

Contract No. R-027-036
“Gateway to Science Ethanol Exhibit”
 Submitted by North Dakota Ethanol Council
 Principal Investigator: Deana Wiese

PARTICIPANTS

Sponsor	Cost Share
North Dakota Ethanol Council	\$25,500
Other Partners	<u>\$24,500</u>
Subtotal Cash Cost Share	\$50,000
North Dakota Ethanol Council	<u>\$10,000</u>
Subtotal In-Kind Cost Share	\$10,000
North Dakota Industrial Commission	<u>\$50,000</u>
Total Project Cost	\$110,000

Project Schedule – 32 months	Project Deliverables:
Contract Date – August 29, 2016	Status Report: September 15, 2016 ✓
Start Date – May 1, 2016	Status Report: January 1, 2017 ✓
Completion Date – December 31, 2018	Status Report: April 1, 2017 ✓
	Status Report: July 1, 2017 ✓
	Status Report: October 1, 2017 ✓
	Status Report: January 1, 2018 ✓
	Status Report: April 1, 2018 ✓
	Status Report: July 1, 2018 ✓
	Status Report: October 1, 2018 ✓
	Status Report: April 1, 2019* ✓
	Status Report: July 1, 2019* ✓
	Status Report: October 1, 2019*
	Status Report: January 1, 2020*
	Status Report: April 1, 2020*
	Status Report: July 1, 2020*
	Status Report: October 1, 2020*
	Final Report: December 31, 2020*

OBJECTIVE/STATEMENT OF WORK:

The purpose of this project is to develop a hands-on, interactive, ethanol-specific exhibit to be utilized as a pilot at the current facility beginning the summer of 2016 and then permanently installed at the new Gateway to Science facility.

It is anticipated that results of this project will be:

- To increase the long-term use of ethanol in North Dakota by educating students, parents and educators in the region on the benefits of ethanol to the economy, environment and energy independence.
- To ensure the future of the ethanol industry workforce by engaging students, parents and educators in the lifecycle of ethanol production, specifically the scientific process of

converting an agricultural product, which is a growing source of sustainable energy, into high-value co-products, including ethanol and distillers grains.

STATUS:

The contract has been executed.

September 15, 2016 - The first status report has been received. The report states in part: During this reporting period, the prototype has been delivered to the current GTS facility and evaluation of the messaging and exhibit has begun. The prototype has been featured on the gallery floor since May 24. More than 4,200 guests have visited the gallery since that date, including groups from North Dakota Farmers Union, Legacy High School, elementary schools in Wishek, Taylor-Richardton and Bismarck-Mandan, and local preschools and daycares.

GTS is collecting feedback from visitors through an online survey. Center Guides are also conducting interviews and recording observations of guests' reactions to the exhibit. Preliminary feedback has been positive with visitors of all ages (toddlers to grandparents) engaging with the exhibit and completing the process to fuel the cars and feed the cows. GTS will provide assessment results from a larger sample set in the next report.

North Dakota ethanol industry representatives have visited the exhibit and provided input on messaging, suggesting some changes for the final exhibit. Discussions have also started with GTS staff on how to best incorporate virtual reality components and partner recognition into both the pilot and final exhibits.

GTS staff and Exhibits Committee members have met with the Science Museum of Minnesota exhibits team multiple times via videoconference and in person when they visited the current GTS facility on Aug. 11. During these discussions, GTS shared ideas to improve the exhibit, along with visitor interactions and observations. Some of the improvements suggested include incorporating actual corn and distillers grains into the display, an improved light notification system, a push button to start the cars racing and the cows eating, and the use of augmented reality to tell the stories of the science, technology, engineering and math (STEM) professionals involved in ethanol production.

Status Report received. It states in regards to the period September 1, 2016 - December 31, 2016 the following:

Objectives

The objectives of this project are: 1) to increase the long-term use of ethanol in North Dakota by educating students, parents and educators in the region on the benefits of ethanol to the economy, environment and energy independence; and 2) to ensure the future of the ethanol industry workforce by engaging students, parents and educators in the lifecycle of ethanol production, specifically the scientific process of converting an agricultural product, which is a growing source of sustainable energy, into high-value co-products, including ethanol and distillers grains.

In addition to the North Dakota Ethanol Council (NDEC), partners in the program are Gateway to Science (GTS) and Science Museum of Minnesota (SMM), as well as ethanol industry stakeholders including: CTE Global Inc, Dupont, Gavilon, Growth Energy, Lallemand and New Age Cryo.

The strategy that will be implemented to meet the objectives is the installation of a hands-on, interactive, ethanol-specific exhibit to be utilized as a pilot at the current facility and then permanently installed at the new GTS facility in Bismarck, ND, which is scheduled to open in 2018.

Strategy Progress

During this reporting period, 2,285 guests visited the gallery and interacted with the ethanol exhibit, including field trips from Turtle Mountain Community Schools, White Shield School, Hazen Elementary, Grimsrud Elementary, Miller Elementary, Theodore Jamerson Elementary and a group of homeschool students.

GTS continues to collect exhibit feedback from visitors through an online survey. Center guides are also conducting interviews and recording observations of guests' reactions to the exhibit. When asked what they liked most about the exhibit, 45 percent of respondents answered the exhibit is based on reality – ethanol production and use is part of daily life in North Dakota. Another 33 percent said feeding the cows and powering the cars were their favorite parts. Other respondents mentioned they liked the exhibit design and graphics and the ability for multiple people to engage with the exhibit at once (i.e., working as a team to turn the handles and complete the process).

When asked what improvements could be made to the exhibit, one guest suggested adding a pump or station that dispenses ethanol-blended gasoline to the exhibit display. Another guest recommended having the display lights turn from red to green to make it more obvious when each step in the production process is complete. Finally, multiple respondents mentioned having a button to trigger the cars and cows at the end of the process.

ATTACHMENTS

Guest reactions to the exhibit can be viewed here - <https://youtu.be/fXoKlpJTj1k>

Status Report received May 2, 2017 for the period January 1, 2017 - March 31, 2017. The Status Report states in part:

Strategy Process

During this reporting period 2,020 guests visited the gallery and interacted with the ethanol exhibit, including field trips from Will-Moore Elementary School, Naughton Elementary School, Theodore Jamestown Elementary, Turtle Lake-Mercer Public School, Lewis & Clark Elementary and Kulm Public School. Gateway to Science (GTS) continues to collect exhibit feedback from visitors through an online survey. Center Guides are also conducting interviews and recording observations of guests' reactions to the exhibit.

In the next quarter, GTS will work with the North Dakota Ethanol Council to add video content, such as NASCAR American Ethanol race footage, to the exhibit. It will also secure corn and distillers grains samples to incorporate in the display and utilize in educational outreach programming.

In addition, GTS is in discussion with Science Museum of Minnesota to determine the timeline for ethanol exhibit modification and additional fabrication to incorporate the changes recommended in the evaluation period.

Status Report received July 18, 2017 for the period April 1, - June 30, 2017. The Status Report states in part:

Strategy Progress

During this reporting period, 3,057 guests visited the gallery and interacted with the ethanol exhibit, including more than 35 field trips from across the state in May alone. The ethanol exhibit prototype has been partially disassembled for transport and shipment back to Science Museum of Minnesota (SMM) in Saint Paul where SMM will begin pilot exhibit fabrication. Once completed, the pilot exhibit will be installed at the current Gateway to Science (GTS) facility.

The North Dakota Ethanol Council provided GTS with corn and distillers grains samples to incorporate in the pilot exhibit--these samples have been sent on to SMM. Other planned changes for the pilot exhibit include: 1) fixing the auger to reduce jams, 2) adding lights to moving pieces to notify visitors when steps in the production process are completed, 3) updating the exhibit graphics and incorporating links to video content, 4) building a transparent cabinet that allows visitors to see the inner workings of the exhibit, and 5) adding a button at the end of the process to start the cars driving and cows eating. GTS staff will meet with the SMM exhibits team weekly in a conference call to discuss their progress.

Status Report received October 30, 2017 for the period July 1, - September 30, 2017. (A copy of the status report is posted on the Renewable Energy Program website.) The Status Report states in part:

Strategy Progress

The ethanol exhibit spent this reporting period at the Science Museum of Minnesota (SMM) in Saint Paul. Several pdfs documenting the work performed by SMM are posted on the website. They include:

- Work plan and timeline for taking the exhibit from prototype to pilot
- Diagram of the exhibit furniture
- Drafts of the exhibit graphics

The final pilot exhibit was delivered to Gateway to Science on October 18, 2017. Science center staff will now begin evaluation of the pilot exhibit.

It was noted in this report that the additional spending will be more than originally projected on the pilot exhibit and less than originally projected on the permanent exhibit fabrication and install. While the percentage for each stage of the project may shift, the total expenses will remain at \$110,000 (\$100,000 cash, \$10,000 in-kind).

Status Report received January 19, 2018 for the period October 1 - December 31, 2017. (A copy of the status report is posted on the Renewable Energy Program website along with photos.) The Status Report states in part:

Strategy Progress

As mentioned in the prior report, the final pilot ethanol exhibit was delivered to Gateway to Science on October 18, 2017. During this reporting period 1,535 guests visited the gallery, including field trips/visits from Shiloh Christian School, Maple Valley Junior High, Hazen Elementary, MOPS and homeschool groups. Gateway to Science Center guides are once again conducting interviews and recording observations of guests' reactions. The ethanol exhibit continues to be one of our most popular exhibits with some of the longest dwell times.

Status Report received April 1, 2018 for the period January 1 - March 31, 2018. (A copy of the status report is posted on the Renewable Energy Program website.) The Status Report states in part:

Strategy Progress

During this reporting period, 2,346 guests visited the gallery, including field trips/group visits from Naughton Elementary, Turtle Lake-Mercer, Christ the King, Little Heart Elementary, The Innovation School, Burdick Job Corps Center, Theodore Jamerson Elementary, Standing Rock Middle School and two homeschool groups.

Gateway to Science met with North Dakota Ethanol Council on March 1 to discuss adding video content to the ethanol exhibit. Growth Energy has given us permission to use a video about the American Ethanol NASCAR team for the exhibit. Gateway to Science and North Dakota Ethanol Council will work together to produce additional videos (e.g., a look inside an ethanol plant or a farmer feeding cows distillers grain) in the coming months. Finally, we will coordinate with Science Museum of Minnesota to integrate the video content into the exhibit with QR codes or other technology.

Status Report received July 12, 2018 for the period April 1-June 30, 2018. (A copy of the status report is posted on the Renewable Energy Program website.)

Strategy Progress

During this reporting period, 4,135 guests visited the gallery, including 60 field trips and group visits from communities across North Dakota (e.g., Beulah, Hebron, Kulm, Minot, Scranton and Wing), northern South Dakota and eastern Montana.

October 2018 progress report received. (A copy of the status report is posted on the Renewable Energy Program website.)

Strategy Progress

During this reporting period, 2,574 guests visited the gallery, including numerous daycare and summer program groups. Gateway to Science hosted 11 weeks of STEM Adventure Camp over the summer. All campers had multiple opportunities to explore the exhibit gallery and interact with the ethanol exhibit. Gateway to Science is working to incorporate video content in the ethanol exhibit. It has started conversations with Microsoft and other vendors about how to best utilize virtual or augmented reality technology.

The recipient has indicated that an extension will be needed due to a delay in construction of the new Gateway to Science facility. A no-cost extension was granted.

*Denotes changes from original contract.

April 2019 progress report received. (A copy of the status report is posted on the Renewable Energy Program website.)

Strategy Progress

From October 1, 2018 through December 31, 2018, 1,686 guests visited the Gateway to Science gallery. For January 1, 2019 through March 31, 2019, gallery visitors totaled 2,084. Gateway to Science hosted group visits from MOPS of Evangel, Hazen Elementary, ND Farmers Union, Missouri Valley YMCA Youth Development Centers, White Shield School, Roosevelt Elementary, Cathedral School, Mary Stark Elementary, Innovation School, Naughton School, Center-Stanton Elementary, Brentwood Adventist Christian School, Christ the King School, Hope Christian Academy (Dickinson), and several homeschooling associations. During this period, Bismarck Mayor Steve Bakken toured Gateway to

Science and had the opportunity to interact with the ethanol exhibit, as did several North Dakota legislators.

On October 10, 2018, a group of preservice teachers from University of Mary joined us for their annual Day of Service. They compiled a guide for educators visiting Gateway to Science that connects our exhibits (including the ethanol exhibit) to North Dakota Science Standards: <https://gatewaytoscience.org/wp-content/uploads/2018/10/18.10.9-Gallery-Exhibit-Standards-Assessment-Promo.pdf>.

July 2019 progress report received. (A copy of the status report is posted on the Renewable Energy Program website.)

Strategy Progress

For April 1, 2019, through June 30, 2019, gallery visitors totaled 3,346. Gateway to Science hosted 60 group visits from across the state (e.g., Dickinson, Inkster, Minot, Selfridge, Zeeland) and into South Dakota. In addition, 28 birthday parties explored the gallery during this reporting period. STEM Adventure Camp, Gateway to Science's summer program for students entering grades 1-5, kicked off May 28 and runs through Aug. 20. Each camp visits the gallery twice during the week.

Work to extend a water main and relocate a power line has begun at Gateway to Science's new building site. We will host a ceremonial groundbreaking this fall.

There are no expenses to submit for this reporting period.

8/2/2019