Emissions Reduction Alberta ("ERA")
Expanded Technology Pilot (ETP)
Final Project Report | January 30, 2024

Project Information	
ETP Project ID:	ETP0162088
Project Title:	Projector Upgrade and Retrofit
Recipient Organization:	Landmark Cinemas
ERA Project Start Date:	February 13, 2023
ERA Project Completion Date:	September 19, 2023
Total Eligible Project Budget:	$419,196
Total ERA Funding:	$209,598

ABOUT ETP

The Expanded Technology Pilot (ETP) offered a new pathway for Alberta businesses to propose effective, commercially viable technologies that could offer high return on investment but were not supported through the Energy Savings for Business (ESB) program. Successful proposals received funding to support project implementation and will help expand ERA's understanding of the technology's performance, market potential, and how it could be best supported in future initiatives.

ETP was open to applications between December 2021 to May 2023.

PROJECT SCOPE

Landmark Cinemas is a well-known and established theatre company in Alberta. The scope of their project was to retrofit movie projector systems in three movie theaters (two in Calgary and one near Edmonton). Specifically, inefficient xenon lamps were retrofitted with a high efficiency laser system.

The laser projection system uses less power during operation and does not require the use of an exhaust system for cooling, saving the energy of running an exhaust system as well. The laser retrofit also results in less waste in the form of used bulbs, less maintenance and training to operate, and does not emit harmful radiation.

Below, Landmark Cinemas has provided additional detail on the outcomes of their project.

PART 1: Commercialization & Technology Benefits

1. List and briefly describe any knowledge-sharing activities since the completion of your ERA funded project. E.g., attendance and presentations at conferences or workshops, news articles, social media promotions, etc.

The results of the project have been shared with other divisions within Landmark Cinema's parent company (Kinepolis) including the MJR theatre chain in the US. No other knowledge sharing activities have been conducted since the completion of the project.

2. What is the plan for further commercialization of the technology? i.e. what does the next 3-5 years look like, will the technology be used/exported outside of Alberta/Canada etc.

   This is a commercially available technology provided by a third-party. Landmark is not aware of the vendors plans regarding commercialization efforts although it is understood that the supplier of the retrofit kits has expanded its efforts to sell these units to various smaller and larger cinema chains across North America.

   Internally Landmark is sharing the successes with other North American divisions under Kinepolis ownership. Landmark has also expanded the rollout of the laser retrofit kit to other locations across Canada.

3. List any additional benefits from the technology system (e.g. water use, land use, social benefits, etc.). Were there any other learnings from installing the technology? (e.g. any new insights into technology capability, difficulties, or setbacks, what other markets the technology could be utilized in etc.)

   Not applicable, Landmark Cinemas had experience with laser projection projects prior to this project.

PART 2: Economic and GHG Impact

4. Provide your best estimate of the number of FTE's supported because of the ERA funded project since project completion:

   The laser projection system requires less maintenance and training to operate. As a result, existing staff are able to use their time to complete other activities.

5. Provide updated estimated direct lifetime GHG emissions reductions in tCO_2e. Please provide any available evidence, calculations, or data to support this claim, e.g. relevant activity date, verification report, assumptions, or project plan.

	Total GHG reductions (tCO_2e)
Lifetime Savings	1,256*

*Values calculated by ERA prior to project completion.

Please specify the number of years the equipment is expected to remain operational: *12*

6. Provide any operational data required in the Contribution Agreement (indicate if there is an additional attachment(s)). E.g., how much time the technology is operational, how much fuel it uses, etc.

Electricity data and hours of operation data for the period between October 1 to December 31, 2023 has been uploaded to ERIMS.

In the three-month period immediately following installation of these projector retrofits there were several unforeseen operational issues at the sites (unrelated to the retrofit project). These issues had a material impact on whole building electricity use.

***Shawnessy (Calgary) Site** – The primary HVAC unit serving the projection booth failed. This forced the exhaust fans back into service (24/7). The HVAC unit has recently been replaced by a new unit and we anticipate additional savings in the future.*

***Country Hills (Calgary)** – As a coincidence, a similar issue arose to what was experienced at the Shawnessy location. Unfortunately, at the same time as the installation period. The lead time for HVAC unit replacement continues to be longer than normal.*

***St Albert (Edmonton area) –** Due to customer complaints Landmark made temporary adjustments to the temperatures in the auditoriums. New temperature requirements forced the HVAC units to run longer and at elevated levels, resulting in additional power being consumed, negating the savings from the laser upgrades. The company is investigating next steps to return auditorium temperatures to company setpoints.*

7. Provide an update on the Technology Success Metrics identified in the Contribution Agreement:

Success Metric	Project Target	Target Achieved?
Electricity usage reduction at cinemas in Calgary and St. Albert	≥ 660 GJ per annum*	*On track. 158 GJ was saved in the 3 months after project completion.*

*Values calculated by ERA prior to project completion.

A part of the success in reducing energy usage is based on the reduction of cooling required in the projection area. The greatest impact will be realized in the summer months when the need for cooling is the greatest. The initial data collection period only includes shoulder season months.

PART 3: Technology Transfer Plan

8. Provide a brief overview of what the problem the technology solves.

In summary the technology solves the problem of how to continue to operate mid-life movie projection systems while taking advantage of new technologies that improve picture quality and reduce operating costs. Also eliminates a major consumable (xenon bulbs) that are difficult to recycle.

More specifically, the technology achieves the following:

- *Reduces electricity and emissions with both more efficiency projection systems and the elimination of legacy the exhaust fan systems, which are no longer needed with the new systems.*

- *Reduces waste as xenon bulbs need to be replaced every few months whereas the new laser systems last up to 100,000 hours.*
- *Better picture quality.*
- *Extend the life of the existing projectors.*

9. Describe what the customer currently uses to meet their needs that this technology addresses. What are the benefits of this technology over the current options?

   The current projectors are Barco DP2k series. These projectors are Xenon lamp projectors. The xenon filled lamps emit the light required for presenting a picture onscreen. Xenon lamps however emit a significant amount of heat and the systems require dedicated exhaust functions to ensure the safety of the unit and the space.

   The projectors are typically located centrally within a multiplex cinema with an elevated projection room housing numerous projectors and exhaust fans. As projection has improved over time the selection and initiation of films can be controlled from centralized computers elsewhere in the building. As a result, staff are infrequently required to be in the projection booth. In order to ensure that proper heat exhaust is in place all exhaust fans installed in the cinemas operate on a 7 by 24 basis.

   Xenon lamp projectors are also now understood to give off small amounts of radiation.
   In a business as usual scenario xenon lamps are replaced on a like for like basis, with the same product at the end of their life.

   The laser retrofits to the xenon lamp projectors realize the following benefits:
   - *Extended life of bulbs/light source (reducing waste through fewer replacements),*
   - *Reduced electricity use both from more efficient light projection and from the elimination of heat extraction systems,*
   - *Lower maintenance required to keep systems operating in peak condition,*
   - *Simpler, easier to use systems that will reduce the training requirements for staff, and*
   - *Safer systems that will not overheat or emit radiation.*

10. Describe where people can access the technology. Who is responsible for manufacturing, selling and servicing the technology?

    Barco is the manufacturer and supplier of the retrofit kits.

    Projectech is a Barco dealer and is responsible for the support and service of the units.

11. Describe who will use the technology and what the target market is. i.e., industry, geography, size, quantity of customers etc.

    The technology is relevant to movie cinemas, theaters, auditorium, university classrooms – anywhere with projectors. Xenon lamp projectors are in place in the majority of auditoriums across Canada.

We do not have any industry information on the number of Alberta movie theaters who have retrofitted projectors to laser bulbs, but laser projection is the standard industry practise for new facilities.

12. Identify specific competitors for similar technologies and substitutes. Include a brief comparison of the technologies and strengths/weaknesses of each. Identify any advantages that might exist with this technology system or that of your competitors.

    The alternative would be to purchase new laser projector systems from one of two vendors (Barco or Christie Digital). The purchase of new projectors would result in the early retirement of functional systems, and the disposal of non end of life products. This option comes with a much higher capital cost.

13. Describe the primary marketing mediums that either your company uses to market the technology or how you found out about the technology. i.e., advertising, industry contacts, word-of-mouth, public demonstrations etc.

    The technology was discovered by Landmark Cinemas' parent company, Kinepolis, and is in use in some locations in Europe.