

Iowa City Climate Action Commission Agenda

Monday, March 1, 2021, 3:30 – 5:00 p.m.

Electronic Meeting, Zoom Platform

Electronic Meeting

(Pursuant to Iowa Code section 21.8)

An electronic meeting is being held because a meeting in person is impossible or impractical due to concerns for the health and safety of Commission members, staff and the public presented by COVID-19.

You can participate in the meeting and can comment on an agenda item by going to <https://zoom.us/meeting/register/tJctdumvrD0sEtFYkP5tonUrC2-R14oEEvYD>. via the internet to visit the Zoom meeting's registration page and submit the required information.

Once approved, you will receive an email message with a link to join the meeting. If you are asked for a meeting or webinar ID, enter the ID number found in the email. A meeting password may also be included in the email. Enter the password when prompted.

If you have no computer or smartphone, or a computer without a microphone, you may call in by telephone by dialing (312) 626-6799. When prompted, enter the meeting or webinar ID. The ID number for this meeting is: 930 1072 6685.

Once connected, you may dial *9 to "raise your hand," letting the meeting host know you would like to speak. Providing comments in person is not an option.

Meeting Agenda:

1. Call to Order
2. Roll Call
3. Approval of Feb. 1, 2021 minutes
4. Public Comment of items not on the Agenda
-Commentators shall address the Commission for no more than 3 minutes. Commissioners shall not engage in discussion with the public concerning said items.
5. Staff Announcements
 - a. Action items from last meeting
 - b. Updated Action Plan report (see attachment)
6. Old Business:
 - a. Continued discussion of the Methane Feasibility Study
7. New Business:
 - a. Request for two commissioners to participate in Climate Action Grant review
 - b. Updates on working groups (see reports in agenda packet)
 - i. Buildings (Krieger, Karr, Soglin, Grimm)
 - ii. Outreach (Krieger, Fraser, Holbrook, Bradley)
 - iii. Equity/Adaptation (Tate, Hutchinson)
 - iv. Adaptation (Bradley, Leckband, Grimm)
8. Recap of actionable items for commission, working groups, and staff
9. Adjourn

If you will need disability-related accommodations in order to participate in this meeting, please contact Sarah Gardner, Climate Action Engagement Specialist, at 319-356-6162 or at sarah-gardner@iowa-city.org. Early requests are strongly encouraged to allow sufficient time to meet your access needs.

IOWA CITY CLIMATE ACTION COMMISSION
FEBRUARY 1, 2021 – 3:30 PM – FORMAL MEETING

Electronic Meeting

(Pursuant to Iowa Code section 21.8)

An electronic meeting is being held because a meeting in person is impossible or impractical due to concerns for the health and safety of Commission members, staff and the public presented by COVID-19.

ELECTRONIC MEETING

MEMBERS PRESENT: Madeleine Bradley, Ben Grimm, Megan Hill, Kasey Hutchinson, John Fraser, Matt Krieger, Jesse Leckband, Becky Soglin

MEMBERS ABSENT: Stratis Giannakouros, Grace Holbrook, Eric Tate

STAFF PRESENT: Sarah Gardner, Jennifer Jordan, Ashley Monroe, Joe Welter

OTHERS PRESENT: Morgan Mays, Marcella Thompson, Jeremy Cook

CALL TO ORDER:

Fraser called the meeting to order.

APPROVAL OF JANUARY 4, 2021 MINUTES:

Krieger moved to approve the minutes from January 4, 2021.

Grimm seconded the motion, a vote was taken and the motion passed 7-0 (Leckband not present for the vote).

PUBLIC COMMENT OF ITEMS NOT ON THE AGENDA:

None.

STAFF ANNOUNCEMENTS:

Action Items from last meeting: Gardner noted there were two action items from the last meeting. One was to include both the working group restructuring discussion and the follow up

questions for the methane study in the agenda. The other item was a call for all working groups to submit updates to staff by the last Monday of the month so that they could be included in the packet. Gardner received updates from the building working group and the outreach working group and those were included in the agenda packet. For the next agenda packet, the last Monday of the month is February 22. Gardner requested to have updates to her by then.

Climate Action and Outreach Office Updates: Gardner noted the bi-monthly list of recent activities was included in the agenda packet. Staff activities for the months of January and February included the TIF Funded Climate Action Incentive Program. She said the program is underway, the application has been finalized, and they have received the first application, which they are excited to be reviewing and hopefully moving forward on. They also continued the discussion with MidAmerican Energy to ensure that the projects were not in conflict and received very good news this month that any project participating in the City's energy efficiency program would also be able to participate in the MidAmerican program. Normally, the projects that just participate in MidAmerican are eligible for reimbursement up to 50% of the cost of the project. By combining their program and the City's, MidAmerican is allowing participants to be reimbursed up to 75% of the cost of the project, which is a big savings for companies that hope to move forward and take advantage of both programs. In addition, Wendy Ford and Gardner have been working with the Iowa City Area Business Partnership to prepare four virtual presentations. The February presentation will be given in collaboration with MidAmerican and is focused on getting the word out about energy efficiency rebate options in the City for small commercial properties and large ones.

The Green Iowa AmeriCorps team continues to deliver home energy kits. So far, they've done a total of 207 audits or home kit deliveries and 69 education and outreach events. Gardner noted AmeriCorps provides kits to the city of Davenport and some of those kits are included in this number but the majority are for Iowa City.

For the energy efficiency and building projects, they have a builder and project identified to showcase in the upcoming Parade of Homes. They also are working with Neighborhood Services on an energy efficiency demonstration rehab project, and have a property identified and are in discussions as to the different energy efficiency elements that will go into that project. They also continue to do work on the Earth Day Neighborhood Energy Blitz plans. It will be a door to door campaign that will utilize the AmeriCorps members as well as high school environmental clubs and the Climate Ambassadors. The pilot program will launch in the South District neighborhood. Staff have been in communication with them as the pilot site and they have agreed to help get the word out to residents to expect the kits. Staff also have formed a staff committee to assist with logistical planning since obviously it is a big undertaking with a lot of moving parts. Staff representing Neighborhood Development Services and Resource Management are serving on that as well as Communication staff.

For the marketing RFP, staff are currently in negotiations with the consultant over the finalized scope of the contract. It will be going before Council for approval in February, which means hopefully they'll be able to get underway in March. In order to prepare for that they are in the process of compiling all the climate related communications and marketing collateral. Gardner added the project will include a vulnerability analysis for populations in Iowa City and identify related communication strategy, which is a nice addition to the project. It's not something they necessarily asked for in the RFP, but it does meet another objective they have for the climate action initiatives.

The second Climate Ambassadors cohort is scheduled to begin its training starting this Wednesday and that will carry on through March 24. This cohort of applicants was drawn from the waitlist of applicants who applied for the first training session back in October. All the applicants who had been waiting for an opportunity and were still interested were able to be enrolled into this session with the exception of just one person. When staff reopen the portal in March to begin looking for the third cohort of trainees, they'll be able to once again to solicit applications from the public as a whole. They will also notify the one person who wasn't able to participate this time.

With regards to the two ongoing grant projects, Gardner reported the EV Readiness Planning Project has had two virtual stakeholder events held in January. They were both very well attended. The first program had 65 attendees and the second program had 55. The first program was presented as a level-setting webinar and allowed interested parties who were unfamiliar with the project or unfamiliar with EVs to learn more. The second event was a virtual whiteboarding event that allowed the project coordinators to gather input from stakeholders. Gardner noted it was a very lively discussion. They were able to get some great points from the participants on what the perceived barriers to EV adoption are in the state, what kinds of strategies they could employ, and what criteria they should be using to prioritize those strategies. The steering committee will now reconvene and go over the information gathered in that exercise to start figuring out where those priorities lie. In the meantime, the consultant has begun outreach to the multifamily housing landlords and property managers to begin that portion of the study, which is focused on a barrier analysis to figure out how to get more charging stations at rental properties so that renters have equal access to this technology. Gardner noted if anybody would like more detail on this project, to understand where it is, what progress has been made so far, and what information that was presented to stakeholders, a recording was made of that first meeting and is available on the YouTube link included in the staff report.

For the Heartland Carbon Sequestration grant, Gardner reported a GIS-based carbon management tool that has been under development is nearing completion. There is also an Excel tool that can be used to make decisions about carbon sequestration strategies that is about to be unveiled and staff will be able to report more on that at the next meeting.

Finally, Gardner introduced the new staff member in the climate action and outreach division, his name is Mohsen Vahidzadeh.

Mohsen introduced himself and noted today is his first day and he is happy to be here. He noted he is originally from Iran and came to Iowa City to pursue a PhD at the University of Iowa. He graduated in December. He is very excited to work with everyone here at the City of Iowa City and work on different initiatives to reduce emissions and reduce energy consumption.

On behalf of the Commission Fraser welcomed Mohsen to the City and Commission.

Regarding ongoing projects Gardner noted they have been collaborating with the Equity and Human Rights Division on a Black History Month event. The Climate Action Division is bringing in Richard Mobian, who is a nationally recognized speaker through Project Drawdown, and is going to be speaking about fostering multiracial partnerships for climate action and addressing historically disparate access to sustainability resources. He will be joined by a member of the

Climate Ambassador cohort from the first training series, Ayman Sharif, who is going to complement the national overview with some perspectives from the local area here in Iowa City. That event is going to take place February 25.

Soglin asked for Gardner to send the Commission the link for the Smart Series so some of them can sign up for that. She also asked how staff is presenting to the businesses and if there are limited seats for that. Gardner believes that series may be for chamber members only but will look into it, and if it is open to the public she will send the Commission information on how to sign up.

Soglin also noted the marketing folks will be doing a vulnerability analysis and that Johnson County Public Health has done some of that type of analysis already, so there may be a way to help each other without taking away from the specific goal. Gardner agreed and stated she would love to connect them and add that analysis to collateral to share what work has been done.

Fraser noted the agenda packet is well done and he urges everyone to make sure they spend a fair amount of time on that before these meetings.

OLD BUSINESS:

Discussion of ideas to restructure working groups: Krieger began the discussion noting there were essentially two ideas outlined in the restructuring proposal. The first takes on a broader based approach and the working groups are really focused on the broad cross cutting ideas. There's the Outreach Working Group, there's the Equity Working Group separate from Adaptation. He likes that approach because when they were more siloed, it was harder to capture all of that. He feels any topic that has enough substance or content to work with should continue and that's why he also thinks the Buildings Working Group should continue. When they first started the working groups one of the things that they wanted to do was not just be a sounding board for what staff are working on, but also generating content and be the communication loop for members of the community as well and bring in other people outside of the Commission, other experts and other stakeholders to be part of those discussions. Krieger believes there's enough content in the ones that are proposed in the document to be effective.

Bradley agreed with Krieger that the first one made more sense for the structure. She did not believe that means they could not also add another working group if a project came about and they felt that it was necessary.

Fraser discussed a book on leadership he follows. The authors break down leadership into five practices. The first is "Model the way" and the second one is "Inspire a shared vision." To him, making the City plan successful, attaining their goals, is all about being able to paint a picture of the vision they have in mind when they have accomplished all of those goals. The third is "Challenge the process," not just maintaining the status quo, and have leaders that lead the change. Leadership is all about understanding when it is not business as usual any longer. The fourth one is what they're talking about right now, "Enable others to act," and it's not just delegating, it's sticking to the belief that within an organization everyone has the capability of being an exemplary leader. Fraser noted with working groups, they're going beyond the original committee, now a commission, and finding talent and enabling them to really get involved. What they need to do is be able to really take advantage and leverage the working groups. The theory

is they haven't been doing that as successfully as they would like to and didn't hit the goals with working groups. They need to be willing to be flexible and allow these groups to evolve into something more than they are right now.

Soglin asked if Fraser is asking about getting at the public involved. Fraser said with the working groups, that is what they are doing – they are bringing in nonmembers of the Commission. Soglin asked if Fraser is wanting the groups to operate the other way, the other option. Fraser said he is not stating his preference at this point. He continued on with the last practice for leadership, which is “Encourage the heart,” which is nothing more than celebrating wins, patting people on the back when they do a good job, and encouraging them to keep up the good work.

Fraser brought this up because it made him think about enabling others to act and that's really what they're doing with working groups. Going beyond just commission members and garnering more talent within Johnson County and Iowa City, and then figuring out how to best capitalize on their skill sets.

Fraser also noted if they chose one option and figure that out in three or four months or six months it isn't working then they can modify so they can't really go wrong with either one of these options.

Grimm noted he doesn't have a strong opinion either way, he thinks both would be an improvement over what they're currently doing. He thinks the key thing is not spreading the group too thin and getting unfocused on the central goals. He is flexible either way with the understanding that they're trying to narrow down the focus of what they're looking at and having more defined clear objectives.

Fraser wondered which option would be the easiest and the quickest to pull the trigger on or are they about the same.

Soglin said she felt the option Krieger and Bradley talked about would be a little bit easier to begin with, because they build more on what some of them have been doing, and while she appreciates that some haven't functioned as well as they could have, the Building Working Group has done a pretty good job. They would like to be allowed to continue as it has only been one year. She noted now the climate ambassadors will be engaged and perhaps some of them could be involved with the groups. Soglin also noted how much time it takes to arrange meetings the Commission members is not insignificant for those who are managing those groups, and to set up agendas and to take notes. All those things have to happen. So while it is their duty to give time, she feels they also need to be mindful of everyone's time realistically,

Fraser noted the density greenhouse gas memo created by the Buildings Working Group and all the work that went into that as an example and said it was well done.

Fraser asked if anyone has a contrary thought or wants to discuss the downside to the first option. Krieger noted the downside is if it doesn't have a specific goal or set of goals in place, then it can waffle or not go a specific direction. One of the things in the Buildings Working Group that they've challenged themselves with is to be looking at the accelerated actions that were buildings related, and looking at where they can make a contribution without being tasked with something. He believes they can task themselves in the working groups, which maybe wasn't something they were quite doing over the past year entirely. Even in the Buildings Working

Group, they had a lot of effort put into a few topics, and those were specific and prioritized. With any of the working groups progress can be made and they can be reaching out and getting additional stakeholders. He does believe it could be a shortcoming if there's not a lot of rigor around that.

Fraser noted they could have the same deficiency or lack of rigor with the second model as well, something based on projects has to be pretty specific in order to be professionally executed.

{Leckband joined the meeting}

Krieger offered a motion to stand down the Transportation and Waste Working Groups and continue forward with the Outreach and Buildings Working Groups and subdivide the Equity Working Group to create the new Adaptation Working Group.

Fraser noted the people that have now been displaced from those groups can now become members of a new group. Krieger said in the past they have self-selected which groups to be members of. Leckband noted he would be interested in adaptation. Hill said she would also be interested in joining the adaptation group as well. Bradley would be displaced from the Waste group but is also on the Outreach Group. However, if it worked with her class schedule, she would be interested in participating in the Adaptation group as well. Grimm noted he was only somewhat displaced because he was originally on the Transportation and building group, and he is still in the Building Group and is unsure if it is necessarily to join another working group.

Gardner noted the only other person who would be displaced is Giannakouros who's not at this meeting today. She said she could reach out to him via email and see if he would be interested in joining the Adaptation Group or some other group. She will then update the list of working groups on the agenda for the next meeting based on what the outcome of the vote is.

Krieger moved that as of today's date, February 1, 2021, the active working groups will be Outreach, Buildings, Equity and Adaptation.

Grimm seconded the motion.

A vote was taken and the motion was passed 8-0.

Building Working Group Density GHG Memo:

Fraser reiterated the memo was well done, very professional, and overall outstanding. Soglin noted this item was information only. Monroe was going to share this with Council this week and if they hear back from them with questions, they'll bring those to the group. Monroe noted she will need to double check and make sure that it went into the into the Council information packet. She stated typically when they're discussing items during a work session or require feedback about a certain subject they will request that at their meeting and the Commission or staff can present at an upcoming meeting. Fraser stated he would be curious to get feedback from Council on the memo.

NEW BUSINESS:

Follow up Discussion with HDR on the Methane Feasibility Study: Fraser first thanked HDR for their very professional presentation and materials that the Commission had to review and now have had some time to think about.

Morgan Mays (Project Manger, HDR) thanked the Commission and noted they did their best in the executive summary of that report to summarize the project and would like to know if anyone has specific questions on things. He reiterated this is an initial, high-level study that was done to really assess different options. Ultimately, they were trying to determine what kind of organics diversion is as a viable consideration and what kind of technologies and beneficial uses can be used to go off of that. He said he believes their report does a really good job of summarizing that. There are some paths forward that are considerations or options that are included in there for the city to look at and further study. Ultimately there would be refinements for the best solution to be determined.

Fraser noted sometimes after a formal presentation to a large group we tend to think of two or three things we wish we said 30 minutes after the meeting is over. He asked if there were any basic thoughts that they would like to refresh the Commission on or items that maybe came to mind after they were done with the meeting last month.

Mays acknowledged there was a lot of information shared and it takes a lot to digest all that information. Overall, they all want to have an action-level plan moving forward. He thinks organics diversion, and some level of diversion, is probably the biggest question that this Commission and the City needs to determine if they want to make the investment on it. All of it was proven to show a greenhouse gas emission reduction that furthers the Climate Action goal.

Soglin asked how does actual reduction of organics fit into this. Would there be any issues if at some point 10-15 years down the road the waste that gets produced in the first place is reduced due to a concurrent effort to do so?

Marcella Thompson (Director of Sustainability and Resiliency, HDR) noted certainly there would be some impact to landfill gas production. It would take a significant incremental source reduction of organics, though. She noted there is already plenty of organics in the landfill today that will continue to generate landfill gas well into the future. Thompson stated they did a little scenario analysis of diverting organics out of the landfill to see what that impact would be, whether it was the 1500 tons or the low diversion scenario, whether that's diverted to another source or whether that was just a simply a source reduction, i.e. preventing the food waste, organic waste. That gave them an indicator of how that would impact landfill gas generation in the future.

Jen Jordan (City of Iowa City Resource Management Superintendent) confirmed that as the perfect answer and added she will never look at this as a reason to stop trying to divert and reduce source food waste.

Soglin had another question regarding air quality onsite, particularly at the wastewater treatment plant which is close to housing. They would be cleaning the natural gas there to make it either usable onsite or to pipe it out. Are there things they need to consider for that neighborhood so they aren't disproportionately affected by what gets off-gassed there?

Joe Welter (Senior Civil Engineer for the City of Iowa City) wanted to first address Soglin's first

question. He noted the organics in a landfill setting is not an efficient way to deal with organics. He explained what the study is trying to do is to divert those organics to a facility, either an existing digester at the wastewater treatment plant in the 1500 ton diversion scenario, or a new facility at the wastewater treatment plant, That would deal with those through an aerobic digestion process, which is much more efficient with dealing with organics than a landfill cell is. As a result they are not doing anything with the landfill and in a sense not really impacting landfill adversely. He explained what they are doing is actually making the landfill better. Organics in a landfill is never a great scenario and not something that they want to do. This study is showing how to make the landfill better and deal with those organics in a more responsible way.

Soglin stated she understood that part of it. What she was not clear on is the additional amount that they brought in versus what they would be using that is already there onsite. Welter reiterated they are not bringing in additional amounts, they're just taking it from one facility and moving into the other. Soglin questioned over time what happens if the waste that gets picked up from the street each week declines. Welter said if the waste is in a multicompartment bin then it is going into the composting operation currently. Jordan added right now the amount that they're talking about is pretty small in the overall scheme of things. On average in a given year the landfill takes in about 130,000 tons of garbage, about a quarter of which is food waste. So they are looking at somewhere around 30,000 tons of organics and are talking about diverting 1500 tons, which is a pretty small amount overall. He said there's always going to be a need for composting and always going to be a need for overall source reduction.

That is the piece Soglin doesn't want to miss, the source reduction, because people think they are just going to drag it off their lawn and take it here, whereas anything they can do upstream is better. Jordan and Welter agreed.

Welter then addressed Soglin's air quality issues. He noted they have permits at both facilities they have to maintain. He said the good thing about natural gas, the biogas generated at the landfill currently or at wastewater when they're flaring, is that those gases burn very, very clean. The goal of this was to look at three things: greenhouse gas emissions and reductions in greenhouse gas emissions, responsible use of energy, and then the economics of doing so. With these scenarios, especially those scenarios that have a better feasibility, the options are improving air quality in terms of greenhouse gas emissions at both facilities as they are looking at this from a community wide standpoint.

Mays confirmed all of these waste handling or different beneficial use solutions they're looking at having to clean that gas to be able to use it for the beneficial use. They are not showing any adverse effects and in fact are improving it at both locations.

Soglin trusts that when and if this moves ahead those neighborhoods in particular will be engaged in the changes as this is right in their backyards, particularly when it's residential. She is also concerned about increases in truck traffic or things like that. Thompson acknowledge they did talk about truck traffic specifically and determined that in collaboration with the City that there would be no significant difference

Welter also explained anytime they change a permit, and these changes would require them to change multiple permits at the two facilities, there is a public comment period, and they invite people to the public comments. The City is especially concerned about the neighborhoods that

are adjacent to the facilities. Certainly and those citizens and any residents are invited to the public comments.

Soglin's last comment is she would prefer an option where the City is not selling the RECs, but where the City gets to retain the GHG credits, so to speak.

Fraser said Giannakouros had emailed two key questions that he had about the project. First is whether dried fermentation at the landfill been looked at as an option. Giannakouros noted by the time cells are capped, 50% of the methane generating potential has been lost, so separating organics and keeping them out of the cells will avoid a large part of the climate forcings they would like to avoid. He wanted to know if that is feasible. Mays responded at a high level, yes, it's a feasible consideration. He would look at it more as an alternative to the more traditional wet co-digestion. He said it would not be something that is less expensive than co-digestion, just something that could be considered as an alternative and looked at further down the road. Typically, dry fermentation is more common on the West Coast where there are different end use products that can be used there, but it is something that is feasible and a consideration that could be an alternative to the traditional wet co-digestion. He reiterated costs are going to be pretty similar, though.

Frasier said Giannakouros second question was about the low diversion scenario, which requires much higher capital costs at the water treatment plant. It seems that this scenario is optimal for holistic sustainability outcomes but might be non-viable regarding the kind of financial ROI the City will need to see to select this option.

Thompson stated the reason they looked at the 1500 scenario was because that's how much the current capacity there is at the existing facility, so they knew that that would be an opportunity to have a little bit more incremental organic diversion and send it to that beneficial reuse of the wastewater plant. At the same time, they recognize that the City also has some ambitious goals around organics management, so they wanted to also look at alternatives that went above and weren't constrained by infrastructure. They landed on the low diversion scenario as something that was reasonably attainable, but given that it exceeds the current capacity, it entails that higher capital cost. It would require the City to make an investment in a new dedicated digester or co-digestion facility to handle that much more incremental organics diversion. He said while there certainly is an investment that's required to do that, it's simply because of the current infrastructure capacity constraints.

Fraser believes that Giannakouros' concern isn't SROI but rather the initial ROI, and that's because they're increasing capacity greater than it is right now. Thompson confirmed that was correct. Fraser asked if they were to calculate a payback period in years, what would that be for this initial investment. When would they break even with the increased initial ROI with the low diversion scenario? Mays said they looked at it in terms of whether it would break even with a 30-year payback period. In appendix B that was provided in the final report, a financial performance and a breakeven analysis was included. The only option that actually had a positive ROI in that 30 year period was alternative one, the pipe pipeline injection at the landfill facility. That had a positive turnaround within about 18 years. For everything else they would need grant support funding to have that break even within a 30-year period. For option three, electricity generation of that low diversion scenario, the City would need almost \$19 million worth of additional grant funding to have a turnaround or breakeven on that 30-year period.

Jeremy Cook (Senior Economist, HDR) confirmed what Mays stated. Basically they only had one alternative that was really breakeven without any additional grant funding, and that was just simply because of the capital investment costs up front really do make it tough to achieve the payback period on all the other alternatives, aside from the one alternative mentioned.

Thompson acknowledged that question is one that many are up against with ambitious climate goals and how to achieve those goals and balance that with the realities of the financing and economics. She added that is why this study was really focused on SROI and what's the best answer for a greenhouse gas reduction and energy return on investment.

Fraser thanked the consultants for their initial report. He noted they would take some time as a Commission and review and get ready to propose a final discussion and perhaps a recommendation at the March meeting.

Krieger asked for clarification on what the intent is from this Commission. Is it a recommendation from the options listed in the report or just some discussion notes. Fraser said his understanding is City Council is asking for a recommendation relative to the options. It doesn't mean that they will take the recommendation, but that is what they are looking for.

Welter added the recommendation from the Commission could be in phases. For instance, there could be some things that happen at one facility and discussion on what happens at which facilities, or what they would want to do inside of those diversion scenarios, because they can't do one diversion scenario at one facility and another diversion scenario at the other facility. They have to be the same diversion scenario. But inside of those guardrails, there are a lot of different options there and they could happen at the same time, or they could happen at a staggered timeframe. They could go towards the capacity that the current digester at the wastewater treatment plant has and move towards that with the goal of a later idea of building into something bigger.

Monroe noted in terms of this project the Commission is the first line of consideration and technical expertise that can help guide the City in planning for, waiting on, or proposing alternatives and options to methane initiatives. To move anywhere further on this item Council would request Commission's feedback and recommendation on how/whether to proceed.

Confirm meeting dates for 2021:

Fraser noted Eric Tate has a class conflict this semester (until May) and Fraser is uncomfortable not having Tate at four meetings in a row. Staff had asked Tate if he was available at an alternate time, and he said would be available at the same time on Tuesdays for March, April and May. However other Commission members might not be able to meet those days.

Grimm noted it would not work for him because when all their projects go in front of the Board and Operations Committee.

Krieger noted they had this exact same discussion when they first started the Commission about trying to set the standard day and time. During that discussion they talked about evening versus day meetings, they talked about day of the week, they talked about this issue where student representatives, any professors that might be included, or others who have a typical

eight to five working day may not work. However, at that time they decided they would continue to move forward with the current time, realizing that from time to time they may not be able to get everyone. He also noted they need to keep the meeting date/time consistent for public input and participation.

Fraser wondered if they couldn't go to an evening time just for three months -- March, April, May – so that everyone could attend.

Krieger noted they need to keep in mind Council meetings are on Monday evenings, so if the public wanted to attend both that would be challenging and certainly some staff are very involved in those meetings.

Gardner added that when Tate came to them notifying of this conflict as a result of his teaching schedule staff checked the bylaws, both to see if it would be allowable to move the meeting and also to see if it would disqualify him from further participation on the Commission. She confirmed he is able to remain on the Commission and have these four absences marked as excused absences. They would not have to fill his position.

Fraser said he could keep Tate up to speed on what he misses, so one option would be to continue on as currently, not confused the issue and work doubly hard to keep Tate involved. It is just three months, but every month is critical, every meeting is critical, particularly with a new administration and new opportunities.

Krieger agreed it is important to keep Tate involved. He personally is in favor of going with the standard set meeting time. Everybody knows what time the meeting is, can count on that time, and he would hate to sacrifice that reliability for kind of a temporary solution.

Fraser noted equity is very important and that's a major benefit of Tate's wisdom and his position and academic work.

The Commission agreed to leave it the meetings at the current day and time but will keep Tate involved in the Commission happenings.

Update on Working Groups: Tabled to next meeting due to time constraints.

RECAP OF ACTIONABLE ITEMS FOR COMMISSION, WORKING GROUPS, AND STAFF:

Gardner noted the action items she has from this meeting as follows: to add Jen Jordan to the previous minutes as an attendee, to reach out to Giannakouros about the reorganization of working groups and have the working group list updated in the agenda for the next meeting, to send the link to the presentation taking place on February 25, to ask the Chamber if it would be possible for any Commission members to attend the chamber presentation that's going to happen, and finally to add the methane feasibility discussion to as an agenda item to the next meeting.

As a final reminder for the working groups that are meeting in the next month, if they would like their minutes included in the packet, please get them to staff by February 22.

Fraser suggested an action item for each one of them doing some deep review of the HDR materials before they discuss them at the next meeting.

ADJOURNMENT:

Krieger made a motion to adjourn.

Grimm seconded the motion.

A vote was taken and the motion passed unanimously.

CLIMATE ACTION COMMISSION
 ATTENDANCE RECORD
 2021

NAME	TERM EXP.	1/4/2021	2/1/2021	3/1/2021	4/5/2021	5/3/2021	6/7/2021	7/5/2021	8/2/2021	9/6/2021	10/4/2021	11/1/2021	12/6/2021
Madeleine Bradley	12/31/2022	x	x										
John Fraser	12/31/2020	x	x										
Stratis Giannakouros	UI Rep	x	O/E										
Megan Hill	12/31/2022	x	x										
Grace Holbrook	12/31/2021	O/E	O/E										
Kasey Hutchinson	12/31/2022	x	x										
Matt Krieger	12/31/2020	x	x										
Jesse Leckband	MidAmerican Rep	O/E	x										
Katie Sarsfield	12/31/2020	x	x										
Becky Soglin	12/31/2022	x	x										
Eric Tate	12/31/2021	x	O/E										
Ben Grimm	10/31/2022	x	x										

KEY: X = Present
 O = Absent
 O/E = Absent/Excused
 NM = No

Meeting

-- -- = Not a Member

Progress update on "Accelerating Iowa City's Climate Actions" as of 2-25-21

Note 1: Many actions initiated in 2020 have continuing activities. There is an expectation that the actions will continue to develop over time, as they become integrated throughout City and community operations.

Note 2: Phases indicate anticipated year of project start		Phase 1 (2020)	Phase 2 (2021-23)	Phase 3 (2024-25)	Find companion "Accelerating Iowa City Climate Actions" Report at www.icgov.org/climateaction			
Action	Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes	
Buildings								
BE-1	Promote Energy Efficiency and Performance Tips to the Public	1	1.1 – 1.2, 1.6	Jun-20	Initiate planning and needs assessment. Identify resources, contacts, and content. Assess web access and source development, method of dissemination. Support eventual actions with strategy from communications plan (Action 5.1 - EDU). Agreement with Cause Impact as consultant in effect and kickoff begins early March. Staff discussions with community groups are positive and developing ideas. Promotion of programmable thermostats went out in fall. Additional promotion planning underway.	Imperative. Review of equity report and assistance from EHR staff essential. Commission and Working Group recommendations and feedback needed.	In Development	Discuss plans for educating and engaging residents and business; recommendations and program ideas welcome
BE-2	Partner with Stakeholders to Promote Green Building and Rehabilitation	1	1.1-1.4	Jun-20	Started introduction to organizations, several more meetings and expansion of contacts necessary. Met with City development staff and Home Builders Association. Plan to engage small group of stakeholders to discuss barriers and interest in pursuing green build strategies to create new alliances/education opportunities. Writing up proposed ideas and will schedule meetings with community stakeholders. Support more actions with strategy from eventual communications plan (Action 5.1 - EDU).	Use equity report to ensure stakeholders from impacted groups are represented, and feedback is shared with development community, landlords, and builders. Staff is continuing work on an equity outreach plan that involves community-based organizations that may provide valuable insights on needs, benefits, and barriers. Commission and Working Group recommendations and feedback needed.	Underway	Discuss plans for educating and engaging residents and business; recommendations and program ideas welcome
BE-3	Encourage the Local Realtor Community to Include Energy Performance in the Multiple Listing Services (MLS) Property Inventory	1	1.1 & 1.6	May-20	Staff met with local realtors from ICAAR about housing trends and potential for education and cooperation on energy efficiency and projects benefitting residential properties. ICAAR and City exploring example programs and will plan to meet again in 2021. In the interim, City staff is finishing a compilation of information about assistance programs, many of which enhance climate action initiatives. ICAAR is supportive of sharing these programs with the community. ICAAR shared that several initiatives supporting sustainability measures are in development. Staff has conceptualized new ideas for partnering with ICAAR but has not yet discussed.	Benefits for informed buying/selling, may need incentive assistance later on, if concentration of activity falls within only a few neighborhoods or stakeholder interest lacking. Education for all residents and renters about housing with energy efficiency and indoor air quality speaks to equity concerns. Commission and Working Group recommendations and feedback needed.	Underway	

Action	Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes	
Buildings								
BI-1	Offer Free Home Energy Assessments through Green Iowa AmeriCorps	1	1.1	Sep-20	Energy Assessments with the Green Iowa AmeriCorps team look slightly different this year but still are included in their responsibilities. Supplemental weatherization kits available through GIA, available to IC residents have been shared with many households this fall. Exploring non-AmeriCorps group to perform other weatherization services.	AmeriCorps is focused on certain groups - seniors, low income, veterans. Not sure how they track or report these demographics. Education delivery and equipment installation/provision alternatives probably needed in short term. Development of a mapped GIS inventory of energy efficiency assessments and investments is underway.	Underway	
BI-2	Enhance Energy Standards for City Rehabilitation Projects	2	1.1	Jun-21	Received updated report from NDS on current activity and efforts. Staff currently exploring alternatives for rehab projects and ability for City to support incentives or supplemented energy efficient equipment if homeowners cannot/won't pay the difference to upgrade. Have met with local HVAC providers & builders to identify key issues and ideal projects. Proposal still in development; will bring to Commission and community stakeholders for feedback and further guidance. Education components also necessary - communications strategy outcomes. GIS equity mapping underway; will bring mapping tool and toolkit info to Commission for review.	Assisted households currently meet federal income requirements. Establish a mapped GIS inventory of energy efficiency assessments and investments. Ensure access to energy efficiency and other sustainable design elements in each project through education and engagement. Adding GreenIowa AmeriCorps energy assessment property addresses to GIS Equity Map, to further gauge possible geographic or demographic gaps in program services and outcomes.	Underway	Await staff proposal for enhancing Energy standards for City rehabilitation projects
BI-3	Coordinate Neighborhood Energy Blitz Events	1	1.1	Fall 2020	Coordinate efforts with Neighborhood Planner, Recreation, and community organizations; Support actions with strategy from communications plan (Action 5.1 - EDU). Party in the Park efforts cancelled due to COVID-19. Climate Action Grant awarded to Green Iowa AmeriCorps for a lightbulb exchange. Staff and community stakeholder planning in progress, will bring concepts to Commission for feedback and review. Plan to launch first project in spring around Earth Day, hoping to include students and neighborhood residents as volunteers.	Assess equity report to determine any areas of focus. NDS can assist with housing/permit data that can help focus on neighborhoods with less efficient housing stock. Outreach to underserved groups may spur interest in blitz programs or projects. Working Group recommendations and feedback needed. GIS equity mapping in progress.	Underway	Provide feedback on upcoming Neighborhood Energy Blitz Program (April 2021)

Action	Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes	
Buildings								
BI-4	Launch a TIF-funded climate action incentive program aimed at reducing industrial energy consumption	1	1.2 & 5.4	May-20	In August 2020, Council finalized approved establishing and approving Urban Renewal Areas at Heinz, Sycamore, and Scott Six and approved changes to downtown URA in Sept. 2020. Staff is beginning to engage with businesses in these areas and is encouraging them to take advantage of funding assistance in remaining years of the TIF agreement. Interest from at least one property owner so far with additional meetings planned. Program informational handout has been created to supplement the application for assistance. Staff met to finalize requirements for downtown TIF program, focused on occupants of smaller commercial spaces. More information about this program component to be released in early 2021.	Downtown program considers ability of businesses to get funding through other sources and existing city grants, to help prevent potential gaps in assistance availability.	Underway	
BI-5	Develop or Partner with Local Stakeholders on a Comprehensive Climate Action Rehabilitation Program	1	1.1 – 1.4	Jul-20	As discussions with community organizations progress, new ideas for how to accomplish this task are being generated. Commission will need to weigh in on neighborhood pilot program/s which are in conceptual development. Explore RFQ for external partner/s to implement a program. Significant interest in supporting youth or young adult skills training program. GIA crew conducted first in-home energy assessments in late October but held off on indoor visits from November through the end of the year. Instead, they have delivered energy saver kits for residents to install themselves for over 160 households. Planning for this item continues into 2021.	Approach to populations served critical. Commission and Working Group recommendations and feedback needed for further development.	In Development	Recommendations needed to develop comprehensive energy efficiency building rehab programs, identify best practices, suggest example programs, assist with equity efforts
BI-6	Consider a Building Permit Fee Rebate Program for Enhanced Energy Standards	2	1.3	Feb-21	Discussion with NDS, identify requirements, potential costs, and offset. Present to local stakeholders and Commission for feedback.	Understanding that locally, incremental home "price creep" tends to price homebuyers out for every \$1,000 more, we need to keep inflation of housing costs to a minimum and ensure that the program does not add costs. Geographic review could also ensure that program is applied somewhat evenly through all areas of new development/redevelopment.	In Development	As work progresses, will require Commission feedback and recommendations
BI-7	Initiate a Net-Zero House Design Competition	2	1.3	Aug-21	Have determined that competition should include student and professional categories but needs further shaping. Potential for resulting designs to be functionally built. Modification of this program includes a category for retrofit/remodel at lower energy savings.	Potential for outcome of contest to be constructed by the City with income-requirements for homeownership. Modified competition categories could define different pricing models and occupant populations. Working group can provide suggestions and feedback.	In Development	As work progresses, will require Commission feedback and recommendations

Action		Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes
Buildings								
BI-8	Complete a Net-Zero Demonstration Rehabilitation Project	2	1.1 & 1.4	Mar-21	Budgeted FY22 funds for preliminary or complete rehabilitation/construction. Although initial project is not identified as true net-zero, goal is to provide two levels of investment by residential property owners, complete with data collection and analysis. Significant rehabilitation planned for one unit, and moderate rehabilitation for another. Project to begin construction in early 2021, completion by summer 2021.	Equity will be required in review of the project placement, occupants, and local impacts. Demonstration project engages local students as an educational and skill-building opportunity.	Underway	As work progresses, will require Commission feedback and recommendations
BI-9	Launch an Electrification Incentive Program	2	1.1-1.2 & 1.4	May-21	Starting with a few rental induction stovetop appliances to begin to introduce residents to non-natural gas technology. Development of a rebate program in early part of the year will require research and stakeholder feedback.	Explore opportunities for multi-family properties. Working group and stakeholder feedback helpful.	In Development	As work progresses, will require Commission feedback and recommendations
BR-1	Create a More Robust Energy Code Inspection Program	1	1.1 -1.2	Jun-20	Additional inspector budgeted in FY21, on hold. Met with NDS staff in September to review items staff will be looking at and addressing through compliance checks, such as pre-drywall conditons, R and U values of walls and windows. Altered inspections program and initial education about necessary inspections planned for initiation shortly after additional inspector hired.	Commission/Working Groups should assist with how they would like to measure equity and what should be reported to show progress.	Underway	Define how City should measure equity in housing inspection program
BR-2	Incorporate Stricter Energy Standards into Tax Increment Financing Policies	1	1.3 – 1.4	Aug-20	While codifying these efforts is not fully in motion due to existing project load, staff continues to encourage and require actions informally through the development process. Elements of recent development approvals require energy efficiency measures, including LEED Silver standard build (minimum of 8 points from energy category), rooftop solar, low flow fixtures, and incorporated stormwater improvements. These measures will be administrative components of the process until these measures or enhancements are amended into Code.	Greater equity can be achieved through a geographic distribution of benefits. Education and advocacy could benefit populations impacted and served by policy implementation.	In Development	Participate in stakeholder review or provide commentary to Council
BR-3	Incorporate Strict Energy Standards into Height and Density Bonuses	2	1.3 – 1.4	2022	At this time, NDS is working on an update to the Riverfront Crossings District Code, in which the height and density bonuses apply more frequently than other zoning districts. Application of the height bonus provision is discretionary and staff has been instructed to require energy efficiency measures as a category for height bonuses. These provisions closely mirror the existing TIF standards. Recent projects that have come before Council and upcoming projects are incorporating these provisions and the City will continue this until the Code is amended. (See BR-2)		Not Started	As work progresses, will require Commission feedback and recommendations

Action		Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes
Buildings								
BR-4	Initiate Energy Benchmarking Requirements	2	1.6	2022	Research. Consideration of current laws, existing programs in and out of Iowa needed before application of this type of regulation.		Not Started	As work progresses, will require Commission feedback and recommendations
BR-5	Develop Climate Action Requirements for all Existing and Future Rental Permits	2	1.1 & 1.7	Jun-21	Discussions with NDS and stakeholders, including property owners, landlords, realtors, renters, and development community.	Renters should be impacted as little as possible while receiving benefits of any improvements made to comply with a proposed program.	Not Started	As work progresses, will require Commission feedback and recommendations
BCP-1	Advocate for State Adoption of Advanced Energy Codes	1	1.1 – 1.4	May-20	The spring 2020 meeting was delayed by COVID, with hopes to reconvene later in the year. We do not have confirmation that a meeting was held. City Council legislative priorities included this, noting that although approval is administrative, assistance and support from Iowa policymakers will help.	Could support these efforts with help from education and advocacy from underserved groups that directly benefit from housing improvements. Staff reached out to several aligned groups in September but did not hear back. Discussions may need to take place when equity planning/outreach is further along.	Underway	
BCP-2	Advocate for Aggressive Energy Code Development and Adoption	1	1.1 – 1.4	May-20	Eligible staff voted for adoption of new IECC codes in 2020. City Council legislative priorities included this, with a request for the State of Iowa to develop an energy plan or update that will address climate actions.	Could support these efforts with help from education and advocacy from underserved groups that directly benefit from housing improvements. Staff reached out to several aligned groups in September but did not hear back. Discussions may need to take place when equity planning/outreach is further along.	Underway	
BP-1	Solar Partnership with MidAmerican	1	1.5	Apr-20	Brought forward one project to City Council in April 2020 and was not approved. Assessing opportunities as locations or chances present themselves. Since Oct. report, City and Commission moved ahead with JCED partnership proposal to create a solar feasibility study for Iowa City to plan for potential solar sites and engage community in conceptual conversations. Mapping, technical information gathering, and work plan development has started with a community-led committee of stakeholders. Anticipated study completion in July 2021.	Elements of the JCED solar feasibility study will require a study of equity measures, engagement efforts, and actionable measures to confidently go forward with concepts for solar infrastructure and placement.	Underway	Upon completion of JCED study project, Commission may choose to offer additional feedback and recommendations
BP-2	Net-Zero Public Housing	2	1.1 & 1.7	Jan-22	Must determine where this project would take place or be retrofitted. Discussions underway at a staff level to identify possible location.		Not Started	

Action	Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes	
Transportation								
TE-1	Significant Transportation Education and Outreach Campaigns	1	2.3	Aug-20	The Climate Ambassador program included segments about transportation. Must continue to identify how we will engage all residents. A significant portion of this effort will come from a combination of the developing climate action communications strategy and coordination of marketing by the Transportation Services Department. Transportation reporting metrics are defined.	Review equity Report to identify groups and locations to focus attention. Explore language translations. Components of public messaging to be part of upcoming development of Communications Strategy. Commission and Working Group recommendations and feedback needed.	Underway	Commission may want to contribute ideas and suggestions for initiatives, partnerships, and outreach
TE-2	Launch an Eco-Driving Campaign Alongside Employers	3	2.5	Jul-21	Grants planned for employer installation of EV charging ports. Paired with an informational campaign and car-free week. Education campaigns must be coordinated with employers. Post-pandemic expand to shared driving or transit campaign.		Not Started	
TI-1	Incentivize Public Transit Options	2	2.2	Sep-21	Coincide any education with Transportation Services rollout and preparation for system changes. Can accompany passes for riders, celebrations/thank you's to dedicated riders, and supplement transit facility or stop improvements.	Community feedback may be gained during outreach stage of Communications Strategy development.	Not Started	Commission may choose to provide recommendations, work on this as a project, or suggest example programs from outside Iowa City
TR-1	Review Parking Regulations and Consider Innovative Ways to Encourage Alternative Modes of Travel	2	2.6	Fall 2021	Start with NDS review. Some issues may be identified during the development of the updated affordable housing action plan, starting 2021.	Considerations include pricing models, transit alternatives, physical access to housing and work, last mile options.	Not Started	
TCP-1	Establish an Electric and Fuel-Efficient Vehicle Purchasing Policy	1	2.2	May-20	Written policy completed in Sept. New text includes preference for EVs, describes process by which new vehicle purchases are considered and directs purchase when multiple factors determine EV appropriate option and available for needs. Included in Nov 2020 CAC agenda for reference.	Although every vehicle the City purchases cannot be EV at this time, continually increasing the presence of non-emitting vehicles creates a healthier air quality as City vehicles move about and provide services in the community.	Complete	Monitor as desired

Action	Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes	
Transportation								
TCP-2	Track Adherence to City Idling Policy	1	2.7	May-20	AVL equipment provides idling data. 37 vehicles currently have the technology and another AVL for another 60 will be ordered in FY2021. Reformatting reports to make it easier to read for improved use and analysis. Staff will compile data and CAO will assist with reporting. Transportation Working Group needs to define and clarify their recommendation before staff can pursue exploration of technology.		Underway	Monitor as desired
TPP-1	Complete the Transit Study and Implement Recommendations to Bolster Service and Increase Ridership	1	2.1	Ongoing	Completed study in early fall 2020; was somewhat delayed from Covid-19. Presentation of proposed measures went to City Council for initial discussion on October 6. Interest in moving forward with recommended system route changes, more information coming for consideration of service expansions and rate changes. Primary implementation of recommendations to begin in 2021.	Dependent upon study recommendations and selected actions for implementation. Goal is to serve residents most needing transit service. Components of public messaging to be part of upcoming development of Communications Strategy. Commission and Working Group recommendations needed.	Underway	May want to provide feedback on proposed Transit system recommendations and planned system changes
TPP-2	Complete Electric Vehicle (EV) Readiness Plan and Implement Recommendations	2	2.2	Jul-21	Project is on track. Stakeholder meeting will be held in January and final report should be delivered in summer 2021.	Recommendations to come from Study.	Underway	Based on study results, may offer Commission feedback and recommendations/support
TPP-3	Achieve Gold Friendly Bicycle Friendly Community Status and Begin Work Toward Platinum Status	2	2.3	Aug-21	Bicycle infrastructure continues to be a focus of the City and the network has grown considerably in the last few years. Unfortunately, the pandemic year prevented some of the planned bicycle education and engagement components that are standard for Gold-level Bicycle Friendly Communities and therefore the application was delayed by one year. The City plans to apply for a Gold designation again in August 2021.	Education and access components include equity practices.	Underway	May want to provide suggestions or support for local bicycle initiatives
Waste								
WE-1	Engage the Public to Compost Organic Waste	1	3.2	Jun-20	Resource Management and NDS engaged in composting education. Course materials created for educators Determine how to tailor it with equity in mind. Expand opportunities with local businesses. Ties into carbon sequestration project underway. Plans for increased downtown access to composting budgeted in FY2022. An education unit for Climate Ambassadors focused on waste.	Focus is reliant upon meetings with staff, current efforts, working Equity Working Group, equity report, translations services available, and outcomes from Communications strategy.	Underway	Feedback or direction welcome

Action	Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes	
Waste								
WE-2	Education Campaigns for Neighborhoods to Reduce Waste/Consumption at the Source	1	3.3	Jul-20	Met with Resource Management to assess current materials. Staff is coordinating efforts with Neighborhood Planner, local schools, and other City staff to share information. Specific messaging about reduced consumption or minimizing waste at the source forthcoming, ideas welcome. An education unit for Climate Ambassadors focused on waste.	Focus reliant upon meetings with staff, current efforts, working Equity Working Group, equity report, translations services available, and outcomes from Communications strategy.	Underway	Feedback or direction welcome
WR-1	Develop a Policy/Ordinance Requiring Specific Demolition or Deconstruction Recycling Standards/Procedures	2	3.4	Feb-21	Although some initial discussions and research have started at a staff level, this initiative requires further discussion. Policy examples and research are needed, as well as exploration of programs that can assist with meeting requirements of recycling and diversion policies.		In Development	Commission may choose to provide recommendations, work on this as a project, or suggest example programs from outside Iowa City
WR-2	Mandating Signage to Assist Waste Collection	2	3.1	Jan-21	Staff continues to field calls from multi-family areas that do not feel they either have access to recycling or are witnessing improper use of waste containers. Many times, this is traced back to a lack of simple signage. Plan is to work directly with haulers to get voluntary labeling on waste and recycling containers. After this effort is made, staff will assess whether any legal requirements will be necessary.	Ensuring signed containers in multi-family properties will help renters with access to recycling, preventing additional trips, and recycling stream contamination. Additional emphasis will be put on language accessibility. Some suggestions may rise from development of Communications Strategy.	Underway	
WCP-1	Require All Park/Public Space Rentals to Recycle and Use "Green" Event Best Practices.	2	3.5	Jun-20	Staff reconnected for this project and finalized simple agreements for sports organizations renting athletic facilities. Community education needed. Testing results with athletics first but the next step to general facility rental requirements will require community and equity input.	Must assess whether new requirements impact populations differently. Working Group recommendations needed.	Underway	Review new contracts for parks athletics use and provide guidance for general parks rentals, including equity review
WP-1	Initiate a Methane Feasibility Study	1	3.7-3.8	May-20	Preliminary models discussed by staff in September. Plans and estimated costs are being refined and should be presented to Council by year end. Study is complete and presentation from consultant made to Commission at January 4, 2021 meeting and followed up in Feb. Discussions continue.	Consideration will be given after final recommendations, to impacts on fiscal health of Enterprise funds and needs to supplement with rate changes over time.	Underway	Commission members preparing a response or recommendation

Action	Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes	
Adaptation								
AE-1	Develop Climate Ambassador Team	1	4.2	May-20	First cohort is successfully complete and second is beginning in March. A new cohort will begin in early 2021. Continued, regular engagement with the Ambassadors is planned.	Development of program includes application process not reliant upon technology to participate. If tech is necessary, funding available to purchase tablets or other device to loan to ambassador participants for training activities. Special attention paid to connection with local groups that can recommend ambassador applicants. Initial cohorts varied in background and experience.	Complete	
AE-2	Establish "Resilience Hubs"	2	4.2	Apr-21	Begin with consultation between public health and community stakeholders. Plan to hold events at these identified resilience hubs to connect them as places for help, security, and comfort for nearby residents. Likely will get feedback during Communications Strategy outreach and development.	Ideally, the community stakeholders will identify their own preferred resilience hub and this project will include their ideas and feedback, as well as the buy-in from the property itself. Language accessibility, cultural competence, and geographic proximity all play roles in this effort.	Not Started	Support efforts to establish resilience hubs through research, meetings, event planning, promotion, etc.
AE-3	Educate and Coordinate with Local Agencies on Health Impacts	2	4.7	May-21	Staff held preliminary meeting with Invest Health partner to identify current needs and to explore co-benefits of climate action projects centered on public health issues. Stakeholder group would serve as connection for further meetings with Johnson County Public Health, University of Iowa, etc. Meeting date yet to be set but stakeholders agree to reconvene this initiative.	Equity reach will become more clear with agency coordination and partnering. Can use equity scale/report to identify starting agency discussions. If full stakeholder meeting held for Invest Health with focus on climate issues, will seek participation from Commission.	Underway	Attend invitation to public health stakeholder meeting (unscheduled); consider guidance about ideal projects, or other partners
AE-4	Concentrated Education Campaign for Private Properties about Native Plantings, Permeable Pavement, Rain Gardens, Soil Health, Rain Barrels and Cisterns	2	4.5	Apr-21	Staff led campaign, will align with developing communications strategy. Budgeted promotional materials and activities. Green Iowa AmeriCorps have interest in rain barrel program, in addition to their standard educational programs and activities and Parks and Recreation native prairie planting education opportunities. Additionally, City and University staff have discussed crossover native planting education and volunteer opportunities for students and community members.	Equity involved in rain barrel initiatives, as well as educational opportunities. Geographic analysis required prior to planned activities.	In Development	Provide feedback and recommendations for existing natural areas and stormwater management programs
AE-5	Coordinated Efforts with Local Emergency Agencies and Utility Agencies Providing Critical Infrastructure	2	4.3-4.4	Mar-21	Discussion must be scheduled for further development of actions. Discussions with utilities ongoing, meetings with EMA had been delayed due to pandemic management.		Not Started	Identify priority issues to be brought up with emergency management - specifically equity concerns

Action	Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes	
Adaptation								
AI-1	Partner with Project Green on a Tree Planting Partnership; Incentives for Private Tree Planting	1	4.6	Jul-20	<i>Root for Trees</i> tree planting program began in October with high interest and over 250 vouchers requested. Residents are able to use a voucher for a discount on tree purchase from Iowa City nurseries. Low income residents are permitted greater discount for tree purchase. Parks and Recreation Department is managing program and will conduct targeted interpersonal and neighborhood outreach. Need to connect with Project Green for additional opportunities for education and outreach programs. Staff in discussions with local partner to identify opportunity for a forestry job training pilot.	Commission provided recommendations and feedback on program proposal. Income eligible properties will be permitted a greater discount. City is tracking planting addresses (but no other identifying information) to monitor geographic distribution. Additionally, staff engagement will be focused in areas that have less tree canopy than other parts of town. Engagement will also provide an opportunity to inform about the utility discount program. Program participation is included as a layer in the GIS Equity Map.	Underway	Could restart/initiate discussions with Project Green, Master Gardeners, etc. to plan additional projects
AR-1	Street Tree Ordinance	1	4.6	Aug-20	NDS will draft ordinance. Research started but needed a meeting with stakeholders in fall. Drafting beginning in 2021, based on staff capacity.	New Ordinance will apply to new developments.	In Development	Identify or provide feedback on priority issues for City to consider in landscaping standards
AR-2	Increase Tree Planting Requirements in Landscaping Standards, Parking Lot Standards and Upon Renewal of Rental Permits	2	4.6	Fall 2021	Initial research and planning required by NDS.		Not Started	
AP-1	Develop Review Standards for New City Facility Construction and Major Rehabilitation that Accounts for Climate Adaptation Principles	2	5.7	Jan-22	Initial research and planning required by NDS and PW. Supplemented by analysis by Climate Action Analyst. Possible that a City facility construction or improvements could be made earlier than 2022, with sustainable design review and engineering.		Not Started	Provide recommendations for developing review standards for new or improved City buildings
ACP-1	Flood Mitigation and Stormwater Management Programs/Projects; Buyouts	1	4.5	Jun-20	Met with Stormwater Team. Collected and reviewed current volunteer lists. Assessed if we need to promote existing program. Streamlined City operations for managing creek clean ups and volunteer processes.	Involving various community groups dependent on makeup of existing volunteer listing and schedules. Review equity report to verify benefits and participation equitable. Recent stormwater management projects are included as a layer in the GIS Equity Map.	Underway	

Action	Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes	
Adaptation								
ACP-2	Continue Implementation of the Natural Areas Management Plan	1	4.5-4.6	May-20	Work agreement executed with AES in May 2020. Significant follow up with neighborhoods required during process. Planned concentration on intensive maintenance in neighborhood park prairies. Education needed about purpose, need and care for natural areas; build community partnerships with advocacy groups. About 60 acres of public land areas were prepared for prairie plantings this fall. Discussions held between staff and the University of Iowa about additional opportunities to expand support for natural areas and onsite education.	Geographic distribution, education variables dependent on groups impacted. Engage natural area advocacy groups that can assist with public education.	Underway	
ACP-3	Expand Public Tree Planting	1	4.6	Sep-20	Provided Tree Canopy memo in 9-17-20 Information Packet for Council review and discussion; demonstrates need for incremental tree canopy replacement activities. City Parks and Forestry bringing plan for new 2021 plantings to Council early 2021.	Review inventory maps, locate areas in need, target workplan outreach accordingly. Emphasis on benefits of tree canopy in low-mod neighborhoods. Soon-to-be-hired Climate Action Analyst will lead this analysis. Opportunity for discussion with impacted groups - residents, landlords, City staff, businesses or development. Address negative perceptions through modifications or education.	Underway	
ACP-4	Equity Review of Neighborhood and Population Outreach; Develop Outreach Plan for Populations Highly Impacted by Climate Change	2	4.1-4.2	May-20	Commission review of project equity review tool for City and other community climate projects. Staff is developing a mapping tool/resource requested by Equity Working Group. Additionally, staff is exploring better documentation for City climate equity efforts. The upcoming development of a Communications Strategy will also incorporate a significant emphasis on equity and true engagement with highly impacted populations.	Emphasis on highly impacted groups, targeted outreach and collaboration for development and implementation of each climate action. Staff and GIA are coordinating an expansion on the USDN Equity report completed last summer. Their efforts include cataloguing community based organizations in a way that speaks to equity and climate impacts, connection and communication with the City, and strengthening resources for future engagement and outreach.	Underway	Provide guidance on areas of focus or process for equity review
Sustainable Lifestyle								
SLE-1	Host Sustainability Forum and Events	1	5.5	Sep-20	Climate Festival held week of Sept 19-25, 2020. Activities included digital and written storytelling, coordinated individual/community activities, and expanded local partnerships. Feb. 2021 held <i>Climate Action and Communities of Color</i> online speaker	Intentional outreach with underserved groups to ensure access to awareness, education, and participation. Staff, planning committee, and CAC Working Group to connect with local organizations willing to partner on activities, promotion, or hosting remote event. Efforts underway to include translated festival materials in digital and print formats.	Complete	Commission may provide feedback and suggestions for events last year and planned in 2021 (Climate Festival, Earth Fest, other education and events)
SLE-2	Launch a Green Business Program: "Climate Action at Work"	1	5.5	Jun-20	Pilot awards program introduced and received applications in summer 2020. Awarded five businesses. Additional opportunities for business-related programs will be to build a network of businesses with climate interests that can support additional demand and resources for infrastructure and policy upgrades. Program confirmed and delivered initial webinar with Iowa City Area Business	Program relies heavily on voluntary participation. Will need to make a greater effort to identify and work with businesses with less access to resources. Geographic access and type of business should also be taken into account. Mapped geographic participation. Need assistance from Economic Development staff, Equity & Outreach Working Groups, and other econ dev and small business	Complete	Commission may provide feedback and suggestions for events last year and planned in 2021; assist with promotion and awareness

Action	Phase	Plan Alignment	Time to Initiate	Workplan	Equity Focus	Status	Commission Notes	
Sustainable Lifestyle								
SLPP-2	Develop a Climate Action Strategic Communications Plan	1	5.5	Jun-20	Agreement with Cause Impacts approved in Feb 2021. Plan will be focused on Iowa City attributes, alignment with current initiatives, focused attention to branding, models for promotional rollout schedules, template materials for modification by project or program, equity and "language" for how to frame climate activities as broadly appealing content. Kickoff March 4 with City staff.	Equity principles will be integral to the process. Selected consultant (yet to come to an agreement) greatly emphasized equity and integrating stakeholder feedback from a variety of community populations. Commission member participated in consultant interviews.	Underway	Determine the ways in which the Commission would like to be involved in development of the Plan.
SLE-3	Local Procurement Campaign - Buy-in from Local Commercial Groups	2	5.3	Jun-21	City staff in discussion with community partners about local consumption/reduced consumption campaign. Small budget of funding to promote and support local economy and resident access to goods and services.	May be able to identify equity issues through research on existing similar programs.	In Development	Working group feedback and recommendations welcome.
SLI-1	Expand Community Climate Grants	1	5.4	Nov-20	Specified non-profit and business categories at higher denominations (\$10,000). Introduced new Student category (\$500). Increased grant total to \$60,000. Applications open March 1.	Applications ask specifically what populations will be served by grant projects. Greater weighting for serving populations with higher risk to impacts of climate change. Outreach plan is to connect with community orgs serving highly impacted groups. Planning for info session and translation of grant information to encourage community members to apply.	Complete	Staff open to feedback and suggestions from Commission regarding these grants and other funding opportunities or community projects.
SLP-1	Community Garden Expansion/Additions	1	5.5	Sep-20	Currently no plans to expand existing community garden areas because of the recent expansions. Staff review plot rentals each year to weigh current and future demand. There could be opportunity to expand gardens by the private sector or other public community partners installed for community use. City has provided information to groups that want to begin their own gardens. Could benefit from research or example programs to expand formally.	City has mapping tools for plot rentals. New Analyst will identify gaps in geographic coverage and gaps in possible access for certain groups. Need focused outreach to see where needs might be to connect unresourced individuals with plot availability in upcoming years; will assist in identifying needs/potential for pocket gardens in ROW, or working with local organizations that may host new garden plots on private property.	In Development	Commission may choose to provide recommendations, work on this as a project, or suggest example programs from outside Iowa City
SLCP-1	Develop a Green Procurement Policy	2	5.3	Jul-22	City Purchasing division went through recent re-organization and needs a little time before they're able to support the development of such a policy. In the meantime, there may be opportunities internally to start gathering existing procedures and modifying, with local and sustainable acquisition principles in mind.	Currently, City has a local preference in procurement policies, along with preference for organizations exceeding minimum wage pay.	Not Started	Commission may choose to provide recommendations or suggest example programs from outside Iowa City
SLCP-2	Develop a City Sustainability Operations Guide and Make Available to Organizations	2	5.7	Aug-21	Plan to have City's internal staff Climate Committee and CAO staff to collect best practices and develop an outline for the guide. Research may result in an existing guide from another location that could be modified to meet the needs of our community.		Not Started	Commission may choose to provide recommendations or suggest example programs from outside Iowa City



Biogas Utilization Feasibility Report

CAAP – Methane Recovery Feasibility Study

Completed by HDR Engineering, Inc. on behalf of the City of Iowa City, to support the Climate Action and Adaptation Plan (CAAP) and the associated Action Items 3.7 and 3.8.

Iowa City, Iowa
December 30, 2020



VERSION: 2

Contents

Executive Summary	ES-1
1 Introduction	1
2 Project Background	1
2.1 Climate Action and Adaptation Plan	1
2.2 Feasibility Study	2
3 Renewable Natural Gas as a Resource	4
3.1 Renewable Natural Gas - Environmental Attributes as Vehicle Fuel	4
4 Description of Project Alternatives	9
4.1 Alternative 1: Natural Gas Pipeline Injection	9
4.2 Alternative 2: Electricity Generation	9
4.3 Alternative 3: WWTP Natural Gas Replacement	9
4.4 Alternative 4: Composting	10
4.5 Organics Diversion Scenarios	10
4.6 Estimated Costs	12
4.7 Description of Impact Categories	13
5 Summary Economic, and Environmental Impacts of Alternatives	24
5.1 Findings and Insights	27
6 References:	30

Figures

Figure 1: SROI Triple Bottom Line Accounting	3
Figure 2: EPA RFS Nested RIN Categories and Volumes	5
Figure 3: Historical RIN values From the EPA from 2015 Through August 2020	6
Figure 4: California LCFS Market History	7
Figure 5: PhysRNG Value Considerations	8
Figure 6: Organics Diversion	11
Figure 7: Lifecycle Cost Structure and Logic Diagram	14
Figure 8: RIN Credit Value Structure and Logic Diagram	15
Figure 9: Renewable Electricity Production Value Structure and Logic Diagram	16
Figure 10: Renewable Natural Gas Value Structure and Logic Diagram	17
Figure 11: GHG Emissions Structure and Logic Diagram	23

Tables

Table ES-1: Summary and Ranking of Monetary and Non-Monetary Results.....	3
Table ES-2: Indexed and Weighted Scores for each Alternative.....	4
Table ES-3: Potential Biogas Utilization Alternatives Combinations.....	5
Table 1: Summary of the Alternatives and Diversion Scenarios evaluated for Feasibility	11
Table 2: Biogas Utilization Alternatives Summary	13
Table 3: Value of RIN Credits	15
Table 4: Value of Renewable Electricity Production	16
Table 5: Estimated Energy Inputs for Each Alternative	19
Table 6: Estimated GHG Emissions	22
Table 7: Social Costs of GHG Emissions	23
Table 8: Summary of Monetary Benefits and Costs (\$ Millions, 2019)	24
Table 9: Summary of Non-Monetary Impacts	25
Table 10: Summary and Ranking of Monetary and Non-Monetary Results.....	26
Table 11: Indexed and Weighted Scores for each Alternative	27
Table 12: Potential Biogas Utilization Alternatives Combinations.....	28

Appendices

Appendix A - Low Diversion Scenario Digester Costs

Appendix B – Financial Proforma – Breakeven Analysis



Executive Summary

In December 2019, the City of Iowa City (City) selected HDR Engineering, Inc. (HDR) to perform a Methane Recovery Feasibility Study to address two specific Action Items included in the Iowa City Climate Action and Adaptation Plan (CAAP):

Action Number 3.7: Take Action on a Study to Efficiently Capture and Use Methane from Wastewater Operations

“After water is used by residents, it flows into the wastewater system and then goes to the City’s Wastewater Treatment Facility. While the City currently captures methane gas from the digesters used in the wastewater treatment process, only a portion of the methane is used to offset natural gas usage for the plant. To explore other options for further management of wastewater greenhouse gas (GHG) emissions, the City should conduct a study to determine the feasibility of using all captured methane to create renewable fuel or electricity that can be used to operate the facility, and take specific actions based on the results of this study.”

Action Number 3.8: Take Action on a Feasibility Study on Energy Generation from Landfill Methane

“The methane produced by decomposition of organic waste in the Iowa City Landfill is currently being flared to transform it into carbon dioxide, which is a less potent GHG. The City has been considering methods to use the methane as a renewable energy source, and to further explore this opportunity, the City will conduct a Feasibility Study in FY2019 and take specific actions based on the results of this study.”

This Feasibility Report incorporates a number of recently completed Technical Memorandums (TMs) that evaluated current and future biogas generation potential and identified alternatives for utilizing biogas at the Iowa City Wastewater Treatment Plant (WWTP) and/or the Landfill and Recycling Center (Landfill). HDR used its Sustainable Return on Investment (SROI) process to measure the feasibility of the objectives.

The Study objectives are to evaluate current and future methane generation, collection, processing, and reuses at the two facilities based on the following three categories for feasibility:

- Net GHG emissions, considering both incremental emission sources and direct and indirect reductions;
- Net Energy impacting, applying an Energy Return on Energy Invested (EROEI) methodology;
- Economics, using HDR’s SROI framework to monetize the benefits associated with beneficial reuse of methane sourced from the Landfill and WWTP.

HDR analyzed three alternatives to beneficially reuse biogas generated at the WWTP and Landfill, as well as GHG emissions and financial impact of expanding composting operations to handle



incremental food waste diverted from the Landfill. The following is a description of each alternative:

- **Alternative 1: Natural Gas Pipeline Injection.** This alternative is divided into two sub-alternatives:
 - Alternative 1a – WWTP NG Pipeline Injection.
 - Alternative 1b – Landfill NG Pipeline Injection.
- **Alternative 2: Electricity Generation.** This alternative is divided into two sub-alternatives:
 - Alternative 2a – WWTP Electricity Generation.
 - Alternative 2b – Landfill Electricity Generation.
- **Alternative 3: WWTP Natural Gas Replacement**
- **Alternative 4: Composting**

Recognizing the synergy with another Action in the City’s CAAP, Item 3.2 Increase Composting of Organics, the alternatives consider impacts of diverting incremental volumes of food waste from the Landfill to the existing WWTP, a new, dedicated anaerobic digester (AD) located at the WWTP, and expanded composting operations. Each of the alternatives listed except Alternative No. 4 consider three organics diversion scenarios:

- 1) No incremental organics diversion (No-Diversion)
- 2) Additional 1,500 tons organics diverted from Landfill, which represents the available capacity at the existing WWTP AD (1,500 tons)
- 3) 20% of food waste diverted from landfill to a future “new” AD (Low-Diversion)

HDR developed an opinion of probable construction costs (OPCC) and opinion of operations and maintenance (O&M) costs for the No-Diversion scenario for each alternative. The No-Diversion scenario costs were then extrapolated to estimate costs for the two diversion scenarios for each alternative.

The SROI analysis considers the triple bottom line (i.e., economic, environmental, and social) benefits of methane reuse. This study focuses on the economic and environmental impacts.

The analysis took into account:

- Estimated reductions in GHG emissions and the associated social cost of carbon;
- Value of Renewable Identification Number (RIN) credits under the Renewable Fuel Standard Program;
- Value of electricity exported to the grid under net metering and buyback agreements with MidAmerican Energy Company and the Eastern Iowa Light and Power Cooperative;
- Value of avoided natural gas purchases;
- Capital investment and O&M costs of biogas reuse alternatives; and
- Energy Return on Investment (EROEI).

The results of this study are intended to help the City assess the viability of, and prioritize, alternatives with the greatest potential to reduce GHG emissions under CAAP Action Items 3.7



and 3.8. This Report details technical information on the feasibility analysis and summarizes the previous Technical Memorandums (TMs) that were completed by HDR leading up to the SROI analysis:

1. Evaluation of Existing Facilities TM
2. Wasteshed Analysis TM
3. Biogas Utilization Alternatives TM

The monetary and non-monetary results and rankings by metric are presented in [Table ES-1](#). The evaluation of economic and environmental impacts considered a time horizon or study period, which includes project development (construction and implementation) and 30 years of operation and benefit. This extends to 2050 and aligns with the planning horizon of the City’s CAAP. All monetary Costs and benefits have been converted to present value using a 3% discount factor and are compared using a benefit to cost ratio (BCR), benefits divided by costs. BCR’s exceeding 1.0 indicate that the benefits from the alternative exceed the costs of the investment over a 30 year period. The non-monetary metrics include EROEI and lifecycle change in CO_{2e} emissions.

Table ES-1: Summary and Ranking of Monetary and Non-Monetary Results

Alternative Description	Location	Alternative	GHG Reduction	GHG Rank	EROEI	EROEI Rank	BCR	BCR Rank
Pipeline Injection	WWTP	Alt. 1a - ND	40,500	15	6.9	9	0.20	11
		Alt. 1a - 1500	77,800	12	7.9	6	0.22	9
		Alt. 1a - LD	436,200	6	7.9	4	0.39	8
	Landfill	Alt. 1b - ND	820,500	3	7.5	8	1.62	3
		Alt. 1b - 1500	844,500	2	7.6	7	1.63	2
		Alt. 1b - LD	931,800	1	7.9	5	1.69	1
Electricity Generation	WWTP	Alt. 2a - ND	19,000	16	2.0	13	0.05	16
		Alt. 2a - 1500	60,000	13	12.4	3	0.10	15
		Alt. 2a - LD	395,600	7	13.3	1	0.18	12
	Landfill	Alt. 2b - ND	459,200	5	1.5	15	0.76	6
		Alt. 2b - 1500	386,500	8	2.1	12	0.69	7
		Alt. 2b - LD	585,200	4	12.6	2	0.89	5
Natural Gas Replacement	WWTP	Alt. 3 - ND	40,900	14	4.6	10	0.11	14
		Alt. 3 - 1500	78,300	11	3.4	11	0.13	13
		Alt. 3 - LD	252,200	10	1.8	14	0.20	10
Expanded Composting	Compost	Alt. 4	365,100	9	0.0	16	0.96	4

The results show that:

- Only Alternative 1b (landfill natural gas) has benefits that exceed the costs;
- The highest BCR (1.69) is Alternative 1b – Low-Diversion. This alternative ranks highest on total lifecycle CO_{2e} emission reductions, and when combined with the value of RIN credits results in the greatest economic benefits;
- All of the alternatives result in a net reduction in CO_{2e} over the next 30 years;



- All alternatives except for composting result in an EROEI of 1.0 or greater (incremental composting of food waste does not generate energy);
- Alternative 2a (WWTP Electricity Generation) – Low-Diversion ranks highest on EROEI;
- Alternative 1b – Low-Diversion is ranked 5th on EROEI; and
- Changing the value of the SCC was found to have no effect in ranking as the value influences all of the alternatives equally.

To aid in the comparison of the monetary and non-monetary metrics and provide insight from this Feasibility Study towards actions under 3.7 and 3.8, the results have been combined into a weighted score as shown below in [Table ES-2](#). Each result was converted to an index (1 to 0) and were then weighted equally into a total score with a maximum value of 1.

Table ES-2: Indexed and Weighted Scores for each Alternative

Alternative Description	Location	Alternative	GHG Reduction	EROEI	BCR	Total Score	Rank
Pipeline Injection	WWTP	Alt. 1a - ND	0.01	0.17	0.04	0.23	13
		Alt. 1a - 1500	0.03	0.20	0.04	0.27	11
		Alt. 1a - LD	0.16	0.20	0.08	0.43	6
	Landfill	Alt. 1b - ND	0.29	0.19	0.32	0.80	3
		Alt. 1b - 1500	0.30	0.19	0.32	0.81	2
		Alt. 1b - LD	0.33	0.20	0.33	0.86	1
Electricity Generation	WWTP	Alt. 2a - ND	0.01	0.05	0.01	0.07	16
		Alt. 2a - 1500	0.02	0.31	0.02	0.35	7
		Alt. 2a - LD	0.14	0.33	0.04	0.51	5
	Landfill	Alt. 2b - ND	0.16	0.04	0.15	0.35	8
		Alt. 2b - 1500	0.14	0.05	0.14	0.33	9
		Alt. 2b - LD	0.21	0.32	0.18	0.70	4
Natural Gas Replacement	WWTP	Alt. 3 - ND	0.01	0.12	0.02	0.15	14
		Alt. 3 - 1500	0.03	0.08	0.02	0.14	15
		Alt. 3 - LD	0.14	0.05	0.04	0.23	12
Expanded Composting	Compost	Alt. 4	0.13	0.00	0.19	0.32	10

Based on the indexing and weighting exercise:

- Alternative 1b (landfill natural gas) – Low-Diversion has the highest score (0.86).
- Alternative 1b (landfill natural gas) – 1500 ton diversion is ranked second.
- Alternative 1b (landfill natural gas) – No-Diversion is ranked third.

If the City is instead focused on reductions that will be reflected in its municipal and community-scale GHG emission inventory, then evaluation should be narrowed to focus on Alternative 2, Electricity Generation, and Alternative 3, Natural Gas Replacement. While electricity generated at the WWTP or Landfill (2a and 2b, respectively) could very well be pushed to the power grid, contractual agreements with local utilities could allow the City to retain and retire RECs for GHG accounting purposes. Specifically, RECs could be applied to the City’s Scope 2 market-based GHG inventory. Using RNG to displace natural gas use at the WWTP would result in lower



Scope 1 GHG emissions. Focused on these two alternatives, Alternative 2b – Low-Diversion is ranked highest (fourth overall), followed by Alternatives 2a – Low-Diversion and 2a – 1500. These alternatives are ranked 4, 5 and 7 overall.

Finally, biogas utilization alternatives can be combined together with others, and some can be incorporated as standalone projects (as shown in [Table ES-3](#)).

Table ES-3: Potential Biogas Utilization Alternatives Combinations

Weighted and Indexed Performance Indicators Total Score, inclusive of: GHG Reduction, EROI, and BCR			Landfill Location							
			Do Nothing	No Diversion		1500 ton/yr Diversion		Low Diversion		
				NG Pipeline Injection	Electricity Generation	NG Pipeline Injection	Electricity Generation	NG Pipeline Injection	Electricity Generation	
				Alt 1b-ND	Alt 2b-ND	Alt 1b-1500	Alt 2b-1500	Alt 1b-LD	Alt 2b-LD	
db dcPT WW	Do Nothing		0	0.80	0.35	0.81	0.33	0.86	0.70	
	nos viedN	NG Pipeline Injection Alt 1a-ND	0.23	1.02	0.58					
		Electricity Generation Alt 2a-ND	0.07	0.87	0.42					
		NG Replacement Alt 3-ND	0.15	0.95	0.50					
	nos vied yf no t0051	NG Pipeline Injection Alt 1a-1500	0.27			1.08	0.60			
		Electricity Generation Alt 2a-1500	0.35			1.16	0.68			
		NG Replacement Alt 3-1500	0.14			0.95	0.47			
	nos viedMol	NG Pipeline Injection Alt 1a-LD	0.43					1.30	1.13	
		Electricity Generation Alt 2a-LD	0.51					1.37	1.21	
		NG Replacement Alt 3-LD	0.23					1.09	0.93	

There are 18 unique possible combinations of alternatives, boxes in [Table ES-3](#) with blue numbering indicate the individual alternative scenarios at either the Landfill or at the WWTP. The individual alternatives can be combined together, but must be done so following the same waste diversion scenario from the Landfill. Specifically, an alternative from No-Diversion scenario cannot be combined with an alternative from the Low-Diversion scenario. When combining the alternatives the scores from the Landfill and WWTP alternatives can be added together to identify the optimal combination of actions under each of the waste diversion scenarios. The highest scored individual alternatives are consistently Alternative 1b – NG Pipeline Injection (landfill alternatives for each of the No-Diversion, 1500 ton diversion, and Low-Diversion scenarios).

Identifying the optimal combination of actions may be approached as follows: select the highest scored alternative from the desired waste diversion scenario (shown to be from the Alternative 1b – NG Pipeline Injection landfill alternatives) then work down the column to the corresponding green shaded boxes. Select the highest scored, or desired, combination. Corresponding capital costs for each individual alternative are also additive when combined. For example, if choosing



from Alternative 1b – NG Pipeline Injection (at the Landfill, Total Score of 0.81), with 1500 ton diversion to the WWTP, work down the column (or “diversion lane”) to the desired combination scenario. In this case, combining with Alternative 2a – Electricity Generation at the WWTP, results in a combined score of 1.16. As capital costs are also additive, consideration should be given to the seemingly minor weighted score differential. In the example of combined Alt 1b-1500 with Alt 2a-1500, there is an estimated \$6.2M savings to select Alt 1b-1500 with Alt 1a-1500.

Path Forward

HDR recognizes that incremental food waste diversion is not an instantaneous process, but the SROI analysis provides an assessment of the resulting impact when achieved. This Report provides decision tools to support the City’s further consideration and decision making.

Consequently, the City might consider the following path forward to further evaluate and implement the preferred alternative(s):

- i. City decision on desired diversion scenario and methane utilization at the WWTP to narrow the field of alternatives. (0-6 months)
- ii. Further technical analysis to develop organics management strategies to achieve a targeted diversion scenario and further evaluate life cycle costs of co-digestion (if desired) and biogas utilization to generate electricity or RNG. Consideration of impacts to planned digester rehab project. (3-6 months)
- iii. Conceptual Design Development of the selected alternative(s), providing basis of design parameters and implementation planning. (3-6 months)
- iv. Detailed Design Development. (TBD)
- v. Bidding and Construction. (TBD)

It may be prudent for the City to complete items i) and ii) within the next 6-months for capital planning purposes.



1 Introduction

In December 2019, the City of Iowa City (City) selected HDR Engineering, Inc. (HDR) to perform a Methane Recovery Feasibility Study to address Action Items 3.7 and 3.8 included in the Iowa City Climate Action and Adaptation Plan (CAAP). The CAAP contains objectives for conducting a study that would determine the feasibility of methane generation, collection, processing, and potential re-use at the Iowa City Wastewater Treatment Plant (WWTP) and/or the Landfill and Recycling Center (Landfill). HDR used its Sustainable Return on Investment (SROI) process to measure the feasibility of the objectives.

This Feasibility Report evaluates alternatives for methane gas recovery and beneficial reuse of biogas at the City WWTP and/or Landfill as part of the City's CAAP objectives. This evaluation focuses on monetizing the benefits associated with the reuse of methane sourced from either the WWTP and/or the Landfill. The SROI analysis considers the triple bottom line (i.e., economic, environmental, and social) benefits of methane reuse. This study focuses on the economic and environmental impacts.

The analysis took into account:

- Estimated reductions in Greenhouse Gas (GHG) emissions and the associated social cost of carbon;
- Value of Renewable Identification Number (RIN) credits under the Renewable Fuel Standard Program (RFS);
- Value of electricity exported to the grid under net metering and buyback agreements with MidAmerican Energy Company and the Eastern Iowa Light and Power Cooperative;
- Value of avoided natural gas purchases;
- Capital investment and O&M costs of biogas reuse alternatives; and
- Energy Return on Investment (EROEI).

The results of this Study are intended to help the City assess the viability of alternatives with the greatest potential to reduce GHG emissions under CAAP Action Items 3.7 and 3.8. This Report details technical information on the feasibility analysis and summarizes the previous Technical Memorandums (TMs) that were completed by HDR leading up to the SROI analysis:

1. Evaluation of Existing Facilities TM
2. Wasteshed Analysis TM
3. Biogas Utilization Alternatives TM

2 Project Background

2.1 Climate Action and Adaptation Plan

In September of 2018, the City Council approved its Climate Action and Adaptation Plan. CAAP included specific actions to achieve GHG emissions targets. The plan's targets are in accordance with the Paris Agreement and include city-wide carbon emissions reductions of 25-28% over 2005



levels. On August 6th, 2019, the City passed Resolution 19-218 declaring a climate crisis and requesting accelerated action toward carbon emissions reductions in an effort to meet the Intergovernmental Panel on Climate Change (IPCC) target of limiting global warming to 1.5 Celsius.

CAAP identified 35 actions related to buildings, transportation, waste, adaptation, and sustainable lifestyle to help the City achieve its goals for reducing carbon emissions. Furthermore, these 35 actions were broken into 3 phases with phase 1 actions to be initiated by the end of 2020. Under waste actions 3.7 and 3.8 the City is looking to explore ways to recover and beneficially reuse methane from landfill and WWTP. The importance of these actions were reiterated in the Accelerating Iowa City's Climate Action Plan, published in April 2020. As noted in the CAAP:

Action Number 3.7: Take action on a feasibility study to efficiently capture and use methane from wastewater operations:

“After water is used by residents, it flows into the wastewater system and then goes to the City’s Wastewater Treatment Facility. While the City currently captures methane gas from the digesters used in the wastewater treatment process, only a portion of the methane is used to offset natural gas usage for the plant. To explore other options for further management of wastewater greenhouse gas (GHG) emissions, the City should conduct a study to determine the feasibility of using all captured methane to create renewable fuel or electricity that can be used to operate the facility, and take specific actions based on the results of this study.”

Action Number 3.8: Take action on a feasibility study on energy generation from landfill methane.

“The methane produced by decomposition of organic waste in the Iowa City Landfill is currently being flared to transform it into carbon dioxide, which is a less potent GHG. The City has been considering methods to use the methane as a renewable energy source, and to further explore this opportunity, the City will conduct a feasibility study in FY2019 and take specific actions based on the results of this study.”

2.2 Feasibility Study

The objective of this Feasibility Study is to evaluate alternatives developed to support actions 3.7 and 3.8. To conduct this study, HDR applied its SROI framework to evaluate alternatives. The following sections of this report detail:

- The approach used.
- The alternatives considered.
- The economic analysis methods used to evaluate alternatives.
- A summary of the economic analysis results.
- Recommendations for waste actions 3.7 and 3.8.

2.2.1 SROI Background

SROI evaluates whether the public value of a project is sufficient to justify the money required to develop the project and which alternative provides the greatest financial and societal return relative to the project cost. SROI process is an enhanced form of benefit cost analysis (BCA) that involves a systematic comparison of the benefits and costs of projects in ways that communicate a project’s triple-bottom line outcomes, (i.e. its full range of environmental, social and economic impacts). SROI originated from a commitment by HDR to develop a new generation of public decision support metrics for the Clinton Global Initiative (CGI) in 2007. SROI was developed with input from Columbia University’s Graduate School of International Public Affairs and launched at the 2009 CGI annual meeting. Since then, the SROI process has been used by HDR to evaluate the monetary value of numerous sustainability programs and projects for water and wastewater infrastructure utilities around the country.

2.2.2 Methodology of SROI Process

The SROI process draws from standard economic BCA methods and the best available data to systematically calculate and compare the benefits and costs of project alternatives. The process addresses sustainability goals and outcomes from a triple bottom-line perspective, meaning the range of potential environmental, social, and economic impacts (see [Figure 1](#)). In this Feasibility Study, impacts are associated with the economic and environmental benefits related to the value of RIN credits to the City as well as the social cost of carbon associated with changes in GHG emissions. In addition, the EROEI and tons of GHG emissions are estimated as non-monetary metrics.

Figure 1: SROI Triple Bottom Line Accounting



The SROI process builds on best practices in benefit-cost and financial analysis methodologies, complemented by advanced risk analysis and stakeholder elicitation. Typically, the SROI process is implemented in four steps, which include:

1. **Develop the structure and logic diagrams (S&L’s):** Structure and logic diagrams are useful to display the understanding of how key variables within an analysis interact to influence the intermediate or final outputs being measured. These diagrams provide a



transparent view of the calculations being made in the analyses for key stakeholders and subject matter experts to review and understand the process better.

2. **Assign values to inputs:** Values are assigned to inputs based on logic established in the S&L's. In some instances, ranges for inputs are established to enable the analysis to capture how an input will impact the project with the potential variability of its value essentially simulating real world conditions.
3. **Develop consensus among stakeholders to validate inputs:** The S&L's and inputs are then presented to stakeholders for validation. This is a key step in the SROI process. Stakeholders and subject matter experts are consulted regarding the values used to understand their view on these inputs. This step is critical for getting stakeholder buy-in on the process and seeking out additional knowledge that may not have been captured previously.
4. **Evaluate impact on agency goals (e.g. cost, environmental impact, public perception, etc.), including simulation if applicable:** These inputs will then be added into the model structure detailed with the structure and logic diagrams to evaluate the agency goals, specifically the costs or environmental impact. The alternative that best meets these criteria will be the one that is the most desirable alternative.

3 Renewable Natural Gas as a Resource

Renewable Natural Gas (RNG) is biogas or landfill gas that has been treated or refined to natural gas (NG) quality. The resulting RNG can be used interchangeably with NG, but is considered renewable as it doesn't rely on petroleum and can therefore provide additional environmental attributes through federal and state programs.

3.1 Renewable Natural Gas - Environmental Attributes as Vehicle Fuel

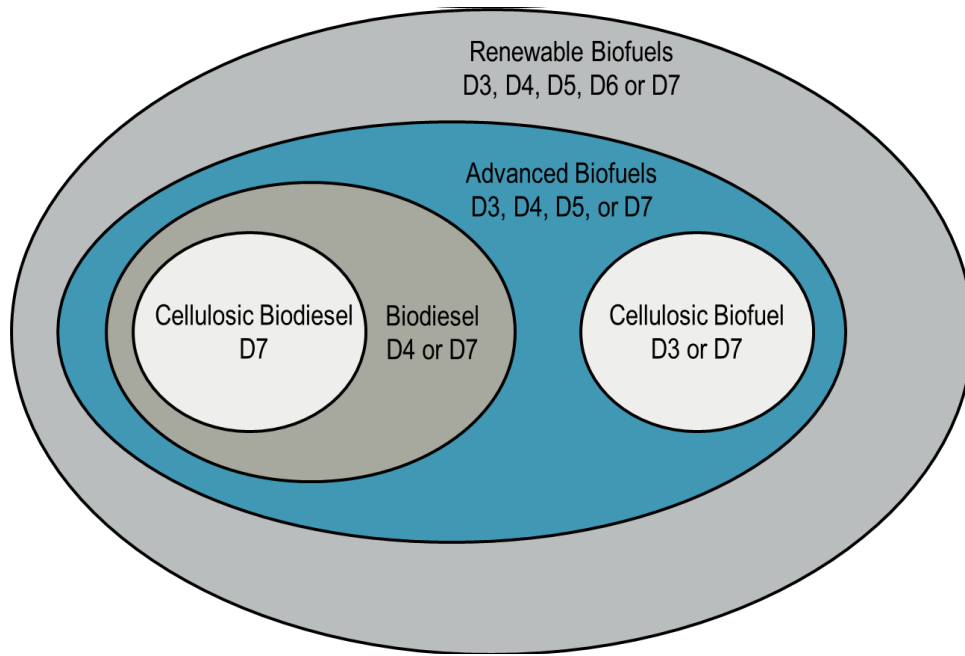
3.1.1 EPA - Renewable Fuel Standard

The United States Congress created the Renewable Fuels Standard (RFS) through the Energy Policy Act of 2005 and revised the program with the Energy Independence and Security Act in 2007. The RFS is a renewable fuels program within the Clean Air Act which mandates that large fuel producers and blenders (Obligated Parties) must include within their fuel mix a growing portion of renewable fuels. The quotas required of the Obligated Parties are referred to as Renewable Volume Obligations (RVOs) and are established and tracked by the United States Environmental Protection Agency (EPA) through the use of renewable credits, also known as, Renewable Identification Numbers (RINs). The original program was designed to increase the RVOs until 2022 and then level off beyond that point unless Congress issued another amendment. The EPA can lower or raise the RVOs up to the maximum RVO quota set for 2022, but Congressional action would be required to eliminate the RFS program. The RFS program has pressure against it from the Oil and Gas Industry, but also has a strong support from the Corn Ethanol Industry, who represent half of the RIN market.

As the EPA's RFS, RVOs are developed by categorized RIN types based on their environmental benefit and the production pathway. These categories, D3 through D7, encompass lower value biofuels like corn-based ethanol (D6) up to high value biofuels like cellulosic biodiesel or ethanol (D3) (see [Figure 2](#)).

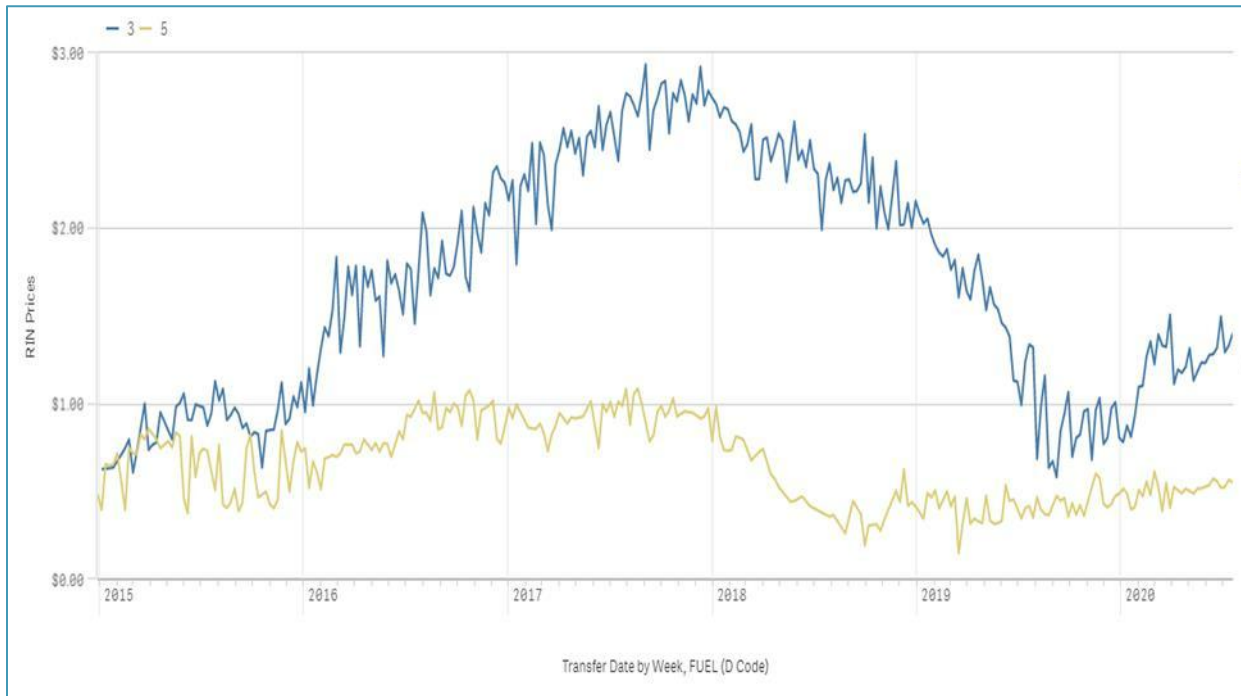
RNG produced from landfill gas is considered D3 cellulosic biofuel in the RFS. RNG produced from wastewater biogas production from anaerobic digestion or co-digestion is considered D3 cellulosic or D5 advanced biofuel depending on the feedstocks used to production. The biogas produced from the digestion of municipal biosolids will be considered D3 cellulosic and have the highest value. However, any biogas produced by the co-digestion of municipal solids with hauled in or high strength wastes will be considered D5 advanced, unless each individual feedstock has a 75% or higher cellulosic content.

Figure 2: EPA RFS Nested RIN Categories and Volumes



[Figure 3](#) presents the historical RIN values as reported by the EPA from 2015 through August 2020.

Figure 3: Historical RIN values From the EPA from 2015 Through August 2020

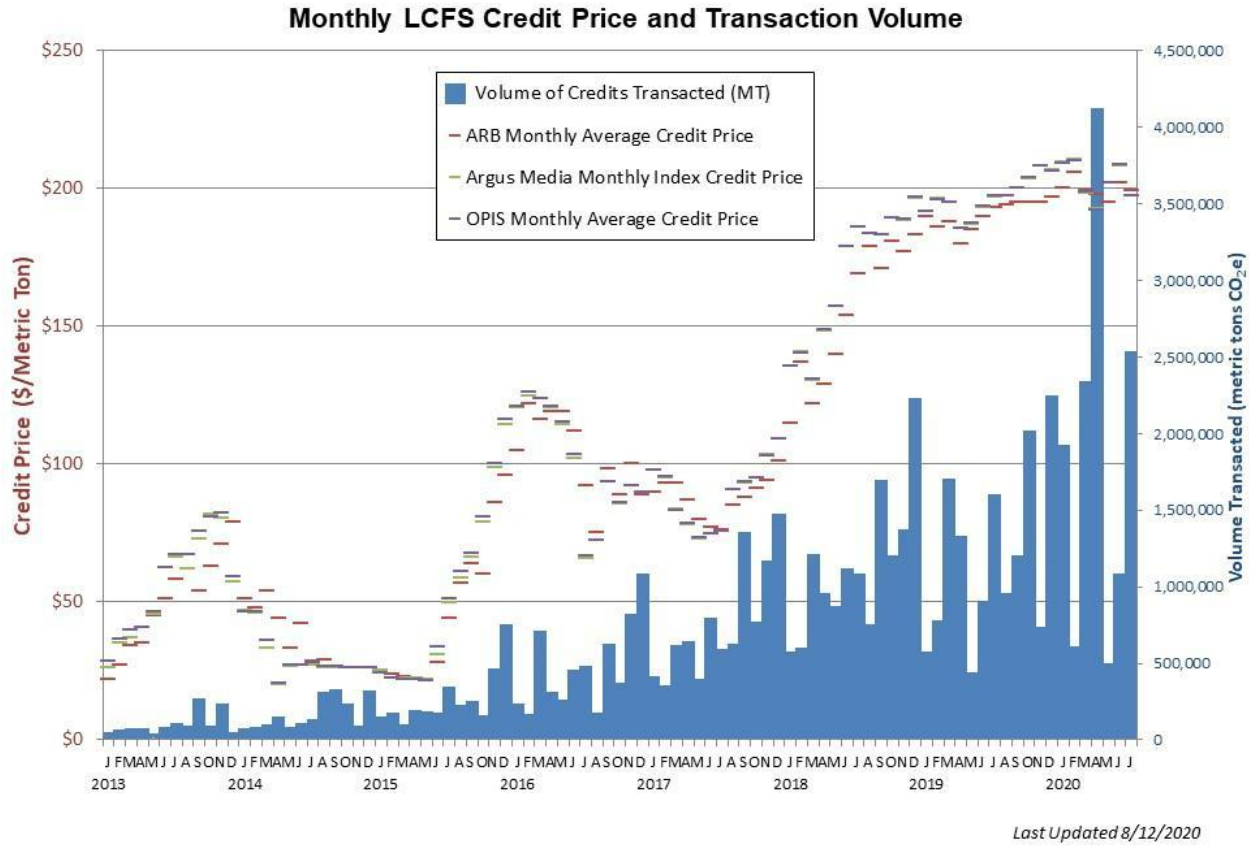


Source: <https://www.epa.gov/fuels-registration-reporting-and-compliance-help/rin-trades-and-price-information>

3.1.2 California Low Carbon Fuel Standard

In addition to RINs, carbon offset credits are also available through California’s Low Carbon Fuel Standard (LCFS) program. The LCFS market has become a healthy market with more transactions and higher values throughout the last seven years (see [Figure 4](#)) and is not anticipated to end until 2032. LCFS credits can be obtained in addition to RIN credits as long as the renewable fuel is contracted for sale to an Obligated Party with end use in California.

Figure 4: California LCFS Market History



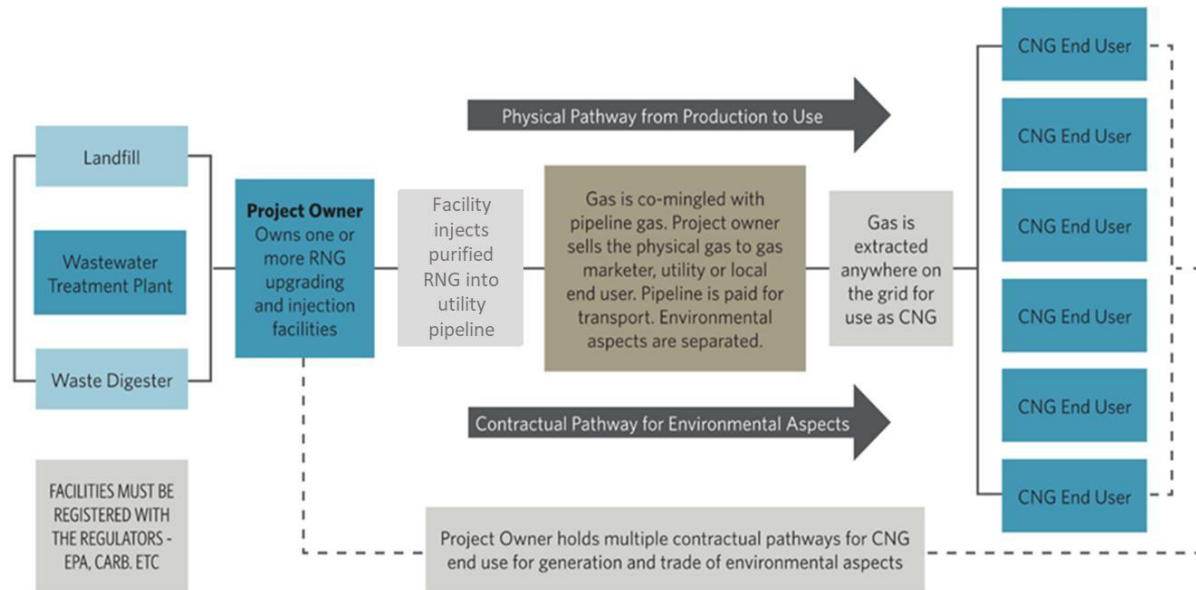
This chart tracks credit prices and transaction volumes over time. Monthly average credit prices reported by Argus Media and OPIS [used with permission] are shown along with CARB monthly average price.

3.1.3 Requirements and Pathways

A requirement to be aware of for both of these programs (RFS and LCFS) is that they are specifically renewable fuels for transportation programs. As such, the fuel must ultimately be used as a transportation fuel in order for the renewable attribute to be recognized. A renewable fuel producer is not required to explicitly find a transportation end user of the fuel it produces, however, at some point along the fuel supply pathway, it must be used as transportation fuel so that an Obligated Party can claim the RIN and/or the LCFS credit and meet its obligation with the EPA or with California.

The production and sale of RNG and environmental attributes like RINs and/or LCFS occurs in two pathways; the physical pathway and the contractual pathway for the attributes. The physical pathway is the sale of the RNG by the producer to end user of the gas via the natural gas grid. The contractual pathway for the attributes is separate and handled by third party which verifies that the RNG is truly renewable and markets the attributes to Obligated Parties. [Figure 5](#) illustrates the two pathways of RNG and RIN/LCFS sales. It is important to note that the molecules of natural gas don't actually have to be used as vehicle fuel, but the physical pathway needs to be verified through the grid system.

Figure 5: PhysRNG Value Considerations



The value of RNG should take into account following:

1. The value of the RNG as natural gas based on the natural gas commodity market.
2. The value of environmental attributes obtained through the RFS (D3 or D5)
3. The value environmental attributes obtained through the LCFS.
4. The cost of compliance with the RFS and LCFS.
5. The cost of marketing the environmental attributes to Obligated Parties.

Items 1-3 should be considered as ranges (low, median, high) to account for the variability in future market values. The biogas revenues at the WWTP need to be divided into D3 and D5 categories. The biogas produced in the anaerobic digesters handling municipal biosolids will produce D3, but biogas produced at the co-digestion facility will be D5, but may be eligible for LCFS depending on the carbon intensity score. Items 4 and 5 are included to reflect the cost of bringing the gas to market within the environmental attribute programs. The RFS is highly regulated, so market RIN values are typically reduced by 15% and the LCFS values by 15-30% to account for the third part cost of compliance and marketing the environmental attributes to Obligated Parties. The third parties are either gas marketing companies or the Obligated Parties themselves, and are typically selected by a Request for Proposal (RFP) process. The resulting contractual arrangement specifies the City's share be based on either a fixed price or percentage of total revenue and the term of the agreement. The third party will qualify the RINs with EPA, qualify with California for LCFS credits, develop QA programs for certification, and administer the program. The City is then paid by the third party for both the natural gas commodity value and the associated renewable attributes based on a monthly or quarterly invoice.



4 Description of Project Alternatives

Three beneficial reuse alternatives were analyzed for current and future biogas generated at the WWTP and Landfill. For a complete and detailed assessment, please refer to the Biogas Utilization Alternatives Analysis Technical Memorandum previously provided by HDR, dated July 17, 2020. Recognizing synergy with another action in the City's CAAP, Action Item 3.2 Increase Composting of Organics, HDR also considered impacts of diverting incremental volumes of food waste from the Landfill to the existing WWTP, a new, dedicated anaerobic digester, and expanded composting operations. The following is a description of each alternative.

4.1 Alternative 1: Natural Gas Pipeline Injection

Biogas Utilization Alternative 1 assumes that the City purchases and operates equipment to condition the biogas to natural gas quality (RNG) for injection into the natural gas pipeline. To provide an interconnection point, the natural gas utility (MidAmerican Energy Company) would route a new pipeline from the existing natural gas distribution system to the City's property. The City would be required to reimburse the utility for the cost of the connecting pipe, and also pay an annual pipeline usage fee. This pipeline usage fee is dependent on the amount of RNG injected into the natural gas pipeline by the City. Assuming natural gas quality meets the RFS Program, the City would sell RIN credits and surrender any downstream GHG emissions reductions that would be realized by the Obligated Party purchasing the credits. Alternative 1 is applicable to both the WWTP and Landfill, presented as alternatives 1a and 1b, respectively.

4.2 Alternative 2: Electricity Generation

Biogas Utilization Alternative 2 assumes that biogas is conditioned and utilized in engine generators owned and operated by the City to produce renewable electricity. The electric power utility (MidAmerican Energy or Eastern Iowa Light & Power) would establish a connection to the grid, enabling the City to sell the renewable power. The City would be required to reimburse the electric utility for all system upgrades required to accommodate the connection. Under this alternative, HDR assumes that the City's contract with the electric power utility would allow the City to retain Renewable Energy Credits (RECs) to offset GHG emission associated with electricity use in their buildings and facilities. Alternative 2 is applicable to both the WWTP and Landfill, presented as alternatives 2a and 2b, respectively.

4.3 Alternative 3: WWTP Natural Gas Replacement

Biogas Utilization Alternative 3 involves conditioning biogas to natural gas quality with the intent of using the RNG in place of the natural gas at the WWTP. Biogas would be conditioned to natural gas quality by equipment owned and operated by the City to be installed at the WWTP. The WWTP RNG produced will exceed the amount of natural gas used at the plant. As such, the City would need to either: find a use for the excess RNG produced, flare the excess gas, or the City would only condition the amount of biogas needed and the excess biogas would be flared. For this analysis, it was assumed that RNG production would be capped at 62,848 standard cubic feet per day. Alternative 3 is only applicable to the WWTP as natural gas is not consumed at the landfill.



4.4 Alternative 4: Composting

Alternative 4 consists of diverting organic waste that would typically be placed in the landfill to a new or expanded composting facility. Because the existing composting operation is at capacity, this alternative assumes the City would utilize existing owned-land and purchase equipment to expand composting capacity. This alternative is only relevant for the Low-Diversion scenario, further described in the section below.

4.5 Organics Diversion Scenarios

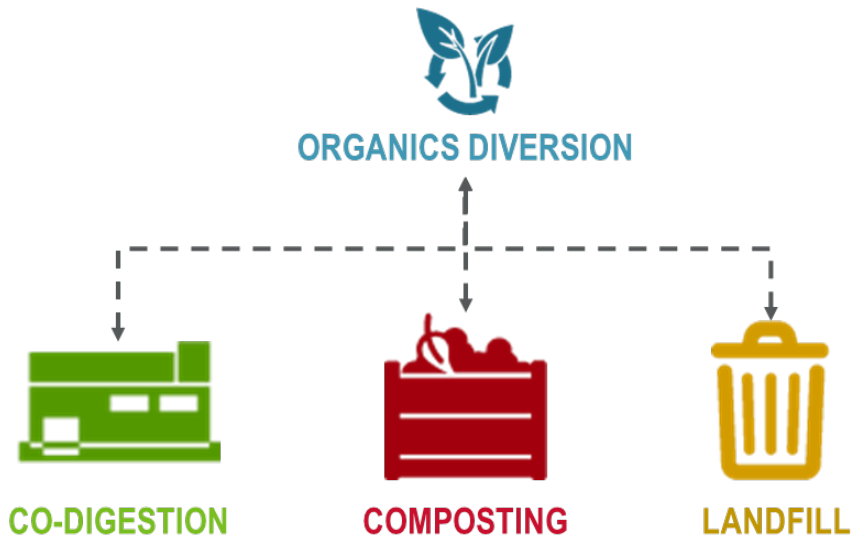
Recognizing the synergy with the City's goal to increase composting of organics, HDR evaluated the relative cost and GHG emissions impact for each of the four alternatives under three food waste diversion scenarios. HDR's previous technical analysis determined the impact on future biogas generation quantity when some of the City's organic matter is diverted from the Landfill for co-digestion or composting.

The three organics diversion scenarios include:

- 1) No Organics Diversion. The No Organics Diversion scenario assumes that all organics material is disposed of in the Landfill (i.e. current operation).
- 2) 1,500 tons. The 1,500 tons scenario assumes that an additional 1,500 tons of food waste material will be diverted from the Landfill to the existing WWTP anaerobic digester each year. This quantity represents the current available capacity in the WWTP anaerobic digester; therefore, no additional digester capacity is required for this diversion scenario. This scenario is not applicable to composting, as the existing facility is operating at capacity.
- 3) Low-Diversion. The Low-Diversion scenario assumes that 20% of organic material (7,960 tons/year) currently disposed of at the Landfill is diverted to new anaerobic digesters or an expanded composting facility. For GHG emissions modeling purposes, HDR assumed that the additional diverted organic material is entirely comprised of food waste. The required anaerobic digester volume required for the Low-Diversion scenario is 1.4 million gallons (MG).

For purposes of this study, HDR assumed that the new waste receiving station and standalone anaerobic digesters required to accept the additional diverted food waste would be located at the WWTP. A standalone digester facility for the diverted organic waste was assumed because the RIN credits for RNG produced in a municipal WWTP digester will have a higher value than those for RNG produced by a diverted waste digester. Additionally, the WWTP digester gas contains high levels of siloxanes. It is beneficial to keep the two sources of biogas separated until the siloxanes are removed from the WWTP biogas. Over the course of the Study development, discussion with City staff supported retaining digester capacity within the existing complex to support municipal biosolids. Therefore, for a planning level, Feasibility Study, an independent system to support new low-diversion digesters is proposed. Implementation would include independent operation, and not an expansion of the existing digester facility. However, as the plan is refined, a more detailed evaluation and conceptual design should be conducted to further determine the best approach for the City.

Figure 6: Organics Diversion



A summary of the alternatives and diversion scenarios selected for the SROI analysis are listed in [Table 1](#).

Table 1: Summary of the Alternatives and Diversion Scenarios evaluated for Feasibility

Alternative Description		Facility Location	Scenario Name
Pipeline Injection (Alt. 1)	Sell RIN credits, & no additional organics diversion	WWTP	Alt. 1a - ND
		Landfill	Alt. 1b - ND
	Sell RIN credits, & 1,500 TPY organics diverted from landfill	WWTP	Alt. 1a - 1500 Div
		Landfill	Alt. 1b - 1500 Div
	New AD facility, sell RIN credits, & 7,960 TPY organics diverted from landfill	WWTP	Alt. 1a - LD
		Landfill	Alt. 1b - LD
Electricity Generation (Alt. 2)	No additional organics diversion	WWTP	Alt. 2a - ND
		Landfill	Alt. 2b - ND
	1,500 TPY organics diverted from landfill	WWTP	Alt. 2a - 1500 Div
		Landfill	Alt. 2b - 1500 Div
	7,960 TPY organics diverted from landfill	WWTP	Alt. 2a - LD
		Landfill	Alt. 2b - LD
Natural Gas Replacement (Alt. 3)	No additional organics diversion	WWTP	Alt. 3 - ND
	1,500 TPY organics diverted from landfill	WWTP	Alt. 3 - 1500 Div
	New AD facility, & 7,960 TPY organics diverted from landfill	WWTP	Alt. 3 - LD
Expanded Composting (Alt. 4)	7,960 TPY organics diverted from landfill	Compost	Alt. 4

Some of the alternatives listed in [Table 1](#) can be constructed as standalone alternatives. Additionally the alternatives can be constructed together in various combinations provided the same waste diversion scenario is followed. For example, Alternative 1b – NG Pipeline Injection at the Landfill may be constructed at the Landfill with no improvements at the WWTP.



Alternatively, Alternative 1b could be selected for utilization of the biogas at the Landfill, with Alternative 2a (Electricity Generation) selected for biogas utilization at the WWTP.

A more detailed explanation and associated matrix table of possible combination scenarios is included later under Section 5.1.

4.5.1 Impacts to Existing Wastewater Treatment Plant

Implementation of anaerobic digestion for organics diversion can result in impacts to the existing WWTP. The diverted organics need to be incorporated into a mixture with a target feed total solids (TS) content of 6 percent. This requires the use of makeup water to create the mixture in a receiving station. Typically, the makeup water is a combination of digester recycle and WWTP effluent. The total water feed rate into the digester is estimated near 90,000 gallons per day, and the makeup water stream would be small.

A more important impact to the existing WWTP is the return stream from the diversion digester. After dewatering of the digested solids, some of the excess water must be returned to the plant as recycle. Digestion of organics results in the release of nutrients, nitrogen and phosphorus in the forms of ammonium and phosphate, respectively. After dewatering, the nutrients are divided between the solids and liquids residuals. A fraction of the nutrients would remain with the solids to their ultimate disposal (e.g. land application or landfilling). The remaining fraction is recycled with the liquid residuals to the WWTP. Recycled nutrients then consume part of the nitrification and nutrient removal capacities of the treatment facility. In addition, the carbon to nutrient ratio is skewed and biological nutrient removal becomes less favorable. This means that carbon addition may be needed to support biological nutrient removal. Further, liquid treatment capacity and cost must be reevaluated with potential increases to nutrient loading.

Organic waste nutrient content varies considerably. The nitrogen content can vary between 5 and 50 percent of the TS, and the phosphorus content can vary between 1 and 10 percent of the TS. This analysis used typical food waste values of roughly 10 percent for nitrogen content and 5 percent for phosphorus for the analysis. The result is an additional 150 to 200 lb-N/d nitrogen load and an additional 30 to 50 lb-P/d phosphorus load estimated for the WWTP for every ton/d of organics diversion. In all, every 1 ton/d of diverted wastes results in a recycle containing between 2 and 3 percent of the WWTP's nitrogen capacity. The Low-Diversion scenario is based on about 4 ton/d of organics diversion, which could use between 8 and 12 percent of the WWTP's TKN capacity¹.

4.6 Estimated Costs

A detailed opinion of probable costs and opinion of O&M costs was developed for the No-Diversion scenario for each alternative. The No-Diversion scenario costs (gas conditioning system and electricity generation equipment) were then extrapolated to estimate costs for the two diversion scenarios for each alternative. For the Low-Diversion scenario, costs were added for a new anaerobic digester and waste receiving station. The estimated biogas quantities for each

¹ Design TKN capacity of WWTP identified as 6,311 lb-N/d based on NPDES permit issued 05/01/2020



scenario as a basis for the extrapolation. Equipment proposals were also obtained for the No-Diversion scenario for each alternative.

[Table 2](#) contains a summary of the capital and O&M costs for each alternative selected for the detailed SROI analysis.

Table 2: Biogas Utilization Alternatives Summary

Alternative	Scenario	Alternative Designation	Opinion of Probable Construction Costs	Opinion of Probable Annual O&M Costs
1a: WWTP NG Pipeline Injection	No Diversion	1A - ND	\$8,600,000	\$1,353,000
	1,500 Ton/Year	1A - 1500	\$10,800,000	\$1,815,000
	Low Diversion	1A - LD	\$41,400,000	\$3,112,000
1b: Landfill NG Pipeline Injection	No Diversion	1B - ND	\$29,200,000	\$2,292,000
	1,500 Ton/Year	1B - 1500	\$29,000,000	\$2,282,000
	Low Diversion	1B - LD	\$28,000,000	\$2,200,000
2a-2: WWTP Electricity Generation	No Diversion	2A - ND	\$13,500,000	\$1,067,000
	1,500 Ton/Year	2A - 1500	\$17,000,000	\$1,432,000
	Low Diversion	2A - LD	\$50,000,000	\$2,538,000
2b-2: Landfill Electricity Generation	No Diversion	2B - ND	\$20,500,000	\$1,288,000
	1,500 Ton/Year	2B - 1500	\$20,300,000	\$1,282,000
	Low Diversion	2B - LD	\$19,600,000	\$1,236,000
3: WWTP NG Replacement	No Diversion	3 - ND	\$7,700,000	\$867,000
	1,500 Ton/Year	3 - 1500	\$9,700,000	\$1,163,000
	Low Diversion	3 - LD	\$39,800,000	\$2,136,000
4: Composting	Low Diversion	4	\$5,700,000	\$495,000

4.7 Description of Impact Categories

The effect of an alternative differs across the individual impact categories (individual economic and environmental benefits and/or costs) and depends on the design of the project alternative, site conditions where the project is implemented, and characteristics in the community. Estimation of benefits and costs from a project depends on the degree to which linkages can be quantified between alternatives and a benefit or cost, and then available economic literature to value this change.

This section develops the general assumptions and inputs used in the SROI analysis framework and describes the impacts.

4.7.1 General Assumptions and Inputs

The SROI analysis measures benefits and costs throughout a 30-year period of analysis from 2021 to through the year 2050 representing the GHG emissions reduction goal year in the City's

CAAP. The methodology makes several important assumptions and seeks to avoid overestimation of benefits and underestimation of costs. Specifically:

- Input prices are inflated to 2019 dollars;
- The analysis period begins in 2021 and ends in 2050. It includes twenty-nine years of operations (2022-2050); and
- A constant 3 percent real discount rate is assumed throughout the period of analysis.

4.7.2 Impact Categories

Each of the evaluated impacts is discussed in detail in the following sections. The impacts are organized by their respective triple bottom line categorization (economic and environmental).

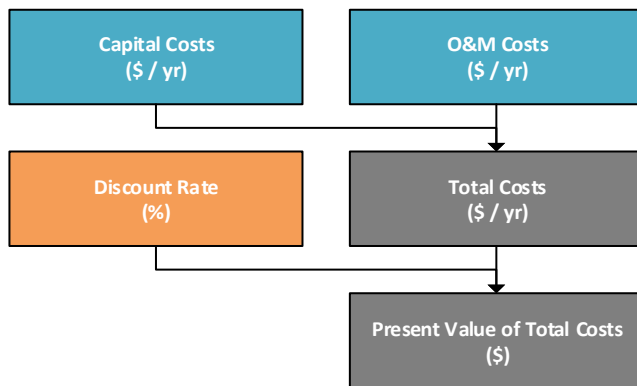
4.7.2.1 ECONOMIC IMPACTS

Economic benefits include impacts that are created by the project after deducting the cost of all inputs, including the cost of the capital expenditures (CAPEX) and annual operations and maintenance (O&M) costs (lifecycle costs of the project alternatives). Economic benefits include value of RIN credits to the City. Additionally a non-monetary measure of economic efficiency includes energy return on investment.

4.7.2.1.1 Lifecycle Costs

Lifecycle costs include CAPEX and annual O&M for each alternative. The costs are estimated as a 30 year life-cycle costs as shown below in the S&L diagram.

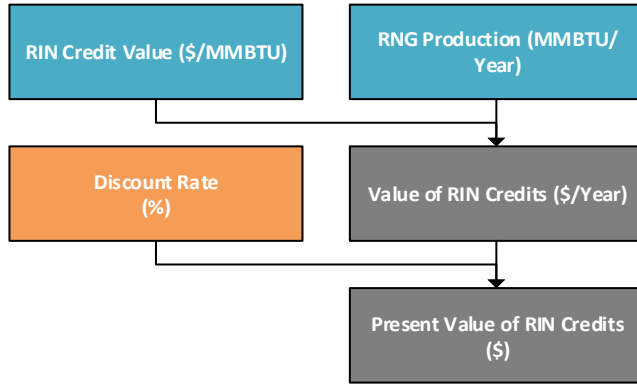
Figure 7: Lifecycle Cost Structure and Logic Diagram.



4.7.2.1.2 RIN Credit Benefits

RIN credits provide a potential unique revenue source to Alternative 1. RINs are the credits that the US Environmental Protection Agency (EPA) uses to track and enforce compliance with the renewable fuels mandates set by the federal RFS Program. The City may be able to generate and sell RIN credits to Obligated Parties by producing RNG from biogas and injecting it into the pipeline for blending with conventional, non-renewable natural gas. [Figure 8](#) illustrates the value of RIN credits.

Figure 8: RIN Credit Value Structure and Logic Diagram.



The potential value of RIN credits beyond 2020 is shown below in [Table 3](#). Based on this information and discussions between the City and HDR, the median D3 value (\$16.18) was used in the SROI analysis for alternatives involving gas produced from the landfill. For alternatives located at the WWTP and food waste diversion scenarios the D5 value (\$7.70) was used presuming the mix of a lesser quality gas.

Table 3: Value of RIN Credits

RIN and Carbon Market ²	Units	Value			
		Most likely	Low	Median	High
Total for D3 + Commodity	\$/MMBTU	\$16.18	\$8.20	\$11.69	\$25.15
Total for D5 + Commodity	\$/MMBTU	\$12.37	\$5.71	\$6.71	\$9.70
Total for D5 + Commodity + LCFS	\$/MMBTU	\$7.70	\$5.71	\$11.69	\$19.70

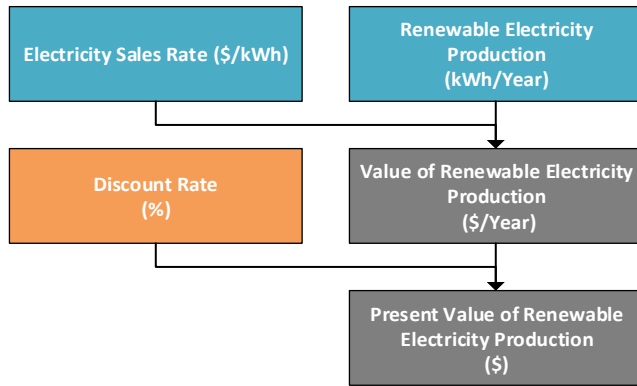
4.7.2.1.3 Renewable Electricity Production

Revenue from electricity sales are assumed to be captured from both net metering and negotiated buyback agreements with MidAmerican Energy Company and Eastern Iowa Light and Power Cooperative.

MidAmerican Energy Company (which supplies the electricity to the Iowa City Landfill) allows for net metering agreements for a facility nameplate generation capacity of up to 1 megawatt (MW) or 110% of its annual load. Credits from net metering agreements are paid out at the average locational marginal price (LMP) from the Midcontinent Independent System Operator (MISO) based on the generation profile of the resource. For energy produced beyond a nameplate capacity of 1 MW or 110% of its annual load, energy can be sold to MidAmerican Energy at a negotiated buyback rate. The Eastern Iowa Light and Power Cooperative allows for buyback agreements for facilities with a nameplate generation capacity exceeding 20 kilowatts (kW). [Figure 9](#) illustrates the value of renewable electricity production.

² HDR is **NOT** providing a revenue projection or analysis of financial feasibility of alternatives. Such projections are highly dependent on open market commodity pricing, political volatility, and local, state, and federal programs and policies.

Figure 9: Renewable Electricity Production Value Structure and Logic Diagram



Electricity production was monetized under the assumptions shown in [Table 4](#). The landfill is assumed to export 110% of its 2019 electricity usage at the net metered rate offered by MidAmerican Energy Company, and any excess generation is monetized at the negotiated buyback rate. The wastewater treatment plant receives the Eastern Iowa Light and Power Cooperative avoided cost rate for all of its electricity generation.

Table 4: Value of Renewable Electricity Production

Electricity Sales Assumptions	Units	Value
MidAmerican Energy Net Metering Rate	¢/kWh	2.6¢ ³
MidAmerican Energy Negotiated Buyback Rate	¢/kWh	2.6¢ ⁴
Eastern Iowa Light and Power Cooperative Avoided Cost Rate	¢/kWh	4.2¢ ⁵
2019 Iowa City Landfill Electricity Usage	kWh	278,882

4.7.2.1.4 Value of Avoided Natural Gas Purchases

The WWTP RNG produced will exceed the amount of natural gas used at the plant. As such, the City would need to either: find a use for the excess RNG produced, flare the excess gas, or the City would only condition the amount of biogas needed and the excess biogas would be flared. Production of RNG would prevent the facility from needing to purchase natural gas. For this analysis, it was assumed that RNG production would be capped at 62,848 standard cubic feet

³ The net metered rate is assumed to be a weighted average LMP based on 2019 hourly real-time LMP prices for the Illinois hub and the MISO load. Calculated based on data from Midcontinent Independent System Operator’s market reports.

*****.misoenergy.org/markets-and-operations/real-time--market-data/market-reports/#nt=.

MISO historical load data was gathered from EnergyOnline from January 1, 2019 to December 31, 2019.

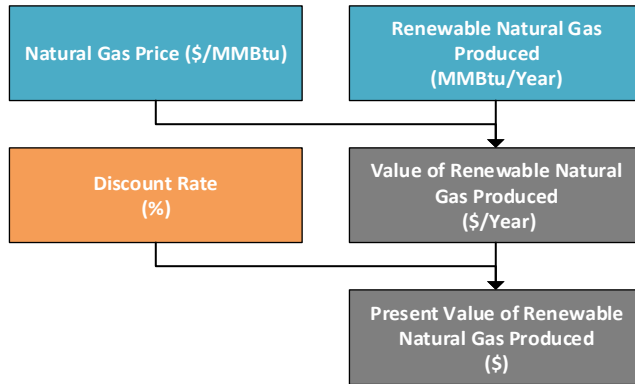
*****.energyonline.com/Data/GenericData.aspx?DataId=17.

⁴ Negotiated buyback rate is assumed to be equivalent to the average LMP price calculated for the net metering rate.

⁵ Weighted average calculation based on Eastern Iowa Light and Power Cooperative’s posted avoided cost of generation during peak and off-peak hours.

per day and valued at the delivered cost of natural gas at the facility assumed to be **\$3.16⁶** per MMBtu. The value stream is shown in [Figure 10](#).

Figure 10: Renewable Natural Gas Value Structure and Logic Diagram



4.7.2.1.5 Energy return on energy investment

Energy return on energy investment is the ratio of the amount of usable energy delivered from a particular energy resource to the amount of energy used to obtain that energy resource as illustrated below.

$$EROEI = \frac{E_o}{E_i}$$

Where:

E_o = Energy output

E_i = Energy input

The resulting ratio demonstrates the relative energy inputs necessary to produce the energy output for each alternative. The higher the EROEI, the greater the amount of energy that is yielded for the amount of energy produced. EROEI was estimated for each alternative except for Alternative 4, because composting does not generate energy.

Energy output was based on the quantity of RNG produced or electricity generated. In addition to energy generated, HDR also factored in lifecycle energy use reduction using the USEPA Waste Reduction Model (WARM), which compares GHG emissions reductions and lifecycle energy savings from baseline and alternative waste management scenarios. HDR estimated change in lifecycle embodied energy by utilizing WARM to compare the baseline conditions to both 1,500 tons and Low-Diversion scenarios. Specifically, the output of the WARM model estimated the lifecycle energy use reduction by co-digesting or composting additional diverted food waste as compared to the baseline of landfilling this material. Because WARM is a lifecycle assessment tool, meaning impacts are estimated from cradle-to-grave, the estimated energy use reduction

⁶ Calculated based on natural gas delivered and delivery charges from the wastewater treatment plant’s bill for the month of October 2020.



occurs outside of the City's reporting boundary and would not be evident in annual GHG emissions inventories.

Direct energy input is based on the parasitic load of new equipment installed for the purposes of generating RNG or electricity, and does not include base load energy use required to operate the WWTP and Landfill Facilities based on current conditions. Specifically, direct energy input includes the parasitic load of the biogas conditioning equipment and electric generators. All energy output and input measures were converted into million British thermal units (MMBtu) to allow a relative comparison of alternatives. [Table 5](#) provides details on each energy output and input value. The resulting EROEI's are presented in the results section of this report.



Table 5: Estimated Energy Inputs for Each Alternative

Alternative Description	Location	Alternative	Energy Input				Energy Output (Lifecycle Output + Lifecycle Energy Reduction)			EROEI
			kW/hr ¹	lifecycle (MMBTU)	RNG (scfm) ²	kW-hr/day ¹	Lifecycle Output (MMBTU)	Lifecycle Energy Reduction (MMBTU)	Total Lifecycle Energy Output (MMBTU)	
Pipeline Injection	WWTP	Alt. 1a - ND	158	141,680	71	0	1,056,062	0	1,056,062	7.5
		Alt. 1a - 1500 Div	243	217,901	95	0	1,417,070	0	1,497,046	6.9
		Alt. 1a - LD	375	336,266	142	0	2,121,111	79,976	2,545,515	7.6
	Landfill	Alt. 1b - ND	1,145	1,026,733	541	0	8,096,474	424,404	8,096,474	7.9
		Alt. 1b - 1500 Div	1,145	1,026,733	536	0	8,026,070	0	8,106,045	7.9
		Alt. 1b - LD	1,145	1,026,733	515	0	7,710,000	79,976	8,134,404	7.9
Electricity Generation	WWTP	Alt. 2a - ND	305	273,497	0	10,915	407,816	424,404	407,816	1.5
		Alt. 2a - 1500 Div	353	316,539	0	14,644	547,143	0	627,118	2.0
		Alt. 2a - LD	650	582,862	0	21,921	819,033	79,976	1,243,437	2.1
	Landfill	Alt. 2b - ND	317	284,257	0	94,517	3,531,432	424,404	3,531,432	12.4
		Alt. 2b - 1500 Div	317	284,257	0	93,695	3,500,720	0	3,580,696	12.6
		Alt. 2b - LD	317	284,257	0	89,997	3,362,552	79,976	3,786,956	13.3
Natural Gas Replacement	WWTP	Alt. 3 - ND	158	141,680	71	0	653,776	424,404	653,776	4.6
		Alt. 3 - 1500 Div	243	217,901	95	0	653,776	0	733,752	3.4
		Alt. 3 - LD	650	582,862	142	0	653,776	79,976	1,078,180	1.8
Expanded Composting	Compost	Alt. 4	0	0	0	0	424,404	0	0.0	

Notes:

- 1) The conversion from kw/hr to MMBTU is: kw/hr * 24 hours * 3,412.14 BTU per kW/hr * 365 days * 30 years divided by 1,000,000.
- 2) The conversion from scfm to MMBTU is: scfm * 1440 mins/day * 950 BTU per scfm natural gas * 365 days * 30 years divided by 1,000,000.



4.7.2.2 ENVIRONMENTAL IMPACTS

Environmental benefits include impacts that are valued based on the project's change in natural resource quality or quantity. The environmental included in this analysis include the social cost of carbon measured by changes in the emissions of carbon dioxide equivalents (CO₂e).

4.7.2.2.1 Social Cost of Carbon

GHG Emissions Impact Assessment: HDR understands that a key driver for decision-making is understanding the relative GHG emissions impact associated with each alternative and making progress towards the City's climate action goals. GHG emissions were estimated for each alternative included in the SROI analysis, and considered both direct and lifecycle impacts, as well as avoided emissions resulting from the beneficial reuse of biogas. Calculation methodologies align with best practices described in the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC) and Local Government Operations Protocol (LGOP) for GHG assessment. These considerations are described below and cumulative GHG emissions impacts for each alternative are presented in [Table 6](#).

- Direct GHG emissions were based on the incremental emissions resulting from processes required to beneficially reuse biogas. Specifically, direct GHG emissions are based on the parasitic load of new equipment installed for the purposes of generating RNG or electricity, such as energy consumed by the biogas conditioning equipment and electric generators. It is important to note that direct emissions do not include base load energy use required to operate the WWTP and Landfill Facilities based on current conditions, rather, the Feasibility Study analyzes the incremental change from current operations. At the City's direction, HDR assumed that there would not be a material change in transportation-related GHG emissions associated with diverting food waste for the 1,500 tons and Low-Diversion scenarios. Lastly, it should be noted that GHG emissions associated with combustion of biogas/RNG is considered biogenic (CO₂(b)), and per the GPC, is to be reported separately outside of Scope 1, 2, and 3 GHG emission categories. Biogenic emissions are those related to the natural carbon cycle, as well as those resulting from the combustion, harvest, digestion, fermentation, decomposition or processing of biologically based materials.
- Lifecycle GHG emissions were estimated using the EPA WARM, which compares GHG emissions reductions and lifecycle energy savings from baseline and alternative waste management scenarios. HDR estimated change in lifecycle embodied carbon by utilizing WARM to compare the baseline conditions to both 1,500 tons and Low-Diversion scenarios. Specifically, the output of the WARM model estimated the lifecycle energy use reduction by co-digesting or composting additional diverted food waste as compared to the baseline of landfilling this material. Because WARM is a lifecycle assessment tool, meaning impacts are estimated from cradle-to-grave, the estimated GHG emissions reduction occurs outside of the City's reporting boundary and would not be evident in annual GHG emissions inventories.
- Avoided GHG emissions were estimated based on the beneficial reuse of biogas, including pipeline injection, electricity generation, and natural gas displacement, assuming:
 - Biogas injected into the natural gas pipeline would be utilized to generate and sell RIN credits, ultimately being used as a renewable fuel for mobile source



combustion. RNG is a market driver for commercial fleets to transition away from conventional diesel trucks to compressed natural gas (CNG)/RNG alternate fueled-vehicles. GHG emission reductions were estimated using a diesel fuel emissions factor published by the EPA.

- Biogas used to generate electricity would ultimately offset electricity generated by local electric power utilities (MidAmerican Energy or Eastern Iowa Light & Power). Emission factors were provided by the City. While MidAmerican Energy does have a public goal related to 100% of retail sales being served by renewable energy, this is not equivalent to a net zero carbon production goal. Absent of either electric utility having a publicly stated carbon emissions reduction goal, GHG emission reductions were estimated using the emission factor provided by the City, held constant for the study period.
- Biogas used as onsite fuel at the WWTP would displace natural gas on a 1:1 unit basis. GHG emission reductions were estimated using a natural gas emissions factor published by the EPA.



Table 6: Estimated GHG Emissions

Alternative Description	Location	Alternative	Change in Landfill GHG Inventory	Parasitic energy load	Change in biological treatment inventory	Beneficial reuse GHG benefit	Change in Net Embodied Carbon (EPA WARM)	Total Annual Change in CO ₂ e Metric Tons
Pipeline Injection	WWTP	Alt. 1a - ND	0	666	0	-2,017	0	-1,351
		Alt. 1a - 1500 Div	1,027	0	27	-2,707	-941	-2,594
		Alt. 1a - LD	1,585	0	144	-4,052	-4,996	-7,318
	Landfill	Alt. 1b - ND	0	4,840	0	-32,190	0	-27,350
		Alt. 1b - 1500 Div	0	4,840	0	-32,047	-941	-28,148
		Alt. 1b - LD	0	4,840	0	-30,903	-4,996	-31,059
Electricity Generation	WWTP	Alt. 2a - ND	0	1,289	0	-1,922	0	-633
		Alt. 2a - 1500 Div	1,492	0	27	-2,579	-941	-2,001
		Alt. 2a - LD	2,748	0	144	-3,861	-4,996	-5,965
	Landfill	Alt. 2b - ND	0	1,340	0	-16,647	0	-15,307
		Alt. 2b - 1500 Div	0	1,340	0	-13,282	-941	-12,884
		Alt. 2b - LD	0	1,340	0	-15,851	-4,996	-19,507
Natural Gas Replacement	WWTP	Alt. 3 - ND	0	666	0	-2,030	0	-1,363
		Alt. 3 - 1500 Div	0	1,027	27	-4,076	-941	-3,963
		Alt. 3 - LD	-7,221	144	2,748	-4,076	-4,996	-13,401
Expanded Composting	Compost	Alt. 4	-7,221	0	0	722	-5,670	-12,169

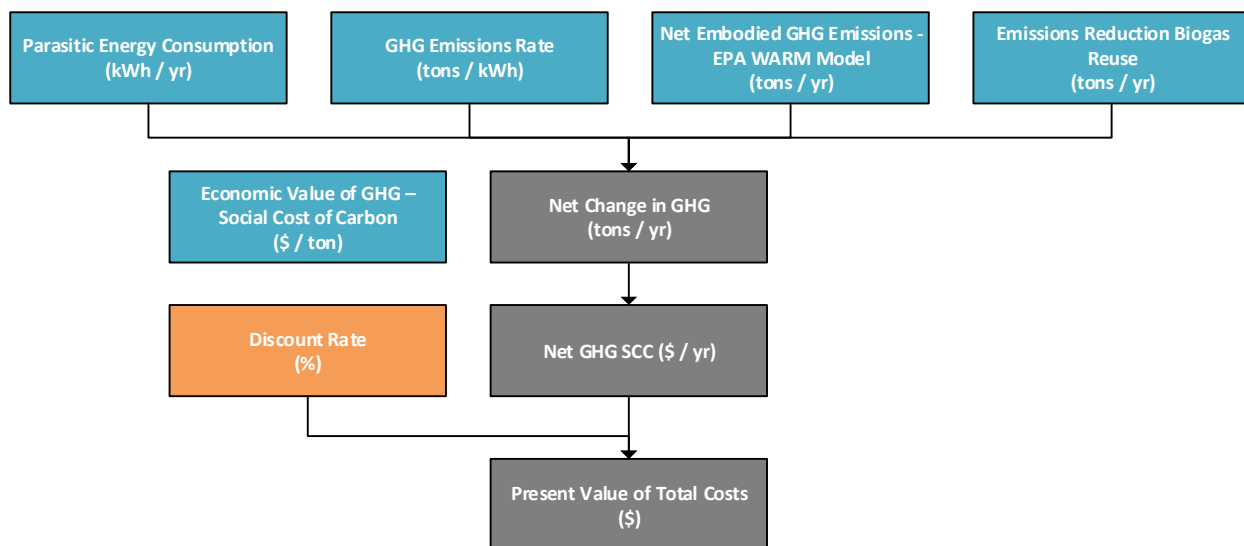
Value of GHG Emissions: Scientific studies in the United States and internationally have widely concluded that GHG emissions are closely linked with climate change, a condition that has been determined to lead to future economic impacts from more extreme weather events and damaging conditions on coasts. The impact is estimated from the change in energy production and net embodied carbon in each of the waste diversion scenarios. In alternatives of 1A and 1B (pipeline injection), RIN credits are counted as an economic benefit and the environmental attributes would therefore be sold to Obligated party who purchases the RIN credits. As such, the value of the social cost of carbon (SCC) is not counted for the associated changes in GHG emissions to avoid double counting.

GHG impacts were estimated using:

- EPA WARM model for the change in metric tons of CO₂e from embodied carbon in the waste stream;
- an electricity conversion factor (converts megawatt hours to tons of pollution for each emission type); and
- a cost of emission (monetizes the impact).

The logic for the estimating impacts of changes in GHG emissions is illustrated in [Figure 11](#).

Figure 11: GHG Emissions Structure and Logic Diagram.



For CO₂e; the value from the Interagency Working Group on the Social Cost of Carbon (IWGSCC) was used in the analysis. This value is then escalated annually at 2% using rates derived from the Federal Interagency Working Group on Social Cost of Carbon. All values are in 2019 US dollars per ton.

Table 7: Social Costs of GHG Emissions

GHG Emissions	Unit	Value	Source
CO ₂ e	\$/Ton	\$46	IWGSCC (2013)



5 Summary Economic, and Environmental Impacts of Alternatives

The evaluation of economic and environmental impacts considered a time horizon or study period, which includes project development (construction and implementation) and 29 years of operation and benefit. This extends to 2050 and aligns with the planning horizon of the City’s CAAP. Costs and benefits have been converted to present value using a 3% discount factor. Total benefits and costs are compared using a benefit to cost ratio (BCR), benefits divided by costs. BCR’s exceeding 1.0 indicate that the benefits from the alternative exceed the costs of the investment over a 30 year period. Results are shown below in [Table 8](#).

Consideration should be given to the implementation schedule of alternatives and potential for a phased approach. Revising the economic framework to account for a phasing of projects over 5-10 years would affect all of the alternatives equally and would not change the overall ranking or comparison of the alternatives. Furthermore, there is limited impact to the capital and O&M cost considerations as long as the period of study remains over 30-years. The more significant cost impacts are observed with a minimum delay of 8-10 years out of the study period. A number of implementation scenarios are possible, but the CIP planning impact is often similar from a planning perspective.

Table 8: Summary of Monetary Benefits and Costs (\$ Millions, 2019)

Alternative Description	Location	Alternative	Total Cost	Total Social Cost of Carbon	Total Value for RIN Credit and Energy Revenues	Total Benefit	Benefit -Cost Ratio
Pipeline Injection	WWTP	Alt. 1a - ND	\$35.92	\$1.67	\$5.48	\$7.15	0.20
		Alt. 1a - 1500	\$47.44	\$3.21	\$7.35	\$10.56	0.22
		Alt. 1a - LD	\$104.23	\$18.01	\$23.09	\$41.10	0.39
	Landfill	Alt. 1b - ND	\$75.47	\$33.87	\$88.14	\$122.01	1.62
		Alt. 1b - 1500	\$75.07	\$34.86	\$87.37	\$122.23	1.63
		Alt. 1b - LD	\$72.42	\$38.46	\$83.93	\$122.39	1.69
Electricity Generation	WWTP	Alt. 2a - ND	\$35.04	\$0.78	\$1.58	\$1.91	0.05
		Alt. 2a - 1500	\$45.91	\$2.48	\$2.71	\$4.41	0.10
		Alt. 2a - LD	\$101.24	\$16.33	\$2.77	\$18.31	0.18
	Landfill	Alt. 2b - ND	\$46.50	\$18.96	\$27.16	\$35.23	0.76
		Alt. 2b - 1500	\$46.18	\$15.95	\$26.91	\$32.08	0.69
		Alt. 2b - LD	\$44.55	\$24.16	\$25.75	\$39.58	0.89
Natural Gas Replacement	WWTP	Alt. 3 - ND	\$25.20	\$1.69	\$1.09	\$2.78	0.11
		Alt. 3 - 1500	\$33.18	\$3.23	\$0.93	\$4.16	0.13
		Alt. 3 - LD	\$82.92	\$16.60	\$0.15	\$16.75	0.20
Expanded Composting	Compost	Alt. 4	\$15.69	\$15.07	\$0.00	\$15.07	0.96



The results show that only Alternative 1b (landfill natural gas) has benefits that exceed the costs. The highest BCR is Alternative 1b – Low-Diversion. This alternative ranks highest on total lifecycle CO₂e emission reductions, and when combined with the value of RIN credits results in the greatest economic benefits. However, the City should be aware that the CO₂e emission reduction when RINs are sold to an Obligated Party will occur outside of the City’s municipal and community-scale GHG inventories. This alternative has the sixth highest cost of the 15 alternatives presented. The net result, of Alternative 1b, is a BCR of 1.69 dollars of benefit per dollar of cost invested.

A sensitivity test was conducted to test the impact of key monetary values (RIN credits and SCC values) on the ranking of the alternatives. Changing the value of the SCC was found to have no effect in ranking as the value influences all of the alternatives equally. Conversely, the RIN credit value only affects the BCR of pipeline injection alternative (Alternative 1) and would have an impact on alternative ranking. The sensitivity analysis showed that the realized RIN credit value would need to be below \$6.00 per MMBTU, or 5% greater than the low value of D5 RIN credits shown [Table 3](#) for the BCR ranking of alternatives to change.

Perhaps as important for consideration in CAAP are non-monetary considerations. The non-monetary metrics (EROEI and lifecycle change in CO₂e emissions) are shown in [Table 9](#). Perhaps the most important measure related to CAAP action objectives is CO₂e reductions. All of the alternatives result in a net reduction in CO₂e over the next 30 years. Alternative 1b – Low-Diversion results in the greatest net reduction.

Table 9: Summary of Non-Monetary Impacts

Alternative Description	Location	Alternative	Lifecycle Change in CO ₂ e Emissions	Lifecycle EROEI
Pipeline Injection	WWTP	Alt. 1a - ND	40,500	6.9
		Alt. 1a - 1500	77,800	7.9
		Alt. 1a – LD	436,200	7.9
	Landfill	Alt. 1b - ND	820,500	7.5
		Alt. 1b - 1500	844,500	7.6
		Alt. 1b - LD	931,800	7.9
Electricity Generation	WWTP	Alt. 2a - ND	19,000	2.0
		Alt. 2a - 1500	60,000	12.4
		Alt. 2a - LD	395,600	13.3
	Landfill	Alt. 2b - ND	459,200	1.5
		Alt. 2b - 1500	386,500	2.1
		Alt. 2b - LD	585,200	12.6
Natural Gas Replacement	WWTP	Alt. 3 - ND	40,900	4.6
		Alt. 3 - 1500	78,300	3.4
		Alt. 3 - LD	252,200	1.8
Expanded Composting	Compost	Alt. 4	365,100	0.0



Finally, all alternatives, except for composting, result in an EROEI of 1.0 or greater. Incremental composting of food waste does not generate energy. Opposite of the economic and GHG measures, Alternative 2a (WWTP Electricity Generation) – Low-Diversion ranks highest on EROEI. Meanwhile Alt 1b – Low-Diversion is ranked 5th on EROEI.

The overall ranking of the alternatives for the monetary (BCR) and the two non-monetary results are shown below in [Table 10](#).

Table 10: Summary and Ranking of Monetary and Non-Monetary Results

Alternative Description	Location	Alternative	GHG Reduction	GHG Rank	EROEI	EROEI Rank	BCR	BCR Rank
Pipeline Injection	WWTP	Alt. 1a - ND	40500	15	6.9	9	0.20	11
		Alt. 1a - 1500	77800	12	7.9	6	0.22	9
		Alt. 1a - LD	436200	6	7.9	4	0.39	8
	Landfill	Alt. 1b - ND	820500	3	7.5	8	1.62	3
		Alt. 1b - 1500	844500	2	7.6	7	1.63	2
		Alt. 1b - LD	931800	1	7.9	5	1.69	1
Electricity Generation	WWTP	Alt. 2a - ND	19000	16	2.0	13	0.05	16
		Alt. 2a - 1500	60000	13	12.4	3	0.10	15
		Alt. 2a - LD	395600	8	13.3	1	0.18	12
	Landfill	Alt. 2b - ND	459200	5	1.5	15	0.76	6
		Alt. 2b - 1500	386500	9	2.1	12	0.69	7
		Alt. 2b - LD	585200	4	12.6	2	0.89	5
Natural Gas Replacement	WWTP	Alt. 3 - ND	40900	14	4.6	10	0.11	14
		Alt. 3 - 1500	78300	11	3.4	11	0.13	13
		Alt. 3 - LD	402000	7	1.8	14	0.20	10
Expanded Composting	Compost	Alt. 4	365100	10	0.0	16	0.96	4



5.1 Findings and Insights

To make recommendations for actions under 3.7 and 3.8, the monetary and non-monetary results are combined into a weighted score as shown below in [Table 11](#). Each result was converted to an index (1 to 0). The indexed results were then weighted equally into a total score with a maximum value of 1.

Table 11: Indexed and Weighted Scores for each Alternative

Alternative Description	Location	Alternative	GHG Reduction	EROEI	BCR	Total Score	Rank
Pipeline Injection	WWTP	Alt. 1a - ND	0.01	0.17	0.04	0.23	13
		Alt. 1a - 1500	0.03	0.20	0.04	0.27	11
		Alt. 1a - LD	0.16	0.20	0.08	0.43	6
	Landfill	Alt. 1b - ND	0.29	0.19	0.32	0.80	3
		Alt. 1b - 1500	0.30	0.19	0.32	0.81	2
		Alt. 1b - LD	0.33	0.20	0.33	0.86	1
Electricity Generation	WWTP	Alt. 2a - ND	0.01	0.05	0.01	0.07	16
		Alt. 2a - 1500	0.02	0.31	0.02	0.35	7
		Alt. 2a - LD	0.14	0.33	0.04	0.51	5
	Landfill	Alt. 2b - ND	0.16	0.04	0.15	0.35	8
		Alt. 2b - 1500	0.14	0.05	0.14	0.33	9
		Alt. 2b - LD	0.21	0.32	0.18	0.70	4
Natural Gas Replacement	WWTP	Alt. 3 - ND	0.01	0.12	0.02	0.15	14
		Alt. 3 - 1500	0.03	0.08	0.02	0.14	15
		Alt. 3 - LD	0.14	0.05	0.04	0.23	12
Expanded Composting	Compost	Alt. 4	0.13	0.00	0.19	0.32	10

As noted previously, the Alternative 1b-LD (Landfill RNG Pipeline Injection) – Low-Diversion has the highest BCR. It also has the highest GHG reduction over 30 years. This is driven by the assumption that biogas injected into the natural gas pipeline would be utilized to generate and sell RIN credits, ultimately being used as a renewable fuel for mobile source combustion. Further, RNG is a market driver for commercial fleets to transition away from conventional diesel trucks to compressed natural gas (CNG)/RNG alternate fueled-vehicles. However, the City should be aware that when RINs are sold to an Obligated Party, the CO₂e emission reduction will occur outside of the City’s municipal and community-scale GHG inventories. Opposite of the economic and GHG impacts, Alternative 2a (WWTP Electricity Generation) – Low-Diversion ranks highest on EROEI. Meanwhile Alternative 1b – Low-Diversion is ranked 5th on EROEI.

Based on the indexing and weighting exercise, Alternative 1b (Landfill Natural Gas) – Low-Diversion has the highest score (0.86). Alternative 1b (landfill natural gas) – 1500 ton diversion is ranked second. Alternative 1b (landfill natural gas) – No-Diversion is ranked third. Again, CO₂e emission reduction associated with pipeline injection and used as a renewable fuel will occur outside of the City’s municipal and community-scale GHG inventories.



If the City is instead focused on reductions that will be reflected in its municipal and community-scale GHG emission inventory, then evaluation should be narrowed to focus on Alternatives 2 (Electricity Generation) and 3 (Natural Gas Replacement). While electricity generated at the WWTP or Landfill (2a and 2b, respectively) could very well be pushed to the power grid, contractual agreements with local utilities could allow the City to retain and retire RECs for GHG accounting purposes. Specifically, RECs could be applied to the City’s Scope 2 market-based GHG inventory. Using RNG to displace natural gas use at the WWTP would result in lower Scope 1 GHG emissions. Focused on these two alternatives, Alternative 2b – Low-Diversion is ranked highest (fourth overall), followed by Alternatives 2a – Low-Diversion and 2a – 1500. These alternatives are ranked 4, 5 and 7 overall.

If total GHG emissions reduction is the ultimately priority, Alternatives 1b (Landfill Pipeline Injection) offers the greatest potential, simply due to the volume of biogas generation and associated potential for renewable electricity generation.

Finally, biogas utilization alternatives can be combined together with others, and some can be incorporated as standalone projects (as shown in [Table 12](#)).

Table 12: Potential Biogas Utilization Alternatives Combinations

Weighted and Indexed Performance Indicators Total Score, inclusive of: GHG Reduction, EROI, and BCR			Landfill Location						
			Do Nothing	No Diversion		1500 ton/yr Diversion		Low Diversion	
				NG Pipeline Injection	Electricity Generation	NG Pipeline Injection	Electricity Generation	NG Pipeline Injection	Electricity Generation
				Alt 1b-ND	Alt 2b-ND	Alt 1b-1500	Alt 2b-1500	Alt 1b-LD	Alt 2b-LD
WWTP Location	Do Nothing		0	0.80	0.35	0.81	0.33	0.86	0.70
	No Diversion	NG Pipeline Injection Alt 1a-ND	0.23	1.02	0.58				
		Electricity Generation Alt 2a-ND	0.07	0.87	0.42				
		NG Replacement Alt 3-ND	0.15	0.95	0.50				
	1500 ton/yr Diversion	NG Pipeline Injection Alt 1a-1500	0.27			1.08	0.60		
		Electricity Generation Alt 2a-1500	0.35			1.16	0.68		
		NG Replacement Alt 3-1500	0.14			0.95	0.47		
	Low Diversion	NG Pipeline Injection Alt 1a-LD	0.43					1.30	1.13
		Electricity Generation Alt 2a-LD	0.51					1.37	1.21
		NG Replacement Alt 3-LD	0.23					1.09	0.93

There are 18 unique possible combinations of alternatives, [Table 12](#) has been developed to more appropriately showcase combinations and the “diversion lanes” in which decisions would need to be maintained with a decision. Boxes with blue numbering indicate individual alternative scenarios



at either the Landfill or at the WWTP. The boxes are also color coded in a “heat map” format, to show the overall ranking of the individual scenarios.

The individual alternatives can be combined together, but must be done so following the same waste diversion scenario from the Landfill. When combining the alternatives the scores from the Landfill and WWTP alternatives can be added together to identify the best combination of actions under each of the waste diversion scenarios. From [Table 11](#) above, the higher the score the better the alternative. The highest scored alternatives are: Alternative 1b – NG Pipeline Injection landfill alternatives for each of the No-Diversion, 1500 ton diversion, and Low-Diversion scenarios. Identifying the best combination of actions works as follows: select the highest scored alternative from the desired waste diversion scenario (shown to be from the Alternative 1b – NG Pipeline Injection landfill alternatives) then work down the column (or “diversion lane”) to the desired combination scenario. In the case of combining with Alternative 2a – Electricity Generation at the WWTP, a resulting combined score of 1.16. As capital costs are also additive, consideration should be given to the seemingly minor weighted score differential. In the example of combined Alt 1b-1500 with Alt 2a-1500, there is an estimated \$6.2M savings to select Alt 1b-1500 with Alt 1a-1500.

5.1.1 Path Forward

HDR recognizes that incremental food waste diversion is not an instantaneous process, but the SROI analysis provides an assessment of the resulting impact when achieved. This Report provides decision tools to support the City’s further consideration and decision making.

Consequently, the City might consider the following path forward to further evaluate and implement the preferred alternative(s):

- i. City decision on desired diversion scenario and methane utilization at the WWTP to narrow the field of alternatives. (0-6 months)
- ii. Further technical analysis to develop organics management strategies to achieve a targeted diversion scenario and further evaluate life cycle costs of co-digestion (if desired) and biogas utilization to generate electricity or RNG. Consideration of impacts to planned digester rehab project. (3-6 months)
- iii. Conceptual Design Development of the selected alternative(s), providing basis of design parameters and implementation planning. (3-6 months)
- iv. Detailed Design Development. (TBD)
- v. Bidding and Construction. (TBD)

It may be prudent for the City to complete items i) and ii) within the next 6-months for capital planning purposes.



6 References:

City of Iowa City (2018), Climate Action and Adaptation Plan,
<https://www.icgov.org/project/climate-action>.

City of Iowa City (2019), City Resolution 19-218, <https://www.icgov.org/project/climate-action>.

City of Iowa City, (2020), Accelerating Iowa City's Climate Action Plan,
<https://www.icgov.org/project/climate-action>.

Clinton Global Initiative, (2007), <https://www.clintonfoundation.org/clinton-global-initiative/commitments/creating-sustainable-return-investment-sroi-tool>.

Interagency Working Group on Social Cost of Carbon (IWGSCC), United States Government. (2010). Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866.

U.S. Environmental Protection Agency (2019). Environmental Protection Agency Waste Reduction Model (WARM) version 15. <https://www.epa.gov/warm/versions-waste-reduction-model-warm#15>.



A

Appendix A

Low-Diversion Scenario Digester Costs

OPINION OF PROBABLE CONSTRUCTION COSTS

Low Diversion Scenario (20% Diversion) - New Anaerobic Digester Complex			
			Costs
Capital Cost	Hauled Waste Receiving Station		\$2,960,000
	Anaerobic Digester (1.4 MG)		\$18,325,000
	Sludge Dewatering and Storage		\$4,990,000
	Total Adjusted Base Bid with Installation		\$26,300,000
Annual O&M Cost	General O&M - Parts, Labor, Electricity	1.5% of capital subtotal	\$394,500
	Annual O&M Costs		\$394,500



B

Appendix B

Financial Proforma – Breakeven Analysis



Appendix B - Memo

Date: Wednesday, December 23, 2020

Project: CAAP Methane Recovery Feasibility Study (HDR #10203725)

To: City of Iowa City (PM – Joseph Welter)

From: HDR (PM – Morgan Mays; Marcella Thompson; Serguei Kouznetsov; Jeremy Cook)

Subject: Financial Proforma - Breakeven Analysis

Building on the Sustainable Return on Investment (SROI) and the Energy Return on Energy Invested (EROEI) analysis performed by HDR, a high-level breakeven financial analysis was performed for each of the options identified in the Final Feasibility Report. The financial analysis examines the impact of cash flows to Iowa City (the City) to compare the revenues (inflows) and costs (outflows). The purpose of the analysis was to identify the length of time for each alternative to break-even. This memorandum outlines the cash flows evaluated, key assumptions, and the results of the analysis.

Key Assumptions

The financial analysis examined revenue streams for the various alternatives. For the pipeline injection alternatives, the revenue is derived from the Renewable Identification Number (RIN) credits under the Renewable Fuel Standard Program. For the electricity generation alternatives, the revenue is derived from electricity sales through an agreement with the utilities and Renewable Energy Credits (RECs). For natural gas replacement alternatives, revenue or rather savings are derived from avoided natural gas purchases.

Revenue from electricity sales are assumed to be captured from both net metering and negotiated buyback agreements with MidAmerican Energy Company and Eastern Iowa Light and Power Cooperative.

MidAmerican Energy Company (which supplies the electricity to the Iowa City Landfill) allows for net metering agreements for a facility nameplate generation capacity of up to 1 megawatt (MW). Credits from net metering agreements are paid out at the average locational marginal price (LMP) from the Midcontinent Independent System Operator (MISO) based on the generation profile of the resource. For energy produced beyond a nameplate capacity of 1 MW, energy can be sold to MidAmerican Energy at a negotiated buyback rate. The Eastern Iowa Light and Power Cooperative allows for buyback agreements for facilities with a nameplate generation capacity exceeding 20 kilowatts (kW). RECs are earned for each megawatt-hour (MWh) of electricity generated. For the purposes of this analysis, an average LMP of **2.6¢**¹ per kilowatt-hour (kWh) was calculated based on the 2019 LMP prices for the Illinois hub and the 2019

¹ Real time LMP prices gathered from Midcontinent Independent System Operator (MISO)'s historical LMPs for real-time markets from January 1, 2019 to December 31, 2019.

*****[misoenergy.org/markets-and-operations/real-time--market-data/market-reports/#nt=](https://www.misoenergy.org/markets-and-operations/real-time--market-data/market-reports/#nt=).

MISO historical load data was gathered from EnergyOnline from January 1, 2019 to December 31, 2019.

*****[energyonline.com/Data/GenericData.aspx?DataId=17](https://www.energyonline.com/Data/GenericData.aspx?DataId=17).

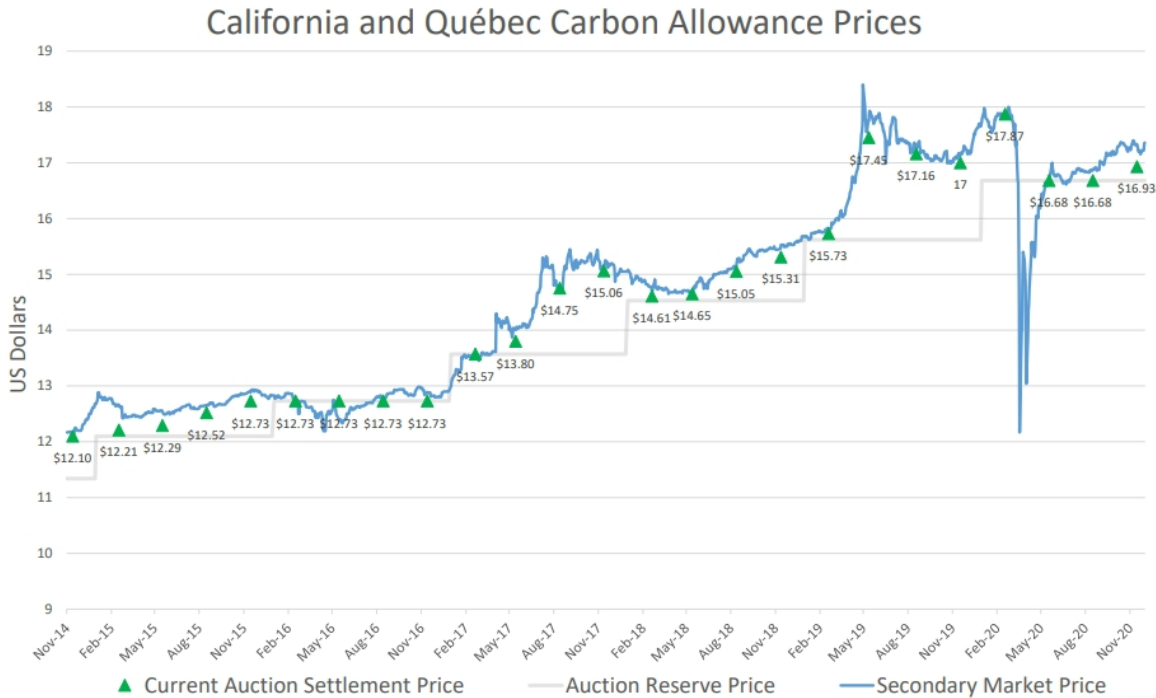


MISO load. This was assumed to be the price paid per kWh for MidAmerican Energy’s net metering agreements. It was also assumed that the negotiated buyback rate for electricity generation in excess of 1 MW was equivalent to the average LMP price of **2.6¢** per kWh. Eastern Iowa Light and Power Cooperative posts its avoided cost of generation during peak and off-peak hours online from which a weighted average rate of **4.2¢** per kWh was calculated for energy sales from the wastewater treatment plant.

Renewable energy credits were monetized at an average rate of **\$17** per MWh based on the latest auction prices of \$16.93 per MWh in and the approximate band of prices over the past couple of years (see figure below). The analysis assumed that prices would remain at that price for the full 30 years of the analysis.

Figure 1: Historical Auction Prices for Renewable Energy Credits²

Posted December 4, 2020



Notes:

1. California and Québec held their first joint auction in November 2014.
2. Current Auction Settlement Price is the price at which current vintage allowances sold at auction.
3. Auction Reserve Price is the minimum price at which allowances can be sold at auction.
4. Secondary Market Prices are a composite of commodity exchange futures contract prices for near month delivery and a survey of OTC brokered transactions for California Carbon Allowances. Secondary market prices are provided with permission of [Argus Media Inc.](http://www.argusmedia.com)
5. Secondary Market Price data drawn on December 4, 2020.



As mentioned in the main report, the WWTP RNG produced will exceed the amount of natural gas used at the plant. As such, the City would need to either: find a use for the excess RNG produced, flare the excess gas, or the City would only condition the amount of biogas needed

² California Air Resources Board. California and Quebec Carbon Allowance Prices, December 4, 2020. *****ww2.arb.ca.gov/sites/default/files/2020-09/carbonallowanceprices_0.pdf.



and the excess biogas would be flared. For this analysis, it was assumed that RNG production would be capped at 62,848 standard cubic feet per day and valued at the delivered cost of natural gas at the facility assumed to be **\$3.16** per MMBtu.

Results

High level results of the financial analysis are presented in the tables below. Projects were assumed to be bonded at a 3% interest rate and the breakeven term represents the minimum financing term that would be needed for the project to break even financially. Many alternatives have a payback term that is longer than 30 years, making them infeasible without grant funding support.

Table 1: Lifecycle Financial Breakeven Analysis Results, Millions of 2019\$

Alternative Description	Location	Alternative	Total Cost	Total Financial Benefit	Project NPV (3% bond rate)	Financial Breakeven Term
Pipeline Injection	WWTP	Alt. 1a - ND	\$35.92	\$5.48	-\$30.44	N/A
		Alt. 1a - 1500 Div	\$47.44	\$7.35	-\$40.10	N/A
		Alt. 1a - LD	\$104.23	\$23.09	-\$81.14	N/A
	Landfill	Alt. 1b - ND	\$75.47	\$88.14	\$12.67	17.9 years
		Alt. 1b - 1500 Div	\$75.07	\$87.37	\$12.30	18.0 years
		Alt. 1b - LD	\$72.42	\$83.93	\$11.52	18.2 years
Electricity Generation	WWTP	Alt. 2a - ND	\$35.04	\$1.58	-\$33.47	N/A
		Alt. 2a - 1500 Div	\$45.91	\$2.71	-\$43.21	N/A
		Alt. 2a - LD	\$101.24	\$2.77	-\$98.47	N/A
	Landfill	Alt. 2b - ND	\$46.50	\$27.16	-\$19.34	N/A
		Alt. 2b - 1500 Div	\$46.18	\$26.91	-\$19.28	N/A
		Alt. 2b - LD	\$44.55	\$25.75	-\$18.81	N/A
Natural Gas Replacement	WWTP	Alt. 3 - ND	\$25.20	\$1.09	-\$24.11	N/A
		Alt. 3 - 1500 Div	\$33.18	\$0.93	-\$32.25	N/A
		Alt. 3 - LD	\$82.92	\$0.15	-\$82.77	N/A
Expanded Composting	Compost	Alt. 4	\$15.69	\$0.00	-\$15.69	N/A

Table 2: Annual Financial Breakeven Analysis Results

Alternative Description	Location	Alternative	Annual Debt Service on Capital Costs	Annual Operating Costs	Annual Revenues/Savings	Net Annual Financial Impact
Pipeline Injection	WWTP	Alt. 1a - ND	\$0.44	\$1.35	\$0.27	-\$1.52
		Alt. 1a - 1500 Div	\$0.55	\$1.82	\$0.36	-\$2.00
		Alt. 1a - LD	\$2.11	\$3.11	\$1.14	-\$4.08
	Landfill	Alt. 1b - ND	\$1.49	\$2.29	\$4.37	\$0.58
		Alt. 1b - 1500 Div	\$1.48	\$2.28	\$4.33	\$0.57
		Alt. 1b - LD	\$1.43	\$2.20	\$4.16	\$0.53
	WWTP	Alt. 2a - ND	\$0.69	\$1.07	\$0.08	-\$1.68



Alternative Description	Location	Alternative	Annual Debt Service on Capital Costs	Annual Operating Costs	Annual Revenues/Savings	Net Annual Financial Impact
Electricity Generation	Landfill	Alt. 2a - 1500 Div	\$0.87	\$1.43	\$0.13	-\$2.17
		Alt. 2a - LD	\$2.55	\$2.54	\$0.14	-\$4.95
		Alt. 2b - ND	\$1.05	\$1.29	\$1.35	-\$0.99
		Alt. 2b - 1500 Div	\$1.04	\$1.04	\$1.33	-\$0.74
		Alt. 2b - LD	\$1.00	\$1.24	\$1.28	-\$0.96
Natural Gas Replacement	WWTP	Alt. 3 - ND	\$0.39	\$0.87	\$0.05	-\$1.21
		Alt. 3 - 1500 Div	\$0.49	\$1.16	\$0.05	-\$1.61
		Alt. 3 - LD	\$2.03	\$2.14	\$0.01	-\$4.16
Expanded Composting	Compost	Alt. 4	\$0.29	\$0.50	\$0.00	-\$0.79

Given that many of the alternatives do not generate enough financial benefits to break even in a reasonable time frame, the HDR team considered whether grant funding support could make the project feasible. The table below presents the minimum amount of grant funding required for each project to break even within specific time frames. Since grant funding is used to support up-front project capital costs, amounts above the initial capital costs are highlighted in red as not feasible. Amounts in green are feasible with the specified amount of grant funding.

Table 3: Grant Funding Support Necessary for Projects to Break Even

Alternative Description	Location	Alternative	Initial Project Capital Cost	Baseline Financial Breakeven Term	Grant Funding Support to Break Even within 30 Years
Pipeline Injection	WWTP	Alt. 1a - ND	\$8.60	N/A	\$30.44
		Alt. 1a - 1500 Div	\$10.80	N/A	\$40.10
		Alt. 1a - LD	\$41.40	N/A	\$81.14
	Landfill	Alt. 1b - ND	\$29.20	17.9 years	\$0
		Alt. 1b - 1500 Div	\$29.00	18.0 years	\$0
		Alt. 1b - LD	\$28.00	18.2 years	\$0
Electricity Generation	WWTP	Alt. 2a - ND	\$13.50	N/A	\$33.47
		Alt. 2a - 1500 Div	\$17.00	N/A	\$43.21
		Alt. 2a - LD	\$50.00	N/A	\$98.47
	Landfill	Alt. 2b - ND	\$20.50	N/A	\$19.34
		Alt. 2b - 1500 Div	\$20.30	N/A	\$19.28
		Alt. 2b - LD	\$19.60	N/A	\$18.81
Natural Gas Replacement	WWTP	Alt. 3 - ND	\$7.70	N/A	\$24.11
		Alt. 3 - 1500 Div	\$9.70	N/A	\$32.25
		Alt. 3 - LD	\$39.80	N/A	\$82.77
Expanded Composting	Compost	Alt. 4	\$5.70	N/A	\$15.69



In general, pipeline injection and electricity generation at the landfill are the only options that generate enough revenues to pay for the operating costs on an ongoing basis. Pipeline injection is feasible with bonding terms of about 18 years, while electricity generation would require around \$19 million in grant funding support to be financially viable within 30 years. That said, the electricity generation revenues are currently limited by the net metering and buyback agreements in place. This analysis has assumed that MidAmerican Energy Company (which provides electricity to the Iowa City Landfill) will negotiate a buyback agreement similar to the LMP-based rates they offer under their net metering agreement. However, if the City were able to negotiate a higher rate, it could make the alternatives financially viable. Specifically, an electricity sales rate of **5.7¢** per kWh would make all three of the alternatives financially viable within the 30-year time frame.

Grant Funding

A few federal and state grant programs could potentially be leveraged to reduce the City’s financial contribution and make the alternatives financially viable. The table below summarizes a few options based on literature review of the biggest programs which have had funding cycles within the past year.

Table 4: Grant Funding Opportunities

Program Administrator	Funding Program	Eligible Applicants	Eligibility Requirements	Funding
Federal Programs				
US Department of Energy Office of Energy Efficiency and Renewable Energy	Bioenergy Technologies Multi-Topic FOA	Individuals, entities, state or local governments, corporations, etc.	Varies based on year. FY2020 included area of Waste to Energy Strategies for the Bioeconomy, focusing on projects addressing topics such as advanced preprocessing of feedstocks, conversion of wet wastes to energy and products, and synergistic integration of algal biomass technologies with municipal wastewater treatment for greater energy efficiencies and lower costs. 20% cost share required.	Varies based on topic. Based on the FY20 grant application documentation, minimum award was \$1,000,000 and maximum award for most topics was between \$2,000,000 and \$4,000,000.
US Department of Agriculture	Biorefinery, Renewable Chemical, and Biobased Product Manufacturing Assistance Program	Individuals, entities, state or local governments, corporations, institutions, public power entities, etc.	Must be for development and construction or retrofitting of a commercial scale biorefinery using an eligible technology for the production of advanced biofuels and biobased products. Majority of production must be an advanced biofuel.	Maximum loan guarantee of 80% of project costs or \$250 million. Term length of the lesser of 20 years or the useful life of the project.
State Programs				
Iowa Energy Center	Iowa Energy Center Grant	Iowa businesses, colleges and universities, and private nonprofit agencies and foundations	Projects must provide benefit to Iowa ratepayers and aid in one of the key focus areas of the Iowa Energy Plan: 1) technology-based research and development, 2) energy workforce development, 3) support for rural and underserved areas, 4) biomass conversion, 5) natural gas expansion in underserved areas, 6) electric grid	Minimum award of \$10,000, maximum award of \$1,000,000.



Program Administrator	Funding Program	Eligible Applicants	Eligibility Requirements	Funding
			modernization, 7) alternative fuel vehicles.	
Iowa Energy Center	Alternate Energy Revolving Loan Program	Businesses, individuals, water and wastewater utilities, rural water districts and sanitary districts	Eligible technologies and resources include solar, wind, waste management, resource recovery, refuse-derived fuel, agricultural crops and residue, and wood burning, hydroelectric facility at a dam, energy storage, anaerobic digestion, biogas, combined heat and power, wind repower. Facility must be in Iowa and be wholly owned by the borrower.	Minimum loan of \$25,000, up to 50% of eligible project costs. Maximum loan of \$1,000,000 per project. Loans offered at 0% interest.
Iowa Department of Natural Resources	Solid Waste Alternatives Program	Any unit of local government, public or private group, or individual	Projects to reduce the amount of solid waste generated and landfilled in Iowa. Funds can be used for waste reduction equipment and installation, recycling, collection, processing or hauling equipment, purchase and installation of recycled content products. 25% cash match required.	First \$10,000 is eligible as a forgivable loan, next \$50,000 is eligible as a zero-interest loan, and 3% loan on the remainder.



CITY OF IOWA CITY MEMORANDUM

Date: December 28, 2020
To: Climate Action Commission
From: Ashley Monroe, Assistant City Manager
Re: Methane Feasibility Study Documents

At the January 4, 2021 Climate Action Commission meeting, HDR will be presenting the results of the Methane Feasibility Study conducted in 2019 and 2020. This study was conducted to meet the Climate Action and Adaptation Plan initiatives 3.7 and 3.8. (<https://www8.iowa-city.org/weblink/0/edoc/1803121/Climate%20Action%20Plan.pdf>). Two of the resulting reports, *Feasibility Report* and *Facility Evaluation* provide good overviews of the project and are provided for your reference in this packet.

The HDR team evaluated current and future biogas generation potential and identified alternatives for utilizing biogas at the Iowa City Wastewater Treatment Plant (WWTP) and/or the Landfill and Recycling Center (Landfill). HDR used its Sustainable Return on Investment (SROI) process to measure the feasibility of the objectives. The study was based on three categories for feasibility: net greenhouse gas emissions; net energy impact; and economics. Three alternatives were evaluated at each facility with three different scenarios for diversion of organic wastes from the Landfill. These study parameters led to seventy different combinations of alternatives and scenarios between the two facilities, of which, they will present an overview of the project and highlight top recommendations. HDR will present their findings and be available for questions in order to assist the Commission, City Council, staff, and other interested parties with any next steps.

If you have specific questions, Joseph Welter, Senior Civil Engineer, managed this project and has offered his contact information. Please feel free to email or call Joe at joe-welter@iowa-city.org and 319-356-5144.

Outreach Working Group, Meeting Agenda

Wednesday, Feb. 17, 2020, noon – 1 p.m.

Zoom Meeting Link:

<https://zoom.us/j/97398387268?pwd=Mmo2a1A0T1E2MytqU0Zia2Uxa3FHZz09>

Members:

Sarah Gardner, Matt Krieger, John Fraser, Madeleine Bradley, Grace Holbrook, Marcia Bollinger, Deb Schoelerman, Blake Rupe, Cheryl Miller (JCED)

1. Welcome and Introductions
2. Updates
 - Ambassador program: *Training sessions are underway for the second cohort of Ambassadors, who had a virtual meeting with NOAA climatologist Ray Wolf last week and will be meeting with recycling coordinator Jane Wilch this week. The group seems very engaged with the discussions so far.*
 - Neighborhood Energy Blitz: *The budget for the project has been approved and both the neighborhood association and environmental club school coordinator have agreed to the plan. Logistics planning is underway to map out the routes volunteers will follow to deliver the kits and to figure out how best to coordinate re-supplying teams throughout the route. Outreach to landlords at multi-unit rental properties will begin next month.*
3. Follow up on active transportation discussion from previous meeting
 - Sustainability Newsletter: *Space has been reserved to help get the word out about the Bike Library's Raise It Up series of bike rides in the April-July issues of the newsletter*
 - Bike to Work Month: *A workaround has been identified to help solicit ideas for Bike to Work Month events in the March issue*
 - Bike Friendly Business: *While looking into this program, staff learned that applying for the designation involves a 20 page application and a minimum \$50 filing fee, which has been identified as potential barriers to area business involvement. Staff is following up with a conversation with ICAD to learn more about other barriers and benefits businesses have identified when approached about participating, in hopes of applying the lessons learned to an alternative transportation initiative the City has begun designing. The hope is create something with a lower bar for entry and higher rewards on the local level.*
4. Climate Action Grants: *The application period for the Climate Action Grants will open March 1 and close April 1. Grants of up to \$10,000 will be awarded this year, with \$500 mini-grants available for student-led projects. Staff would like to ask Climate Action Commission members to participate in the grant review and selection process alongside staff. An item will be placed on the March agenda to ask for 2 commissioners to do so.*

5. Other Items

- *Talking points against alternative energy that have emerged following recent extreme weather events in Texas serve as reminders of the importance of ongoing education and outreach efforts.*

Next Meeting Wed, 3/17

Active Transportation Community Outreach Ideas (from Bob Opplinger)

1. Create an active transportation advisory committee and/or hire an active transportation coordinator. This is long overdue. The advisory committee or coordinator would work with IC transit services, neighboring communities, and Johnson county as well as the MPO.
2. Promote more widely the Bike to Work Month activities. There will be a dozen or more events. The calendar is just being put together.
3. Work with the schools to promote Safe Routes to Schools. This is a nationally funded project to promote active transportation to schools. The Iowa Bike Coalition has a staff person dedicated to promoting this and will host their annual, virtual workshop for it on Thursday, January 28. (It's FREE.) The IC South District and the Bike Library were ramping up a biking version last spring. Garner school in NL has promoted this idea too and maybe Longfellow.
4. Help promote IC South Districts ambitious schedule of biking actives. Because of all the trails, ICSD want to become the biking mecca of IC.
5. Assuming live farmer's markets resumes, more actively promote Move Naturally to the Market. This promotion goes back to the Blue Zones Project and was hosted by BIC in May. People who biked or walked to the Saturday market received a \$2 coupon for the market. (Vendors were reimbursed at the end of each market.) It was well received by vendors as well as patrons and attracted up to 250 people on a sunny Saturday.
6. Promote more widely, the League of American Bicyclists Bike Friendly Business initiative. This is a companion program with the Bike Friendly Community & Bike Friendly University programs. Our metro area has about a dozen BFBs. Tom Banta and I were able to persuade about 6-8 area business/worksites to apply. (It does not require everyone in the workplace to ride a bike to work.) IC Civic Center, Robert Lee Rec Center & Public Library collectively hold a silver-level designation, Johnson County offices a gold-level and we have one platinum-level business.
7. Develop a promotion that rewards bikers or walkers patronizing local businesses. There is a national program Bike Benefits (bb2.bicyclebenefits.org), that offers specified discounts, e.g. 10% off purchases, for patrons who bike to their business sporting the program's decal.
8. Learn to Bike classes. Work with BIC and IC rec services to set-up classes. We can teach an adult to ride a bike in 2-3 hours. NYC hosts clinics around town and annually teaches about 30K new bikers. Young kids take a little longer. We should have available soon a short pamphlet "Teaching your Child to Ride a Bike; A Guide for Parents and Caregivers."
9. Street Biking Classes. Street biking would take proficient riders further in offering them help to gain confidence using bike lanes and "safe streets" to commute.
10. Create a promotion that runs through the summer. For example, Iowa City Active Transportation Challenge. Beginning in May and running thru September create a challenge like the National Bike Challenge (<https://www.lovetoride.net/usa>). In its simplest form, a person who walks or bikes to work or on an errand instead by car would receive a credit. Accumulate 20 credits and receive a \$10 gift card for area businesses. This is an ambitious idea. Some things to workout.
 - a. The threshold for the number of points to receive a gift card. Twenty equals about one/week and the size of the reward
 - b. How to record points. Is honesty an issue; considering the reward amount, I'd say no.
 - c. How to underwrite expenses. Maybe offer only 500 cards and the number of gift cards an individual can receive, e.g. two. The biking community would offer financial support.

- d. Soliciting cooperation with area businesses. These days I don't think that'd be hard.
- e. Could you offer weekly super "raffle prizes" to people enrolled, e.g. a gift certificate to Film Scene.
- f. Promotion