

## Appendix C: Phase 1 Engagement Data

September 2019 - May 2020

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## Community Pop-Ups

Date October, 2019

## Climate Shift #1: Tools and Targets

*Excited*

- I would like to get a sense of the GHG emissions of the thing we buy/consume. I might change my habits/purchasing
- Good to see carbon budget into account --> makes targets more tangible
- I would LOVE to make consumer choices based on this! opportunities for \$\$ incentives?
- This seems aggressive - lets work on incentives.
- Reuse and recycle
- Putting a cost (a carbon cost) on the things we do and have.
- Measure the amount of hydrogen produced and consumed in metro Edmonton. We're probably #1 across Canada
- Yes, (the above) this needs to be built into decision process otherwise it will always be a wish item. Managers need performance review based also on this metric.
- Evidence-based decision making (esp in policy) is the best way to have effective change.

*Concern*

- Is there opportunity to work regional on this?
- City cannot do this alone --> we need province on board.
- How will this be made public? - What exactly does a carbon megatonne mean?
- Efforts of prov and fed gov't needed to meet UN declarations for Indigenous Peoples
- How is this (20 tn/pp/yr) translated into actual activities?
- Does this mean a lower standard of living?
- With the new budget how will all of this funded?
- We need to go faster
- Lack of political will at provincial level.
- Remember: Reduce and Reuse should come before Recycle!
- Why per person? wouldn't this be achieved faster per facility or industry?
- That there's not enough understanding in the general public.
- I'm worried that there is not enough support at the provincial level to make this happen. What things are under municipal control and not.

## Climate Shift #2: Low Carbon City and Zero Emissions Transportation

*Excited*

- Less wait time at LRT crossings for less 'idle' time and reduce gas emissions.
- Yes! (the above) Instant cabin heat always starts but, coldest week of winter will have half range.
- Removing cars from the road is essential.
- Can we get E-bike sharing business in YEG? I love my ebike!!
- I love this! How about also lower ETS fare to \$1.00 per ride and get many more riders (some tax on carbon intensive activities to pay for it)
- Changing social norms so that people do it. Improving access to sidewalks and super streets (lights) can help.
- Construction projects should be accountable to not cause tons of inconvenience to pedestrian traffic (plz)
- Possible, just need to invest in better sidewalks and bike lanes.
- What is the impact of the recent provincial budget cuts? - set back?
- Project in Vienna "seestadt aspern" energy neutral --> check it out!
- Check out --> active transportation, renewable energy, village. can energy use :- ) - carbon neutral
- Get more bus that are doing these things involved. start thinking

outside of box.

- Hydrogen has a diesel - like power profile, ideal for hardworking Alberta vehicles.
- Autonomous cars? good? bad?
- Can we power the LRT using win2power (like Calgary)?
- Walking is greener than electric cars! Sidewalks, bike lanes, density!
- There are efficiencies within the City of Edmonton that could help (unnecessary travel, idling). - operations - show leadership.
- Local business can also support EV stations - attract business & provide charging ----> I like this idea!
- Electric vehicles rebates or I could not afford to change cars.
- How about 100% hybrid or electric 2025. (X2) Then 100% electric 2030.
- Opportunity to measure emissions on a development application basis.
- Very excited for the electric bus fleet - please don't cut it!!
- More bike lanes that are separate from pedestrian and from cars. Then I'd be bike more in a heartbeat! More walking would be good.
- I'm excited to see the commitment to active transportation. However we need the investment in infrastructure and shift culture to make this happen.
- Make transit sustainable - electric & hydrogen.
- Only if battery chemistry, range and price improve.
- More campaigns radio / tv to encourage people to walk / bike (never hear campaigns about that)
- quieter streets!
- Electric clean vehicles
- No new detached single-family greenfield development
- Alberta has the opportunity now to move away from oil and embrace technology. Can there be financial incentives for people to change?
- Charging infrastructure
- Will there be subsidies for purchase of switch to electric vehicle?
- also include public transit
- I am excited for cleaner air and less smog!
- Work with builders of new buildings/condos to ensure at least plug ins at all stalls. Better would be LV12 charging availability
- All Govt. employees (fed, provincial, municipal) working downtown must take LRT, bus or bike to work!
- - Painting streets and the tarmac white to increase the albedo effect.
- Battery tech growing in leaps. Today - good but \$. Soon - price parity w/gas cars. By 2030, all changes solved.
- I can do this! 5km is not that far
- Need to have more EV charging areas - this will grow! Maybe free parking for EV?
- People can/should walk and bike more. The transit system is good but there is room for improvements.
- if we can't do it get other countries that are to show us how
- Promote more electric & plug-in hybrid vehicle sales locally (most dealers here don't have them in stock) Also, more charging stations on highways.
- Expand electric to include both batter electric and hydrogen electric (fuel cells)

*Concern*

- EV charging in apartments/condos
- Producing new electric vehicles also releases carbon emissions
- Educating citizens whether EVs work in our cold climate.
- better ride share forum in community. create car-pooling groups



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- in neighbourhoods
  - We need better traffic management - watch the traffic at intersections and adjust the light timing - less idling!
  - Fugitive emissions make CNG far from clean zero emissions please!
  - Electric vehicles - where do we get enough power?
  - Does battery tech. work in cold weather?
  - Why aren't we going to CNG for buses like Calgary? There is a supply and it's clean.
  - The amount of rain this year and cooler weather.
  - What do we do with the batteries from the electric vehicles
  - Look at disincentives to discourage public from using personal vehicle
  - Where does public transit fit into sustainable transportation choices?
  - #YEG must develop more user-friendly and comprehensive transit options and multi-modal options.
  - Too many whiners that don't want to actually do anything and want to be babysat
  - Rather than focussing on the new personal vehicles, the City should make it a priority to improve public transit (decrease transit times to encourage people to use public transit).
  - Is this a seasonal target?
  - Autonomous vehicles could replace traditional transit.
  - Avoid having so many unnecessary vehicles (COE) running / idling around.
  - How will the provincial and federal gov't support this?
  - Can our grid currently meet this demand?
  - Rethink how and where we work
  - Need to focus and stick to decisions e.g. rapid bus or LRT long discussions
  - Active transportation can be achieved only through an expanded bike network - we need more bike lanes.
  - What about synthetic fuel made from CO<sub>2</sub> or garbage (carbon neutral)
  - Price of electric vehicles (X1)
  - Very difficult with urban sprawl we experience and focus on meeting developer needs.
  - Transition of gas stations to charging stations? Charging takes much longer than fuelling, long lines to charge?
  - Clean sourced energy for EVs needed to have the required impact.
  - These things will all make the city better but they'll be expensive.
  - My barrier to active transportation is usually time. A new frame of mind is needed. Being more intentional with activities.
  - Building more freeways just encourages more cars on the road. ---> how?
  - If working in any env. job thinking who, how, what, where why to make a difference for all people and the world
  - Who will be supplying the oxygen to people after walking 5 km or will there be a station to get warm?
  - How will you switch the electric vehicles in winter, or bike or walk in winter?
  - Will home building standards require vehicle charging options/ infrastructure
  - bikes need to be permitted & left space on both buses & LRTs to increase integration possibilities
  - We need to transition to electric vehicles, but we need upstarts from federal/provincial/city government
  - How will you achieve this in the winter when you drastically decrease transit service after 6pm?
  - City sprawl seems to be inhibiting bike/walking
  - Is EPCOR working on ensuring this distribution grid will be able to charge all of our electric vehicles?
  - Increase density
  - Sales and service of electric vehicles. (at dealer level)
  - Bus - Improve the bus service Griesbach
  - Promotional campaign based on WWII rationing
  - Less flights
  - Will electric vehicle batteries get me all the way to Calgary? In winter?
  - How can we help younger people getting their first cars to get an electric car?
  - I want to go faster ---> then pedal harder ---> haha!
  - I agree with the idea but how much is within 5 km? We need more density and less sprawl
  - What would happen to older vehicles that still work?
  - What is the impact of the recent provincial budget cuts? - set back?
  -
- Climate Shift #3: Emissions Neutral Buildings**
- Excited*
- Getting industry on board
  - All city buildings to be net zero carbon by 2030?
  - Which programs/incentives rebates/subsidies will there be to help builders develop affordable net zero homes?
  - Update zoning to increase density and add multi-use in pockets... to eliminate some commuting.
  - Policy to allow more site coverage so that builders can turn a project while building affordable energy efficient homes.
  - I support this decision. Can we offer incentives businesses to go ahead?
  - How many apartment buildings actually did the free enviro upgrade even?
  - 100% necessary
  - How can we make affordable housing energy efficient without increasing the price? --> subsidies
  - Hydrogen's power profile is high enough to support heavy industrial use. (cement, metallurgy, etc.)
  - I want to make my home emission neutral
  - Rewarding and/or incentivizing homeowners to retrofit to "net zero" :-)
  - Invest in local businesses doing emission neutral work
  - more info/training on net zero and how to get there energy efficient for contractors would be great!
  - get realtors on board, incentive/mandate energy evaluation - tie to property tax? incentives when pulling permits
  - Advances in Alberta hydrogen production are resulting in cheap, clean hydrogen from expired wells. We can out compete electrolysis.
  - Grant programs for community buildings and churches.
  - Excited about district energy! Would love to see in older neighbourhoods.
  - Cheap, clean hydrogen can be blended with our natural gas to increase power and decrease emissions.
  - Yes! but sooner would be better.
  - Cheaper heating bills would be amazing
  - Building codes will already be update in 2030 so now is the time to require this
  - What do you mean by process energy? What are energy targets that would make the most impact?
  - Competitive builder market and increased awareness of carbon neutral housing options = innovation
  - Tremendous amount of jobs coming up soon!!!
  - Possibility of marketing carbon neutral housing? Benefits to consumer such as reduced utilities costs.
  - Need grants to help families meet this, hope this doesn't put people in more debt.
  - Change bylaws and codes to make it mandatory



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- Hemp to save the earth!
- I want to see incentives for this sooner
- With major incentives. It will still cost taxpayers.
- Geothermal for all new developments? Can it be added to older neighbourhoods?
- Promote \$ savings and people will do it! Rebates? Incentives?
- LED lights programs are great. Keep those programs running to help reduce electricity.
- The geothermal district energy system at Blatchford is great
- Give people incentives for insulation and windows.
- New builds that take sun exposure shade etc into effect to maximize solar power and limit energy usage.
- The technology is already available. Let's start net zero buildings now.

*Concern*

- This may be a difficult target to legislate. It would be a high cost to building owners.
- Similar Garage Suites program (at the City) after 4-classes to talk about energy retrofits financing/grants, partner with industries
- Even if as a builder/developer I want to build highly energy efficient/net zero homes --> It's hard to make a profit. We need change in policy and subsidies.
- LEED - BOMA BEST - Building Standards Mandate.
- Be careful about focusing only on energy reduction. Emissions attributable to energy use 13 the more important metric.
- Is retrofitting better than new builds? If so we need to encourage retrofitting with grants, tax breaks etc. New builds - urban sprawl
- Stop acquiescing to developers.
- Do NOT expand the City anymore, build up, saves energy and transport time, wake and sewer cost.
- Turn the lights off at night of this building.
- All new building codes have to start right now
- Green buildings (gardens on top of buildings). Green roofs. Water collection.
- Could we set smaller goals for 2012, 2025, 2028 to encourage them to drop more sooner? Slow emissions on new builds?
- Solar. Roof tops. Solar powered cars.
- Consider green infrastructure for carbon sequestration.
- Cost to do this too high.
- Will there tax savings? \$ incentive + funding
- Who will pay to retrofit existing buildings?
- Industrial hemp -- building materials
- First it is electric cars and now it is save electricity - how do you figure that will work?
- We will need bigger incentives to allow people to retrofit older buildings.
- How will you get to all net zero homes by 2030? is this realistic

**Climate Shift #4: Renewable Revolution and Circular Economy***Excited*

- The use of biogas for base load production could be very applicable!
- Renewable energy needs to be affordable if mass buy in is wanted.
- Yes to wind power!
- Development of wind power around the Edmonton area.
- Brings great jobs and carbon free electricity to the grid!
- Promote more reduction of plastic packaging so there is less to recycle and transport. Bakery, deli food, bulk, etc. where you can bring own containers. Yes!
- Have the City engineers look at closed-loop geothermal systems.
- Our industrial areas should be capturing all of their waste heat and piping it to other buildings.
- The biggest current consumers of hydrogen are agriculture (am-

monia fertilizer) and oil refining (hydro-cracking). Both are key to AB.

- More education on home composting and promotion, so the City has less to do. (may be advertising of the John Janzen's program)
- Advances in solid state hydrogen present an opportunity to leapfrog expensive infrastructure with low-cost transport and storage
- Make people pay more for their garbage per bag/in! Pay to pollute!
- Methane generation from food waste!
- Solar installations on parking lots which cars can park under.
- Work with partnering cities, the province and country for nation wide electricity grid.
- I'd be excited to see the City put a small bar pole style wind turbine on every street-light ad traffic light! (check out ridge blades as well)
- We can have a lot of hope if we invest more in renewable energy.
- EPR Waste - start companies using canning jars. Have a deposit on jars (like pop, milk etc) wash and reuse same jam/spaghetti sauce come in these.
- Promo: Solar Energy Society of Alberta
- Renewable biogas from food waste!
- Waste Heat Reuse
- Green roofs - Urban farming program where neighbourhoods "donate" underused strips of land to social program.
- More education needed on recycling. I like how Leduc has the diagram for you fridge on what goes where.
- A diverse energy industry keeps jobs in Alberta during the shift away from oil extraction.
- Extended producer responsibility advocacy by council.
- accelerate source separation of waste
- smart and very possible
- development of new and innovative non-carbon options.
- I'd like to encourage City administration to find a way to purchase green electricity for the whole community of Edmonton and have it be "off the grid"
- Water desalination --> the technology exists already in Canada (Canadian Forces)
- Alberta's long history of innovative chemical engineering could certainly come in handy
- Encourage and enable community renewable energy investment options (for those without great solar access or space for geo)
- We need to create a bylaw that requires all new building and sign renovations to put solar PV on the roof and geothermal in all new buildings. Also requires all new building roofs to face south.
- Initiate "PACE" to help offset start up front cost. "Property Assessed Clean Energy"
- We have a number of steep flow water pipes in our water infrastructure - we should put electricity - gener. turbines in them
- Good to see more composting of foods
- Promotional campaigns line WWII on growing food and walking more
- Planting fruit bearing trees for carbon sync as well as providing a equitable food source locally
- Student summer job of setting up individual composting?

*Concern*

- Per household? or companies only?
- What about the new generation of nuclear reactors?
- can we combine green roofs and solar panels? --> multiple benefits
- Hydrogen isn't adequately represented despite new innovations that make it an excellent fit for metro Edmonton
- Please do not have people in charge of disposing of their own yard waste, as this will lead to illegal dumping. We need a compost system for yard waste too
- Why is wind generation (bar pole style) not allowed on homes?



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Surely it could be.

- We need to re-educate employees from oil and coal to use their skills in renewable energy.
- Waste reduction is an incredible threat to the climate and I believe should be focused more on
- Solar energy should be retrofitted on each building and all new buildings to have this standard.
- Illegal dumping a consequence? Use portion of property tax and give rebates to those who produce less waste.
- Neighbourhood (NB) volunteering network setup to foster awareness of strategies to reduce food waste. Lower trash. Have workshops in NB. Regular visits to gather feedback.
- Nuclear power wind turbines kills birds.
- Rainwater collection should be added.
- The challenge is to get industries and homeowners to invest upfront because the ROI is worth it but prohibitive.
- Maximize value and return with industrial hemp
- Resource and feedstart (??) product development us/export of resource recycling
- Solar recycling must be calculated up front.
- Geothermal is not cost effective for a homeowner. They will never recoup the cost in energy savings.
- When it comes to waste it is becoming clear we cannot rely on foreign recycling.
- Why just wind?
- Provide an incentive for people to recycle and manage waste.
- Will this work in our winter city climate?
- Do a study to have birds avoid wind turbines? what is the cause, or do not put on migratory routes.
- New turbines are better at bird avoidance. Plus cats and cars are of far greater danger to birds.
- We recycle and sort but we don't have an actual recycling plant... why not build one?
- Currently there is no limit on amount of waste that can be put out for pickup.
- Solar power paid for my house
- Impact of wind energy on migratory birds.
- Master composter program is too large of time commitment
- Education about composting to mass amounts of people best composting category front yards in bloom?
- Small food rescue innovations are not enough. Big and medium stores should initiate "leftover" food pickup for less cost or give away.
- Needs a target.

**Climate Shift #5: Just and Equitable Transition***Excited*

- What types of public education? school programs?
- Solar, wind incentives rebates
- Yes! Very important. Need as many strategies and programs as possible to achieve Net Zero future.
- - Adding geothermal to new neighbourhoods would really help people w/low incomes because they won't have to maintain their own furnaces.
- Downhole hydrogen production from expired wells can leverage our existing strengths to create jobs and wealth within our existing oil and gas industry
- Oilfield jobs can easily be transitioned to the renewable energy sector!! Everyone will benefit
- Research proves that women are better stewards of the environment. so yay
- Equitable transition for our many oil and gas families
- Support women and girls as our future will be in their hands. Entrepreneur women.
- What does this mean? I heard it in the climate strike but oil and

gas people don't like it

- Study the effects of GHG emissions on the human brain.
- Free transit
- Lots of older homes to convert
- So glad just and equitable is one of the shifts. Don't let this one be forgotten
- Yes!! Low income are the ones that will have a harder time paying for upgrades. Good to see you raise(?)
- Encourage people to plant fruit trees so they get food and get the carbon absorbing benefit of the trees as well
- UK program connects resident health and home energy retrofits - collaboration with province
- Engage with recent immigrants first-hand experiences with climate change

*Concern*

- Renters that pay for their energy have no control of the cost. Landlords should have better energy efficiency standards. also net zero
- Incentives for builders to build more energy efficient homes
- What will incentivise participation?
- How city can help residents pay for retrofits (especially for low income families) +1
- So many things take energy... ipod, xbox etc. encourage non-electric activities
- Focus also on lower middle. class most impacted by lower economic outlook
- Employment (cost vs. benefits) What will be the employment generated through these actions
- What are examples of green jobs?
- What about our big existing labour force in oil and gas? What are we going to do about that?
- Get rid of the mentality of a throw-away society
- Reduce lights pollution (unnecessary at night) Construction green jobs
- Meaningful job - programs like collection of "best before" outdated food collection and sale/gifting of same

**Climate Shift #6: Negative Emissions***Excited*

- Utilize spaces in community league lands
- Solutions: increase green houses to absorb CO2 during winter
- Schools: encourage schools to have the children plant their own flower garden - so that they start training about CO2
- Solutions: cannabis absorbs CO2 - increase the number of plants and allow more people to grow
- Solutions: encourage people to grow plants indoors where they are not impacted by snow. That reduces GHG
- Lets add more trees in urban areas. Makes the place friendlier (?) and greener
- We want Edmonton to be number 1 in climate shift to enjoy for future generations
- Partner with research opportunities for engineering opportunities
- Can we plant more trees? There are some parts of the city that would be nice with more trees.
- Look at a tree bylaw for preserving trees on private property
- Edmonton - love the trees and green spaces
- Restoring natural areas is #1!
- Edible native species and pollinator (?) health
- Tree policy!
- Partnerships! Industry! Universities!
- Solutions: schools - introduce forestry as a topic. as well as permaculture. - have guest speakers to inspire them
- Plant more trees in Edmonton. Take care of our trees.
- Encourage native grasses/species in yards. not lawns



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- Refineries can reduce emissions and costs by shifting to solid state hydrogen storage and transportation.
- I love this - I think Edmonton/AB we really need to lean into the jobs
- Incentivize new products in industry and potential partnership. Just 1 idea: Weyerhaeuser and derivative petrochem to use plastic discards and high pressure rail ties instead of using timber.
- More trees and bushes on boulevards.
- Edmonton Global needs to promote on "Edmonton pathway" for hydrogen, with cheap green H2 from oil wells and solid state storage and transport
- Ensure species are climate adapted
- Carbon X prize competition
- Ban plastic - encourage incentives
- Sounds cool! Eager to hear details
- Incentives for bring your own container/box to decrease use of one time use of lunch containers
- Industrial hemp captures 3x the carbon that trees do! Planting both would help - emissions
- Replace lawn with food growing trees and plants. Have carbon capture and we get food. Private and public.
- No more big front lawns. 2 trees per property = lower property tax
- Incorporate more tree boulevards into neighbourhood renewal
- Trees are good because they absorb carbon. We should plant more. (But then we have to be careful they don't catch on fire)

**Concern**

- For public education use more simple language
- We need a more aggressive tree planting initiative. Current one is nice but not ambitious enough.
- Edmonton's population is going up but trees population is going down --> this must change
- A tree tent needs cut-down on private land should need permission from the city
- What about reduction of coal-powered energy plants?
- Bring back rain garden development program for residential neighbourhoods. --> What?
- Emerald ash borer pest threatens our urban canopy. Could be very costly.
- Plastic has to be eliminated at source. Design and engineering
- Has the City of Edmonton considered expanding to the industrial hemp industry?
- Plastic pro consumerism in daily life
- New UCP budget has eliminated funding climate change research

- Stop the urban sprawl. That is one way to maintain our tree inventory! --> Yes!
- UCP has eliminated provincial ministry on environment :-(
- Smokers pollute air quality. We need enforcement in public area.

**Climate Shift #7: Economic Development**

*At this point in the project, Economic Development had not yet been identified as a separate Climate Shift.*

**General Comments****Excited**

- Opportunities for a healthier future!
- Thank you for calling a climate emergency and putting it in public record!
- I'm excited to be here and to have an opportunity for advice. If we want change we have to get involved...
- More curbside EV charging in YEGDT, nodes. There are over 600 Tesla's in YEG as of 2019 and growing # of EVs overall.
- Knowledge keepers have info you need
- Thank you for taking our carbon budget seriously!
- Climate change should be our focus! We need to accelerate our work!
- I'm really glad Edmonton's moving faster on this than Calgary. It Makes me glad I'm moving here.
- Biking to the farmers market, grocery store... and investing in a cargo bike.
- Get on with it!
- Yes. It's not about personal preference it's about us, our land and our future

**Concern**

- Who assigned us this target?
- It would take DRASTIC and fully accepted action to achieve this goal. We are so far off.
- Please accommodate these sessions for times people who work can join (like evenings)
- You guys are very brave, this is hard work.
- This might not be realistic. --> tonnes/person
- Other levels of Government funding to Municipalities and the impact on the strategy
- This is a little overwhelming
- Considering how I could move my home toward being emissions neutral.
- Not enough ACTION

**Green Ribbon Panel (Energy Futures Lab Fellows) - Policy Review**

**Date** October, 2019

**Carbon Budget and Accounting Information Brief**

- It might be worth noting that the GHG emissions for any project should be calculated over a specified 30 or 50 year life cycle (this is actually mentioned), but specifically, based on our current grid intensity, electrification doesn't look as favourable as it should. The city should provide direction to each project on timeline to study, and grid emissions factors to use for every year. The point is to encourage technologies that will reduce GHGs drastically over the long term, not for 1-3 years.
- Adding a carbon budget or cost to the cities budgeting decisions
- The concluding statement is very powerful and informative:
  - Adding a carbon budget into the City of Edmonton's greenhouse gas reduction targets is an effective way of communicating the urgent need to reduce emissions. With a carbon

budget superimposed over a city's projected emissions, the impact of delaying reductions in emissions becomes very clear. This makes a carbon budget a useful tool for encouraging municipal governments, which are often more agile in deploying programs than other levels of government, to act quickly.

**Climate Mitigation and Adaptation (Co Benefits)**

- Understanding of mitigation vs. adaptation and the idea that one might contradict the other.

**Consumption Based Inventory and Recommendations**

- I disagree that the City should perform more Consumption Based reporting in the near future and going more in depth on calculating the Consumption Based information. I disagree because this



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report stated that the PB reporting already generally points to the sources of the largest emissions. I think the recommendation should be for the City to spend time and money taking action on the largest sources of emissions (the low hanging fruit) for the next decade, at which time, it would be worthwhile for the City to then do another Consumption Based estimate to decide on the next tranche of actions. The recommendation of this report should consider the economic constraints of the City and the urgency of the Climate Emergency by taking action on the obvious large emission sources instead of spending more money on more analysis at this time.

- Building Archetypes suggested for Athena life cycle analysis need more careful review. (i.e. 6 storey or lower condos in Edmonton are not made of concrete.)
  - If the Carbon Accounting is going to be effective in making informed decisions it must reflect the changes made by the various proposed actions so that we know we are on the right track or have to make course corrections. Given a 10-20 year time frame this must be more frequent than the 5-years recommended for the CB approach.
  - It is important that Edmonton uses/develops a precise and credible measuring tool that can be used to make fast and informed decisions."
- I only read the executive summary, but I appreciated the solid description of the difference between Production Based reporting and Consumption Based reporting
- This is a highly technical document and I lack the expertise to even begin to comment on its methodologies. As I would assume most readers.  
That said it does provide a basis for the Carbon Budget as per "current best practices" of a PB (Production Based) methodology. As long as this aligns with global standards and allows us to compare data with other municipalities this seems to be a logical approach.  
I do not, yet, understand the CB (Consumption Based) methodology. It seems to use a lot of hard to defend assumptions and "fudge" factors in order for it to align with the PB approach.

**Edmonton's Green Energy Economy: Summary Report**

- This policy brief is a bit dated and a refresh of the statistics to at least 2018 would likely show more considerable trends.
- I generally support all the conclusions.
- The scope is limited to "Green Energy" and is very internally focused – Edmonton / Alberta – which is a limited market with limited growth opportunities beyond replacing traditional jobs. This is not bad but limiting and is likely to happen regardless.
  - The stated value of the "green energy" market at 3.59 billion and 14,669 direct jobs to me seems grossly overstated and does not reflect future opportunities.
  - Renewable Power and Alternative energy – is mostly large industrial wind projects that will be built anyway because of the reduced cost and need to replace coal generation.
  - Energy storage and grid Infrastructure – is mostly incremental improvements of traditional industries that will occur anyway.
  - Green Buildings – this information is at least a decade old. LEED, BOMABest, Built Green are no longer competitive differentiators and don't even get us to carbon neutral. This table stakes for getting into the game and will not create new jobs. I don't buy the fact that building a LEED building requires massive trades retraining.
  - Green Transportation – 90% of this is rail that already exists and public transportation (LRT) which after the initial capital costs will add few new jobs and no innovation unless you consider packing more people on fewer LRT cars progress. Electric buses are purchased from China and offer no value add. New bike lanes and walkable cities do not contribute directly to the economy other than to attract knowledge workers (we need to create high tech challenges for them to work on).

The part I do think will add value is commercialization of electric vehicle components and autonomous vehicles – IoT, Sensors, Data Analytics, AI, etc.

- To take advantage of the 3.8 trillion global economy by 2030 (Kinsey) we need to answer the question in the conclusion of this report "How does Edmonton create a strategic position that will differentiate it from Canadian and Global Cities?"
- To address this I want to reference the report "Alberta Clean Technology Sector 2019" by ACTia and co-authored by Delphi:
  - This report focusses on the "pure play" clean technologies (the core of the onion) that excludes R&D created by branch plant labs for companies with Headquarters outside Canada or Alberta or Oil & Gas labs such as Suncor or Cenovus.
  - Advisors and implementers of products and services procured from outside
  - Suppliers and service providers (Siemens, GE)
  - In other words this includes ventures formed to develop new kinds of wind turbines NOT building wind power projects with equipment and expertise purchased abroad.
  - By this measure Alberta's Clean Technology sector is only worth 1,758 jobs – about the same as 2016 – of which 70% are in Calgary and 22% in Edmonton.

Finally I want to reference (as an example only as there are numerous sources) the book "Smartest Places on Earth, Why rustbelts are emerging as hotspots of Global innovation"

- Lets assume that the issues of a rustbelt is similar to a sunset industry such as Oil & Gas
  - The reason these places are successful is that they transitioned to Knowledge as the primary generator of wealth. One of the case studies is Brainport in Eindhoven the Netherlands. I have visited this area several times and we have hosted several trade delegations to see what we can learn from each other.
  - One of the reasons for a global trend of manufacturing and fabrication returning to North America and Europe is that complex systems and technologies out-compete cheap labour.
  - Some of the future opportunities listed in the book include: One strategy for Edmonton is to create, grow and mature its Innovation Ecosystem (elements exist but it is not coordinated)

One tactic is to further grow and promote the "Innovation Corridor" envisioned to be between NAIT and U of A but could include the Research Park and EIA. A knowledge core.

EEDC could act as a concierge that helps start-ups and scale ups connect with each other, research institutions and other incubators and accelerators across Canada and the World

One idea might be to add a business layer to Heritage Days. We currently celebrate culture and food, and chances are that most of the folks involved have business connections at home that can be leveraged for knowledge and markets. As a diverse Urban Centre Edmonton is uniquely positioned to take advantage of this and become a true global city."

**Energy Transition Funding Options**

- I would add a section showing the combination of the most plausible funding sources and how they could fund a capital investment in emissions reduction.
- I support that funding will need to be creative and through partnerships between public and private sources.

**Evaluation of Sustainable Development Goals - Barriers to Green Buildings**

- I recommend the document mention the origin of the Sustain-



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ability Development Goals as being from the United Nations. I recommend this to highlight the significance and reason behind this evaluation.

- none.
- Based on the latest City Core Plan documents the above policies account for only a 6% emissions reduction. The workshops and phone interviews seem to have generated just old suggestions – most are more than a decade old and have still not been implemented or proven to be effective solutions. Most are incremental improvement over inefficient systems – the proverbial low hanging fruit.
- Eco-industrial Plans (based on Industrial Investment Action Plan)
  - Is this strategy still relevant? The City has been working at this for the last two decades and if anything there is less of a need for it.
  - This is aimed at capturing large industrial Oil & Gas developments from the region. Given the new found regional cooperation (Edmonton Global) <https://edmontonglobal.ca/> does locating this within Edmonton municipal boundaries still make sense?
  - The eco-industrial principles have not been very successful in Alberta (Taiga-Nova, Hinton Eco-industrial Park) or even globally if it lacks a large and stable anchor.
  - Perhaps expand the NISP concept Province wide in order to share resources.
  - The new economy no longer depends on large global scale facilities. Smart complex industries are out-competing cheap labour – hence industries are moving back from China to North America and Europe.
  - Like the IT industry, manufacturing is shrinking to smaller, regional facilities where mid-size cities can compete.
  - The new economy is driven by data, which is the key input to AI, which ultimately creates the wealth through licensing. Perhaps Edmonton should focus on smart city, climate change opportunities leveraging it's University and post-secondary institutions and growing the "Innovation Corridor" into a globally recognized ecosystem – leverage the 3,400 municipalities that signed the Edmonton Declaration as early adopters of Climate Change innovations.
  - some recommendations are bold and necessary.
- Overall a very good document that provides a deep dive into sustainability in the Edmonton context  
The format of this document very closely aligns with the City Core Plan process, however there is no evidence that there was any form of collaboration or communication between the two.  
Documents referenced:
  - Municipal Charter
  - Strategic Plan
  - Area Redevelopment Plans – City Core Plan
  - Area Structure Plans – City Core Plan
  - Neighbourhood Structure Plans – City Core Plan
  - Rezoning & Subdivisions – City Core Plan
  - Development & Building Permits
  - Servicing Agreements
  - The Way Ahead – to be replaced by City Core Plan
  - The Way we Green – to be replaced by City Core Plan
  - The Way we Grow – to be replaced by City Core Plan
  - The Way we Live – to be replaced by City Core Plan
  - The Way we Prosper – to be replaced by City Core Plan
  - Edmonton's Community Energy Transition Strategy – the reason for this review

## Geothermal Potential

- 1) The metric at the end should include cost per tonne of carbon reduced not per kWh saved.

- 2) Some of the operations costs are misleading. Consider:
  - a) Life cycle costs. Report only includes the first year and not a life cycle cost with price escalations, maintenance costs, etc. Consider taking a view on increasing global temperature reducing energy requirement for heating and increasing requirement for cooling?
  - b) Don't use fixed rate energy costs - use the regulated rate option
  - c) Include the variable distribution and transmission (fees and tariffs) cost for gas and electricity - this is public information.
  - d) Don't estimate the fixed fess, calculate them. This is public information.
  - e) Provide a sensitivity with increasing carbon tax.
- 3) Table 8 title should say operating cost of heating/cooling passive and active options."
- I had a long talk with [person] about all this and am convinced that geo retrofits make more sense than DERs in some circumstances. Geo is good technology and I don't want to in any way discourage its deployment in individual or community scale applications where it makes sense. We just need to be much more explicit that it is not a universal solution. I have the similar reservations about DERs. They will not make sense in all situations.
- The base case for the geo retrofit is a recently built house. By not explicitly stating that this house is not typical, and then continuing with language that is very inclusive and general, the document give the impression that most houses would benefit from the approach. The language throughout the document reinforces the misapprehension that this solution could work for any house. The range of houses should be described much more fully and emphatically upfront to correct this impression. This is much too easily misunderstood.
- Geo retrofits make sense only in a fairly narrow range of existing houses: houses built to the very recent code with siding, roofing, soffit, fascia etc that don't need replacing anytime soon, and that are reasonably airtight. (2.5ACH 50 is optimistic for most new construction) The example house is described in a way that sounds like it is a fairly typical house. It should be spelled out explicitly that the heating load should be determined by modelling and that the area available for the bore field be big enough to meet that load. Area restrictions are dealt with but not related to requirements based on load.
- Only the negative aspects of the alternative Passive Case (DER) are presented:
  - It is not necessary to move out during a DER necessarily
  - The specifications listed were one example and not very optimal
  - The co-benefits of DERs were not mentioned:
  - Longer building life- new siding, roofing, rain screen opportunity, air tightness,
  - Better IAQ, humidity control and comfort because of air-tightness and having an HRV
  - Opportunity for better aesthetics
  - There are no built examples in Edmonton where this retrofit strategy has been successfully deployed on existing houses. This is not to say that it is unreasonable, but the city should exercise caution commensurate with this lack of demonstrations.

In an effort to check my own bias in favour of conservation measures over mechanical solutions, I sent the document to [person], a highly respected EA at 4 Elements in Calgary and [person] at ReNu Engineering. Their responses are reflected in my comments above. Here's [person]'s last paragraph: "The report feels a little bias to me on a first read, as I think we will need a balance of both approaches to decarbonize. Some homes will be a fit with geo for sure, but not all. I



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heard a disturbing note from a client recently that many of the early geo ATCO pilot homes in Calgary have pulled out their geo systems and gone back to gas due to high electrical costs. Those homes had an energy demand much smaller than what is proposed here. But I haven't been able to follow up." (I believe that the design problems with early geo systems have mostly been solved. This is especially true in [person]'s designs. In some cases the high operating costs [person] mentions were a result of installing geo systems on high load homes.)

In fairness, the scope for [person] work on this was limited. It would be a mistake to generalize too far.

- I think the document should be more vocal in encouraging greening of the Alberta electricity grid before adoption of geoechange systems.
- The benefits of Geothermal as an alternative to reducing emissions.
- That's a highly qualified yes. It needs serious qualification. Please see below
- I support the method used to assess.

**Green Electricity - Community Wide Procurement**

- Total lack of imagination to think innovatively about how the City could procure renewable electricity for the community as a whole. For example, the city could run a REP like program for community electricity needs ensuring REC availability at low cost. OR the City could offer to scale up its own green electricity procurement to any businesses in Edmonton that would like to come in for XX MWh - this would avoid the competition issues cited while reducing barriers to entry for businesses to procure new, green electricity. There is also a total lack of jurisdictional scan and how other Cities have made this work. Honestly, I would send Power Advisory back to redraft the document. Far too little actual analysis in the document relies instead on conceptual pieces and assertions which can be easily disagreed with.
- I was hoping this policy brief would more strongly suggest energy efficiency and reduction strategies and policies to encourage more renewable energy production within the City.
- Re: Carbon pricing on page 9 statement "Power Advisory notes that Alberta has adopted the TIER (TIER) program and initial carbon price of \$30/tonne has been established that will not trigger the use of the federal carbon plan backstop in Alberta." Should clarify that this is talking only about industrial emitters. The federal carbon plan backstop will apply to consumers in the absence of a consumer facing carbon levy.  
- Do we know for sure that under TIER \$30/tonne will be the floor price? Of course the price of carbon under CCIR was \$30/t but excess compliance offsets often sold for less I think.
- Interesting concept that has been seen in other jurisdictions - to procure renewable electricity for a whole City. Could have a material impact on the grid emissions in Alberta and move the needle on greening the grid.
- I generally support the conclusions that both offsets and RECs may not be the single solution for Edmonton to lower its GHG emissions.
- I generally support the conclusions that both offsets and RECs may not be the single solution for Edmonton to lower its GHG emissions.
- Green Electricity will be essential to lowering City wide emissions.

**Impact of Autonomous Vehicles on GHG Emissions**

- Electric vehicles are not the only answer and are likely not the best considering Alberta's electricity sources. Hydrogen-fueled vehicles should definitely be considered in this policy brief, with mention of mandating that a certain percentage of vehicles in Alberta be hydrogen-fueled, as Alberta is rich in hydrogen, the hydrogen-engine technology already exists, there are jurisdictions that are adopting a hydrogen "highway" (see the actions the Netherlands are taking to set up their hydrogen fueling network). This policy brief seems to force only two choices, but their is a

third that needs to have its profile raised - Hydrogen - because it leverages many of the assets that Alberta already has.

Another point that should be mentioned is about limiting the speed of AVs to a more energy-efficient speed (typically 70-80km/h for internal combustion cars) to reduce GHGs. As this policy brief assumes, if people will be more willing to spend time in an AV for a longer trip because they can occupy themselves with other tasks, then they should be able to tolerate slower travel speeds.

- Some thought should be given to Car2Go and their exit from YYC. Its a great idea but why didn't it work for a company doing this around the world?
- AV arrival is inevitable, and it's good for people to use their time more wisely and to improve vehicle safety.
- This report adds another layer to the other documents we have seen so far. Although the conclusion is that we just don't know how Autonomous Vehicles will impact GHG emissions it does do a good job to spell out how we can influence the outcome through appropriate and flexible policies that include:
  - Reducing vehicular trips
  - Vehicles to be electric
  - Incentivize care sharing - Mobility as a Service (MaaS)
  - Autonomous Vehicles present a significant innovation and economic opportunity Globally

**Is there a Role for Nuclear?**

- Fission and fusion are both nuclear but should not in practice be grouped together. Fission has been commercial for many decades, fusion still doesn't work. Fission, especially in the form of small modular reactors, could offer reliable baseline power and a lot of reliable heat. I don't know if the distinction between base and variable power is fully accounted for with leveled costing.

It's not clear to me that the City should be giving fusion as much as a platform as it has.

- That the city does not participate in the technological development of SMRs or fusion technologies.

There is far too much uncertainty involved and the costs discussed are still high, even according to their own projections. Add to this the overpricing of wind, possibly by a factor of two. This simply does not look like a strategic or wise use of resources. It is a little too much like buying lottery tickets to solve the climate crisis.

There are far too many proven technologies (solar, wind, geothermal and possibly others) that already offer much better prices. The one factor that is likely to be a big barrier is public acceptance of these technologies. It could take a decade to sell the ideas to the public, assuming they work, assuming they are economic and assuming the environmental impacts can be managed to an acceptable level of risk.

- nuclear will not be a quick fix

**Jurisdictional Review**

- On page 5 what does transportation mean in the first Canadian cities chart? Confused since active transport and electrification are already broken out... footnote would be great addition to explain.

Also curious if any of the jurisdictions were tinkering with variable tax rates based on urban sprawl (i.e. lower tax rate for those living centrally). I have read about it academically but not sure if implemented anywhere. Very interesting mechanism to internalize cost of building out.

- I recommend expanding on the descriptions of noteworthy actions on page 8 under "Climate Shift 1: Tools and Targets". Instead of just stating "Edmonton should review XXX's approach," list out the specific noteworthy items from that report for the convenience of the reader.



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- Hydrogen should be included in renewable sources. Don't explicitly state electrify all vehicles because RNG or Hydrogen may be the better option depending on the class of vehicle. Instead of explicitly stating heat pumps may want to leave this more broad and open for other smaller carbon footprint technologies.
- test
- Recommendations are a good start but not definitive – leave room for new ideas / innovation in the future
- Negative emissions are important for more than just carbon sequestration – ecological diversity, soil building, air/water filtration, human health,
- Climate Shift #3 - I think there should be some analysis on the cost and environmental impact of ASHP/GSHP, especially considering our current and future grid mix.
- Nice charts that clearly communicate the number of policies on each area. Curious if the number of policies represents the investment in each area. Ie maybe millions being spent on solar pv but only one incentive program so only showing up vs tons of rules changes for retrofits showing up multiple times. Just curious.
- I support the overall purpose, which is the presentation of what other cities are doing.
- Comparing Edmonton to other cities, breaking it into Climate Shift strategies
- Great review of a global response
  - Identifies numerous actions taken by a variety of other cities which is useful.
  - Do we know the results and/or lessons learned? Did any of these actions achieve their stated objectives? Ideally in terms of emissions reduced.

**Just and Equitable Transition**

- 1) Considerations to prioritize well built affordable housing that considers natural disasters into its built form as a proactive measure to respond to the impacts of Climate Change. 2) promote mixed income neighbourhoods and such a range of housing choices in all neighbourhoods for if disasters do hit. 3) Do not locate affordable housing units in flood zones due to lower land costs. 4) Find ways to ensure/incentivize that affordable housing stock (both market affordable and non market) is built using high-quality materials and constructed to withstand future disasters. 5) Difficult to find interim housing for large amounts of people after the weather disaster- need strategy. 6) Document doesn't consider the renter vs. owner angle 7) Housing should be mentioned in the conclusion. I feel more could be added to the housing section (more than just heating bills). Overall, I think the document is very well done from an equity standpoint.

## Readings:

<https://www.pewtrusts.org/en/research-and-analysis/blogs/state-line/2019/08/30/climate-change-is-making-the-affordable-housing-crunch-worse>

<https://www.scientificamerican.com/article/climate-change-exacerbates-the-affordable-housing-shortage/>

<https://www.nytimes.com/2019/03/25/opinion/california-home-prices-climate.html>

- An addition: Consider how to incorporate Just & Equitable Transition into other City projects and processes, including Neighbourhood Revitalization efforts, the work of Citizen Services in serving marginalized Edmontonians, and into the mandate of End Poverty Edmonton. For example, Neighbourhood Revitalization efforts could include involving social enterprises in training lower income Edmontonians to do energy retrofits of older houses. Although that applies to homeowners, albeit low income Senior homeowners, the idea could be expanded to include (rental) social housing energy retrofits (e.g. GEF, CRHC, Ambrose Place, etc.). Winnipeg used this model in its neighbourhood revitalization efforts some years ago. If all of the City's work is required to fit within a Triple Bottom Line framework, the capacity for success is far greater.

[ago.http://necrc.org/index.php/services/housing/](http://necrc.org/index.php/services/housing/)

Also please note, pg 23 Should be Providing Accessible Transit Here, rather than Providing Accessible Transit Here.

- Social Equality lens, consideration of minority groups as things change, link to affordable housing and transit development.
- Focus on social equity, principles & strategies to achieve.
- A lot of content is covered from all the aspects of justice and equality that I think could be considered.

**Mandatory Energy Labelling and Disclosure**

- I would also recommend legislation or policies around labeling of energy sources such as where Edmonton's natural gas and electricity come from to raise awareness of the carbon-intense sources.
- I initially did not support this brief until I saw it included a paragraph on an equitable program for people who may not be able to afford it - A key consideration.

**Nature Based Carbon Sequestration**

- The graph showing impacts of different land use of where carbon sequestration made an impact was confusing...
- I would add to this recommendation that the City consider limiting boundary growth to encourage density while conserving what natural capital the City still has. Boundary growth overtakes wetlands, grasslands and forest area continuously. I do strongly area the increasing the biomass in the city is one important part of the solution. I would also add that consideration may be given to encouraging citizens to preserve natural capital and enhance it on private property. (natural capital = trees and other live biomass)
- Edmonton's land use, wetlands and urban forest are an important sink of carbon within the City's GHG inventory!
- The conservation of nature capital in the City limits, and considering natural capital as a part of city planning.

**Role of Alternative Fuels**

- I don't disagree with anything, but perhaps there could have been more examples of how other cities are already using alternative fuels.
- Isn't "blue hydrogen" more considered these days to be Natural + Carbon Capture and Storage, not just straight Steam Methane Reformation with no capture? The first paragraph in Hydrogen muddies this a bit.  
Hydrogen page 15 – "around 25% hydrogen" on what basis? Volume? Weight? Mol?  
As the transition to electrification occurs, interim reductions can be attained through supplementing a proportion of current natural gas use with hydrogen in building heating systems? This reads like the reader is supposed to conclude that we will be using electric heating in Edmonton. Has that been fully decided?  
Conclusion section contradiction specific to RNG page 21: "It is therefore important to note that renewable natural gas, biodiesel, renewable diesel, and ethanol can be used in current transportation equipment at specific proportions, whereas the use of renewable natural gas or hydrogen in the transportation sector does require investment in new equipment."  
How does Edmonton square their RNG work at Goldbar and Cloverbar (selling emissions credits to make \$\$\$) with their desire to reduce emissions locally?
- I am pleased to see the assessment of a variety of fuels that are viable in Alberta, especially hydrogen.
- The use of alternative fuels in the City's strategy.

**Technological Solutions for Negative Emissions**

- Disappointed that a broader range of carbon negative solutions, such as natural sequestration, were not explored.  
Report organization seemed a bit weird. It only focused on DAC but didn't capture that in the beginning and report structure. Perhaps overly positive on CC. For example, idea that we should add carbon capture at the household level instead of retrofitting is hard to swallow without any cost estimates or additional



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analysis.

Would have liked to see the idea of city CO2 management services explained more.

A concrete procurement standard should be tech agnostic and focus on GHG/ unit produced not amount of sequestration specifically.

- I disagree with statement #1 in the conclusion. If CCUS can be deployed at scale, then business as usual technically could continue in many sectors (technically).
- Overall good report
- I especially support the action proposed in statement #5 of the

conclusion because standards and codes need to change to nudge behaviours in the design and construction of buildings. It is also great to see this document highlight existing and developing technologies in the appendix.

- That this is only part of the solution. These technologies cannot be relied upon to “fix” climate change. These are a good start to addressing hard to manage emissions. The deployment of these technologies should not take the place of aggressive emissions reductions strategies in other areas.

## Spark 2019: Carbon Positive

Date October 29, 2019

## General

## Excited

- Innovative transportation technology.
- Research into alternative fuels.
- When you look at a tree - you are looking at our best tool to regulate the carbon cycle and to mitigate the effects of climate change.
- Plant more trees!
- Consider hiring a full time resource person who will work on Community Energy Transition Strategy. Perhaps hiring a full time Energy Manager may be a good idea. At most, municipalities have full time Energy Managers in BC.
- CCS Implementation & Growth.
- Continue to support NISP Canada (circular ? related)
- Carbon & Building
- Programs to get locals more involved.

## Concern

- Lack of compost opportunities the city can take. Way behind other cities
- Environmental Zones (Germany)
- Require overhaul of our grid and transmission infrastructure.
- Install Clean O2 Carbinx units in city buildings.

## Climate Shift #3: Emissions Neutral Buildings

## Excited

- New technologies in renewable energy.

## Concern

- Funding to make this a reality for all Edmontonians
- People not believing climate change is real.

## Climate Shift #6: Negative Emissions

## Excited

- Models on energy systems
- Renewable gas for home heating
- The mental shift of Alberta to align with the rest of Canada
- Consider energy monitoring to establish a baseline to work from. This should be #1 to start.
- Liquid Hydrocarbon for Business can create a great change to fuel applications.
- Waste/Heat/Recovery
- Investment opportunities in Edmonton and Alberta
- The shift towards understanding sustainable
- More involvement with the Root for Trees program!
- More plant based foods.
- Rooftop plants.
- There was a restaurant in T.O. that used plants from rooftop for recipes

## Concern

- Interested in opportunities for carbon sequestration
- Not having “Buy In” from the public organizations
- Transparent life cycle accounting for new technology
- I’m worried about poor decisions. ? diesel pickup trucks. Tax these people.
- Energy intensity improvement.
- Energy star technology.
- Low cost housing being built sustainably? or only cost effective?
- Is CCU scalable to R4E Urban Envl.
- Polarization derailing progress.

## Energy Transition Leadership Network - Nuclear Energy

Date November 11, 2019

## Key Challenges and Opportunities for Nuclear

- Yes; the industry has not done a great job of demonstrating the current safety improvements and success of current reactors. The more that people find out about the work that is going on currently. They may feel more confident in the technology
- Fission can happen spontaneously. Fusion can’t - it must use a lot of energy in the first place.
- A hydrogen molecule will take a billion years before the probability of it attaching to another hydrogen.
- It’s been a long learning curve - in science, technology, experience - but progress has increased that we’re near the last 10th of the curve.
- Fission is easy to start, hard to stop. Fusion is hard to start, easy to stop.
- There is one company, TAE, that had a business model that looked at going this route. They had to back off to go with the normal DTU. We’ll probably get there but not for a while.
- The temperature you need for the approach is 100 million degrees - you need 10x that temp for the other route
- To get high enough electric fields to get a fusion event taking place within the molecule. Not feasible beyond the theoretical.
- Licensing a reactor in NA takes about 3 years; a new design takes 10 years. They need to review the new designs.
- That is a local phenomenon in NA and in the UK. The regulatory



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bodies there require licensing for each new reactor that is built. If you take the approach of France and have many reactors under the same design that don't need to be re-licensed every time, you save time.

- You open it up to civil suits, communities that oppose it, etc. That lengthens the time and imposes penalties for delays in construction
- Asia & Europe are leading, having invented it. North America is doing it, but not part of energy policy and higher dependence on fossil fuels.
- China has put fusion as a high priority, and Europe is aiming for that too.
- Recognition that we are sufficiently close that we need to be a part of it.
- A lot of the new designs are focused on heat generation rather than electricity. One of the most important things in the AB econ is oil & gas. Nuclear can help us stop burning fuel to create the heat to extract the fossil fuels. If you could build high heat reactors, you could improve the profitability of the oil sands - creating improved products rather than low-heat products like fuels.
- See an evolution renewable - fission - fusion - Fusion will help clean up the waste from fission. Fission for heat, electricity. Fusion is coming whether we are ready or not. Will we be in or out?
- Finding a site will be incredibly difficult.
- Concern that oil & gas mindset makes people resistant, need the political will to pursue it.
- Need to consider decommissioning.
- Water use, by-products
- Public perception . Heavy industry buy-in. SMRs not available for pilots. Need turnkey solutions now.
- Programs showing statistics, have Indigenous peoples onside

**Municipal Levers**

- The City could put the regulations in place that demand zero emissions. We'd be forced to find new ways to achieve that goal and nuclear would make sense to achieve that. Nuclear could pair with industry.
- Enabling technologies that are working - laser fusion side and related materials.
- The City can be backing the technology and encourage fusion industry to build.
- We have a great vision from Council - I could see us looking at a more modular approach. Breaking up the construction of fusion plants into chunks. If we can become the leader and bring investors to Edmonton and connect with the Universities and other industries. Increase public awareness and set the stage in Edmonton.
- We've got a got AI industry and a University that building a department in physics
- Take what we have, expand it and bring it to the world.
- The declaration of a climate emergency breaks status quo and opens up people to new possibilities.
- Removing barriers (regulation)
- Announce that Edmonton is a new Canadian nuclear hub; use a splashy news story.
- Children's book - Marie's Electric Adventure: a book to be used for community outreach. Kids care!
- Demonstrating how it can be tied into the current system.

**Other Comments**

- #1. Incorporate nuclear into a 'New Energy Transition' public presentation space that doubles as a destination for general citizens, school tours, & large group presentations that includes:
  - Fairly large 3D models of various nuclear plant designs done to scale
  - Full size, hands-on samples of solar, wind & hydrogen technologies
  - Interactive displays & infotainment

- Displays communicating the ecological foot print of each, wind, solar & hydrogen (For example mining footprints & amount of toxic waste from solar vs. nuclear)
- Cost calculations of each technology including end cost of recycling materials
- List of toxic chemicals in solar
- Maybe make two sets of these & have one set that tours around to the community halls or some other public spaces
- #2. Interactive digital public education tool(s) to teach & test a persons understanding of New Energy compared to fossil fuel technologies capabilities, cost per energy unit, eco-impact, materials recycling & current global adoptions, initiatives & leaders. Something not too heady but deep enough to make it clear why certain technology is rising to the top.
- #3. Have a specific indigenous peoples presentation & meeting regarding nuclear safety & how much better it is for the environment overall
- #4. Look into nuclear plant types that are ideal for making both electricity & hydrogen for industrial purposes
- #5. After federal election is over get on top of streamlining approval both provincially & federally
- #6. Ask New York to hand over in open source raw calculations data set for demonstrating 2/3 of all cars can be made unnecessary. And think of that when calculating end totals of what will be needed, including savings on roads & parking space for sequestration. Could be publicly owned as far as I am concerned. Dealerships go, but we can repurpose that talent quite successfully. You would have to figure out how to best bridge them into new careers. It's time though. Celebration of gluttonous consumption can be seen as a wise repurpose in my opinion. From what I know of auto, they would make perfect staff for nearly any technology company as long as there were standing desks and lots of real live plants.
- #7. Have Terrestrial Energy scheduled to talk everything with you. They are Canadian, and were the only company in the world invited to the International Generation 4 Nuclear Assembly Thingy(not sure of the last word). Bill Gates awarded them Top Tech 2019. Need I say more. You obviously know he can get us the financing if we are seriously ready to go & has tech of his own known as TerraPower.
- #1. Feedback on the role of nuclear in our energy strategy
  - #1. Nuclear being substantially cheaper & cleaner than solar means to me it really is the primary option for electricity generation for the city.
  - Solar has 300 times the toxic waste that is a slurry of chemicals in basic elemental form so it literally lasts forever unless processed
  - Nuclear saves us from the solar e-waste management, recycling & toxic waste containment
  - Nuclear could mean opportunity to supply hydrogen for industries including agriculture inter-provincially
  - Nuclear would add further enhancement to energy expertise to Edmonton & the province.
- #2. Address the fact I see hydrogen was overlooked (I understand why but I want to help)
- #2. Hydrogen generation for industrial heat processes in manufacturing, train transport & building heat is something we should be on top of.
- Here is a safety program for Alberta Construction Workers, & First Responders I voluntarily have been working on for the province because I expected the city to announce hydrogen as part of the transition strategy. I am not 100% done but I feel it may be useful for you now as it is, while I continue working on it [https://openonenesscom-my.sharepoint.com/:p:/g/personal/davinci\\_openoneness\\_com/EYjPenFnYitLqepzzatnWckBhlgXLj-3Cnydh7WgdE-8GtA?e=pU4Ey0](https://openonenesscom-my.sharepoint.com/:p:/g/personal/davinci_openoneness_com/EYjPenFnYitLqepzzatnWckBhlgXLj-3Cnydh7WgdE-8GtA?e=pU4Ey0)
- If it is not already done, I would like to arrange a city meeting with the likes of NEL, Air Liquide, Siemens, etc.
- Europe, China, Japan, Australia & U.S. are so far ahead on this.
- Alberta would have been expected to fail to be ready to adopt the



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technology because it is the end game fuel replacing natural gas. But that is exactly why we have to do it"

- I would like to add 3 more things about the role of nuclear:
  - It prevents the world being decimated with mining & toxic pollution from mining
  - Avoids much of the materials used in battery technologies & solar that are unethically sourced by some of the world's more horrific human rights violators such as Congo
  - Prevents even further colonization & murder of indigenous peoples protecting the wilderness to be destroyed in the making of new energy systems
- I made a mistake. I'd put the multiple of 300 in there & that is more so close to the size over all of waste in comparison. Cost of recycling all the rest must be calculated in. Otherwise it is a massive amount of e-waste that all must be contained to avoid ground water contamination among other issues. Sorry, for the mistake there. Stupidly I had thought back but not long enough before I hit the send button.

Here is a PDF & Powerpoint version of the Alberta Hydrogen training. We need provincial construction safety training for labour & first responders so that is why I did this voluntarily. Almost made a full web & app version for giving away as provincial training, till I heard Don Iveson on the mic say we were not prepared for hydrogen yet & that he thought it may be crucial for this transition.

City permits office said they had no clue what to do about permitting for hydrogen installations

Alberta Construction Safety Association has no recognized provincial training for labour or first responders  
Industry is depending on us getting this right

- For all of you I know in leading roles of the energy transition whom I had expressed nuclear may be a great option for us to adopt. I was wrong. World Nuclear Industry Status Report 2019 released today literally eliminates nuclear as a climate solution in this decade for most intents and purposes. Here is the 323 page report. Page 228-256 is where the hammer comes down. <https://www.worldnuclearreport.org/IMG/pdf/wnisr2019-hr.pdf>
- Just making sure you are aware of this one. I'm all about Toyota & Hyundai since I followed their tech for years & know for certain they are at forefronts in the industry. They bought invention of the year a few years back that was a spectacular win for on-site hydrogen generation for businesses. I know for a fact Edmonton's future is best off if Toyota was part of the planning consultation process. So if no one is going, the show contact list csv from show management would be ideal. Not that you would ever send me down there, but I would go if you for some reason needed someone who knows what is going on. But really, there is some important tech out there needing comparisons & I don't know anything else close soon. Oh & you should be sending someone to Japan Hydrogen Olympics... That is how Japan is labelling 2020 World Olympics. It's the hydrogen economy global showcase.
- [We] believes that nuclear's time has come and gone for a number of reasons, well summarized by Stanford researcher Dr. Marc Jacobson here <https://www.leonardodicaprio.org/the-7-reasons-why-nuclear-energy-is-not-the-answer-to-solve-climate-change/>
- Among the top three:

- Nuclear planning-to-operation (PTO) time is too long (10-19 years). Even the optimistic 7.5 years claimed by nuclear proponents is too long to have a significant effect in the near future. Globally, 2017 saw the addition of 177 GW of renewable electrical capacity, and only 2 GW of nuclear capacity.
- Utility-scale nuclear is too expensive: nuclear is roughly 12¢/kWh vs. 4¢ or less for utility-scale renewables. This is not counting the cost of nuclear disasters (e.g. Fukushima estimated US\$460 to 640B) or storage (US\$500M per annum US alone), the latter a cost to be borne by future generations almost in perpetuity as well. Incidentally, the levelized cost of energy (LCOE) of renewables is beginning to out-compete even the cost of just operating existing coal and gas power plants, based on analyses by respected industry leader Lazard, and the levelized cost of storage is following a similar trajectory (<https://www.lazard.com/perspective/levelized-cost-of-energy-and-levelized-cost-of-storage-2018/>), with solar PV LCOE already at US¢ 2.34 to 2.91/kWh in countries such as Chile, Egypt and Saudi Arabia.
- Nuclear is a poor match for renewables, since it has no peaking capacity. Why nuclear and renewables don't mix: this article by Craig Morris outlines why nuclear is a poor complement to wind and solar energy transition. [de/2016/05/germany-nearly-reached-100-percent-renewable-power-on-sunday/](https://www.greentechmedia.com/articles/story/germany-nearly-reached-100-percent-renewable-power-on-sunday/)
- With respect to nuclear fusion, we would like to add the following comments:
  - Nuclear fusion has been "just 10 years away" for decades. While we believe that some research into fusion should continue, it will likely not be able to have a significant impact for the 2030 time horizon. Also, we already have a working fusion reactor, at the safe distance of 149.6 million kilometres from earth, that provides the energy for virtually all of the planets renewable energy sources. It is called the sun :-)
  - Jacobson and his team provide some of the world's best modelling for a 100% renewable energy supply with storage, with a net creation of 24 million jobs globally (e.g. Jacobson, Mark Z., Mark A. Delucchi, Mary A. Cameron, Brian V. Mathiesen. 2018. Matching demand with supply at low cost in 139 countries among 20 world regions with 100% intermittent wind, water, and sunlight (WWS) for all purposes. Renewable Energy 123: 236-248. Accessible at <https://web.stanford.edu/group/efmh/jacobson/Articles//CombiningRenew/WorldGridIntegration.pdf>). His team has also provides scenarios for Canada and Alberta.
  - The best and first solution, though, is still Negawatts, i.e. the energy not used but replaced by efficiency, which could address 50 to 75% of the 80% of GHG emissions resulting from energy use, as you know first-hand from your work with Edmonton's Building Energy Benchmarking Program. The most interesting summary of Negawatt potential is probably still <https://www.goodreads.com/review/edit/12742309> or info at [rmi.org](http://rmi.org)

In summary, [our] position is that nuclear would be better than climate change, but efficiency, renewables, and energy storage are better, faster and cheaper than nuclear. Therefore, we believe that nuclear is not a sensible or viable choice for Edmonton's Energy Transition.



## Appendix C: Engagement Data

**The Local Good Green Drinks: A Carbon Neutral City**

Date November 13, 2019

**Climate Shift #1: Tools and Targets***Excited*

- Align City Plan with the Energy Transition Strategy
- Celebrate efficient businesses and communities (Awards/incentives/public recognition)
- Budgeting \$ allows for prioritization of issues like climate
- Partnering with higher education institutions to develop and implement commercial energy efficiency programs
- Make business bylaws more sustainable for business expansion
- Control urban sprawl by restricting green field development

*Concern*

- How do we keep businesses and corporations with high carbon costs accountable? Taxes? Penalties?

**Climate Shift #2: Low Carbon City and Zero Emissions Transportation***Excited*

- better performance of EVs (e.g. Tesla Roadster)
- political leadership
- election of progressive council through direct electoral mobilization (i.e. Ben Henderson retiring)
- young demographic that is open to change
- new clean tech opportunities
- showing more evidence that climate catastrophe is looming
- promote healthy living
- self-generated fuel - disconnect from fossil fuel costs
- debunk myths around EVs in cold climate
- increase availability of charging stations
- push for subsidies like in Quebec
- electrify the grid
- support local community - e.g. telecommuting community hub

*Concern*

- funding cuts, no funding
- monopolies
- unwillingness of city to implement free public transit for all and expand network
- unwillingness of city to partner with carshare/bikeshare/etc. and include in parks, expand zone coverage
- battery supply, chemistry specific
- provincial government (UCP), conservative councillors
- disconnect between road planning and low carbon transportation
- our weather
- financing - we need a system that better values what is actually valuable
- long-term decisions lock in high energy-intense reality (e.g. zoning, transportation, low density)
- commercial media where our opposition buys a big voice

**Climate Shift #3: Emissions Neutral Buildings***Excited*

- Demand for actions

*Concern*

- New non-efficient buildings
- Cost

**Climate Shift #4: Renewable Revolution and Circular Economy***Excited*

- Make sure City Plan aligns with the Climate Change Strategy

- use recycling waste to create structures for solar panels - lower waste, lower price of solar
- promote a zero waste market
- have an expo with booths showcasing technologies and products available
- effective regulations for energy efficiency, packaging, etc.
- need policy to connect orphan wells to geothermal energy production
- incinerate trash instead of shipping offshore
- pollution and land use reduction for waste handling and improved recycling comprehensiveness
- localize market
- new energy code
- need citizen push on PACE
- make old buildings net zero
- info is accessible to all, including children - e.g. share (?) waste-compost app

*Concern*

- in view of Alberta budget, we will lose subsidies to solar to help homeowners adopt
- plastic waste
- accountability of companies for end-use, reuse/recycling of products and packaging they create
- understanding the regulatory process

**Climate Shift #5: Just and Equitable Transition***Excited*

- profit incentive on disaster relief
- provide info/guides to tenant boards on becoming more energy efficient and saving money
- create a safe space for a person to participate
- integrate skill building for green jobs into existing employment readiness programs (e.g. Water Wings, Verto, Working Worries, Kids in the Hall)
- engagement is available online and easy to understand - available and accessible
- meet people where they are
- empower local mentors and leaders to reach youth
- consult people at the beginning of opportunities
- break down problems into smaller problems - easier to tackle than one large problem
- make climate a key factor in all policy making
- we need to respect the people who were on the land and hear their voices
- grants
- free transit
- remember bees - cut lawn less and let dandelions grow
- tax the rich
- train youth from cultural communities to do outreach in their communities
- call out environmental racism and white supremacy
- have stronger non-profit incentives
- more thinkers working with doers - working independently is not efficient
- Elon Musk

*Concern*

- making energy transition accessible and affordable
- jobs for new graduates



## Appendix C: Engagement Data

- it's hard to bring people to the table if they don't have the info or background to know - educational deficiencies/gaps in education
- providing information in other languages and having staff who speak other languages so non-English-speaking people can participate

**Climate Shift #6: Negative Emissions***Excited*

- We need a carbon tax
- Tax credit for other than lawns
- Tax credit for mature trees
- Native Yard Award
- Change nomination process for Yard Awards
- Encourage urban farming
- Make it sustainable (WEED list and Integrated Pest Management)
- Increasing urban tree survivorship beyond establishment period (5 years) to continue being part of canopy
- Afforestation in fields. Increase naturalization.
- Diversify definition of beautiful
- Bylaw for unsightly yards penalizes native and diverse planting. How can we make food forests "beautiful"?
- Less rules - alternatives to turf
- Pro-food lawns
- Oak versus poplar planting
- Use leaves of energy generation
- Compost hubs within 500m of every home (apartments and houses)
- We need a compost hub (many of them) . At community leagues.
- Compost waste app (to share waste). Compost incentives and workshops.
- Diversity bonuses: Bloom awards for sustainable yards
- Diversity bonuses: tax credit for planting and keeping unusual trees for 5-10 years

- Diversity Bonuses: "best-tasting unusual fruit grown here award"
- Ban fake lawns
- Introduce species diversity: willows (e.g. Golden), alder (tree form), amur cherry, prunus (Schubert, mayday), cedar, Norman maple, Russian olive (no), Ginkgo
- Introduced planting in Edmonton: Elm, Oak, Ash, Linden, Spruce, Pine, Doug fir, horse chestnuts, butternut, fruit trees (apple, cherry), larch, maples, hybrid poplar/aspens
- Inventory already includes ornamental park & street trees and all elm. Native species: maybe some balsam fir? aspen, lodgepole, jack pine, white/black spruce, tamarack, willow, alder, white birch, balsam poplar.
- Urban farming
- Should be illegal to have new roofs facing north - we need solar access
- no fake grass
- tax credit for non-lawn
- Prairie Urban Farm
- compost hub; instead of inefficient leaf blower, run it over with mower
- no fields of grass - use nature-scaping

*Concern*

- Too complicated to create a new community garden on public land. Why?
- Taxpayers pay for public lands maintenance. It should be easy to pass this (+\$) to public that want to use + care for the land
- If we only planted local diverse species we wouldn't have the diversity we see in Edmonton today
- Lawn and garden restrictions are frustrating
- tax credit for mature trees problematic

**Climate Shift #7: Economic Development**

*At this point in the project, Economic Development had not yet been identified as a separate Climate Shift.*

**An Evening with Bill Nye**

**Date** November 16, 2019

**Climate Shift #1: Tools and Targets***Excited*

- Fighting for a green Edmonton.

*Concern*

- The future.
- Cost of each individual to achieve target?
- Reducing emissions to a seventh in just over a decade is aggressive.
- This is non-binding, so what is the motivation, and possible consequence.
- Pace at which transition is achieved

**Climate Shift #2: Low Carbon City and Zero Emissions Transportation***Excited*

- An ICV vehicle buy back program that encourages those with internal combustion to switch to electric.
- Bike lanes done properly.
- Downtown Edmonton built around pedestrians not cars.
- Telecommuting, allow people to work virtually/from home and reduce transportation requirements.
- Encourage people to be more active and help lower our carbon footprint.
- More bike lanes.

- Electric cars.
- Reliable public transit.

*Concern*

- But where will the "electric vehicle" energy come from?
- What happens to carbon emitting vehicles?
- "Having Corporate Offices in suburbs so people do not have to travel as far to work."
- What is the current/future environmental impact of the LRT/New line?

**Climate Shift #3: Emissions Neutral Buildings***Excited*

- More solar subsidies.
- Solar Power!
- Retrofitting existing buildings to align with blue and green infrastructure goals. (look up or SDGE)
- More buildings = more dense population = Better for Env.

*Concern*

- Whose paying for this?
- Safe disposal of metals.

**Climate Shift #4: Renewable Revolution and Circular Economy***Excited*

- New Energy sources - Nuclear Power!



## Appendix C: Engagement Data

- Nuclear Energy!
- Roofs with plants.
- More solar energy
- What about in the winter?
- Water Reuse Technologies! In homes. In facilities.
- Don't rule out nuclear as an interim solution.
- Solar mandatory on new construction.

*Concern*

- Address food waste from grocery stores. Encourage and reward alternatives to throwing it out.
- How might our waste management facilities handle this?
- Regulatory policy change to allow for community generation projects. Not all buildings are suitable for solar.
- Excited about composting. But how are we going to educate people around how to compost?
- Make composting accessible in all areas including downtown apartments.
- Compost pick-up in all areas.

- Traffic created wind pressure turbines. (Along major roads)

**Climate Shift #5: Just and Equitable Transition***Excited*

- Tax rebates for low income families.
- Creating these opportunities, not just encouragement will be key!
- Don't have carbon taxes that target low income families/people.

**Climate Shift #6: Negative Emissions***Excited*

- More involvement with the Root for Trees program!
- More plant based foods.
- Rooftop plants.
- There was a restaurant in T.O. that used plants from rooftop for recipes

**Climate Shift #7: Economic Development**

*At this point in the project, Economic Development had not yet been identified as a separate Climate Shift.*

**Energy Transition Leadership Network**

**Date** December 4, 2019

**Climate Shift #1: Tools and Targets***Excited*

- consumption- based GHG inventory is exciting for a growing city like Edmonton( hard to measure though) potential for creative financing Solutions. public- private- Partnerships(p3) and other project deployment
- peak-hour charge rates to shift Behaviour
- excited for the opportunity to apply carbon offset funding to local initiatives
- use collaborative delivery models like IPD and lean Construction to transition at less cost
- what gets measured gets managed!
- excited about how this shift can be a source of cost savings and wealth creation
- excitement about Google's EIE Radius (?) about this transportation patterns
- increase transparency! ( taking fear out of measuring and reporting)
- excited about the opportunity to measure and evaluate new/ emerging Technologies, including cost( hydrogen production and export)
- excited about green bonds as a way to bring in investment
- opportunity to incent NetZero with PACE and NetZero bonus
- single, evidence evidence-based, transparent province Co ze/ kwh for electrical grid. to Provenance to publish our current ear(?) intensity and then data behind it
- personal energy budget tracking
- Target setting has not worked in most cities(ref. C40)
- shift Focus to \$ invested to GHG reduced to improve effectiveness
- excited about private financing for clean energy in the city eg. ciep, PACE
- transparent Target/ data-sharing- giant countdown sign, conference events, app!

*Concern*

- tools and targets is an opportunity to educate not just measure. concerned about exclusive focus on carbon Matrix, when we have a sustainability crisis. it is not economics and technology that should be the focus- social practices have to change
- decentralized energy storage is not currently being properly

considered 8% line loss on feedback systems- min! --> especially for industry

- need very timely action to meet the targets! will be challenging to create messaging to engage people
- climate adaptation plans- what data tells us about what yeg can expect
- inclusion of rural people and their limitations to GHG reductions and program participation
- effective measuring and monitoring of emissions reduction strategies once they're implemented
- can rurals help though?? Production of food for instance?
- concerned that funding policies will create gaps (Arenas can fund clean zamboni's, but schools can't fund clean school buses)
- of CO2 the Baseline and continue monitoring and reporting is fundamental
- one of the targets should be our progression to electric heating- 63% of energy used in buildings is for heating
- measuring tools must be globally consistent( benchmarking)
- not enough awareness on need to remove barriers ie PACE
- 

**Climate Shift #2: Low Carbon City and Zero Emissions Transportation***Excited*

- interest in electric vehicles for commuting
- free transit
- data analytics for traffic light/ flow control with A.I. learning
- excellent bike network
- Bike Share
- car free downtown zone!!! ( no more cars)
- self-driving cars
- active, healthy lifestyle walking/ biking especially for school transportation
- used EV batteries leveraged in charging stations
- hydrogen injection into diesel engines improves performance and Emissions without the need to replace the vehicles( Empire hydrogen, Hydra energy)
- incentives for telecommuting
- resiliency hubs



## Appendix C: Engagement Data

- Public (electric) transit to EIA and Calgary: frequent, on time, cheap
- used electric market--> consumer shift
- electrification of transit--> normalizing tech
- electric scooters, bikes, skateboards and personal EV
- dedicated lanes for e-bikes, walking, scooters
- City size directly influences transport Behavior
- warming shelters for Transit stops
- work on my shift: City for people and not City for cars
- electric cars- electric charge stations for cars- level 3
- regional Network- address commuters within the capital region( work with neighbouring munis)
- Road tax( like Europe) to ensure vehicle runs properly pay for roads and less tax for low emission vehicles
- winter service for bike Lanes
- time-of-use/ Dynamic electrical tariffs smart grid
- ability to take pets on transit
- demand reduction strategies
- creative financing Solutions--> per mileage leasing--> battery leasing--> solar on bus barns
- hydrogen storage and transport will be transitioning to solid state, drastically reducing the cost of rolling out new fuelling infrastructure
- electric vehicle incentives coupled with solar install rebates
- toll roads
- clean hydrogen cost will be plummeting with in Alberta over the coming year( proton Technologies)
- Secure bike storage/ change rooms and showers
- make Transit service awesome people use it more!
- disincentives to driving

*Concern*

- lack of access for walkability
- more reliable/ accessible Transit options Beyond Edmonton ( to airport/ Calgary)
- low usage of public transport
- transit times- almost every trip is faster by bicycle than by bus
- if people all use electric cars and they charged at the same time how to manage the load? New infrastructure? Cost?
- Finding challenges
- self-driving cars might increase use and carbon emissions
- Transit redesign: communities being left without easy access to public transport
- Mini- EV ( scooters) lack of infrastructure and understanding
- cost-sharing mechanisms for new( EV charging) infrastructure
- dealing with school buses when school boards aren't under city
- concerned that we're focussed on battery electrics as the only solution, rather than the core problem of emissions
- Education
- coverage and reliability a public Transit- buses are not reliably on time and not convenient to use.

**Climate Shift #3: Emissions Neutral Buildings***Excited*

- partner with educational institutions to get upgrades done (more affordably) and train new workers at same time
- deep green retrofits of existing buildings
- poster on building: infographic on how much electricity, heating Etc used in building = people walk by and learn: celebrates positive buildings, challenges others to do better
- incentive in BP time for Leed gold/ NetZero- reduce time to permit
- time-of-use pricing
- collaborative based project delivery model like ipd to transition to sustainability at less cost/ more effective \$
- geothermal for heating and cooling

- energy performance contracts
- C-PACE 2020 now
- shift Focus to Dollars invested to GHG reduce to improve effectiveness
- changing bylaws to allow for very different siting of buildings on land not just for solar orientation but also for one example innovative semi-detached housing with courtyards
- build on 50/50 challenge - build one building renovate another to use less balancing out do less energy
- expanding District energy sharing to other neighborhoods ( starting with lower-income neighborhoods?)
- Change gas and electricity pricing structure- lower fixed rates, higher variable rates
- why oh why are we allowing any building that is not NetZero?!! ( To be built now by 20-25 NetZero needs to be mandated) --> S t e r d s approach
- new school builds LED silver - pressure Alberta Government to move standards to NetZero for new Eco solar home tour expand and support showcase all NetZero models Etc
- sharing of ideas
- energy sprong
- Pace ( ceip)
- drive and support local innovation
- water: legislation for Gray Water Reclamation
- code for building materials
- clean hydrogen can be blended into the natural gas supply to achieve gains at scale
- green( planted) roofs provide greater insulation and make the city more attractive
- net tve buildings of the future
- resilience hubs
- carbon metering
- existing building commissioning and continue monitoring and reporting
- all City buildings - new: NetZero - existing: Net Zero retrofit
- showcase industrial wins to illustrate to others
- NetZero building standard and incentives
- phase- change materials --> new funding models--> funding to do this
- emissions- based component to property tax as a carrot/ stick
- step- codes(i.e. BC)
- charters- City specific incentives and stick

*Concern*

- retrofitting costs up front
- bring rental companies on board 4 retrofit (tpr par mainstreet)? What
- school buildings mostar retrofit - how deal with these when not under municipality control
- Enforcement
- many people who have the oldest homes/ least modern and efficient cannot afford efficient upgrades: let's facilitate retrofits for low-income households
- opportunity missed! to set bar at Beyond NetZero regenerative Target
- Workforce capacity
- maintaining housing affordability
- are people incentivised by a small reduction in energy costs?
- Non-financial values (comfort, Etc)
- new construction not optimizing designs for solar PV
- no focus on electrifying our heating systems
- misunderstanding on best retrofits for homes for optimal Energy savings--> have standard steps for best Energy savings
- developers apathy to Net Zero building? Is this a trend? Can coe motivate them?



## Appendix C: Engagement Data

**Climate Shift #4: Renewable Revolution and Circular Economy***Excited*

- Extended producer responsibility (waste)
- Demonstrate leadership - emissions don't stop at Alberta's borders!
- Website of COE: Overview for education "what you can do" including programs available
- Many of the 'right' leaders in place - seem to be reaching a tipping point
- Facilitate indigenous clean energy projects: energy sovereignty and social / economic / cultural / environmental benefits
- Epcor 100% renewable
- Implement household waste water recycling/heating infrastructure
- Indigenous leadership --> circular teachings
- Community loaning programs (tool hubs) what about those pasta makers?
- Reduced transmission and distribution prices
- Tracking energy usage
- Competition to save energy
- Making available consistent and easy to use tools for energy consumption and generation monitoring (potential impact measurement of behavioural change)
- Create procurement (to push EPR strategies)
- High COE standards and goals for waste diversion
- Increase energy budget for recycling reprocessing of goods
- Reduction in packaging
- Power purchase agreements for city and commercial
- Organics collection--> create renewable natural gas. Max out solar and storage
- Integration of renewable energy and smart grid and building automation digitalization
- Partner with educational institutions in green projects. food systems work
- Increase in onsite renew. gen by having local storage = behind the fence
- Load management through decentralized storage. Inside transformer loop extends grid security and capacity. Win-Win!
- Transition town mvmt.
- Solar-friendly building orientation
- CEIP yay!
- Celebrate our successes in public messaging - inspire people to replicate this in their own home / business / org
- Develop innovative waste management system to reuse and resource materials
- Replacement of natural gas with nuclear over the medium term
- Building code / bylaw changes to support renewable energy
- Create spaces and programs that support swap and "sharing" economy (subsidies, etc.)
- Create renewable energy grid ASAP\*
- Creative financing to accelerate project development. P3s private investment
- Revolving green bonds (circular bonds)
- Collaboration - other provinces import commodities from Alberta. (ie. BC tie-line) \*inspire to bring forward larger solution\*
- learning with newcomers re: less waste / sharing
- Education on source separated organics - needs to be clear and easy for people to comply

*Concern*

- Not enough focus on electric heating
- Better measuring and monitoring of waste management
- How can we meet the waste reduction goal without widespread organics collection?
- Residence acceptance

- Loss of convenience
- Land usage (excess) for energy generation
- Influence AUC on transmitting pricing etc.
- Pembina's aggregated green power purchase program
- Geothermal for heating or from productive electricity
- Provincial support (renewables)
- Solar vs green roof - who wins?
- Creating a greater circular economy is about innovation and innovation requires failure. How do we learn from these failures and not have them constrict innovation? e.g. World class waste management system" Edmonton 10 years ago celebrated but it was never successful in diverting the waste it was supposed to. How are we learning from that failure?
- Develop methodologies to measure savings (or impacts) achieved. through behavioural change brought by investment in education and outreach
- Waste to energy strategy
- Building code for roofs to support solar

**Climate Shift #5: Just and Equitable Transition***Excited*

- I'm concerned about how this is integrated into shift one. if this isn't part of what's measured it will have very little impact
- current situation- massive layoffs, unemployment, reduce tax base, reduce social safety net, wasted human capital
- increase taxation for more wealthy people and companies to fund equality programs
- is equality a climate shift issue? or is it a human rights issue that needs to happen regardless
- create a guide for oil and gas workers to highlight how their expertise/ skillset can be applied in an Alternate energy environment- would increase buying from that population
- free programs for underrepresented groups (i.e. lgbtq+, women, non-binary) to provide training on getting into governance or politics increase their confidence and skills in that area
- solar energy co-ops
- green/ Heat and warming shelters in downtown core
- tool kit- plan for PWD adults when their parents are no longer there
- planning and development- guaranteed lower income housing( also to infill)
- free Transit!!!
- opportunities to partner with training an education institutions and Community Development organizations to help unemployed to realize the talents they have to offer, to invent new jobs, new, contribute in new and different ways
- the economy is a set of rules designed to transfer Wells to the rich. it is a system designed by and for billionaires there are 20 100 billionaires in the world who have amassed \$8.2 trillion (~10% of global GDP)
- --> without addressing this fundamental purpose of the economic system, all initiatives proposed within this context are merely distractions
- OR - guaranteed employment; - increased consumer spending; - increased personal security and well-funded social safety net -- funded by progressive taxation on rich
- promote Tech solution and provide access through programs - PACE; - transit pass
- convenient and free transportation system
- used language that is accessible for people of different culture, educational, economic, and social backgrounds
- engage newcomer and ethnically diverse communities via programs that assist transition
- increase funding for minority-owned entrepreneurs
- host engagement and education in spaces that belong to those people: talk with them on their turf



## Appendix C: Engagement Data

- increase funding for and improve coverage of public transit
- Concern*
- community greenhouses
  - how do we see opportunities for jobs that don't exist now?
  - Answer idea: agile- Lean Startup financial support as new job opportunities come up
  - there needs to be a gender and immigration lens on many solutions II walking and biking paths not considered safe due to ? fears or experience in very unsafe environments in another country
  - To support programs for communities incentives- where does that funding come from
  - maintaining the river valley ecosystem as accessible to all
  - ensure safe and secure for women children newcomers etc
  - boost the profile of lower-income people who already live low-carbon/ circular economy
  - avoid centrifical station- let's avoid creating a low-carbon city that is exclusively about affluent NetZero low income housing needed
  - create climate ambassadors within diverse communities
  - women building futures( Partnerships)
  - low indigenous involvement in planning and consultation
  - housing: certain % of new builds reserved for affordable housing (< 30% of income)
  - partner with minority organizations and have a strategic working group so they can always have input, advice, ideas that acknowledge their community members needs
  - More \$ for EcoCity initiatives
  - Work with local community organizers re: Climate ( many youth, )
  - more housing options ( housing first, psh, seniors, low income)

**Climate Shift #6: Negative Emissions***Excited*

- green roofs as carbon sinics
- existing treestands need to be protected
- Community leadership for carbon sinks through schools
- existing tree canopy is old... all trees the same age and we'll die within the same time frame
- potential lack of energy access to support Logistics of negative emissions
- renewableCCS producing carbon neutral fuel; City can choose to buy carbon neutral fuel
- green spaces connection to food production and security
- Green space - carbon sinks but also make connection to well-be-

- ing health( much research)
- increase tree canopy through regulation
- involve residence community members in caring for and protecting natural areas
- Fire - grass fires; bush fires
- opportunity for COE to incentivize regenerative buildings using PACE and bonus for achieving net zero + 10%
- technology is yet to be fully developed
- right to light/ solar
- cost of carbon capture; leaks/ blowouts of CO2 storage
- carbon sequestration focussed on high carbon emitting Industries
- selling clean energy beyond our borders - solar? - nuclear? - hydrogen?
- - planned fire breaks and diverse ecosystem to reduce fire impact
- entice Industrials to be part of the solution
- diverse tree canopy - moving beyond mono-culture of elms... Apple, mountain ash, Elm, Oak, birch, etc
- deep green energy retrofits of existing buildings - incentives
- planning new communities for solar access

*Concern*

- communication is the key?
- excuse for people to continue their current emissions
- natural gas as a solution for Transit
- creation of bio char from organic waste for City Green SPACE fertilizer
- can the carbon that is captured become Industrial feedstock?
- Urban agriculture--> green houses
- more use of geothermal
- --> direct capture from flue gases more efficient than from here--> nuclear is: safe; low carbon; reliable; rapidly scalable
- --> hempcrete( for building cladding); soil( native grasses); synthetic limestone
- energy audit for resale of houses/ properties
- human factors that lead into switching to renewable energy
- two elements of drawdown: requires lots of zero carbon power; require storage of carbon, long-term
- consolidate parking lots downtown and use the rest for Green SPACE
- parking lot medians can include trees and green sPACE
- can carbon sinks alone get us to 100 mtonnes or do we need carbon capture as well?
- Cost vs benefits of carbon sinks vs CCS

**Environmental Advisory Committee**

Date January 12, 2020

**Climate Shift #1: Tools and Targets***Barriers*

- How to make concepts and targets like 135 MT understand - able to general public
- Education for public. what does 135 MT look like?
- International models are highly variable and difficult to apply to a small region.
- Industry engagement to also do carbon reporting?

*Opportunity*

- Encourage individual carbon accounting tools to conceptualize what 3T/P/Y looks like
- Individual emissions tracking tool?

*Solutions*

- Make it easy for industry to report (incentives)

- Do we implement mandatory reporting? how do we create this inventory?
- Citizen engagement that is values based and encourages individual action

**Climate Shift #2: Low Carbon City and Zero Emissions Transportation***Barriers*

- Value of gas/diesel powered vehicles drops.
- How to address urban sprawl?
- LRT and transit needs to be efficient - how valuable in your time?
- How will we accommodate population growth



## Appendix C: Engagement Data

- Will people just move to the suburbs to get bigger homes and increase footprint? is this just shifting problem?
- In Alberta is this doable without regulation and better incentives (\$\$) electric cars
- Improve transit \*\$!&!\*
- Not everyone is keen to ride bikes in winter
- Shift needed for lower dependence on vehicles

*Opportunity*

- Edmonton needs more pedestrian areas / squares - no car streets
- Decentralize commercial centres. so people can work closer to home. eg more office towers in west/south
- Health integration ie. healthy lifestyle via activity; work with fitness movement to encourage <5k active trans.

*Solutions*

- Clear requirements re: citizen access to services within X meters.
- COE needs to promote density and really sell it to the suburbanites.
- Economic prosperity via smaller homes (lower cost) and incentive with fed gov to "buy less" and "buy smaller"
- Grants for charging infrastructure for multi-residential

**Climate Shift #3: Emissions Neutral Buildings***Barriers*

- Heritage homes and retrofitting and old valuable buildings \$\$\$ who pays?
- Old residential buildings challenging to retrofit.

*Opportunity*

- Residential housing developers cars sell 'energy efficient' homes
- Will policies be developed to enforce/encourage this?
- Taxes --> higher the lower your homes energy rating.
- Ratings of homes your car is rated l/km your house needs a rating to know what you're buying and fix. grants based on these numbers.

*Solutions*

- Seek building code changes
- Tax large houses and houses farther from city core more!
- Strong incentive program / rebates to developers

**Climate Shift #4: Renewable Revolution and Circular Economy***Barriers*

- Education on waste management to general public
- Incentive for solar system installations - also opp.
- Education the public on the economic benefits of retrofits (residential)
- Who pays for all these changes?
- Retrofitting old building can be a challenge (residential and commercial)
- Zoning restrictions - multi-lot solar? - access to sunlight --> legal right
- Oil and gas, culture and job dependency. 30% ed. GDP

*Opportunity*

- Grants to schools and education sector to adopt renewable (solar) under budget constraints

*Solutions*

- Expand network of eco-centres ie. community level service (smaller scale)
- Sell electricity back to grid when we reach a surplus
- Nuclear power
- Community level integrated food banks to reduce food
- Nukes
- Partnership with community leagues to create and provide renewable energy source.
- Capture and processing of biogas from waste water treatment

- Advocating for renewable outside of YEG = alignment with other towns and municipal districts?
- ASP - MDPs - solar alignment

**Climate Shift #5: Just and Equitable Transition***Barriers*

- How best to make green housing affordable?
- Attitude of displaced energy workers -> may not be interested in green jobs.

*Opportunities*

- Indigenous communities conversations?
- Co-ops
- Incentivize share and public transport
- Immigrant organizations

*Solutions*

- Work with community leagues to facilitate transition \*similar characteristics \*closer ties to home \*smaller scale

**Climate Shift #6: Negative Emissions***Barriers*

- Green space are not always carbon neutral. counting these are questionable.
- Funding for innovation hubs? (previously provincial)
- Baseline inventory - does COE have one? or biodiversity
- How to balance preservation with constant population growth?
- Get neighbourhood developers to incorporate more green space
- Space to plant trees vs. diversification?
- Provincial regs and wetland preservation may be in conflict. industry may not comply
- Solar target vs. tree target?
- Need land for urban farming. hard to do in central areas

*Opportunity*

- Native plants not just trees, - get rid of grass, city parks and properties. clover and native plants low maintenance.
- Work with developers to ensure native plants are used in wildlife friendly naturalized native landscaping and less grass better wetlands
- Urban farming is cost saving for individuals/families

*Solutions*

- Tech challenges and industry to support
- Stop urban sprawl

**Climate Shift #7: Economic Development***Barriers*

- Markets are slow to adapt
- Politics of other levels of government

*Opportunity*

- Mindful of term "good" jobs to encourage transition
- Incentives for industry wanting to diversify economy

*Solutions*

- Accessibility for Edmontonians to financial incentives...renters? Low income?
- Leverage savings from energy costs to fund job - creation and make this visible
- Need clear regulatory signals - the faster the better
- Partner with immigration organizations. (many under employed immigrants)



## Appendix C: Engagement Data

## Edmonton Food Council Meeting

Date February 18, 2020

**Climate Shift #4: Renewable Revolution and Circular Economy***Barriers*

- How will COE handle increased decentralized energy storage ... "GRID MAX"
- We need land for wind power...
- Money to get solar systems up/who pay for it?
- Attracting investment

*Opportunity*

- Randomized street light outages on COE property
- New businesses
- Shifting existing business activities onto new (maybe unknown) industries
- Waste heat to heat greenhouse
- Put together preferred vendor / company list for home/commercial buildings.
- Grey water use/recirculation in households / commercial buildings
- Partnerships with clean energy industries e.g. wind, solar, biofuel etc.
- RAMP zone / keep land for wind / other renewables (outside the City)
- Buy local (food) procurement policies

*Solutions*

- Financial incentives
- Combine wind turbine and ag?
- Eliminate roadblocks/red tape from starting new and innovative businesses.
- Reduce food waste in the home
- 

**Climate Shift #5: Just and Equitable Transition***Barriers*

- Learning about opportunities to get involved / income.
- 

*Opportunity*

- Intergenerational education/program focus. Value system around your generation. i.e. baby boomer vs. genZ
- Incorporating people as they change "how to engage seniors" - reduce social isolation - teach students etc. system level thinking.
- look into "sole street foods" in Vancouver -- needs City support
- Language barriers? Education | Programs.
- low-income / vulnerable are low emitters. --> must focus more on adaptation.

*Solutions*

- Work with Landlords (many low income are renters)
- intersectional approaches (GBA+ is just the start!)
- Engage food workforce on transition (precarious employment)

**Climate Shift #6: Negative Emissions***Barriers*

- Cost - offsets - programs - etc.
- Cultural resistance to edible landscapes.
- Cultural residence too "messy" landscaping
- How to get City to approve water collection for businesses - e.g. laundromats?
- AHS / risk/liability?

*Opportunity*

- City sponge (perishable landscaping)

- A tool for mitigating effects of climate change...
- Circular economy education
- Water collection in res. house holds as a mandatory i.e. rain barrels
- Identify exiting edible tree/shrub reserves in City for public use/ education.
- Planting urban tree/shrub fruit orchards in all avail areas. i.e. meridians, bike lanes, COE parks (new/existing)
- Flora/Fauna Diversity/ crops.
- Diversification of food system (food from more sources)
- Green areas are carbon and water sinks (low emissions and flooding risk)

*Solutions*

- Community composting
- Bylaw to protect mature trees on private property.
- Food - not - lawns. Program idea.
- Urban food forests
- Encourage access to land for urban agriculture.
- Credit (taxes maybe) for making lawn a carbon sink or water sink.
- Urban refugia (protecting biodiversity)

**Climate Shift #7: Economic Development***Barriers*

- How is Edmonton an already incubator for energy innovation?
- Partnering regionally to see shared benefit EMRB Edmonton Global \*\*especially for food!
- A lot of food based business is not sustainable year-round
- Low profit margins of food -based businesses: need \$ to transition them.

*Opportunity*

- What training programs exist or are required to employ 6,500 jobs. Create inventory.
- Distribution centres for small/medium urban ag businesses
- Community aired energy coops ex. solar geothermal
- Food hub! --> GHG -centralized place for producers to sell product from -centralized place for ICI to "buy local" policy holders to purchase
- Inclusive economies : good jobs for lower income Edmontonians (post-secondary)

*Solutions*

- Energy efficient food distribution within the City and region (link to RAMP?)
- Capitalize on niche market of local food with more food tourism.



## Appendix C: Engagement Data

## Youth Policy Jam

Date February 25, 2020

**Climate Shift #1: Tools and Targets***Actions*

- We are in a carbon - intensive, northern city.
- We are in a car-centric city.
- we eat too many animal products.
- Car focussed world.
- Economically driven
- City designed for car users.
- We are in a car centralized City!
- Edmonton downtown.
- Excessive food waste.
- We are in a car-centric City.
- City of Edmonton for climate change.
- Buildings made with unsustainable building materials
- Lack of correct knowledge and lots of too incorrect information.
- Phase of development for renewables
- No idea
- Making a good start
- In a space for potential to make things better.
- Million square kilometres of tailings lying around
- in a climate emergency.
- We're in a situation where we need concrete action.
- Disagreement.
- We are in a self generating city where positive can equal negative.
- An unequal society
- In a fast and growing community.
- We rely on cars too much.

*Barriers*

- Emission of pollutants to our ozone layer by exhaust fumes of its vehicles can affect the health of our community.

**Climate Shift #2: Low Carbon City and Zero Emissions Transportation***Actions*

- Save the planet
- A decrease in food waste from grocery stores/organizations.
- Bike everywhere year-round.
- Affordable, equitable, accessible and sustainable transit.
- Green bins for compost.
- Convenient public transit.
- Re-mediate tailings (waste water from oil sands) --> help get back clean water with ecosystem.
- 9% regular use of public transit
- A world where everyone can thrive
- A well connected and carbon neutral city.
- One solar panel can save tonnes of carbon.
- Healthy and green eco-system.
- New communities built in high density; new buildings made out of cross-laminated timber (CLT)
- Net zero and free transit
- Mass transit accessible to all.
- Being green isn't just for middle or lower class.
- Eliminating all food waste and community composting..
- Want to no longer be in climate "emergency"
- A city where walkability isn't a luxury.
- More netzero infrastructure
- We want to be in a human-centralized city.

- Distributed energy systems.
- Renewable / clean energy
- Remove heat/gas and go old ways ex: wooden stoves
- Self sustaining clean energy.
- Anywhere outside with fresh air.
- Smoke free environment.
- Limit downtown parking lots?
- LRT YEG to YYC to Lethbridge (may mean a revisioning of YEG airport)
- Public car-share
- Better regional transit, rural transit.

*Barriers*

- police presence in transit
- limited public transit routes, lack of frequency a disincentive
- Transit is not working for all Edmontonians
- Public transport has image problems
- Better planning for connecting routes
- funding for free transit and political will.
- Pedestrians and cyclist not prioritized in infrastructure (less waiting time on traffic lights)
- Excessive punitive fines for lack of fare
- Active transit in a winter city has extra challenges
- Lack of funding for sustainable transit systems
- enforcing car pool
- Car centric city / urban sprawl
- Car and truck culture, infrastructure that supports this
- An established oil industry (difficulties convincing to transition)
- I hate when the sidewalk abruptly ends! why?
- -not big enough parking lots - not a lot of choices to use a park and ride
- Review bylaws and road layout to ensure safety.
- Car frustration with bike lanes! (don't want to close people off to idea!)
- Challenge: Ensuring all voices are heard and represented (properly).
- Make the low income bus pass more easily acquired - requirements too stringent!!!

*Opportunities*

- Designing a system with the most vulnerable in mind.
- Where we wanna go? Higher prioritization of active and public transport!

*Solutions*

- Shift
- Transform "car only" streets to multi-purpose lanes
- Investment in active transport bike lanes / walking paths
- Mobility hubs with sharing transport with clear rules.
- Low public transit engagement.
- its biker safety an issue?
- - active transportation. - public transit. - how city is built
- Free transit
- Free and better transit
- Opportunities: technology exists, we just need to figure out how to implement solutions.
- Fare free transit
- Public transport not private
- Re-allocation of transit spending from fare enforcement, administrative costs from means-testing for low-income passes, fare tech



## Appendix C: Engagement Data

- costs to sustainable transit (high speed rail, electric bus fleet)
- Massive expansion of our transit system.
- Fare-free and good transit that is accessible to all.
- opportunities: eventually eliminate and replace diesel / gas fueled vehicles taxis uber buses etc. for electric hybrid vehicles
- more pedestrian space (wider sidewalks)
- Opportunities: if working in the city or going to school in the city and living on the outskirts, using the park and ride is the better option than using own vehicle and adding more to the emissions.
- How do people with mobility challenges get around in the winter? Are sidewalks clear? Are there snow banks that block them?
- City should clear sidewalks and bike paths throughout and frequently
- Transit electrification
- Enough place for cars in city. --> we can shift that space for increasing public transport and non-motorized traffic.
- Dedicated bus lanes.
- Incentivize car travel. car-free zones, congestion pricing, etc.

**Climate Shift #3: Emissions Neutral Buildings****Climate Shift #4: Renewable Revolution and Circular Economy***Actions*

- Creating more "we" rather than "me" - Lots of lifestyle changes and willingness to change habits
- Practice not being so reliant on oil for energy
- Diversify our economy in renewables
- Diversify the (hecking) economy.
- Equity-based decision making
- A distribution of more correct (?) knowledge and sense of urgency from starting locally!
- Having an open mind about different views.
- Slowly
- Eliminate tobacco purchase
- Keep an open mind and share ideas globally.
- Reduce emissions and protect our environment from pollution.
- The right gov't politics to incentivize solutions.
- Massive investment in our transit system and a just economic transition for all.
- Having conversations and engaging the community.
- Well thought out policy
- Figure out the needs we really have for all life in an urban environment.
- Proper remediation protocol to clean the tailings (processed water from oil sands).
- Just believe that you can make a difference.
- CCS carbon capture and storage
- Unanonymous acknowledgement of the need for action.
- Invest in local sustainable solutions.
- Food systems that allow everyone (including the env.) to be healthy.
- Community engagement direct action. Actually investing in community infrastructure (community compost)
- Prioritize public services over private economic interests
- Free public transit
- Transferring how we approach and understand urban planning and political will.
- Renewable energy
- Tax incentives for people.
- Educational communication plays a key role in supporting policy that incentivizes infrastructure change, renewables, and waste management.

*Barriers*

- Challenges: single use plastics are "cheap"

- Diverting food waste away from landfills. Transporting "green" waste from individual homes and neighborhoods is expensive.
- Communicating to the public --> public opinion/adapt
- Current costs of renewable options are high. This limits who can participate.
- It will be difficult for low-rise buildings to generate electricity from solar panels on their roofs if they are in mid or high-rise neighborhoods.
- Dealing with solar panels at the end of their life. How to deal with solar panel waste.
- Challenges: solar panels and batteries are expensive to produce.
- > Acceptability --> Policy --> Education of fusion technology
- > Getting ideas across
- Unwilling to change ways.
- Lack of knowledge of the urgency of climate change.
- conversations around nuclear energy is difficult, complex and people are fearful.
- It will be challenging to fund rooftop solar on a large scale.
- Such a heavy focus on building developing sustainably - what about not developing, or reducing development (i.e. circular economy) to preserve natural spaces.
- Challenge: Too many coal energy (atco, epcor)
- Challenge: Too many windows

*Opportunities*

- Rogers Place should donate leftover concession food to mustard seed, YESS and other vulnerable person organizations.
- Finding alternatives to single use plastic.
- Decrease / ban single use plastics!
- Be more strict on grocery stores on food waste and put an emphasis on donating.
- converting waste to energy
- Improved urban composting program (and recycling too!) and education
- Rooftop solar will free up space where solar farms would otherwise be
- nuclear fusion and fission
- opportunity - encourage research and development in green energy
- Funding for innovation around technologies to capture carbon (algae farms?) Funding for tree planting: work with community leagues
- Opportunities: Reward recycling efforts (incentivise recycling through tax breaks for businesses)
- Opportunities: solar panels in buildings
- Offer economic incentives for people that install solar panels on their roofs
- Employ workers that have been laid off from oil and gas industry to install rooftop solar panels
- When we are giving people licences we have to be equitable so they can be responsible without environment
- Opportunities: Clean energy reduce emissions
- Continue to engage with all ages - the youth are often the focus, but how can more elders be involved?
- > rooftop solar --> net-zero geothermal heating

*Solutions*

- hemp plastic - mushroom packaging
- Solutions: repurposing and recycling plastics and wood products
- Build/design community composts with community leagues
- Solutions: Convert waste into energy with carbon
- Implement more strict rules on how food waste is dealt with.
- Community benefit agreement
- Solution: There should be a regulatory and laws that govern the big companies. - Educate and awareness to our community.
- more incentivization for incorporating solar on new homes, infra-



## Appendix C: Engagement Data

- structure etc. maybe not necessarily monetary?
- Time of use pricing
- solution: Transparent solar panels rather than windows.
- Public education. - Climate change should be added in the school curriculum.
- Public access cable network for learning about sustainability and updates on policy
- Develop ways to remove snow/ice from rooftop solar panels.
- Solution: Copy (OPG) in Ontario
- Free transit.

**Climate Shift #5: Just and Equitable Transition***Actions*

- Diverse sources of energy (wind, solar, hydro)
- Community markets, gathering and unity.
- Local business and support
- Biofuel dominated.
- Accessible public transit
- Close, walkable communities
- Distributed Energy Resiliency (Micro Grids)
- Zero waste.
- Cab are obsolete. Public transport is mainstream.
- Accessible communities, transit, infrastructure
- Companies that could produce harm are prevented from starting/existing.
- Much less economic inequality.
- regenerative - radically different (not just today minus fossil fuels) - shared transportation
- Lots of social services and public sector jobs.
- Community benefits statement --> transitioning coal workers
- forward thinking - planning for a changing world
- Tensions with economic interests
- Indigenous sovereignty
- Living wage.
- Affordable housing.
- Household sustainability. Commercial waste redirect/recycle prog's. Energy staff trained in green jobs. Great public and electric transport. (less cars required).
- No single use plastic \*equity - informed.
- Reducing and reusing becomes the norm
- Net-zero cities

*Barriers*

- Equitable w/indigenous values.
- Language - diversity
- Making green energy competitive.
- Accessibility
- Understanding existing inequities.
- Education (re-train)
- Societal accountability
- Future of work, re-skilling
- Affordable?
- Speed of change.
- Redefining success from materials to community
- Short-term & longer term
- Working through stigmas

*Opportunities*

- Will we plan to transition out oil & gas?
- Education & media for young people.
- Create a better society than the one we have now
- Challenging the system of investing
- Diversify "green" paths

*Solutions*

- Campaigns to promote sustainable lifestyles vs. consumerism
- Policies to support educational campaigns
- Slow shut-down of oil fields while transitioning workers to "green" jobs with scholarships.
- Policies to encourage (force) all business types to move to net-zero energy models.
- Leverage existing work (COE and equity groups)
- Building accountability and social responsibility
- Getting people on board
- Re-skilling
- How are we evaluating success?
- We moved away from coal, but why not oil and gas now?
- Fund the grassroots groups already doing the work.
- Incentivizing investors
- Reframing & imagined futures
- Measure success by well-being not GDP (New Zealand).

**Climate Shift #6: Negative Emissions***Actions*

- Edmonton sequesters as much carbon as we produce
- People are reconnected with food (where it comes from, etc.) and how much time, energy it takes to grow. Hopefully reducing food waste.
- Changing education curriculum (to include gardening environmental skills and stewardship)
- Youth will be aware of solutions and ways to implement them because these issues will be discussed in classrooms
- A better collective understanding of urban gardening/composting
- Job creation by utilizing what we have. Making it better and less wasteful.
- Encourage new solutions into our existing GDP for Alberta
- Building code includes: all new houses built must have solar panels & battery backup & feed to grid
- Regulations banning food waste
- No more front yards with grass, natural and native vegetation only
- More farmers markets

*Barriers*

- No one gets left behind
- Politics
- Time
- Willingness to finance - benefits e.g. time off for garden - personal levels as gov't
- Industrial land development

*Opportunities*

- Training for new careers
- Energy transitions trees planting
- Green space certifications - similar to leed certification for buildings - can be for business storefronts
- Research collaboration / fund research with the U of A
- Economic diversity
- Maximizing land use (and all of our resources already available to us)

*Solutions*

- Everything: create jobs & reduce emissions
- Vertical gardening - rooftops & balconies
- Increasing wildlife habitats through wetlands
- Increasing security of food supply
- Jobs
- Companies could have carbon sink offsets.
- New technology.
- Carbon cure --> carbon sequestration in cement production
- Carbon sequestration by trees lower overtime. Maybe turn older



## Appendix C: Engagement Data

trees into a useful product after a certain time and replace with young/new trees.

- Promote natural wild grasses will cut down lawn mower use.
- Teaching citizens about sustainable gardening practices. e.g. permaculture, no dig.
- vertical gardening, rooftop gardening

- Capturing food waste to create biogas and use for heating / cooking. (forces creation of natural gas instead of CO2)
- Economic rebates and tax incentives
- Incorporate the importance of carbon emissions and solutions into curriculum.

**Green Ribbon Panel (Energy Future Lab Fellows)**

**Date** February 26, 2020

**Climate Shift #1: Tools and Targets***Barriers*

- patreon.com "how the future can go really, really well" Maggie Hanna
- Satellite just launched for methane lead detection.
- Dave Layzell CESARNET.ca read blog AZETEC Slade Channel
- Very clearly conveys the size of the challenge --> referring to the targets chart on board
- Etdm zero property tax - consumption tax
- Edmonton has >150,000 k-12 students (who'll all be voters in a decade) - should engage them too
- and the fact that this requires systemic /policy intervention - i.e. not just about individual action.
- Develop a predictive model for GHG emissions. This way trends can be predicted and corrective actions be made.
- Develop online/offline dashboards with interesting measures to help decision makers.
- Citizen dashboard for personal carbon data?
- I would like the COE to do more to promote awareness of these targets.

**Climate Shift #2: Low Carbon City and Zero Emissions Transportation***Barriers*

- Eliminate minimum parking requirements.
- Show ROI for bike lanes / transit (consider direct and indirect)
- Mixed use
- --->electric or hydrogen -- referring to first bullet on whiteboard speaking about all new personal vehicle sales to be electric by 2030.
- Make transit free like other leading cities are doing
- Using A1 for predictive maintenance of transportation fleet.
- increase density

*Solutions*

- Mixed zoning and bike/walk friendly urban planning.

**Climate Shift #3: Emissions Neutral Buildings***Barriers*

- Read Australian Hydrogen economy paper - very good.
- Get the UK CCC (climate change committee) Hydrogen Economy 2018 paper. Heat pumps.
- Role for A1 and machine learning? A1 expertise at UofA.
- Making building changes affordable
- energy - step code for buildings
- Applying A1 for decision making for operations. example: HVAC systems

*Solutions*

- Districts
- Replace natural gas furnaces with district heaters

**Climate Shift #4: Renewable Revolution and Circular Economy***Barriers*

- District energy :-)
- Mandatory solar - orientation consideration for new development.
- Don't limit options! Goal is circular not tech specific.
- No to nuclear
- Nuclear = same game - no justice
- hydrogen buses
- www.wttec.ca Cal Holland Wers

*Opportunity*

- Reduced cost for houses with less garbage.

*Solutions*

- Waste of renewable heat sources for district energy systems
- Net zero energy districts
- geothermal and biomass district heating
- yes to small modular nuclear
- Powering down means changing habits. No to nuclear.
- Electric transit
- Actually get a composting and proper recycling system and get sort it out bins.

**Climate Shift #5: Just and Equitable Transition***Barriers*

- Ongoing consultation
- Tax reduction for community energy
- Reduce taxes for high density neighborhoods and increase taxes for low density.

*Opportunity*

- Not just one time engagement. Engage through the whole process: have a seat at the table
- Micro Leasing of spaces for small local economic opportunities pop-up markets.
- Affordable efficient housing

*Solutions*

- Use language that is accessible for all.
- Goals for relieving energy poverty need to be focussed on impact in home vs. overall market transformation. Holistic, effective, diagnostic solutions.
- Develop a cost effective kit house hyper-insulated with solar and wind and swell battery for resilience
- Green does not equal just. Policy needs to keep this front and centre.
- Increase mobility for seniors (if you can't drive = trapped)

**Climate Shift #6: Negative Emissions***Barriers*

- Halt the urban sprawl. densify
- Transit-oriented development land-use planning
- Ways to add jobs: - more natural space caretakers
- create a design studio to help condo and buildings to retrofit solar EV charging and insulation.
- Need to reconcile infill with loss of trees in central Edmonton.



## Appendix C: Engagement Data

- Naturalization of existing open spaces (fields, parking lots, right of ways)

*Opportunity*

- Make parks an integral part of planning (soft surfaces in urban spaces)
- Tap into fed. gov. commitment to plant 7B trees.

**Climate Shift #7: Economic Development***Barriers*

- Foster emerging industries (AI, AR/VR lost, etc.)
- This is key - need to create jobs / opportunities for citizens in post

- carbon world

- locate - close by NE Edmonton - Hx (blue) generation bub and pipe it to whole province - good carbon storage
- Brand Edmonton as an energy transition leader EEDC? - Make it core to the YEG brand.
- Can more be done to showcase local suppliers?
- Showcase local solution - provider companies.
- help Edmonton - based solutions providers find new markets 'goal of growing local businesses
- A good local supplier: growing greener innovations
- AI Economic develop opportunity?

**Economic Development Workshop**

**Date** February 27, 2020

**Climate Shift #7: Economic Development***Barriers*

- Lack of understanding/education / agreement on MGA --> Limit of city jurisdiction
- Regional competition
- Time
- Local access fees increase to give better signals and raise \$. Constitute local self reliance - John Rerrel
- Funding - where is it needed Awareness
- Adoption of tech vs. development of tech.
- Value proposition
- Creating Awareness - showing value -->what's in it for us? (consumer and all others)
- How do we define value
- Upfront capital to support ROI
- Investment attraction opportunity
- Small # of startups in this space -procurement causes challenges -also regulation
- Cost -buying solar -wind etc.
- Mindset -unwillingness to change - current cost of gas & natural gas
- Competition from other jurisdictions
- Do easy things first
- Regulatory barriers
- Change is difficult
- Overlapping government jurisdictions
- Way of thinking
- Scalability of Innovative ideas -People in YEG (develop) -Export IP to world
- Look at from a systems thinking perspective
- Cross Pollination of ideas
- Inertia
- Funding
- Communication -corporation -collaboration
- Infrastructure

*Opportunity*

- Developing efficiency first policies
- supporting technologies "in our own backyard"
- developing efficiency - driven products and services that can be commercialized elsewhere
- Creating a market to recognize purely monetary opportunities
- New education, new jobs
- Post secondary - new trainings
- trouble finding resources - become readily available

- geothermal
- retrofit economy - energy advisor - engineering - trades / installers
- solar jobs
- diversified economy - start ups - technology companies (invest)
- less linear approaches to problem solving
- Diversify economy
- Leading new Technology -define policy - regional circular economy work
- Green start-ups and scale ups
- Electric vehicle infrastructure
- Resilience
- Local jobs
- This can create jobs in Edmonton
- Selling our knowledge to world - business opportunities globally
- Cleaner/healthier environment / people
- Increase in local businesses/innovation
- Opportunities to increase transportation efficiency (avoid ship-ping detour)
- Time cost savings for Edmontonians who consume lots of energy due to cold climate
- Less linear approaches to problem solving -new thinking -systems thinking
- Cooperation
- Cubicles/Commute to work -health benefits
- Changing the way we arrive
- Societal
- Diversification
- Technology Deployment - Innovation & Testing

*Partners*

- Industry + manufacturers + waste producers educational institutes
- - circular economy leadership coalition
- Retraining - unions --> trade schools
- Clarity around MGA -->province and city for building code
- Technology funding mechanisms
- - connect tech busines to feasible building pilots (Company)
- Industry Associations --> Industry and building owners /operators (energy users)
- Academic institutions
- Financial institutions
- Utilities
- Provincial agencies
- Outlying communities



## Appendix C: Engagement Data

- Cities
- How? - interactive -in-person -community
- Regulators GoA \$ + Feds \$
- Local business and start-ups
- Does economic development need to re-localize to neighbourhoods
- Media
- Who needs to work together -everyone
- Regulators
- Investors/Banks
- Other cities
- All levels of governments
- Economic Development Agents
- Start Ups
- Big Business
- Billionaires (Green VC)
- Citizens
- Community Leagues
- Education Institutions
- Large Emitters
- Collaboration -Incentivize? Private -Sustainable funding models
- Government -City of Edmonton  
Procurement  
GOA
- Academia -U of A  
MacEwan
- Media -Global
- CTV, etc.
- Associations -Canadian Green Building Council
- Edmonton Global

**Focus Area 1 - Finance the Transition**

- What is Return on Investment?
- Financial incentives to stakeholders/emitters/industry and consumers
- Determine payback mechanisms
- Return to shareholders
- Tax incentives for green economy businesses i.e. SRED tax credit
- Charge \$0.01 -0.02 per litre of gas across provinces and redirect to incentivization conversions to low carbon (grants)
- PACE - local improvement levy
- Intangible assets
- Leverage - federal funds, provincial funds, industry investment
- Focus incentives on new tech/start-ups

**Focus Area 2 - Integrating our Work**

- Diversity in Champions
- City of Edmonton Energy Transition networks
- - sub-culture networks (specific purpose aligned with their industry)
- - finding synergies / shared interest
- - Awareness
- Investment
- Incentives
- Regulatory support
- Time + education
- Tools, expertise, financing for adoption of new technology.
- Risk Analysis for business and industry
- Talent pool us
- Job opportunities
- Post secondary
- Training
- Return on investment

- Education specific to job force transition affordable or creatively funding program to support
- ---> Channels for private owners to procure clean electricity collectively
- --> Enter into PPAs together
- Policy

**Focus Area 3 - Regulations**

- Procurement policy that encourages local (within trade agreement parameters) -->life cycle cost, embedded carbon, etc. requirements to support local sourcing
- Extended manufacturer responsibility -->include in procurement -->beyond-->
- Harmonization of regulation to rescue complexity and cost.
- Monetize the value of save energy/emission reductions
- PACE (Property Assessed Clean Energy) --> residential --> commercial
- Benchmarking --> transition from voluntary to mandatory
- Simplify permitting --> train building inspectors / permitting engineers etc. so know the high efficient technology
- Experiment with regulatory changes the way would do for other innovations.
- Advocate for improvement to Utility Act i.e. local access fee / carbon tax
- Change tax structure to make COE less dependant on comm. attraction/retention.
- City jurisdiction for regulation stepcode for buildings.

**Focus Area 4 - Research Required**

- Research into new economic thinking think lateral scaling vs. scale up!
- Internet of things
- Determine benchmark / examples to show ROI on installs / technology
- Research into where the leverage points are.
- Net zero buildings - materials.
- Autonomous transportation
- Research into green finance tools
- Smart farming (vertical)
- Smart Cities - green technology impacting transportation - alternate fuels - autonomous system
- Demonstration projects (real-world results and data) - ROI

**Focus Area 5 - Advocate and Educate**

- Reach to the new gen 16-18 years for ideas/buy-in esp. where they are i.e. digital media
- Create tools for life cycle analysis --> i.e. teaching oldest generations the total cost of actions etc.
- Getting rid of jargon.
- Industry specifications
- Workforce training
- Sort of like a mortgage calculator --> the end, you have an asset
- Build awareness / understanding that saved energy from energy efficiency is an energy resource that delivers value to utility systems, and the economic value of that energy resource.
- --> industry
- large energy users
- building owners / operators
- policy makers - COE
- Invest innovation and business development \$ into testing and demonstrating economic value and barriers to implementing clean tech.
- To reach those not directly involved in industry, increase advertisement / marketing (TV, bus ads, etc) showing benefits.

**Focus Area 6 - Data**



## Appendix C: Engagement Data

- Data!
- Info on employment opportunities
- Info on workforce
- Info on businesses
- Info on ec. dev. potential. (machine-readable, easy to access)
- Sharing of the data --> make accessible
- Resources for social procurement and active hiring

**Focus Area 7 - Success Criteria**

- Elevate place and people as centres for prosperity
- Place based incentives
- Work play and school
- Near or at home
- Complete communities
- All one tipi
- Language choices

**Just and Equitable Workshops**

**Date** March 4, 2020 & March 7, 2020

**Climate Shift #1: Tools and Targets***Barriers*

- City should work to reduce (in particular) the emissions of the less financially-able with programs that offer some kind of a 'sliding scale'/subsidies to these people. Note: % of income of poor used for energy (heat/power) is about 1.5x that of people in middle income brackets.
- Carbon taxation should only be used for addressing carbon emissions not redistribution of wealth. eg. have surcharge on license for cars that drive downtown. Does 2 things - more people use transit + socialize with each other and lowers emissions
- Transition from 19T/y to 3T/y in a period of 10 years might be a challenge
- Instead a stepwise reduction or gradual transition would be more equitable and but less stress on achieving the goal.
- Stop focusing so much "education" (outsource that component) and just enact policy that must be followed. Be bold and leadership.
- Carbon accounting must be part of all city projects and permit evaluations.
- Integrate City Plan and the Energy Transition Strategy
- City of Edmonton has giant purchasing power when carbon budget is integrated into local operating and capital budget markets can be transformed and process for technologies like EV, solar can come down and trades can be trained and jobs created for tradition ally, underserved communities (newcomers, indigenous peoples, people of colour)
- How do we future proof this from the next municipal (2021) government - protect funding
- When everyone sees that 1.5C will not happen, How can we plan to go even further and faster. Can we change more quickly?
- Avoid dismay/giving up. Related to not hitting the 1.5C goal despite best efforts
- Decision-making, fossil-fuel infrastructure includes buildings with a gas connection. Decisions can be made now to stop this investment in fossil fuel infrastructure
- We cannot duplicate the top down programs of the government which result in drastic economic change. Think of the bankruptcies that came from the introduction of the NEP in the 1980s.
- Politicians must realize they cannot ask for sacrifices on the part of taxpayers without making equitable sacrifices themselves
- We cannot compare energy usage globally to what we can/should accomplish in our cold climate.
- Major systems change required, entrenched institutional and structure inequities will require transparency accountability, intentionally rigor and persistence in design and adherence to new policies to ensure carbon + equity are centred in decision-making

*Opportunity*

- Education about community, how to live locally

- More local hubs
- Promote fruit tree map better! Edible streets and rooftop gardens (if you don't have solar)
- Bottom-up approach to incentives and restrictions
- What if the City provided a universal basic income
- Friendly competition/social norms over neighbour emissions
- Better transit/carless city
- Can we use similar tools for allocating emissions as the UN does globally to the City? eg Wealthy/Able individuals and corporate to do more/faster than the more vulnerable
- Work on legislation requiring individual and corporate emissions reductions now. Requires monitoring and verification
- Focus on what we want not mitigation from a negative point of view. Electric cars are cool. Job creation and positive feedback
- Our contribution to UNs SDGs (sustainable development goals) as a city.
- Hope and success will help to keep young people engaged.
- Track heat (waste heat) to use more efficiently as a goal or target
- Carbon budget helps see what our fair share is regarding climate action
- CBEI - opportunity to see our total impact from consumption choices, we are heavy consumers
- Integrate this education in financial empowerment initiatives
- Awareness and education is the key to pushing change
- Encourage volunteerism in the community

**Climate Shift #2: Low Carbon City and Zero Emissions Transportation***Barriers*

- Rising transit costs
- More accessible, frequent, efficient, effective transit systems
- Building income out of more developed LRT
- Car culture
- Safety of scooters
- Develop green grid - to make cars effective
- Affordability of electric cars especially for those who may not have the means
- Culture, cost and availability of public transportation
- No market or demand for electric vehicles, dealerships currently don't sell electric vehicles, affordability of electric vehicles especially for people who are disadvantaged
- Bike infrastructure - ie. bike highway - is slow to develop and underfunded
- Connecting Edmonton to the world with sustainable air travel which brings our carbon footprint up
- Lack of support for regional transit/connectivity
- Switching from one vehicle type to another behaviour challenges, etc imagining beyond "the switch"



## Appendix C: Engagement Data

- Winter may increase the risk of freeze/thaw
- 

*Opportunity*

- Free transit is democratizing
- Develop more coordinated and accessible system citywide
- Improve DATS
- Job mobility
- Pedestrian/cycle friendly environments (better infrastructure, improved accessibility)
- Proper park and ride/free
- Energy capture from parking lots
- Bring back street cars
- Stop supporting car culture by widening roads/highways
- Improve car sharing with electric vehicles
- Bike share
- Free transit and improved transit (we are subsidizing car use)
- Free parking at transit hubs
- Tax on cars and use it for free transit
- Subsidize electric car plug-ins and charging stations
- Neighbourhood hubs for retail (groceries) to encourage walking and cycling
- Money directed at public transport, more accessible, greater density
- Changing bylaw (zoning) allows for mixed-use areas and inclusionary zoning
- Empowers mobility and independence
- Addressing social perception of transit users
- Reclamation of public space (parking lots)
- Influence vehicle (EV) market and encourage more through incentives and rebates
- Collaboration with car sharing programs
- Bike infrastructure
- Safer active transportation
- Technological advances
- Eliminating non-essential travel
- Regional public transport
- Stop expanding/widening driving lanes
- Work less
- Do build for walking and cyclists, build to invite car-free living - make it appealing and people will do it!
- Free public transit (we build roads for people to drive on for free, shift this support to public transit users)
- Build more warming shelters for public transit
- Zone for neighbourhood corner stores
- Build like Montreal
- Our community leagues can expand their vibrant work
- Intergenerational consultation
- Use Edmonton's extra space for innovative community space, gardens, urban farming

**Climate Shift #3: Emissions Neutral Buildings***Barriers*

- Money to get emissions neutral buildings
- Help those with barriers to employment
- Getting clients/owners to want to pay
- Get legislation to allow private investors to...
- Education into the mainstream and media
- Regulations are difficult to enforce
- Jurisdiction (regarding building codes etc.)
- Deep energy retrofits are very expensive
- Training, experience for buildings (especially framers)
- Shortage in trades for specialized projects

- How to provide incentives for apartment dwellers (and landlords)
- Lack of capital funding for NFP operating "free" (donated) old buildings
- Support to citizens and building operators to know what to do and manage the change project
- Remember that vulnerable communities maybe cannot afford to think about their house for energy efficiency
- To meet targets will it be more feasible to tear down than retrofit. Is this causing economic concern
- Make sure programs like PACE are accessible to everyone (financing)
- Build robust agencies to handle the large "spike" in need for auditors and transition consultants

*Opportunity*

- PACE Funding
- Buildings as sequestration platforms (wood, plastic, etc.) in more durable designs
- Energy efficient buildings are cheaper to operate
- Trade job opportunities
- Engineering and innovation job opportunities
- 74% of people want to make a difference, tell them how
- Opportunity for municipal leadership in building transition and lessons learned
- Use biogas instead of natural gas
- Could benefit victims of housing inequality by addressing efficiency and affordability gaps
- Innovations in construction tendering and building materials
- Edmonton-based design, construction and use of modular housing that works
- Solar panels on berm space and undivided buildings
- Neighbourhood geo-thermal retrofit with new developments
- Net zero affordable housing (zoning bylaw, community standards, property tax incentives, building codes, incentivizing net zero cooperatives)
- Energy sprawl
- 0% interest loans for retrofits, solar and geothermal
- Builders (trades people) with focus on energy efficiency
- Find opportunity to encourage multi-unit renters or building owners to purchase green
- Build family-sized apartments, condos, townhouses and make them affordable and efficient
- Energy decentralization ie. production, storage
- Utilities could change their operations to be rewarded not for generation but for conservation!
- Communication on future swings to the citizens of Edmonton

**Climate Shift #4: Renewable Revolution and Circular Economy***Barriers*

- Education of public on energy requirements
- Massive gas infrastructure
- Retrofitting every building
- Must handle climate realities
- Local food cycles (diversion) must be rendered food safe by temperature
- Wild fires result in occlusion of the sun and reduce solar efficiency
- Solar panels select for home owners, privileged people. Need to incent renters and building owners.
- Free trade agreements re. circular economy
- I absolutely do not want nuclear waste as a product to deal with now and into the future!
- Re: 85% solar, some systems do not have this level of efficiency yet. Some homes are too shared to receive/generate this,
- Timeframe - unreasonable



## Appendix C: Engagement Data

- Incremental goals works against us
- Governance and accountability and misalignment of residents vs. electricity providers. eg. City of Edmonton and EPCOR relationships
- Old buildings and old building standards
- Smaller lots and roofs
- Need for designing neighbourhoods holistically, including solar assessment
- Budget for retrofitting buildings
- Political support and will if conservative elements/climate deniers take over
- Where is the money coming from?
- Carbon offsets - selling carbon credits/clear and auditable money trail is needed
- Tall trees vs solar
- Enforcing regulations

*Opportunity*

- Making solar panels accessible for all people/residences
- Green the grid
- More district heating
- Solar hubs in each neighbourhood
- Promote the sharing economy
- Local, community-led and benefitting enterprises to produce food and circular products
- Don't burn anything, switch to electric heating - baseboard heat, airsource heat pumps, ground source heat pumps
- Reword businesses which offer for sale refillable products, demonstrate a decrease in packaging, carry products that are locally produced.
- Co-gen plants as transition to heat/electricity with natural gas
- Look at Eavor Loop technology (old oil well sites)
- Look at Netherlands and Windsor Plans and NYC
- Property transfer (donated) - energy retrofit review so old buildings don't become a liability to groups who can't afford to retrofit
- Transition EPCOR to renewables, geothermal, solar
- Educational opportunities and jobs for young people in innovation
- Procurement for renewal electricity, opportunities for residences
- Off-site generation - solar partnerships
- Hydrogen economy
- Educate young people (K-6) and practically educate youth (g7-12) to understand impacts of choices before they are committed to a lifestyle
- Locally produced energy including economic benefits and energy credits
- Lower to cost of entry to district produced solar and geo-thermal heating
- We are the shareholders of corporations through our investments, pensions, RRSPs, invest in eco-friendly instruments to force corporations that make green investments/choices
- Engaging young people. They need to see results (results) ie. Real Change

**Climate Shift #5: Just and Equitable Transition***Barriers*

- Just and Equitable is not well defined
- Less fortunate (financially) will have more transportation
- Government policy and politicians advocating
- Misinformation and skewed marketing by large corporations
- Finding someone to do it, create it and keep it up to date, as well as gatekeeping those standards
- NIMBYs. Tax incentives required
- Lack of research, lack of resources, tax churches and universities
- Larger corporate projects take up more of the projects, intergrate

- Needs improvements, normalize using transit
- Other societal issues that are focus for many people especially vulnerable people/busy people
- Easy cherry picking of issues, needs to extend beyond the league itself
- Money and access, leave no one behind, push rather than pull
- Funding
- Parts/repair
- Bylaw problems, harvesting, street boulevards
- Lower income people have less money for energy upgrades
- lack of subsidy for upgrades
- Low income groups have 'higher' priorities
- participation in city plans/actions
- Massive overhaul cost
- natural aversion to risk
- Getting everyone on the same page
- current lack of programs
- Money
- getting everyone on board
- grants
- access to funds to make green happen
- Time is precious
- Provincial government attitude on the climate issue
- Buy-in from the larger community
- Weather patterns/hazards
- Huge building/houses etc footprints
- Poverty
- Time is precious
- Childcare
- Medical
- Transportation
- Cars
- Institutionalized Humiliation
- Refugee experience
- Lack of sense of belonging
- Lack of universal basic income
- Lack of experience w/ direct democracy
- Engagement by all groups
- Ensuring affordable housing is one main concern that people have before being able to consider energy transition actions. But in addition to housing, other basic needs must also be stable before energy transition is possible for/by all.
- Nowhere near enough incentives in place for making the needed financial and behavioural changes. Need to perform acupuncture to market and system problems
- Don't reinvent the wheel - take what and what and connect them with other "who and what's" for guaranteed action not more talk about 2050
- Not enough capacity-building and education with average people who are not mega-corporations or their lobby groups and lawyers
- Conflict of authority between province, municipal, private
- Public buy-in and education
- Cost to citizens, convenience
- Scale - timeline
- Legislation hard to follow 1.5C Strategy
- Environmental racism
- Overvalue the development part of sustainable development, need to dismantle the treadmill of production
- Lack of implementation, climate plan needs to be enforced in other departments, Councillor/Mayor cannot continue to vote against approved plans
- Cultural shift - unawareness, too niche, overvalue at expense of future



## Appendix C: Engagement Data

- Dependence on buy-in of big corporations
  - Culture of excess and entitlement
  - Cost to citizens, convenience
  - Mobility issues
  - Cold Climate
  - The idea that we should look at every individual as having same intrinsic value, not focusing on identity politics
  - Avoid the temptation to make this a wealth transfer scheme, like the Green New Deal in the US. This will kill public support for this plan.
  - The idea that you can overcome the injustices of the past by prejudiced decision-making today
  - Inherited fossil fuel mentality in Alberta
  - Lack of political will at the provincial level
  - Oil and gas feeling attacked
  - Private makes their own rules - all about margins and cost
  - Early adopters benefit most/first
  - Lack of governance structures to support transitions (transportation sectors, oil and gas sector)
  - Who pays for it?
  - Consider biodiversity (not just humans) when goal setting (developing wind and solar farms)
  - Time
  - Money
  - Mobility
  - Health
  - Language
  - Priorities
  - Political climate/debate is polarized
  - People who don't feel concerned/don't care
  - Finding common ground
  - To ensure a truly just and equitable transition we probably need to start some time ago. Making it truly just and equitable takes time (doesn't mean we shouldn't start)
  - People feel overwhelmed by the idea of climate change or actions to mitigate
  - Future benefit doesn't outweigh current convenience - even for engaged citizens
  - Really regular and expansive public transit
  - People that are disadvantaged may not have ability to take action or may need to focus on immediate survival
  - If you can't afford a warm home, you can't afford green energy
  - Barriers are higher for women to access jobs in general
- Opportunity*
- Begin to define what the most urgent groups are
  - Better mass transit
  - Trickle up social justice
  - Education on sustainable technologies especially by industry leaders
  - Social procurement and hiring supply chain - could be a brokerage
  - Enable affordable housing
  - Free transit and universal basic services
  - Allowing a diversity of community-positive initiatives, a larger carbon budget than strictly for-profit projections
  - Free transit and improved system
  - Increased communication about strategy and urgency
  - Use EFCL to help drill this strategy to community league level, CLs are the link between the city and citizens
  - Retrofitting accessible
  - Affordable housing upgrades
  - Repair shops, re-use centre, tool library
  - Gardening fruit trees and chickens/bees
  - GBA+ indicators and disability and transition workers and women and newcomers
  - Tax break, rezone, promote co-ops, sustainable low income housing
  - Free transit, free training, universal basic income
  - Equalize opportunity for lower income people to pay energy bills
  - More money for affordable housing (subsidy for energy upgrades)
  - Utilizing power given in the MDP
  - Empowering citizen-led groups
  - Don't wait for the provincial government, need to inject money now
  - Less waste food
  - Electric Cars
  - Earth Treaty Declaration
  - More bikes/walking
  - True reconciliation taking care of our mother earth
  - Gardens/trees
  - Better transit (affordable/access)
  - Equality action
  - Mentor education
  - Ceremonies that honour the seasons/give thanks
  - Partner up with Indigenous Climate Change
  - Respect the treaties across Turtle Island/Mother Earth
  - Be wise with the environment
  - Take more care for the earth
  - Locally sources and responsive community development
  - Democratized budgeting
  - Edmonton Schools for Climate Action (talk to ACEE)
  - Paid working group members - better able to give time/effort/resources
  - Take leadership from those immigrating to Canada (Edmonton) and traditional ways of living by indigenous groups, may come from places with better systems, lower footprints
  - Value each individual's contribution, make sure we are asking groups specifically for their help and input to actually be a part of change
  - Bring together among groups the elderly, and the very young, may have creative ideas
  - Use networks already in place, eg. community leagues, ngos, seniors, schools groups, religious and ethnic groups, they know what is needed for justice and equitableness for their constituency/group
  - Directly target fears with answers
  - Redefine what it means to be a good civic citizen
  - Rewards for participation in networks/actions (beyond cookies) eg. reduced city program costs, impact on civic taxes etc. - sustainability currency (carrot or stick)
  - Put regulations/penalties in place early (the 'stick') to give time and clarity for individuals and organizations a clear context for planning
  - Communication (What the city is doing, why, how, - outlining facts that affect their decisions, and Edmontonians)
  - Include renewable energy solutions into urban renewal
  - Decentralization, energy independence, food, transportation
  - Ensuring the vulnerable are taken care of first (ie. Westmount Presbyterian/ECN, Habitat Studio development permit)
  - Incentives/rebates for citizens based on better performance
  - Free comprehensive and reliable transit
  - Greenbelt
  - Annex outlying communities and disincentivize living in suburban communities (ie. tolls, parking permits)
  - Urban agriculture - equitable - everyone has access to affordable agricultural opportunities
  - Reclaim parking space - revenue generation



## Appendix C: Engagement Data

- Universal basic income
- Community (any scale) ownership of actions
- Raise taxes! - distribute wealth
- Promote benefits of living more simply
- Conversations between everyone
- Legislation should make net zero options the only option - don't leave it up to consumers
- Use public space creatively - trees, grow food
- Educate about costs of not acting
- Educate about savings of actions
- Work on changing public perception
- Create opportunities for training and experience to deal with challenges
- Develop investment opportunities for individuals to provide funding for opportunities (low-cost borrowing)
- Create community-based renewable energy cheaper than individual systems
- Engage private businesses, let market forces work through education (not propaganda) which will take longer than using a 'stick' of government but will result in a happier community
- Identifying training and economic opportunities for oil and gas workers
- Subsidize training
- Get political, have youth be engaged
- Publicly funded projects employ less advantaged sectors of the public
- Consider the economy responding with an aging population and an economic recession, how would we continue to transition
- Create persuasive arguments as to how transitioning will make use healthier
- Please make sure to be vocal about what is being done regarding CS #5. It's important to share.
- Provide options for individuals/corporations to choose to be carbon neutral. Eg. Power options for Edmontonians that are carbon neutral. Change billing/rate structure to promote efficiency
- First - meet basic needs
- Targeted/focused education for specific groups
- Partner with community organizations to leverage those existing relationships
- Inclusive education opportunities - many methods (webinars etc.)
- Translate content
- Go to the people! Go see them in their environment
- More and deeper incentives
- Educate kids to change family actions (and to clean up)
- Enforce rules
- Think about how everyone can take advantage of opportunities - scaling of incentives, professional services (access to)
- Not only accessible to those with equity or capital
- Leadership to visibly walk to talk
- Set goals for retrofit/transition industry to employ vulnerable people/groups - conditional for funding,
- Understanding who is the most marginalized/impacted - including persistently marginalized
- Hearing from those who are impacted (women, food scarcity/security)
- Intersectionality is very important
- What are ideas that help people benefit this way of life and help with the transition (access to gardens, seeds, to grow own food), (use energy poverty and equity explorer (CUSP))
- Litter
- Pesticides and poisons leaching into the ground
- Outfalls are not filtered before dumping into the river
- Meaningful recycling and composting systems
- Sustainable garbage disposal
- Manufacturers having unsustainable practices (+ plastics)
- Cutting down trees for new developments
- Our attitudes towards consumption + climate change
- Heat island effect
- Current bylaws regarding urban farming, change to allow
- Cultural expectations around turf management/weed control
- Knowledge and cultural expectations around waste, organic waste and sewage
- Knowledge of growing, processing and storing food
- Capacity to collect, store and use rain water
- Knowledge to use rainwater safely (algal and bacterial growth etc.)
- Resistance to eating locally and seasonally
- Size of homes - community spaces need to be more attractive to encourage community gatherings
- Avoiding environmental racism in reference of carbon capture
- Where will the money come from
- Sustainable and continued funding for green industries

*Opportunity*

- Tech carbon consumption reuse concrete injection
- Business opportunities
- Carbon capture
- Protect trees (green) at all costs
- Encourage garden growth discourage grass food
- Public spaces for food
- Public goat herds
- Replace trees
- Encourage residential growth
- Create a monetary value for growth
- Turn more privately owned parking lots into parks (especially downtown)
- Greenroofs and Community gardens on roofs
- Take back your front yard
- Using river flow as an energy source
- Vertical greening
- Wetland protection
- Community engagement - incentives to work together to plant trees/gardens/build green roofs
- Youth outreach
- New developments required to replace/redesign existing trees and important natural areas
- Buy/eat local to reduce emissions
- Biophilia
- Heat reduction and wind tunnel effect reduced downtown
- Stop cutting down trees
- LRT resulted in a complete waste of mature trees in Strathearn and Bonnie Doon. SAD
- Trees should be prioritized and only cut down as a very last resort
- Overall small increase in property tax rate. Decrease this rate back to the original rate with planting of one tree every second year for 10 years
- Less erosion, reduce flooding
- Improve mental health with green areas
- Community green infrastructure - essential urban infrastructure (community gardens, food security)
- Parks and public space that become edible - feed the communities (employ pickers, processors, allow storage)

**Climate Shift #6: Negative Emissions***Barriers*

- Reclaiming land
- Initiation capital over time



## Appendix C: Engagement Data

- Follow vigilantly existing preservation policies (incentivize/subsidize required upgrades)
- Hire vulnerable community members to plant trees
- Incentives/property taxes percentages for replacing lawns/tree planting
- Engage rural farmers for urban initiatives - cultural shift
- Promotion of "other ways" to use landscaping and animals
- More social, small livestock
- Let's use our black water + grey water - incubate incentivize business/tech development for such
- Prevent the commoditization of water
- Make sure start-up opportunities are truly open to all
- Incentivize carbon capture in infrastructure development
- Carbon offset markets depends on sustained economic growth to encourage buy-in (maybe not good for short time frames)
- Support and encourage security in relation to jobs in regards to reclamation, such as abandoned wells etc. (moving incentives)
- Building regional allies/bottom-up power from municipality to federal government
- Food systems change
- More involvement of youth/educational element
- Creating a culture of connection to our food
- Addressing the cost/financial barriers

**Climate Shift #7: Economic Development***Barriers*

- finding and understanding the skills and people that exist here
- Like Edmonton Made for social procurement and hiring
- Lack of support from province, lots of these things should be their jurisdiction
- Capitalism itself is parasitic
- Fossil fuel jobs and attitudes
- Accessible training opportunities
- Plastics dependency
- Making sure the local expertise we have is compatible with a sustainable economy
- Carbon budget tracking all new developments. Reject projects that do not follow the budget
- Attracting the right (socially responsible) companies who invest in community, not just profit (community benefit arrangements)
- Proper engagement with indigenous folks
- Poverty
- Affordable Housing
- Basic Needs
- Societal benefit/carbon budget allocation vs. projects like Yellowhead conversion with external funding.
- Where does money come from?
- Bridging different levels of government
- Subsidies - who gets it/benefits (not just the owner)
- No topography constraints to urban sprawl
- Past injuries of economy - 1980s NEP
- Zoning requiring parking, limits home businesses
- We always choose the cheaper option (eg. automation reducing jobs)
- Current market is not a 'free market' - it is driven to make people money richer
- What are you doing not to achieve targets - ie. growth, annexation

*Opportunity*

- Plastics circular economy
- Hydroponics
- Hemp
- Intergovernmental collaboration
- Measure benefit/cost ratios via benefit agreements

- Task EDC(?) to develop local supply chains and hiring services
- Work with Buy Social (?) to follow best practices and more beyond pilots
- Rather than market globally, study municipal multiplier and do social procurement and GBA everything you do
- Urban farming cooperatives
- Bee farming
- Promote the sharing economy
- Planning for economy of the future by promoting local, small and sustainable businesses
- Free and open skills training programs to everyone
- Workforce capable of accomplishing the transition
- Creating the workforce for the City of the Future
- We need visionary urban planning
- Prioritize economy projects like affordable housing
- Green Jobs
- Micro-loans for small business
- Track all new public and private projects with a carbon budget
- Promote reuse-focused businesses, (prioritize their permits etc.)
- Take advantage of existent infrastructure
- Geothermal systems, combine new technologies with old (ie. coal industry using new filtration tech)
- Job creation
- Working with schools (ie. NAIT) to create training programs for green jobs or trades that support energy transition
- Zoning to support people working from home including parking relaxations entrepreneurship, better occupational use of home
- Urban growth boundary to justify investment and densification within Edmonton (developers)
- Say no to autonomous driving, annexation, big LRT projects
- Risk assessment
- Business case methodology for each option. ie. free transit what is more equitable/financially feasible - winners + losers with regard to industries and people
- Degrowth vision - what would this look like
- Use other financial tools that account for externalities ie. full cost accounting, social aspects, cost of carbon, servicing of land for developers
- Alberta has generated billions in revenue from exporting energy but oil prices have declined
- The value of carbon offsets are increasing, therefore there is an economic opportunity in exporting those
- Carbon free energy and carbon sequestration e.g. sequestering, CO2 diversion, CO2 enriched houses

**Just and Equitable Working Group**

- COE
- Urban Planners and COE
- Schools and industry leaders
- COE, Buy Social Canada, End Poverty Now, Edmonton Economic Development, Business Sector, Co-ops, Indigenous People
- COE Sustainable Housing, Newcomers Associations, Homeward Trust, Interfaith Housing Coalition, Indigenous Relations Office, Federal and Provincial Housing Strategy, Indigenous Peoples
- Federal and provincial economies, property owners, indigenous peoples
- Indigenous Peoples, Persons with Disabilities
- City, Low-Income, Disabled, Seniors, Non-Transit Users, Suburbs (non-users)
- City, Press, People who don't care yet, vulnerable people
- EFCL, Community Leagues, ACE(?)
- City/Province/Federal Government
- Habitat Housing, Bike Edmonton
- Volunteers, entrepreneurs, seasonal workers, youth programs to



## Appendix C: Engagement Data

- keep
- Demographically diverse input
- City, Investors
- City, Investors
- Communities most in need, people who have been silenced historically, the city, advisors from local, successful communities, citizens
- Community members
- Working Group - one for city-wide, many for neighbourhood or smaller area level
- Multicultural brokers (similar to Edmonton's Multicultural Health Brokers Co-op but for energy transition)
- Network the networks (a network of networks of networks)
- Leaders of organizations
- Energy corporations need dedicated sustainability professionals
- All 3 levels of government
- Representative sample - not just those that are available/sign-up
- Bottom-up approach - meeting existing organizations where they are/those already doing this work
- Free Transit Edmonton "Free and Good"
- Representative decision-making authority
- All ages - youth, seniors, parents etc.
- People in the oil and gas industry whose jobs are on the line - but not only them
- People with access challenges
- Any policies should be dominated by businesses (funders of government programs) so we can avoid pushing our city into bankruptcy
- Private sector jobs should always outnumber public sector jobs to ensure future prosperity.
- We have not gained anything if our environment is pristine but we cannot afford basic health care and food. Think of Venezuela, shifting from prosperity to poverty through expansion of government regulation and policy
- Youth groups - more years to be involved in issues
- Industry leaders - utilities - show them the economic opportunities
- ties
- Federal level to connect with municipalities
- Representatives from COE Economic Development
- Treaty 6 First Nations
- Newcomer groups
- University students
- Federal and provincial government employment department
- Affordable housing representatives
- Green Energy Providers
- Biodiversity experts. Equitable is not just about humans
- How are you developing/structuring the working group
- Making sure it's accessible to every group
- Rotate location and time
- Provide translation and interpretation support
- Have food offered
- Women, minorities, youth, indigenous people, students, seniors
- Need to go where people already naturally congregate
- Need to provide some level of education to produce meaningful consultation (at least in some cases - some will have more awareness)
- Need to provide some form of compensation for engagement (money, public recognition, something else?)
- Use the example of the UofA/City public engagement partnership
- How - make child minding options at events very functional so parents will be dragged here by the kids (treehouse recreation centre) and intentionally engage the kids so the whole family talks about it
- Engage Capital Region Housing
- Compensate to participate - day care, transit etc.
- Should include people who are most impacted and have least influence to implement
- Single moms, single parents
- Who is most impacted from climate change, intersected with who is most marginalized in general
- Needs to reach all levels, people affected, institutions, case workers (those who serve the marginalized), governments

## Energy Transition and Climate Resilience Committee

**Date** April 9, 14, and 15 2020

### Climate Shift #2: Low Carbon City and Zero Emissions Transportation

#### Concern

- On top of autonomous vehicles, lobbyists are protecting an industry. We can do things where people that need autonomous vehicles can use them, but not necessarily for everyone. No one is talking about how to address it before they get here. We have not fully addressed the enjoyable riding experience (social aspect). We could encourage active transportation right now (with COVID)! Interested in the study of active transportation using free transit. We want to be more ambitious about modes of transportation.
- Legislations are important. Better to identify the purpose of the technology. Create the best habits that we can. When we only think about the life cycle of the car we do not look at how it means less densification. Example: we cannot afford an LRT but need the Anthony Henday. It is about the urban form that the car supports and encourages. There should be a way that we can incentivize behavioural choices.
- Buses by 2030, based on conversations with the transit folks, they are not going to have large numbers of buses. Next bus garage will not be ready for another 5-6 years. The electric buses will be a challenge - already starting to slide from the target.

- About electrifying everything. Assuming electricity that we do not currently have, the grid cannot yet handle. How do we respond with the regulatory environment in Alberta? Missing - nothing really jumped out. Mobility as a service, fits into different places. Better term than ride-share. End-to-end transportation solution and how it works together. Not sure if there is anything in there about how all the pieces fit together. Google abandoned bikes of Copenhagen - it's not without its own challenges. How do all pieces fit together?
- About assumptions. Number of 50% of buses, where will the facilities be and how far do the buses need to drive to get to each node? Have we analysed routes with drive cycles based on range? Mix of EV and hydrogen - assumptions may be wrong in a year or two. Have a strategy that encourages more of everything but be adaptable.
- Talk about the floor space per house/employee.
- Difficult to forecast these changes.

#### Excited

- About pedestrian areas. If we can incorporate more that would be a real win. If it's tough to find parking - discourages driving.
- Autonomous vehicles. US 38, 000 ppl die in traffic collisions. Autonomous vehicles can eliminate that. Talking about a dramatic



## Appendix C: Engagement Data

reduction to injury or loss of life. We need to be careful - not just be against autonomous vehicles. Challenge - the City will not be able to implement restrictions on autonomous vehicles, given the federal jurisdiction. Important that there is federal regulation, and incentives to move towards alternative energy sources (zero-emission vehicles). Highest level autonomous vehicle is the Tesla, electric vehicle. Two technologies are driving each other.

- About bikes! Yay! More people this summer will likely want to take bikes. The whole world is changing rapidly, and public transportation may become limited. I suspect no longer having packed LRTs or buses during COVID-19. It is good to be proactive and aspirational in our vision. This is what we would love to see and leave opportunities to create transition. We need every and any solution to reduce carbon. We need to take an equitable transition lens, and push as many carbon reducing transitions as possible.
- About bikes, mode shift in general. Getting away from dependence on vehicles. The urban form we have in Edmonton is vehicle-centric. You almost have to drive to get to certain places. Our urban form needs that transition (i.e., walkable city). Like the idea of changing out electrification to zero-emission.
- About bikes. Also how we are looking at the zoning bylaws, zero emission districts. They need to be net-zero now, because they will be developing for the next few decades. Liking the whole thought of nodal neighbourhoods. Revitalization has completely transformed how people use the neighbourhood (e.g., Ritchie/Hazeldean).
- About the willingness to look at things differently, to experiment. European cities are a great model, but they are also car-centric. There are some technologies that we can use to continually explore to see what works and what doesn't. It is a cultural shift! Increasing parking cost is not the best answer. Being careful about the silver bullet solutions. Make it a cultural and behavioural change. Personal and business shifts. Edmonton has great infrastructure, but should focus on people not cars. Provide another alternative to business as usual. Missing - we need to have scenarios, what if we did this or that.
- About biking.
- Transportation will undergo lots of changes, this is exciting.

*General*

- Key feedback - it would be good to know if there is a check back to the C budget to ensure the plan is working.
- Consider accessibility exemptions (e.g., UofA). Accessibility committee to be considered with the just and equitable piece.
- Vehicle cost of ownership - space for an education piece. Not many ppl realize how much they spend on their vehicles.
- Difficult topic - big disruptions as a result of changes to transportation. We need to be as flexible as possible. Not specifying electric for example. It is very expensive to put in electric bus infrastructure.
- Curious how much autonomous vehicles have been factored in.
- I think accessibility is very important. Big concern regarding transit. Taking the bus is fairly unpleasant. How many people get assaulted? How many drunks are on the bus? Social side may not be dealt with easily through this lens.
- Cultural thing - in North America there is a lot of freedom. Example: in Europe more people use mass transit, so if there is a drunk person, there are more people on the bus that are having to deal with that. Highlight the social and transportation shift.
- We need to be very careful. The technology is there for us to be completely different. "Looking at low emission districts." Envision where there are smaller, more dense neighbourhoods. Rapid transit between the nodes and only use buses and mass transit when going from node to node. Another thing - COVID-19 has shown that there might be a lot more acceptance of people working from home. Companies are more accepting of people working from home. How much would that take off of your model? Cultural shifts but how do we deal with that?
- Points to needing flexibility. New way with an old model in mind. Post-COVID more people may work from home. Nodal - people

do not need to travel as far. How does each shift affect the other. It depends on how we are looking at mobility? Are we optimizing individually or having a more holistic approach? Mobility as a service or each transport section being optimized separately. Constantly checking back is important.

- Support car sharing programs, 10% of all trips by 2050. This seems silly in my mind. Clean Disruption presentation referenced Tony Seba. Concern - not reflective as to where the market is going.
- All of those studies show that the number of trips with autonomous vehicles go up with ownership. Even if they don't own the vehicle, you increase the number of trips for the same value of usable miles. More single passenger trips, whether you or a centralized car-share owns the vehicle. Many people would still travel at the same time. Strictly autonomous... it may be a threat to Energy Transition. On the front such as those that have mobility issues, seniors, those that cannot drive. The solution comes in with the zero-emission vehicles - this is where you really see the benefits. Ultimate Solution - example: European cities, central mass transit with private vehicles with shorter connections. Big win is when you combine autonomous with centralized mass transit (reduce emissions).
- It is important to break down the Carbon budget into smaller chunks. To be able to go back and adjust strategy.

*Missing*

- Response to autonomous vehicles is missing.
- We are thinking too holistically. Analyze individual areas and streets to identify what is best. Example: this street is a natural corridor, this street lacks connections so implement more EV. Ensuring that we model each solution and if it is correct for that particular area.
- Trying to build on stopping habits before people are missing them. Bike susceptibility. Opportunity: cyclists to follow the rules of the road... may lead to more acceptance from people driving cars.

**Climate Shift #3: Emissions Neutral Buildings***Concern*

- Big assumption that electrification is the way to zero emissions (this is misguided). We will need to green each source of energy to some extent. The existing building stock uses lots of energy.
- Hanging hat on electrification to green grid, this is dicey. Excited that we have firm targets for 2030 and 2050. I do not know if the City is showing leadership if this is adopted by others... it is scary that we still continue to see these problems. Very happy with the overall message.
- Existing buildings, codes are not there yet? How do we encourage people to renovate their buildings when they do not have funds? There are no energy cost forecasts... are we going to see spikes in energy? The City does not account for fugitive emissions... have some sort of way to capture this into CO2 calculations.

*Excited*

- This is a great high level start. The objectives are supported by us. It is the right message.
- Seeing the level of ambition. CEIP/PACE is a game changer. I wish that the province would make PACE legislation better for private capital to come in. City leadership - with new buildings at net zero. Not sure the impact this will have on the industry... People working on these projects will see this as possible, and normal.

*General*

- Important to highlight global leadership call. How the next two months are critical to community wellness, focus on energy transition. The language is important. We can really frame things in terms of larger benefits. Think critically about changing the vocabulary. Very excited about many things. If we could push the envelope further in interesting ways - how does everyone become part of this? Not just about money or education... how do we have programs that create employment in other income brackets. We need to build in other kinds of resiliency. There will be pandemics and interruptions in the future. We need to change the conversa-



## Appendix C: Engagement Data

tion - we are doing it to be resilient to these moments. The communities that invest in renewable energy, education and research and help will be the most resilient to these kinds of shifts.

- I am heartened by the general direction and ambition. We need this. I am excited to try to help. Can't think of anything missing... other than figuring out how we will pay for it and make it happen.
- this is a time where drastic change can be enacted. Looking to invest and get the economy up again. Push the plan, and revise later. Ask the federal government for funding. If the City can come out with something sooner, there are dollars available at the federal level. If there is something here that is shovel ready, we should be pushing it. Transformational things need to move.
- Regarding mandatory labelling... Example: the City offers audit support for those who submit and go through the program. This is a great example of doing it in a productive way. Having another bylaw to penalize owners may not be the best approach. Is there data around the residential side? I do not know that there is enough data to show that you have "X" increase in home value. Would love to see that info. If so, messaging could be: if you want an increase in your home value, go through this program and show it. Federal government saw serious pushback from industry with mandatory labelling. Way better to tempt the horse with a carrot rather than using a stick.
- Not penalize people. And I do think that by a certain point there will be a mandatory requirement, this motivates people.
- Love to see mandatory, codes to be stringent. It's not about incentivizing - but it's about making this a conversation point. If you do not have pushback from industry you are not ambitious enough.
- We need both carrots and sticks. Big carrot - total cost of ownership analysis. NRCan developing financial tools to show this. Returns on investment. It is a powerful tool. But sticks also work, especially during emergencies.
- PACE - access to credit for higher income might be great. For lower-income just having a rebate might work.
- Look at costs, but also the behavioural aspect of what incentivizes people. Breaking up people by incomes.
- The rebate was performance based. The rebate is directly related to the savings. This was good.
- CEER feedback... we want to create a market transformation. Furnaces and boilers were still on the rebate list. These will be around for 20+ years. We need to be careful about promoting these.
- People still need furnaces; but should we pay for these through an energy efficiency program?
- Love to see mandatory, codes to be stringent. It's not about incentivizing - but it's about making this a conversation point. If you do not have pushback from industry you are not ambitious enough.

*Missing*

- Economic recovery framing.
- Is there a Question around cost or cost benefit? It belongs somewhere. To do this we need to be honest about cost benefits. This will create a lot of jobs for a long time.
- Tools to help encourage retrofits in existing buildings. Looking to benefit each household; this is an important message to property owners, and will encourage retrofits.

**Climate Shift #3: Emissions Neutral Buildings, and #6***Concern*

- Modelling based on IPCC, including nuclear? More unlikely to happen in AB, and AB is an electrical island. We talk about transmission lines (positive) but I am leery about IPCC modelling as a basis for AB projection.

*Excited*

- About cement carbon capture storage. Overall, I dislike the idea of relying on carbon capture and storage. Large number of storage outlook is not actually doing the hard work. Suggesting we will do things efficiently down the road.
- I like that we are focusing on a wide variety of potential solutions. I believe we will need all of the things mentioned to get near

targets. Missing (or not brought together) - the COE could be a leader in redesigning how Energy Systems work. We want 85% of buildings to have solar. But where is that Energy going to go? Similar to the California problem. Batteries and hydrogen... but I do not see anything regarding energy storage? Not stated overtly. It would be good to see "the coupling of the gas and electricity systems so that we could run on renewable." Pipeline network can help you get there.

*General*

- Guys at EDC do a good job. Current grid, 0.72. My concern is that those numbers actually came out of an IPCC document that Canada submitted, specifically regarding AB. Current value is much closer to 0.7 than to 0.4 (and we will not reach 0.4 in a year). A lot more changes happening with the grid. Questioning some of the assumptions to get to such a low number. We cannot rely on greening the grid all the time, at that suggested level.
- I agree. The numbers we were using to justify the DDE are much higher than that. So the business case, the reduction that it is promising would be affected by the greening of the grid.
- I agree also. At a high-level - there is a lot we don't know. Many investments to green grid will likely happen privately. We don't really have a shortage in AB so justifying investments is hard for private entities. To get to something below 0.6 is pretty aggressive.
- The forecast from EDC - used in DDE. So there is consistency there. It does depend on the coal shut down. It is consistent with the current AB gov as well. Who is going to invest in a big cycle natural gas plant?
- We see coal to gas conversions. They are slightly better... but these are broader issues. I land on the higher side of the number but things can change.
- Even if they succeed in greening the grid, we could not make our other changes fast enough to stay within our Carbon Budget. Not without the emissions factor that we are using. In the modelling we poured ground mount solar so that we could be off the grid (100% of the city grid). The grid as it is currently forecast, meaning the C budget. Or investing in other renewable energy, the current grid will not allow us to get there.
- Coal to gas conversions are better. 40-50% reductions expected. We are always going to disagree on the forecast directionally. Likely not by 2021, but maybe in the next decade? Comfortable with it as an input.
- It looks wonderful, I found myself wanting to dig into the assumptions more. To have an idea of how realistic it is. Also wondering about the negative emissions, what the assumptions are around those. Excited by the path being there.
- Questions about waste diversion - this is really expensive for what you get back? I think the money could be better put somewhere else. As long as you are separating organics, using anaerobic digestion then methane not being released. Utilities need to invest money and play ball.
- Generally really good. The Renewable Revolution is a little bit easier.
- Seemed to be confusion about E grid intensity and grid displacement (always going to be lower than grid intensity). Use grid intensity and not displacement factor - just check please.
- Overall I like this. Renewables is important. Overall though, the COE incenting and working with others is really important.
- Acknowledge cost comment earlier.
- Waste is an opportunity - happy to see that there is a focus on the recoveries.
- Regulatory note. ATCO and EPCOR are being held back by the rules. How can we change those rules, re: RNG and hydrogen. Changing rules to make investments. EPCOR has the same problem... maybe there is a place at the AB commission for the City of Edmonton to intervene on applications. Not necessarily for this list, but would help move things forward.
- COE action to influence province wide changes.



## Appendix C: Engagement Data

- I learned a lot! Wanting to know more about pairing the gas and electrical grid. Maybe that is the opportunity for H and storage. As a solar advocate, I always thought that with small amounts on a house you would consume most of the energy. But if there is excess to go back to the grid... would love to learn more.
- I hope we can remember not to silo all ideas, e.g., electrify vehicles and sucking up excess power? Create car charge zones that can suck up extra power. Siloing of the ideas - maximize solar will that crash the grid... maybe there are other things that can work synergistic-ally.
- Negative emissions: the planting 2 million trees makes me concerned. Rendering earlier what the river valley might look like if we do not deal with climate impacts. Localize a lot more with negative emissions. Especially in the time of the COVID crisis. Urban/ community gardens - add more focus on that.
- those comments are captured in climate resilient energy strategy. There are a lot more benefits on the adaptation side (not ignoring mitigation).
- Not a specific engagement with the Feds - it is the specific NRCan project.
- If Walmart is saying they are carbon neutral because they are purchasing offset globally - how are we able to track and understand that. How does that impact the overall carbon budget? Lots to figure out.
- Just and equitable piece around Indigenous communities.
- Grid will have an intensity of 0.406 kg/kWH in 2021 to 0.284 kg/kWH in 2033. This is newer data. We used slightly different data to align with City Plan.

*Missing*

- Portions that were touched on. Community solar program. Will the city get into solar or wind projects? This is still in front of us - excited to see what this looks like! Huge potential, esp. With partners. School Boards, UofA. There is also a large number of things being done on greening the natural gas side. I do think that the use of non-carbon based fuel (electrification) ... jurisdictions that are looking at this with a great lens. Not so much for us now. Solar for Edmonton is also exciting.
- Just and equitable, and adaptation. That lens should be given. ie) smoke days double, what does that mean for solar target during peak months. I love the group purchase of aggregated renewable energy - automatically include an indigenous community. We should not do another one that does not have indigenous participation. Solar programs need to be there for those who can least afford it.

*Priorities*

- 1) We need to figure out how to get Building Code to a net zero standard. 2) Very quickly figure out how many can be pivoted as economic recovery, job opportunities. Transportation still has a ways to go. Renewable Electricity still underway... Any other thoughts?
- CEER Program today. More and more deep retrofits, bump up the incentives and some of those retrofits could be happening as we speak! Potential for combined heat and power plants.
- Every renovation that goes on - need to be close to net zero. Low-lying fruit. Kill the business case for DER. But DER is not easy.
- COE corporate GHG emission profile - buildings are about half of the GHG, and within buildings 60% electricity and 40% natural gas. It would be powerful if we could start with larger scale projects, like electric and gas working together. If we cannot figure out how to green electricity and gas supply, we will struggle with reaching goals. Need to build stuff and start projects.

*Concern*

- What is actually needed to achieve some of these objectives, hydrogen economy, 85% solar on new buildings. Is that really what we want? To me the end goal (bigger than COE) - you have a reliable electricity system, that is as close to zero as possible. Adding tons of solar... we need to think through what interventions we want to make in the electricity system. Is there anything that can be done at a city of EPCOR level to incentivise EVs... does that

need to be included? Reliability and unintended consequences?

- What is the impact of electrification of the grid? Is it better to put out small/big solar systems. California and Arizona examples. Other than batteries there is no home based storage system available. Some industrial stuff is available, but nothing really commercialized and in the market. Ensuring that this is looking with the lens of what this looks like for the electrical system. We have a regulatory framework, and there are things that the City wants EPCOR to do, that we can't. City needs to push things.

**Climate Shift #7: Economic Development***Concern*

- The economic piece. Similar to what was missing. There are traditional renewable retrofit jobs that we need to pursue, but that is not enough to transition our provincial economy. It is saying we are actively diversifying our economy. What are the other sectors that we are specifically trying to grow and diversify. We simply need to replace the economic driver - oil and gas. Define Edmonton's role in the broader ecosystem.
- That the carbon accounting framework will not be fully implemented until 2027. There are other organizations we can learn from. Hopefully the goals can be more ambitious.

*Excited*

- Shift in vocabulary to just and equity, biodiversity and holistic. Idea of the task force, and building a new type of governance. People are listening and these are interesting strategies.
- This is what we need. Concern - how are we going to do this? As a direction it is spot on though, we just need to look at implementation.
- Carbon budget, and carbon accounting. Crucial factors of success is that the city can adequately account for the cost of doing or not doing something. Looking at the bigger picture. There are tools to be implemented to help with this.
- See justice committee being brought forward. Things are moving forward with the climate budget.
- Ways to integrate just and equitable here. These things look good, but it's all about how it is implemented.
- Having this many people working on a 1.5 strategy is fantastic!

*Missing*

- This one is missing the mark. This is so critical, not just because of COVID-19. It needs to be fundamentally integrated, this is what will make the difference for Alberta and Canada. Edmonton's role is a leadership position that helps Alberta diversify and create other products to export to the rest of the world. It's about the development of technology to help the province, country in energy diversification and export. This one needs to reflect the pathway out of the pain. Action item: developing low carbon sectors, preparing our economy to be resilient for the next number of years.
- 10 years is too long!!!! Key feedback. This is a pillar. It is 3 levels below where it should be.
- Chamber of commerce, business community with big changes. This might be a separate idea though. Broader decision making powers throughout the community. Would need to define roles. Particularly in the Just and Equity implementation - groups that need their voices heard. I imagine that the task force that is handling COVID-19 is empowered to make important decisions, and I am imagining something parallel to that. Not just businesses, we need community involvement.
- We should specifically state that everything that we do to mitigate climate actions are just and equitable, but also state that we are not going to defer action to future generations. Make two strong position statements.
- The City will take action on climate and refuse decisions that defer to future generations... another way to word one of the principles.
- Environmental protection is different from ecology and biodiversity.
- A different point about protection - decisions that contribute to biodiverse ecologies. We are creating an ecology.



## Appendix C: Engagement Data

- We've talked about valuing differently. Decisions with financial or other community benefits that are metrics for evaluation are for creating wellness economies (opposed to capitalist profit). You talk about holistics in ecology, but also include this in the context of community wellness too. Community benefits, common wealth created by this. What is the resilient community created from these economic decisions?
- One principle should realize the significant investments, commitment to the public that their investments will be used in a responsible manner. Cost effective, but also factoring the cost of inaction.
- It is important to appeal to the business community. That is a chunk of the community that we need to have engaged (that is not yet engaged). Without them, we will not get anywhere. Talking about economic responsibility, and enhanced prosperity and business activity should be in here. Some of the climate scepticism comes from a perception that climate change is a left wing plot to enact a socialist agenda.
- There are big decisions with big implications...reassure the public that the COE is being responsible with public funds.
- there are other opportunities. Community aggregation program where we could ask people to join a low carbon grid. Go into the market and say this is what we need. Currently not allowed in the regulatory regime. Everyone has a choice on where they can buy their electricity from. We as the city could not dictate that. More an example that this is a different way to get at that piece.
- Should we not create a committee for information sharing? Regional approach; can try to flush ideas out within that concept.
- Economic transformation should happen within the next two months. Need to figure out how to coordinate with other people, organizations.
- Energy transition, education and health. We just need to mobilize all these years of work as quickly and efficiently as possible.
- Economy trap to avoid. Oil industry says we cannot find 200,000 jobs overnight. We will not find these types of employment overnight. We either sacrifice issues bigger than COVID 19, or do both at the same time. Clean energy sector is wind power, vehicles, buildings... Car industry has transformed, \$300 billion dollars in that industry right now. 700 models of electric cars. The best argument is that we need to make progress, it is urgent. Oil is not the future. We need to follow the money, all going into renewable energy. Electric cars. Other cities are more aggressive than us! Copenhagen net zero by 2025!