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FR-02197 - CITCO Waste Heat Recovery Sub-Application

General Information

Funding Request	855400LLC
Supplement Type	CITCO Waste Heat Recovery Sub-Application
Supplement Status	Submitted

Project Overview

Supplemental Response 01 Question:
Please describe in detail the project scope and proposed changes (e.g., equipment/technology, processes, etc. to be replaced and/or installed).

Response:
The project includes heat recovery from the **Redacted** process **Redacted** exhaust. Heat from the hot exhaust air will be captured by air-to-liquid heat exchangers and re-used throughout the process. Heat will be used for building heat and pre-heating process inputs using an integrated glycol loop.

Project Scenario **Redacted**

Supplemental Response 02 Question:
Please describe in detail the objective of the proposed project.

Response:
The project will install a dedicated glycol heat recovery system in a **Redacted** production facility to capture heat from the process equipment exhaust. This heat recovery will directly displace natural gas consumption for building heat and process fluid heating. The process will operate on a 24hr/362day basis.

Expected Project Lifespan (years) **Redacted**

Project Readiness

Supplemental Response 03 Question:
Please provide a detailed project plan, including the specific work tasks to be completed, the implementation timeline with phases and key milestones, the technological scope of the project, and any potential inflection points where project completion may be reconsidered.

Response:
The design of the size and capacity of the system is completed:
i. Heat exchanger sizing and forecasted efficiency required to recover the wasted heat
ii. Heat sink to receive the energy recovered
iii. Process equipment required to deliver the energy to the heat sink
To come:
1) Procurement phase:
a. Procurement of the wasted energy heat exchanger
b. Piping and pumps to deliver the heated glycol to building heating unit
c. Award piping contract installation
2) Construction phase:
a. Installation of the heat exchanger within the main process equipment scope installation
b. Install pumps and piping
c. Install Building heating systems
3) Startup of the process and the glycol loop system

Supplemental Response 04 Question:
Please describe the team and team members that will be working on this project, the unique qualifications that will lead to a successful project, and the administrative and technical capacity to do so.

Response:

The applicant will utilize professional, reputable and experienced third-party contractors to complete the project. These contractors will have oversight from the applicant's internal engineering, operation, procurement and finance teams formed with multiple individuals who have completed themselves and/or provided oversight to multiple previous installations.

Supplemental
Response 30

Question:

Please provide a project narrative that outlines the proposed waste heat recovery system, including the following: 1) The equipment or industrial process that is (or will be) the source of the waste heat; 2) The physical form of the waste heat (exhaust, water, other liquid, etc.); 3) Temperature range of the existing source of waste heat; 4) The type of waste heat recovery technology or equipment that will be put into service; 5) Integration into existing or proposed systems, processes, technologies, etc. at the industrial facility; 6) The intended end use(s) of recovered waste heat; 7) How the specific waste heat recovery process will occur. For example, will the waste heat recovery system transfer heat between gases and/or liquids, transfer heat to the load entering furnaces, generate mechanical and/or electrical power, use the heat with a heat pump to heat or cool a facility, etc.

Response:

Corresponding to the application notation numbers:

1. **Redacted**
2. Exhausted air
3. 124F - 387F
4. Glycol loop using air/liquid heat exchangers
5. **Redacted**
6. Building heat and also pre-heating process inputs such as air, water and chemicals for the manufacturing process
7. Heat will be transferred from process equipment exhaust and transferred via heat exchanger to a glycol loop to be circulated throughout the machine building and/or to pre-heating equipment

Supplemental
Response 31

Question:

How is the proposed project prepared to address potential issues caused by constituents resulting from industrial heating processes that would otherwise impact the operation of the proposed project?

Response:

Redacted

Est Heat Wasted
(MMBtu/yr)

669,000

Est Annual Heat
Recov (MMBtu/yr)

126,000

Supplemental
Response 32

Question:

What limitations (if any) are there to the amount of waste heat that the proposed project can recover from the heat source?

Response:

Redacted

Supplemental
Response 33

Question:

Will the waste heat need to be stored? If so, please describe the storage system/technology.

Response:

Redacted

Supplemental
Response 05

Question:

Does the proposed project require any known notifications, compliance with land use plans, zoning codes, permits, utility authorizations, or other approvals?

Response:

Yes

Supplemental
Response 06

Question:

If yes, please specify the known notifications, permits, or authorizations needed, including any governmental or utility requirements. Additionally, outline the steps taken or planned to ensure compliance, including where the project currently stands in the permitting or authorization process.

Response:

Redacted

Supplemental
Response 07

Question:

Please outline risks (technical, financial, supply chain, etc.) that may delay or prevent the implementation of

the proposed project should it be awarded a tax credit reservation, as well as proactive steps your organization has and/or will take to reduce such risks.

Response:

Technical risk is well understood and mitigated with internal and external expertise.

Redacted

Labour risk is minimized with the availability of local and non-local contractors to complete the required installations.

Project Budget

Supplemental
Response 08

Question:

What specifically is your organization seeking cost coverage for regarding this proposed project? Please note that only capital costs related to the proposed project are eligible.

Response:

\$2,600,613

Capital Costs

Percent of Capital
Costs Covered

Redacted

Total Tax Credit
Reservation Request

\$2,600,613

Estimated Annual
Savings (dollars)

Redacted

Payback Period
(years)

10

Supplemental
Response 09

Greenhouse Gas Avoidance Benefits

Est GHG Reduction
(MT CO2e/yr)

6,690

Est GHG
Reduction/Dollar (MT
CO2e)

0.077174

Supplemental
Response 10

Question:

How were these determinations [of the estimated annual GHG avoidance benefits of the proposed project] made?

Response:

Calculated based on the average annual heat recovery and taking the therms avoided multiplied by the emissions factor.

Natural Gas Est Pre
(therms/yr)

3,443,344

Electricity Est Pre
(kWh/yr)

Natural Gas Est Post
(therms/yr)

2,183,584

Electricity Est Post
(kWh/yr)

Natural Gas Est Diff
(therms/yr)

-1,259,760

Electricity Est Diff
(kWh/yr)

Other Energy 1 Fuel
Type

Other Energy 2 Fuel
Type

Other Energy 1 Est
Pre

Other Energy 2 Est
Pre

Other Energy 1 Est
Post

Other Energy 2 Est
Post

Other Energy 1 Est
Diff

Other Energy 2 Est
Diff

Project Co-Benefits

Supplemental
Response 11

Question:

Please describe the non-environmental co-benefits that the proposed project(s) will help to achieve (e.g., environmental justice, health benefits, social/community benefits, economic benefits, etc.).

Response:

Redacted will provide significant employment benefits, taxation benefits, multiplier benefits across the economy **Redacted**

Supplemental
Response 12

Question:

Will these co-benefits extend to the surrounding community, and if so, how?

Response:

Yes, both the construction phase and then full operations will provide benefits to employees, governments, utilities, service providers, material providers, and then related benefits to individuals, community groups and businesses that receive multiplier benefits across the region.

Supplemental
Response 13

Question:

Describe any other additional community benefits that the proposed project is anticipated to provide, submitting supporting documentation as necessary. Community benefits may include: 1) Project Partnerships and public/community engagement, 2) Local hiring and job training/apprenticeship opportunities, 3) Support for local small businesses 4) Education partnerships between project developers and academic institutions, 5) Other benefits to the surrounding communities

Response:

Local, regional and relocated hiring benefit.

Local small businesses for services

Redacted

Redacted

Education partnership with the local college for hands on training programs.

Significant tax base from employer and employees to support many local government and non government programs.

Supplemental
Response 14

Question:

Are there other environmental benefits that will result from the implementation of this project (e.g., avoided water consumption, avoided waste products, non-GHG air quality improvements, or pollutant reductions, etc.)?

Response:

Redacted

Reduced maintenance costs and risk of failures improving safety outcomes. New technology implementation helps support employee skill growth and workforce development. Improved temperature stabilization and humidity helps improve the consistency of product quality. Lower thermal energy consumption helps meet sustainability targets and improves overall corporate and brand image. Lower costs, improved safety and governance all support the long term longevity of the site.

Supplemental
Response 15

Question:

Are there potential negative impacts, direct, indirect, or cumulative, related to the implementation of this project, whether they be economic, social, health, or environmental? Please clearly identify all such impacts, addressing each economic, social, health, and environmental impacts separately here or within a supplementary mitigation plan.

Response:

A project risk summary and mitigation plan will be subsequently provided.

Supplemental
Response 16

Question:

Have mitigation strategies for potential negative impacts been developed? Please outline potential negative impacts and the subsequent mitigation strategy below or in an attached supplementary mitigation plan.

Response:

A project risk summary and mitigation plan will be subsequently provided.

Demonstration of Need

Supplemental
Response 17

Question:

Does this project face capital constraints that CITCO would help to overcome? Please describe.

Response:

The consideration for inclusion of the project in the base design requires CITCO support.

Seeking Federal
Grants Or Tax Credits



Supplemental
Response 18

Question:

If Yes to the question about whether the project will be seeking any state or federal grant funding or tax credit offerings, provide additional details on the grant funding or tax credit offerings (program name, funding amount, application status, and any funds already awarded).

Response:

Redacted previously approved for aspects of the Rural Jump Start program. **Redacted**

Coverage Exceeding
75%Supplemental
Response 19

Question:

Is your organization going to leverage any additional private investment partnerships to assist in financing the proposed project(s)?

Response:

Yes, as part of the wider manufacturing facility financing.

Project Innovation

Supplemental
Response 20

Question:

Is this project or aspects of this project innovative? How so?

Response:

Yes – using the wasted energy from the base source of heat to be re-used as heat for buildings and pre-heating process fluids requires significant process equipment installation and requires efficient energy balance control to not disturb the main production process, while maintaining building work temperature comfortable for occupants in all outside temperature conditions.

Supplemental
Response 21

Question:

Is this a project that, if implemented, could be transformative for the sector/subsector, and/or for the specific production process being undertaken by the applicant?

Response:

Yes – the re-use of process heat wasted requires a heat sink and the design proposed is highly efficient in climates with significant winter. The design is applicable for all similar industrial process and industry that are willing to reduce GHG required for building heating.

Supplemental
Response 22

Question:

Describe how the proposed project has the potential to significantly advance reductions in GHG emissions.

Response:

The wasted heat is generated **Redacted** and by recovering this heat into the building heating system and pre-heating processes, the gas that would normally be required for normal building heating is then avoided.

Supplemental
Response 23

Question:

Does the technology to be installed as part of the proposed project(s) meet a technology readiness level (TRL) of six or greater? Please use the TRL guidance document in the appendix for guidance when making this determination.

Response:

Yes

Technology
Readiness Level (TRL)

TRL 9 - Actual system proven in operational environment

Supplemental
Response 24

Question:

If the proposed technology meets but does not exceed the technology readiness level of six, please describe the technology's performance in a relevant environment and the potential risks associated with implementing a full-scale prototype demonstration in an operational environment.

Response:

Supplemental
Response 25

Question:

If the proposed technology does not exceed the technology readiness level of seven, please describe its prototype performance in an operational environment, replicability and adoption potential within Colorado's industrial sector, as well as the technological risks associated with funding this project.

Response:

Supplemental Response 26

Question:
If available, provide scientific literature detailing the potential GHG avoidance impacts of the proposed technology, or subsequent literature on technology results to date.

Response:

Submission Affirmation and Signature

Supplement Attestation Text

By entering your full name and date below, you are attesting that you understand and certify that the applicant organization is both registered and in Good Standing with the Colorado Secretary of State's Office. You understand that any false statement(s) made in this application may result in ineligibility or the termination of a tax credit reservation awarded based on this application.

Supplement Attestation Signed



Supplement Signature

Stewart G. Austin, Authorized Agent - 2025-12-30

Supplement Submitted Date/Time

12/30/2025, 12:43 PM

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Record Type

CITCO WHR Supplement

Files

Waste Heat Recovery_GHG Avoidance Calculator_CITCO Round 4

Energy Audit Note_CITCO application

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Waste Heat_Project Budget Workbook_Colorado Industrial Tax Credit Offering Cycle 4

Confidential Business Information_Example Project Schedule

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