, and by limiting this, it is likely possible to decrease expense in this area.

Based on a 10.2% reduction in fuel gas observed in the study, fuel savings alone at current market prices do not justify investment in Hexa-Cover® projects. However, if Hexa-Covers® were installed at sites with propane, the cost-savings may justify investment at reasonable propane prices. Carbon offsets may provide incremental benefit to project economics. The results from the study are specific to the pilot site, but results at future sites could vary based on operating conditions.

Based on the results of this pilot, Husky could consider a larger rollout of Hexa-Covers® to complete a pilot at a larger number of propane sites in order to establish a statistically significant sample set.

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Purpose

Husky Energy (Husky) recently completed a pilot study to assess energy savings and assess the feasibility of generating carbon offsets from installing Greatario Hexa-Cover® floating tiles on tanks at heavy oil sites. The pilot was conducted at a heavy oil facility, comparing the fuel savings of a row of tanks with Hexa-Covers® and a row of tanks without Hexa-Covers®. Cap-Op Energy (Cap-Op) was engaged by Husky to advise on pilot design, provide project consulting, and complete this report. The purpose of this document is to report the findings of this pilot including how and why emission reductions could be quantified, the fuel savings, the offset generation potential under the Alberta Offset System, and overall economic benefits of Hexa-Cover® installations.

Background

Husky Energy

Husky Energy (Husky) is one of Canada's largest integrated energy companies. Husky has significant heavy oil operations in western Canada. At these facilities, Husky is continuously looking for opportunities to improve efficiencies and reduce costs.

Husky and the Petroleum Technology Alliance of Canada (PTAC) worked together to develop and execute a pilot project to install and monitor the energy efficiency improvements from Hexa-Covers® on heavy oil tanks. Husky was very interested in evaluating the economic benefits including the fuel savings and greenhouse gas (GHG) offset credit potential.

Greatario

Greatario is the manufacturer of the Patented Hexa-Cover® Oil & Gas Duty Internal Tank Modular Floating Roof. Greatario Covers Inc. is a Canadian Company based in Calgary, Alberta with a network of Worldwide Distributors for their Hexa-Cover® patented technology. Over 2160 installations of this technology have been completed in the last 3 years. This technology was the main subject of the pilot project.

Cap-Op Energy

Cap-Op is a trusted advisor to a number of leading energy companies. Our track record of success illustrates our commitment to maximizing value for our partners. Cap-Op directs particular focus towards technology solutions to address the overwhelming cost and difficulties of developing and accounting environmental benefits of emission reduction projects. Our cloud-based DEEP platform offers energy sector clients the ability to automate and standardize the quantification of GHG reductions, yielding high-quality, low-cost carbon offsets for use in emission trading programs.

Cap-Op was selected to support Husky in evaluating the carbon offset potential due to our significant experience working in the Alberta Offset System. In particular, Cap-Op has significant experience developing aggregated offsets from energy efficiency projects in oil and gas.

Husky McMullen Pilot Site

The McMullen cold oil production region near Wabasca in Northern Alberta was selected for the pilot project. The pilot was conducted at a multi well pad that contains two parallel tank trains. Production is typically directed into a train of 1000 barrel (bbl) tanks that cascade one into another in order to separate oil from the emulsion. The emulsion entering the train is heated from approximately 10°C to 80°C using either produced or purchased fuel gas. The Hexa-Covers® were installed on a train with five tanks and the other parallel train with six tanks was used as a control. Both trains of tanks were equipped with separate fuel gas meters. The volume of oil and emulsion entering the tanks was also metered. The figure below shows a schematic of the complete pilot site.

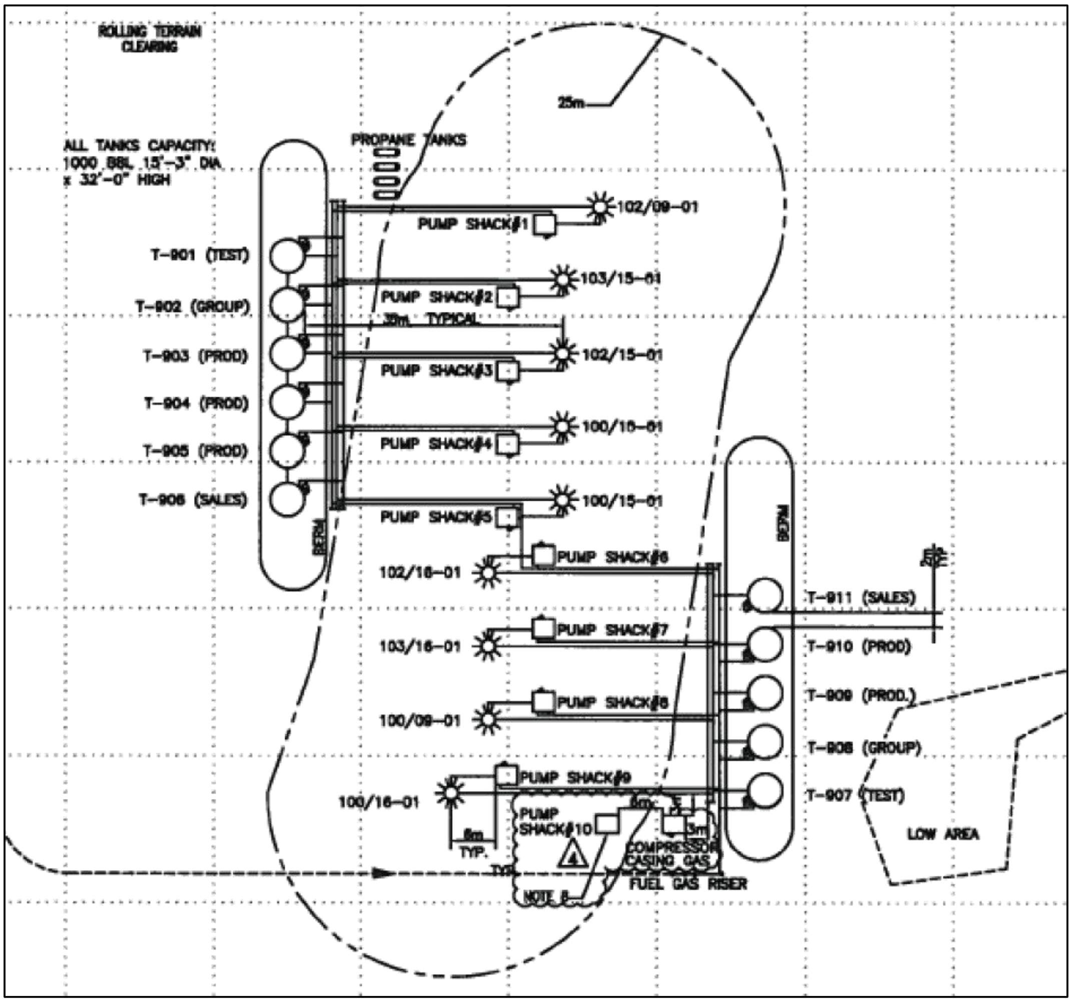

Figure 1. Schematic of the McMullen site.

Technology Overview

As part of regular heavy oil operations, fuel gas or propane is used to heat oil storage tanks. Heavy Oil is typically heated to treat and break the emulsion and to make the oil less viscous for ease of transportation to terminals. To heat oil to 80°C, a significant amount of energy is required and much of that energy is lost to the atmosphere because there is significant headspace between the top of the tank and the level of oil within the tank. Insulating the oil within a tank or improving energy use could significantly decrease operating costs for heavy oil operations.

Greatario originally developed internal tank segmented floating roof systems, or Hexa-Covers®, for applications that required odour control. However, Greatario realized that applications for the floating covers extended beyond odour control, and they could be used in oil tanks because they can help minimize heat loss, evaporation, and VOC emissions simultaneously.

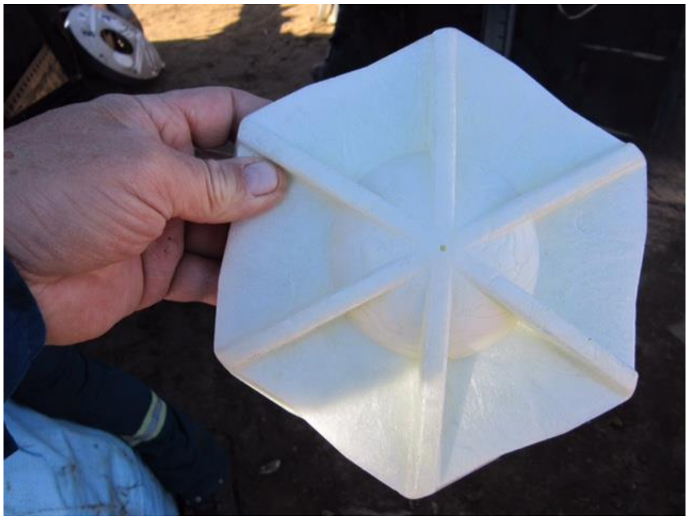
Figure 2. Greatario Hexa-Cover®

Hexa-Covers® can be installed into any tank or open surface. The unique design allows the Hexa-Covers® to interlock and insulate the tank. Additionally, Hexa-Covers® can be easily transported to remote locations due to their size and structure. Hexa-Covers® are developed from an engineered polymer that gives them unique physical properties that are important in oil and gas operations. Firstly, they can withstand significant fluctuations in temperature and will not degrade. Secondly, the unique shape allows for minimal maintenance and even distribution over the surface it needs to cover. Lastly, by insulating an emulsion in a tank they reduce heat loss, reducing fuel use and preventing evaporation of liquids and VOCs.

From Husky's perspective, the most widely applicable quality of the Hexa-Covers® was the potential to reduce fuel gas use and generate carbon offsets. The technology appeared to be a candidate for offsets in the Alberta Offset System because of the existing *Quantification Protocol for Energy Efficiency Projects* that could be used to quantify the emissions reduction. Importantly, this project can clearly prove additionality because installing Hexa-Covers® is not a business-as-usual practice in Alberta.

Prior to completing the pilot project, Husky reviewed the CNRL *2013 Stewardship Report to Stakeholders*[1]. Within this report, CNRL stated that on average it had achieved 20% reduction in fuel use from the installation of Hexa-Covers®. During pre-project evaluation, 20% reductions in fuel use and the potential for carbon offsets were used to estimate the project returns.

[1] https://www.cnrl.com/upload/media_element/830/05/2013-sr2s_october2014web.pdf

Alberta Carbon Market Overview

The Alberta carbon market exists as a compliance mechanism for the Specified Gas Emitters Regulation (SGER). SGER applies to Large Final Emitters (LFEs); facilities that emit greater than 100,000 tCO_2e per year. LFEs are required to meet compliance either by reducing their emissions intensity below the target, acquiring and retiring carbon credits, paying into a technology fund, or through some combination of these. Carbon credits, or offsets, are generated at non-LFE facilities that have voluntarily reduced their emissions.

Offset Projects Must:

- Occur in Alberta;
- Result from actions not otherwise required by law and be beyond business as usual and sector common practices;
- Result from actions taken on or after January 1, 2002;
- Occur on or after January 1, 2002;
- Be real, demonstrable, quantifiable, and verifiable;
- Have clearly established ownership; and
- Be counted once for compliance purposes.

Carbon credits must be quantified using an approved Quantification Protocol into discrete credits (with each credit representing one tonne of carbon dioxide equivalent (tCO_2e) reduced), verified by a third party, and serialized on the Alberta Emissions Offset Registry before being used for compliance purposes. Some of the basic requirements for offset projects are outlined in the sidebar.

Specific to a potential offset project for Hexa-Cover® efficiency improvements, a project would very likely require *aggregation*, which involves combining a number of facilities into a single offset project in order to reduce the transaction costs on a per-tonne basis.

The transaction costs associated with the quantification, verification, registration, and sale of credits indirectly create a minimum threshold for a viable offset project. Typically, this must exceed breakeven due to the risks associated with verification; for the purposes of this report the minimum viable offset project size will be 3,000 tCO_2e. This is based on $25 credit selling price, $50,000 assumed transaction cost, and a risk profile requiring approximately 50% upside in order to pursue the project. Transaction costs could actually be as high as $100,000 (or 4,000 credits) for very complex projects.

To elaborate on the basic requirements above, energy efficiency projects typically must provide sufficient evidence to demonstrate:

- The energy savings resultant from the process changes are offsetting fossil fuel consumption on-site or upstream (includes grid electricity);
- The baseline condition of continuing the historical rate of consumption of fossil fuel with the existing process is the most likely alternative to having not implemented the project (the continued use of tanks without Hexa-Covers®); and

- The quantification of reductions of greenhouse gases achieved by the project is based on actual measurement and monitoring of energy consumed (except where indicated in the protocol).

Husky has facilities that are LFEs, therefore, to reduce its compliance costs, generating offsets can be an economically viable incentive. If a carbon offset project can be completed at a cost lower than all other methods available to an LFE for compliance, that project becomes a feasible option. It should be noted that a project faces internal competition for capital based on metrics including any or all of Internal Rate of Return, Net Present Value, and duration of payback.

Methodology

The Alberta Environment and Parks *Quantification Methodology for Energy Efficiency Projects* was used as the foundation for carbon credit calculations. This protocol is open-ended and very compatible with projects that reduce fuel consumption. The scope of this protocol covers direct and indirect emission reductions from facility retrofits that result in overall efficiency improvements per unit of output. The protocol methodology covers the full life cycle of emissions associated with the project. As part of the report, a functional unit was determined in order to relate baseline and project emissions and real operating data was available to compare a baseline and project condition. However, because this protocol has many flexibility mechanisms to quantify the baseline, the selected method is not necessarily the only method possible.

Initially, all applicable on-site sources and sinks of emissions in the protocol were evaluated. Some sources and sinks were omitted because there was no change between the baseline and project condition. The quantification evaluated upstream and on-site emissions. Therefore, according to the protocol, the only applicable sources and sinks to the baseline and project condition were:

- B1 Fuel Extraction and Processing;
- B4 Generation of Heat and Power;
- P1 Fuel Extraction and Processing; and,
- P4 Generation of Heat and Power.

With an understanding of the applicable sources and sinks, the baseline condition and the project condition were identified. The baseline was easily identified because the pilot allowed for a control with no Hexa-Covers® to operate onsite. The gas consumption by the heaters in the train of tanks with no Hexa-Covers® established a relevant baseline because this is the business-as-usual practice.

The project condition was established as fuel consumption by the heaters in the train of tanks with Hexa-Covers®. The functional equivalence between the two trains of tanks was determined by the volume of gas required to heat a cubic metre (m^3) of oil. This allowed for direct determination of the rate of fuel savings per m^3 of oil and extrapolation of the emissions reduction to a year of production.

The quantification of emission reductions is detailed based on the method provided in the protocol. A complete table of parameters being measured, estimated, or calculated is provide below. The quantification approach is included as:

$$Emissions_{Reduction} = Emissions_{Baseline} - Emissions_{Project}$$

$$Emissions_{Baseline} = Emissions_{Fuel\ Extraction\ /\ Processing} + Emissions_{Generation\ of\ Heat\ and\ Power}$$

$$Emissions_{Project} = Emissions_{Fuel\ Extraction\ /\ Processing} + Emissions_{Generation\ of\ Heat\ and\ Power}$$

Where:
Emission $_{Baseline}$ = sum of the emission under the baseline conditions
Emission $_{Fuel\ Extraction\ /\ Processing}$ = sum of the emissions under B1 Fuel Extraction and Processing
Emission $_{Facility\ Operation}$ = sum of emissions under P4 Generation of Heat and Power
Emission $_{Project}$ = sum of the emission under the project conditions
Emission $_{Fuel\ Extraction\ /\ Processing}$ = sum of the emissions under P1 Fuel Extraction and Processing
Emission $_{Facility\ Operation}$ = sum of emissions under P4 Generation of Heat and Power

It is important to note that, for actual calculations, the emissions for both the baseline and the project are calculated in the baseline equation because the emission reduction is the difference between the baseline and project condition. Using the efficiency improvement in the project condition, it is possible to determine the emission reduction during the pilot, and then project the annual emission reductions.

B1 Fuel Extraction and Processing

$$Emissions_{Fuel\ Extraction\ Processing} = \sum Vol.Fuel * EF\ Fuel_{CO_2}; \sum Vol.Fuel * EF\ Fuel_{CH_4}; \sum Vol.Fuel * EF\ Fuel_{N_2O}$$

Parameter	Unit	Source	Method
Emission $_{Fuel\ Extraction\ /\ Processing}$	tCO_2e	N/A	Calculated
Vol. Fuel Combusted for P4	m^3	Measured	Calculated
CO_2 Emission Factor	$kgCO_2/m^3$	Environment Canada	0.133 kg/m^3
CO_2 Emission Factor	$kgCO_2/m^3$	Environment Canada	0.0026 kg/m^3
CO_2 Emission Factor	$kgCO_2/m^3$	Environment Canada	0.000007 kg/m^3

B4 Heat Generation and Power

$$Emissions_{Heat\ Generation\ and\ Power} = \sum Vol.Fuel * \ EF\ Fuel_{CO_2}\ ; \sum Vol.Fuel * \ EF\ Fuel_{CH_4}\ ; \sum Vol.Fuel * \ EF\ Fuel_{N_2O}$$

Parameter	Unit	Source	Method
Emission $_{Generation\ of\ Heat\ and\ Power}$	tCO_2e	N/A	Calculated
Vol. Fuel Combusted	m^3	Measured	Calculated
CO_2 Emission Factor	$kgCO_2/m^3$	Environment Canada	2.38 kg/m^3
CH_4 Emission Factor	$kgCO_2/m^3$	Environment Canada	0.000033 kg/m^3
N_2O Emission Factor	$kgCO_2/m^3$	Environment Canada	0.000037 kg/m^3

Volume of Fuel Gas

By measuring both the volume of oil entering the tanks and the fuel gas consumed by the tank burner it is possible to determine the difference in volume of gas required per m^3 of oil between the baseline and project conditions. After quantifying the improvement, Cap-Op combined this data with the daily flow rates of oil in the project to determine the annual emission reduction potential.

$$Vol.Fuel\ Gas = (\sum \frac{Baseline_{Fuel\ Gas}}{Baseline_{Oil}} - \sum \frac{Project_{Fuel\ Gas}}{Project_{Oil}}) * \frac{Volume}{Day} * 365\ days$$

Parameter	Unit	Source	Method
Vol. Fuel Gas	m^3	N/A	Calculated
Baseline $_{Oil}$	m^3	Measured	Direct measurement of oil entering tanks
Baseline $_{Fuel\ Gas}$	m^3	Measured	Direct measurement of gas consumed by tank heater with Hexa-Covers®
Project $_{Oil}$	m^3	Measured	Direct measurement of oil entering tanks
Project $_{Fuel\ Gas}$	m^3	Measured	Direct measurement of gas consumed by tank heater with Hexa-Covers®
Volume	Avg. m^3 per day	Estimated	27.19 m^3/day[2]

[2] This was the average volume of oil entering the train of tanks containing Hexa-Covers® in the Pilot.

For the Pilot project, the data from January 11, 2016 to February 3, 2016 was omitted because of significant departure from normal conditions at the pilot site. A number of wells temporarily ceased production during this time with a subsequent, significant decrease in the volume of emulsion entering the train of tanks with Hexa-Covers®. During this time, the volume of emulsion contained a significantly lower ratio of oil to water than was seen during the rest of the pilot project. This created anomalous patterns in the data and for that reason was excluded.

Fuel Gas Savings

To determine the fuel savings from the installation of Hexa-Covers® the volume of gas consumed per volume of oil in both the baseline and project condition was compared. On this basis, the train of tanks with Hexa-Covers® used 10.2% less fuel gas on average than the control. Side A with Hexa-Covers® used on average 16.27 m^3 gas/m^3 oil whereas Side B with no Hexa-Covers® used 18.13 m^3 gas/m^3 oil. The 10.2% decrease in fuel gas consumption results in a decrease of 1.75 m^3 gas/m^3 oil on Side A. The daily fuel savings fluctuated throughout the pilot, and at some points there were no observed fuel savings from the Hexa-Covers®. The figure below illustrates the daily fuel savings.

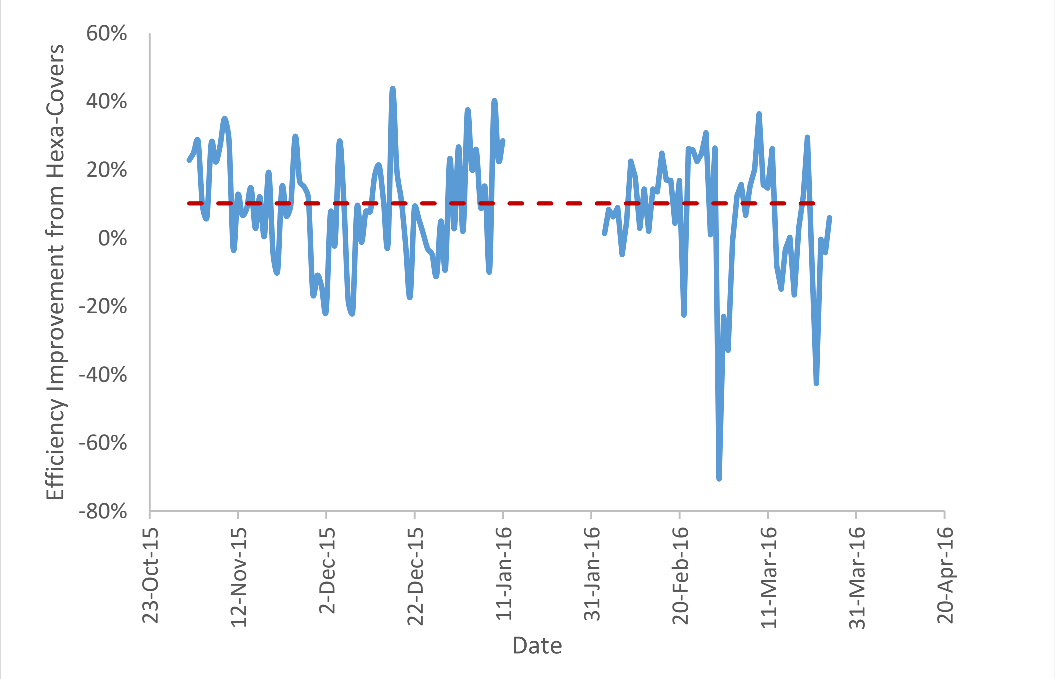

Figure 3. The daily improvement of fuel efficiency resulting from Hexa-Covers® with the average improvement over the project.

Additional analysis was performed on the fuel gas required to raise the temperature in Side A and Side B. Side A had slightly more water in the emulsion entering the train than side B, and therefore required more energy to raise the temperature in the train. Based on the analysis of the energy requirements of the emulsion coming into each train, Side A required 3% more energy than Side B. This is an important finding because it is one of many factors that could contribute to seeing lower than expected fuel savings during the pilot project. This finding was important because it illustrates how external factors such as the emulsion content can influence the outcome of Hexa-Cover® projects.

Carbon Offset Calculations

Based on the Quantification Approach described above, there is an opportunity to develop carbon credits from Hexa-Cover® installations. The following emission reductions were estimated for the Hexa-Cover® Pilot Project.

Table 2. Offset quantification table for fuel gas savings.

Source	$kgCO_2$	$kgCH_4$	kgN_2O	tCO_2e
B1 Fuel Extraction and Processing	2315	45.26	0.12	3.5
B4 Unit Operation	41427	111.4	1.04	44.5
Total	**43742**	**156.7**	**1.17**	**48.0**

Based on the energy content conversion from natural gas to propane, 26,242 L would have been saved using Hexa-Covers®. The table below illustrates the emissions reductions that would have resulted had the project been completed at site with propane.

Table 3. Offset potential calculations from propane fuel savings.

Source	$kgCO_2$	$kgCH_4$	kgN_2O	tCO_2e
B1 Fuel Extraction and Processing	8146	119	0.16	8.1
B4 Unit Operation	39547	0.70	2.83	40.4
Total	**447847**	**119.74**	**3.00**	**48.5**

Offset Development

Based on the results above, Husky could potentially expect to generate 48 tCO_2e. On its own this type of project will not generate sufficient emission reductions to warrant an offset project. However, if Husky were to install Hexa-Covers® across its entire fleet or aggregate projects with other heavy oil producers it could be deemed viable. To achieve this, Husky would have to install Hexa-Covers® in upwards of 100 tanks trains with similar volumes to make this project attractive from a carbon perspective (this number of installs would likely develop over 3000 tCO_2e). It is important to note, this analysis only accounts for the cost and risk to actually develop offsets it does not account for the actual cost of Hexa-Covers®.

For future projects, models could be developed to accurately quantify the emission reduction without taking pre project measurements to determine the baseline condition. The regression model would take into account a number of heat transfer parameters and then project the amount of gas or propane required to heat the emulsion entering a tank. The requirements for the model could include:

1) Fuel gas metering
2) Oil and water volumes

3) Air temperature
4) Temperature of oil within the tank
5) Size of the tank

Fuel gas measurement for the pilot project required additional piping and metering in order to isolate fuel gas usage of the tanks from the engines on site. The remaining variables needed for a model are typically already being measured in a typical CHOPS operation. There are likely opportunities for improvements on the costs incurred during the pilot for fuel gas measurement.

Economic Analysis

Market pricing at time of pilot means that justifying investments on the basis of reduced fuel gas use is a challenging proposition. Carbon offsets in this environment have become an essential component of project return for projects of this nature (energy efficiency).

Husky has thousands of tanks used for cold production methods similar to the configuration at McMullen. However, there are important distinctions to be made with respect to tank heater fuel type. Pad 15-01, where the pilot was conducted, is tied into a natural gas pipeline. When casing gas is produced in volumes larger than necessary for site operations (pumping, tank heating) it may be exported into the pipeline and similarly, when produced volumes are insufficient, fuel gas may be imported. Many other tanks used in operation are not close enough to pipeline infrastructure to warrant investment to tie in to natural gas pipelines. At these sites casing gas is still used as fuel but propane is used to supplement when necessary.

The distinction between different types of fuel is important because propane and natural gas are sold and bought for different prices while the Hexa-Covers® are sold for the same price: enough covers to fill a thousand barrel tank will cost $7500USD less volume discounts.

Fuel gas use during the pilot averaged 0.43e3m3/day on the 5 train tank with Hexa-Covers® and 0.53 e3m3/day on the 6 train tank with no Hexa-Covers, or approximately 0.087 e3m3/day and 0.089e3m3/day per tank, respectively. A 10% reduction in fuel gas equates to approximately 120GJ/year. At time of writing in May 2016 AECO shows the Monthly Index at $1.04/GJ. Compared to the purchase price of Hexa-Covers® it is clear that payback is long and rate of return is low.

Figure 4 shows a ten-year project rate of return for four different scenarios: fuel gas savings of 10% and 20% (equal to CNRL reported savings), both with and without generated offset credits (assumed to start at $30 less $5 for generation). As shown in the carbon offset calculation, a 10% fuel gas savings corresponds to a 48 tCO_2e per year reduction or approximately 10 tCO_2e per tank. Similarly, a 20% fuel gas savings results in a 19 tCO_2e per year per tank emission reduction. It can be seen that given observed savings, Hexa-Cover® installation is not justified with or without offset credit generation through a range of plausible gas prices.

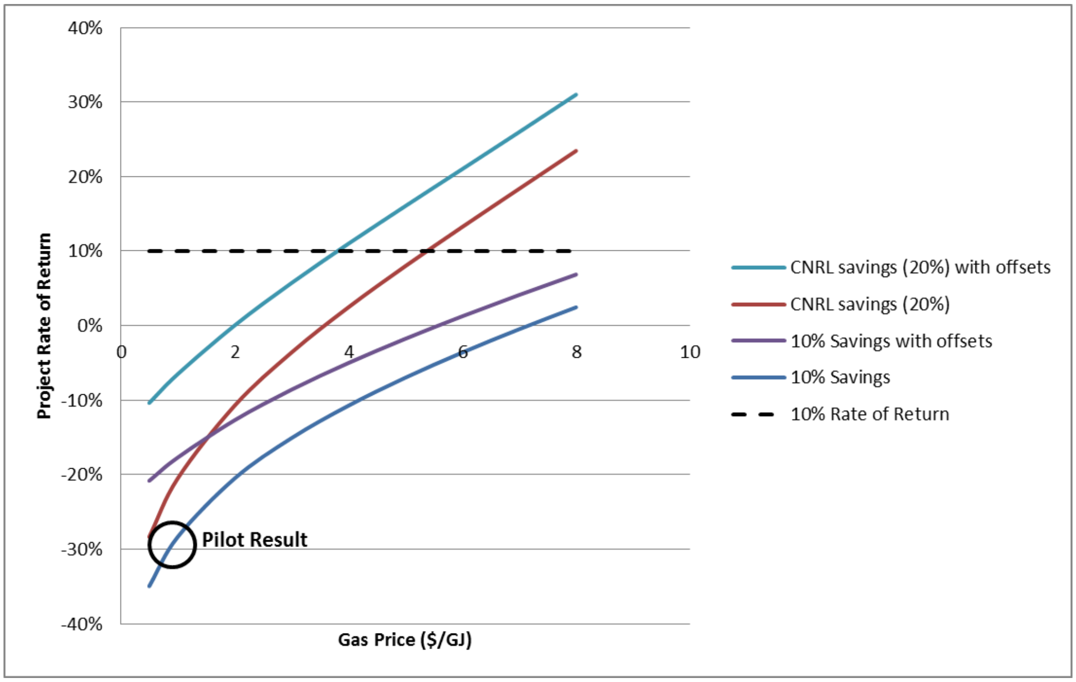

Figure 4. Hexa-Covers® Project Rate of Return (Fuel Gas)

Figure 5 repeats the same exercise as shown previously but instead of fuel gas, propane is substituted on an equivalent energy basis. Propane is typically more expensive than natural gas on this basis. Pilot predicted savings of 10% show a positive NPV at a 10% discount rate even with historically modest but higher than current prices of propane (~$0.30/L).

Tables 4 and 5 show similar emission reductions for either type of fuel and this explains the visual representation of project rates of return for propane (Figure 5): offsets represent small incremental value compared to the propane savings. Given the predicted offset generation of 10 tCO_2e and projected pricing of $30 per tCO_2e, it is imperative that offset generation is cost effective. Even so, it is likely that the presence of offsets will not factor into the investment decision.

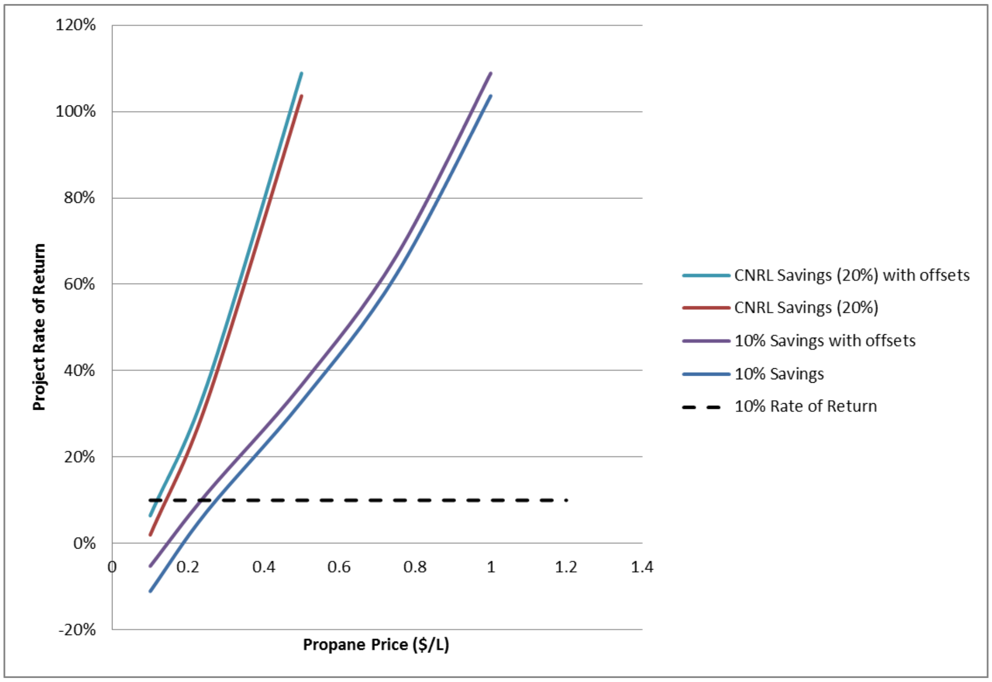

Figure 5. Hexa-Covers® Project Rate of Return (Propane)

Ancillary Benefits

The purpose of this report was to quantify the economic viability of Hexa-Cover® installation based on fuel gas savings and carbon offset potential. However, outside the scope of the pilot project there are additional benefits that were observed or have been observed through other Hexa-Cover® installation. These benefits include:

1. Reducing the evaporation off the tank and decreasing the ice buildup around a thief hatch. A thief hatch is a pressure relief device located at the top of the tank and its main purpose is to prevent implosion or explosion of an atmospheric tank. By reducing the evaporation from the surface of the tank contents, less water vapour builds up and escapes through the thief hatch.
2. Decreasing the chemical defoamer requirements of a site. Defoamer is typically used when there is a large amount of gas produced with the heavy oil, when oil production is very high and the tank burner can't quickly heat the oil, or when the oil is very viscous (maybe >100,000 cP). At a cascading site configuration like 15-01, defoamer is applied in the first tank or first 2 tanks. Hexa-Covers® may be able to address these problems and reduce or eliminate need for chemical defoamers. However, chemical defoamer is not typically needed or used at the pilot site.
3. Reducing odours and VOC emissions such as benzene. This is an additional benefit of minimizing evaporation off the liquid surface. Odour issues are related to subsurface characteristics and again, not typically present at the pilot site in this study.

In certain areas of operations these additional benefits may justify investment or in the case of odour reduction, provide a low cost alternative to a vapour recovery unit.

Conclusion/Recommendation

Husky assessed the fuel savings and carbon offset potential from the Hexa-Cover® Pilot Project. Over the course of the four month pilot there was variance in the fuel savings seen daily. During one part of the pilot a number of wells went offline skewing the outcome because the baseline and project were operating under different conditions. The results of the study are specific to this site. There are a number of factors outside the scope of the study that influenced the results and at future sites the savings could be higher if there were more favourable operating conditions such as higher oil to water ratios.

The resultant fuel savings from the Hexa-Cover® project do not justify the investment in future Hexa-Cover® projects. If Hexa-Covers® were installed at sites using propane, the economics become much more favourable. Carbon offsets are a small incentive and do not make the investment case for natural gas fueled tanks. Propane fueled installations are economical without offsets at reasonable propane prices.

The offset generation potential was calculated using side by side baseline and project measurements that would not be feasible in a large scale carbon offset project. This method would not be economical for an aggregated project because of the significant cost of metering. However, an accurate model could be developed to quantify the emission reductions with significantly lower cost while still developing verifiable results.

Based on the results of this pilot, Husky could consider a larger rollout of Hexa-Covers® to complete a pilot at a larger number of sites. For the second pilot, Husky should focus on propane sites where a minimum 10% reduction in fuel use will bring significant returns to Husky. Any decision to further pursue Hexa-Cover® installation should consider offsets as a benefit to the return but should be wary if reaching internal hurdle rates requires offsets.