
PHASE 2 SUMMARY

CLIMATE ACTION WATERLOO REGION

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Executive Summary

This brief report summarizes the outcomes of Phase 2 in the Climate Action WR plan to reduce the region's emissions by 80% by 2050. Walterfedy facilitated four technical engagement sessions: core team framework setting, management committee, municipal leadership and an online engagement session that reached out to local and external experts.

The purpose of this phase is to identify roadblocks and challenges, mitigation strategies and actions that will help provide recommendations for Climate Action WR's plan to achieve their set goal.

The following overarching trends were identified in all of the engagement sessions:

Challenges and roadblocks

- Cost
- Policy and decision making
- Education
- Stakeholder buy-in

Mitigation strategies

- Identify key stakeholder and recognize best practices initiatives
- Appeal to industrial/commercial markets to reduce GHG emission
- Gain political support for the 80 by 50 goal
- Invest in accessible and family friendly public services
- Find opportunities for renewable resources

Using the themes and challenges noted throughout all four technical engagement sessions the following overarching recommendations were concluded:

- Highlight existing success stories and plans that met GHG reduction goals for motivation
- Cater incentives to each sector(ie. urban, rural, farms etc.) to increase participation
- Develop long term education tools for the public
- Partner with companies to develop specific goals and policies to meet GHG reduction goals
- Update building code policies
 - Aim for transparency for sustainable building information
 - Guidelines for upgrading mechanical equipment

1 Introduction

WalterFedy was retained by the Region of Waterloo to complete a strategy and plan to reduce the Region of Waterloo's carbon emissions by 80% by the year 2050. The purpose of this report is to outline the findings from Phase 2 which was focused on receiving input from expert and technical stakeholders from industry. The co-designed engagement sessions were two in-person sessions and an online survey about leading and bleeding edge technologies.

This brief report will explore the themes, challenges and actions identified in each engagement session while keeping the overarching goal in mind. The overall trends noted in all four engagement sessions will guide the final recommendations concluded from the outcomes of Phase 2.

2 Technical Engagement Session - Core Team Framework Setting

2.1 Intent

The first technical engagement session was held with the CAWR management committee and was to kick off Phase 2 of Waterloo Region's climate action planning. The goal from the framework setting session was to establish the target audience and technical stakeholders to seek engagement from during Phase 2. Additionally, the objective of this session was to gain insight on key patterns and themes that would impact achieving the goal of reducing GHG emissions by 80% by 2050.

2.2 Process

The process followed in this session was facilitated with topics and stickies. Individuals were tasked with brainstorming ideas based on the context provided by the facilitator. The facilitator then briefly summarized the results of each sub-session and facilitated subsequent sub-sessions with a similar methodology.

2.3 Results

There were four main components identified during the first brainstorming exercise. The key sub-components in each of these patterns are listed below.

Society

- Political Will
 - Effectiveness at different levels
 - Short-term vs long-term visions
- Ethical Challenges
 - Population
 - Artificial intelligence
- Carbon Budget (public and private)
- Human Motivation (user, everyday person)
- Municipal policies and decision making

Technology

- Best-in-class design standards to support carbon reduction (systems, sources, etc.)
- Electrification of transportation
- Existing building retrofits
 - Load profile reduction
 - Fuel switching
 - Renewables

- Scalable technologies (small to large)
- Electrical mix (Grid)
- Artificial intelligence and machine learning
- Impact of technology (where and how?)

Roadblocks

- Short and long term
- Politics (short term thinking)
- Financial model
- Spark gap (electricity vs. natural gas) costs
- Existing infrastructure
- Urban and rural priorities
- Local expertise
- Economics (ROI)
- Quantify impacts (CapX, OpX, GHG Impact, ROI)

2.4 Emerging Themes

The first exercise included discussions about 'what?' insights to look for. The following list summarizes the trends identified in the discussion :

- Society
- Technology
- Roadblocks
- Economics

The second exercise established 'who?' the stakeholders are. This included five groupings of stakeholders as listed:

- Local - research forward thinking
- Local - public sector operational
- Local - private tech practical
- External - technical practical
- External - research forward thinking

The topics identified along with the expert and technical stakeholders will shape future engagement sessions to gain further insights on Waterloo Region.

3 Technical Engagement Session - Management Committee

3.1 Intent

The second technical engagement session included the CAWR management committee. The goal from this session was to explore themes, barriers and policies within the agriculture, waste, transportation and facilities sectors.

3.2 Process

The process followed in this session was facilitated with topics and stickies. Individuals were tasked with brainstorming ideas based on the context provided by the facilitator. The facilitator then briefly summarized the results of each sub-session and facilitated subsequent sub-sessions with a similar methodology.

3.3 Results

The tables below outline the results from the three brainstorming exercises.

Agriculture, Waste and other

Table 1: Agriculture, Waste and other

Themes	Barriers	Policies
Reuse and reduce packaging systems	Push back from industry	
Encourage local food production	Scale of food production coming in	
Carbon sequestration through soil	Throw-away society	
	Cheap products that are disposable	

Transportation

Table 2: Transportation

Themes	Barriers	Policies
Reduced parking	Existing infrastructure	Involve the end users in decision making
Encourage electric vehicles	Not enough invested in transit	Perception electricity is expensive
Encourage work from home when needed	Cost - increased buses	Educate users about low costs of EV operations
Better public transport schedules		
discounted fares		

Facilities

Table 3: Facilities

Themes	Barriers	Policies
Harvesting waste energy	Long-term payback not appealing	Show examples of local success
Green energy generation (i.e. Solar, geothermal)	Cost	Decision making biases
Pay attention to embodied carbon	Stakeholder buy-in	
Space optimization	Conflicting information	
Passive housing	Slow moving policy	

3.4 Emerging Themes

The technical engagement session facilitated for the management committee was beneficial to determine the over arching themes, policies and barriers that will shape the discussions in remaining stages of Phase 2.

Across all three topics discussed the emerging themes were concerning end users and encouraging local productions. The overarching barriers highlighted were finances, stakeholder buy-in and existing infrastructure. Furthermore, decision making and education policies were the main trend when discussing policies.

4 Technical Engagement Session - Municipal Leadership

4.1 Intent

The goal from this session was to gain insight from different sector experts regarding common themes, road-blocks, mitigation strategies and action to reach the goal of 80 by 50. The session included senior level representatives from all eight municipalities that participated in two brainstorming sessions. The first session focused

on challenges and roadblocks while the second focused on mitigation strategies and actions. This resulted in a versatile conversation on the impact of planning and infrastructure on CAWR's goal.

4.2 Process

Participants were divided into groups of five and were asked to identify challenges and roadblock themes within the following categories: homes, workplaces (corporate), workplaces (community), transportation, and agriculture and waste. The ideas discussed within each group were stated on sticky notes and then categorized per topic.

The second brainstorming session resulted in finding some strategies and actions for the challenges and roadblocks identified in the first brainstorming session. The existing groups were randomly split to create new groups based on the five categories: homes, workplaces (corporate), workplaces (community), transportation, and agriculture and waste. The session concluded with each group presenting their final strategies.

4.3 Results

The outcomes of the first brainstorming session focusing on the challenges and roadblocks are summarized below:

Homes

- Consumer comfort
 - Fear of loading the electricity grid
 - Availability of credible sources to evaluate priority of retrofits
 - Quick decision making criteria for upgrading equipment
- Cost
 - High capital costs of home energy retrofits
 - Higher costs of electricity adds challenges to switch fuel source

Workplaces (Corporate)

- Large number of workplaces in the community - multinational players
- Need for an incentive - lack of budget
 - Not an issue of technical expertise - they know how to; it's cost-prohibitive
- Lack of urge to make change
- Aging infrastructure
 - Cost of retrofit and new build, up keep infrastructure rather than rebuild
 - Life Cycle of Existing buildings + infrastructure

Workplaces (Community)

- Profit margins are tight
- Involving the tech sector and manufacturing will be challenging

Transportation

- Geography - dispersion, existing infrastructure of communities
- Population density and lack of transportation in townships
- Lack of barriers for personal vehicle transportation
- Cost of public transit for user
- Agreement between municipalities

Taking the the themes identified in the first brainstorming session the groups were asked to find mitigation strategies and actions that would successfully tackle the challenges identified. The tables presented below:

Table 4: Homes

Themes	Strategies	Actions
Knowledge	Work with officials to understand the building code	Energy ranking for buildings (consumption metrics, ie.carbon output per sq. foot) Make this information available when purchasing a home
	Understanding of the payback process Energy ranking for your house Expertise for selecting which retrofits are required Policy changes at provincial level	Increase consumer education Working with realtor boards and developers for implementation One-stop-shop for comparing information on improvement options
Cost	Loans, incentives for reducing upfront capital costs Subsidies and tax breaks Discount development charges	Financial tools to leverage: green bonds, LIC, dividends, etc.
Policy	Encourage progressive policies early Assessing the way tools and policies are being used Looking at improvements to the municipal site plan process	Building code updates Assessing the way that we finance capital projects Incentive municipalities in creative way ie. time bonus for sustainability designs

Table 5: Workplaces (corporate)

Themes	Strategies	Actions
Risk mitigation	Recognizing the best practices that currently exist Identify key stakeholders	
Short term vs. long term priorities	Development of stronger municipal policies Finding tools to help municipal staff embed GHG emission reduction policies into all decision making Education: Informing key stakeholders	
Competing priorities	Appeal to industrial/commercial market (ones with global market) to reduce their GHG emissions Plan for future operation costs	
Access to services	Invest in public ally accessible services vs. privatize	
Technology	Focus on Urban vs. Rural opportunities ie. Off grid, renewable Mennonite energy use	
Education	Understand corporate energy use develop staff and council knowledge	

Table 6: Workplaces (community)

Themes	Strategies	Actions
Fiscal	<ul style="list-style-type: none"> Bottom line impact Upfront costs = prohibitive (even if LCA is beneficial) Budget from this work is isolated from buildings Sustainability policies for municipalities Lobbying Influence Economic Development 	Rural and urban incentives/Business case
Physical Barriers	<ul style="list-style-type: none"> Existing infrastructure design Longevity of building life Land use impacts transportation and corporate initiatives New vs. retrofit - retrofits have less of an incentive there 	<ul style="list-style-type: none"> Influence to other official plans such as transportation Net zero retrofit examples Use of existing infrastructure
Culture	<ul style="list-style-type: none"> Difference between rural and urban Difference between individual organizations and large (potentially multinational) corporations How do we leverage our "sustainability expertise" locally Municipal leadership Political support/buy-in 	<ul style="list-style-type: none"> Having the region identify as sustainable community Identify standards for sustainable buildings
Education	<ul style="list-style-type: none"> Build a business case for sustainability Understanding the nuances of sustainability efforts - where the trade offs lie 	Political Education

Table 7: Transportation

Themes	Strategies	Actions
Financial	<ul style="list-style-type: none"> Disincentive personal vehicle use Have a clear vision upfront for sustainable development 	<ul style="list-style-type: none"> Long term policy thinking Vision upfront for green development
Social and Behavioral	<ul style="list-style-type: none"> Encourage small behavioral changes Design for family friendliness/accessibility Ease of commute 	<ul style="list-style-type: none"> Shift to life cycle costing Set max parking bylaws Promoting shifts in transit use Multi-modal to allow for last mile issues Less parking/more expensive Making parking garages able to be converted for other uses in the future

Table 8: Agriculture, Waste and Other

Themes	Strategies	Actions
Farming and Traditions	Carrot and stick programs Local programs and policy changes across municipality	Operational incentives in addition to capital incentives Financial support for retrofits and upgrades Leveraging Farmers for Climate Solutions - tapping into their networks and understanding where they see the
Waste Generation	Much of this waste generation is habitual - developing strategies to intervene Influencing consumer and purchasing behavior Need for Reaching consumers that don't have access to waste diversion streams Policies for apartments/workplaces that resort to cheap disposal (no composting)	Education around options and importance of shifting culture to waste free Increasing accessibility through programming
Education (farmers and consumers)	Need for understanding and education around what practices are currently available	Community champions

4.4 Emerging Themes

After discussing all the categories there were general themes that were presented in all 5 groups. The following list was identified as general challenges and roadblocks that fit within all categories.

- Finances
 - Upfront Cost
 - Provincial and federal incentive programs
- Conflicting Priorities
 - Affordable housing vs. net-zero
 - Affordability/heritage preservation vs. Energy conservation
 - 10 small capital projects vs. 5 big projects
- Lack of convenience

5 Technical Engagement Session - External Stakeholders

5.1 Intent

The purpose of the external stakeholder session is to expand our resources and insight to technical stakeholders that can provide insight on the 80 by 50 goal based on their expertise in the industry. These insights will further develop the Waterloo Region strategies.

5.2 Process

The external stakeholder session was an online participation survey that was sent to local and external community members focused on climate change and sustainability in the industry. The online sessions focused on leading and bleeding edge technologies. The online forums were open to the technical experts for a period of two weeks to provide feedback, with regular follow-up reminders to ensure a large net of feedback.

5.3 Results

Opinion on the Goal

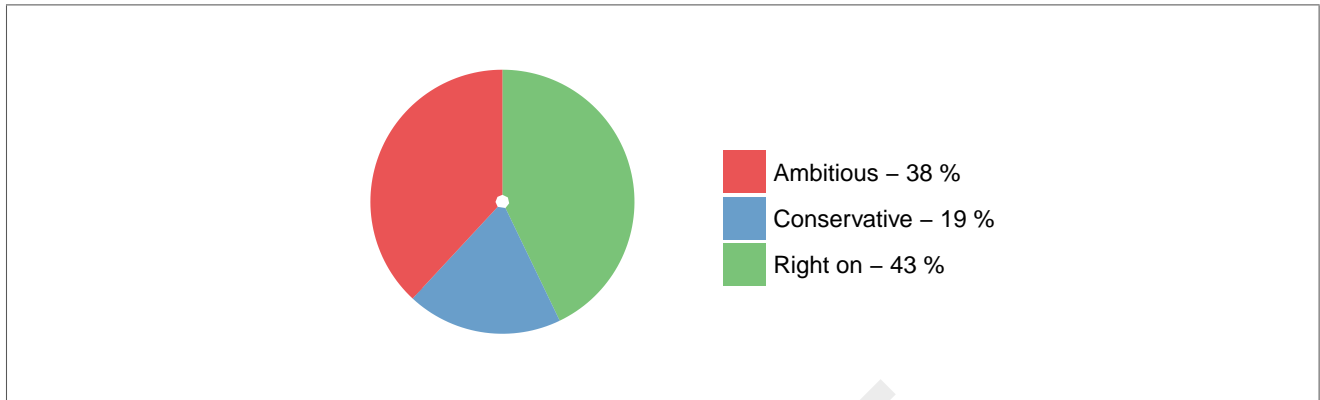


Figure 1: Opinion on the goal.

When asked about the Region of Waterloo's goal of 80 by 50 the majority of the responses stated that the goal is right on if not conservative. Figure 1 illustrates the outcome of the technical online survey.

Some of the common themes in the comments about the goals is that the Region of Waterloo has the technical and economical ability to reach this goal. There was also an emphasis on the urgency of this goal, most participants commented on the necessity of aiming for a higher goal (i.e. Net-Zero) by 2050 in order to reach the goal of 80 by 50.

Barriers were also identified as a part of this question since 38% of the participants recognized the goal as ambitious. This is due to the belief that there is not enough time to reach the goal as behavioral changes, transportation and existing infrastructure are going to be the Region's biggest challenges. These themes were also some of the larger contributing factors to the goal which are explored in greater detail throughout the expert engagement survey.

Transportation

Transportation represents almost 50% of the total emission in the Region of Waterloo and as one of the main topics of conversation when discussing carbon emissions. Stake holders were asked to rank various considerations as shown in 2. The figure presents that more than 50% of experts ranked the following options 4 and 5:

- Electrification of the personal vehicles
- Enhancement of local public transit
- All day, two way, electricity based, train service from Waterloo Region to Toronto (has to be 1 hr commute to be effective)

It also presents that more than 50% ranked the following options 1 and 2:

- Hydrogen Fueling station
- Autonomous vehicles
- Autonomous on call electric vehicles

It is important to note that there were multiple suggestions regarding designing walk-able communities and encouraging biking to decrease transportation emissions. Additionally, since the 401 intersects the region it was noted that an all day, two way train service to Toronto would only be effective if the commute is approximately an hour.

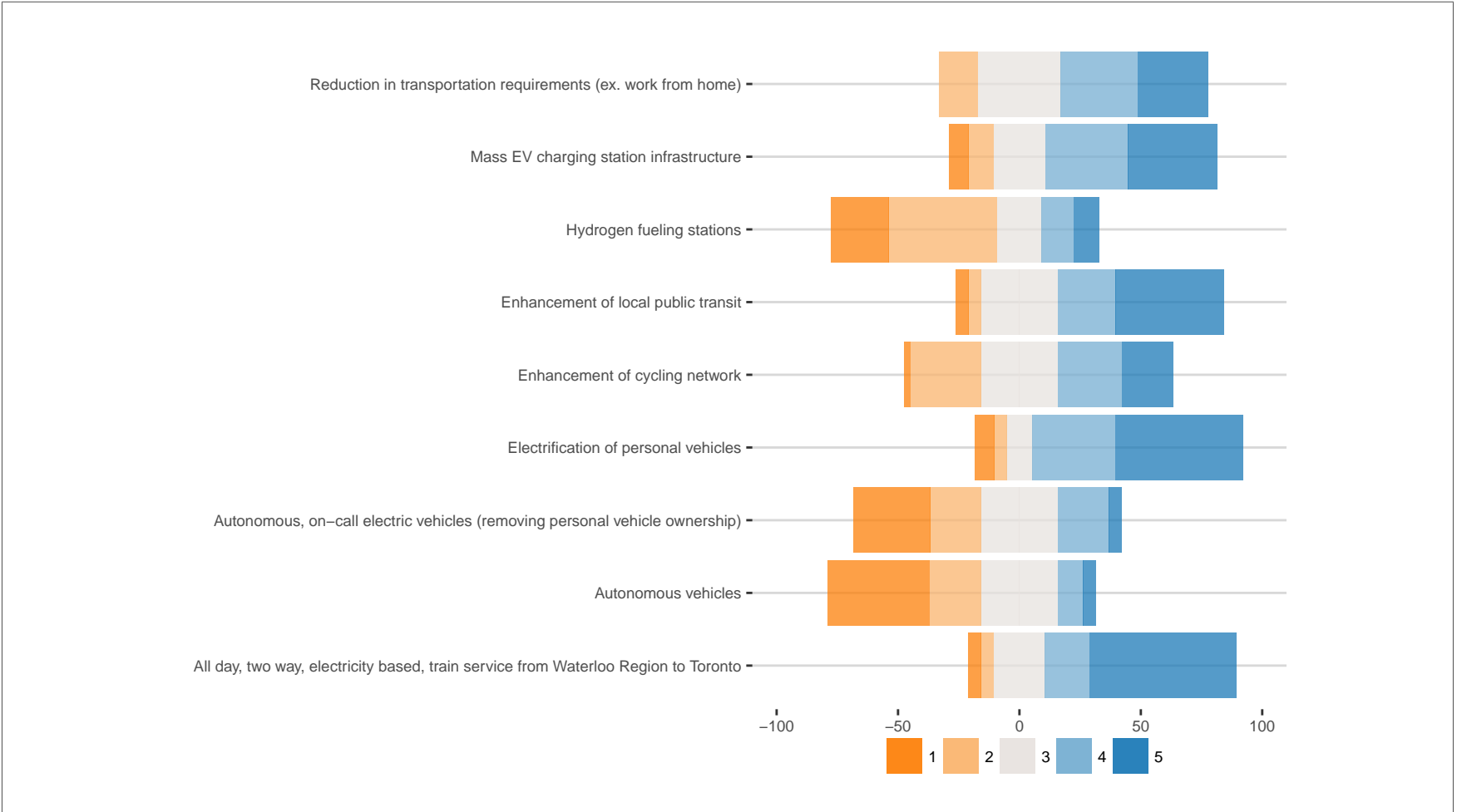


Figure 2: Transportation



Homes and Work Place

One of the common insights noted in the survey was reducing the emissions of existing infrastructure. Given that the majority of the facilities that exist now will exist in 2050, experts were asked to rank retrofit considerations. Figure 3 presents that more than 50% of experts ranked the following options 4 and 5:

- Building envelope retrofits (walls, glazing, roofs)
- Building tightness

Agricultural Industry and Influence

The Region of Waterloo has a significant agriculture industry and influence, technical stakeholder were asked to rank methods to reduce carbon emissions related to agriculture. Figure 4 presents that more than 50% of experts ranked the following options 4 and 5:

- On-site renewable (including waste energy recovery)
- Education and behavioral changes
- Financial incentives

Other comments included:

- A significant portion of the agricultural industry uses on-site generation and is not connected to the grid. Education and outreach to these communities is necessary to encourage renewable and innovative solutions to these high emission sites
- Encourage local food processing to avoid transportation
- Understanding farming practices and impacts

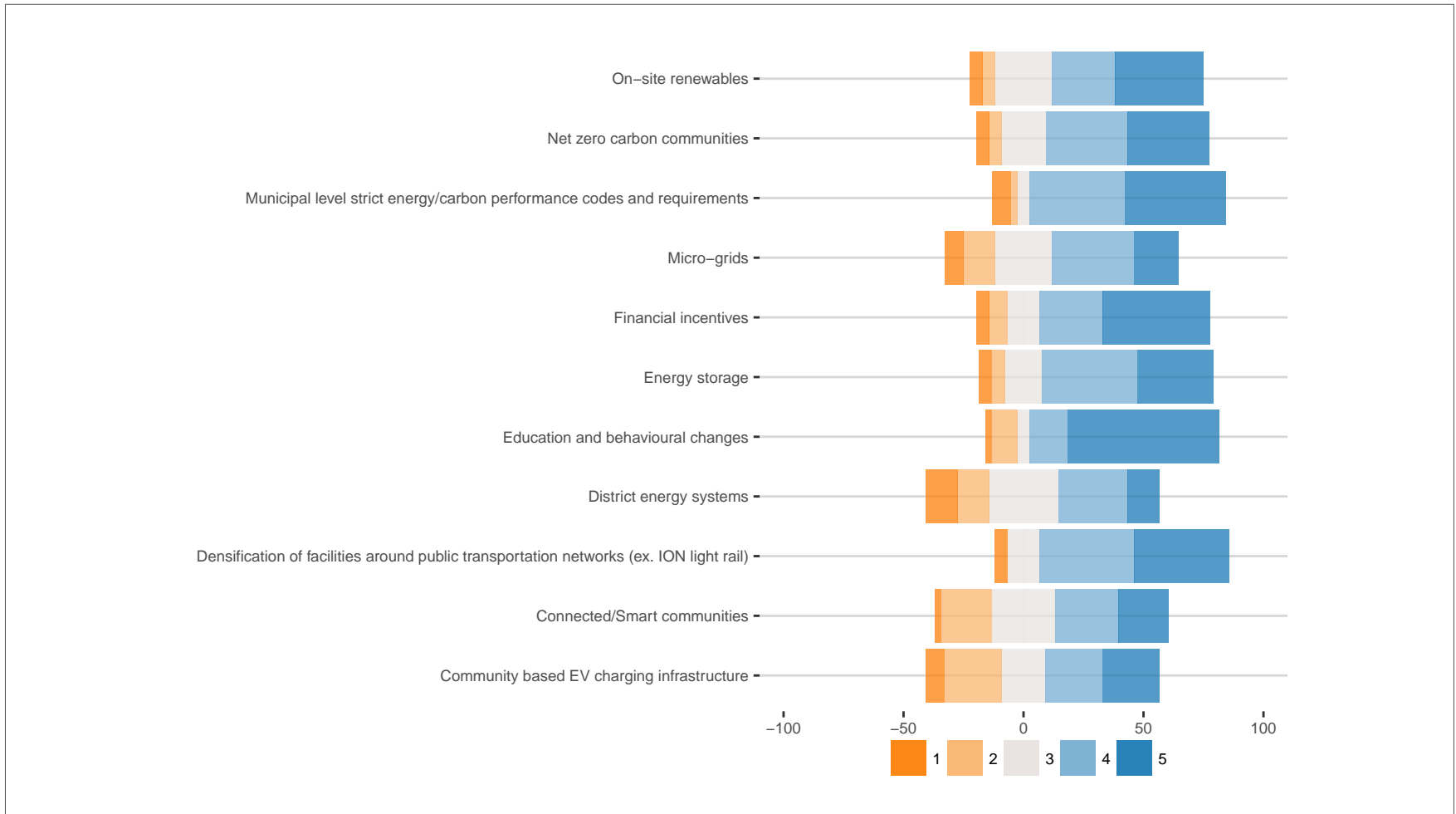


Figure 3: Homes and Workplaces



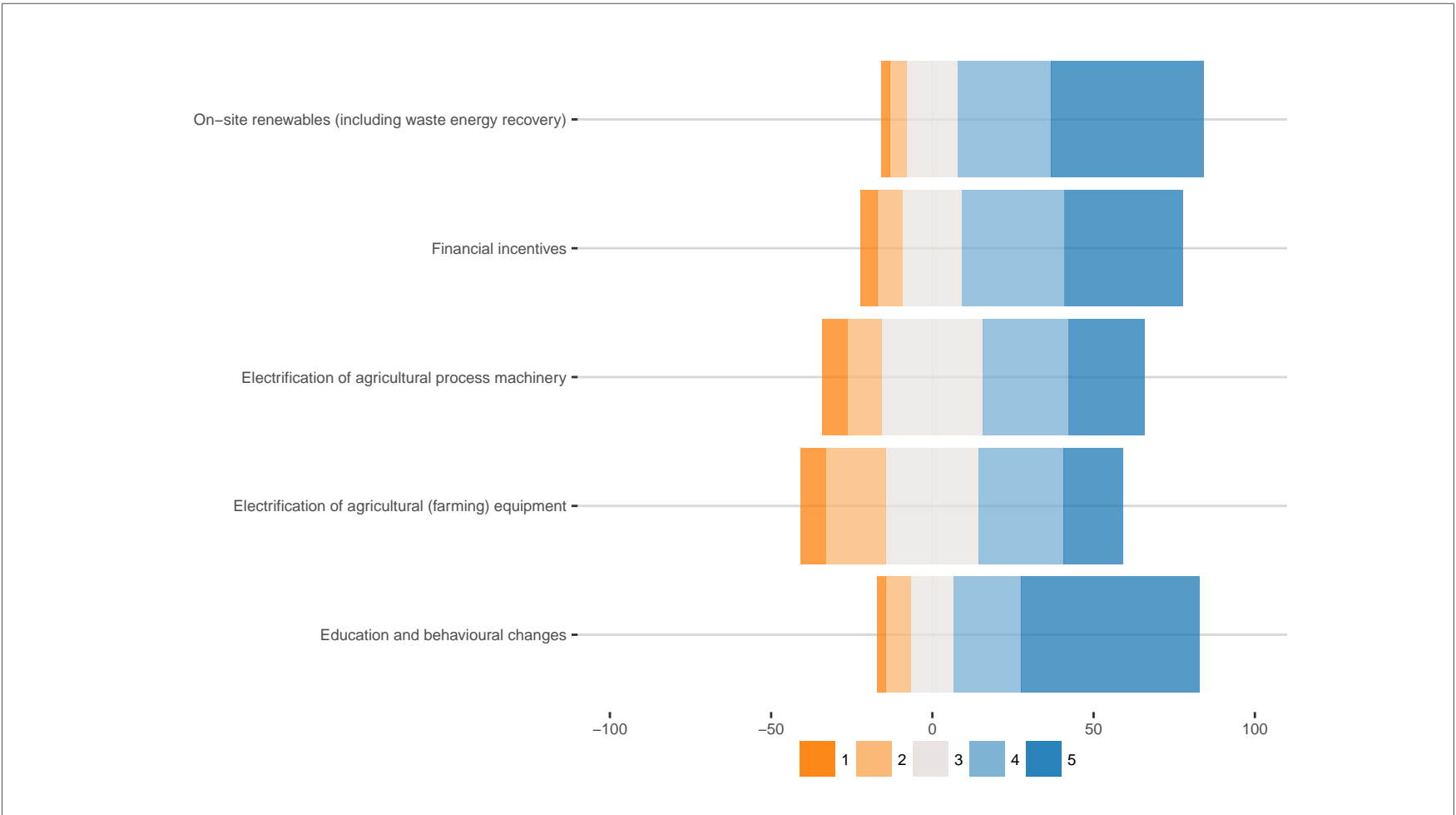


Figure 4: Agricultural Industry and Influence



5.4 Emerging Themes

Technology and Policies

- Cost of existing building retrofit
- Policy and decision making
- Creating accessible transportation
- Stakeholder buy-in

Transportation and Facilities

- Mandatory municipal level strict energy/carbon performance codes and requirements (ex. LEED, Passive House, Net-Zero)
- Mandatory energy labeling for each building
- Focus on community designs - living, working and social spaces how do they relate to each other
- Financial incentives should focus on local improvements
- Controls optimization
- Community based EV charging infrastructure

Societal Changes

- Long-term education - educate about green buildings and cost savings
- Community based development - local and public transport
- Community buy-in
- Equity in policies and facility access

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6 Summary and Recommendations

Phase 2 in the Climate Action WR plan focused on expert engagement and technical consultation from local and external technical experts. Four co-designed engagement sessions were facilitated to gain technical input on the 80 by 50 goal. The four sessions were designed in a staggered approach to utilize inputs from each session to guide the conversation for the next planned session.

Through out all four technical engagement sessions there were predominant roadblocks, mitigation strategies and actions that were identified. The first technical engagement session focused on developing the framework of Phase 2. This led to identifying the four insight parameters to explore during Phase 2: **society, technology, roadblocks** and **economics** that shaped the reaming sessions.

The most trending roadblock in all of the sessions was the **cost** associated with achieving the goal. The discussion about finances included:

- High capital costs of infrastructure
- Long payback periods
- Funding availability
- Incentive programs
- Cost of existing infrastructure retrofits and upgrades
- Cost for user

Additionally, challenges regarding policy and decision making, education and stakeholder buy-in were recognized and the following mitigation strategies were suggested:

- Identify key stakeholder and recognize best practices initiatives
- Appeal to industrial/commercial markets to reduce GHG emission
- Gain political support for the 80 by 50 goal
- Invest in accessible and family friendly public services
- Find opportunities for renewable resources

Using the themes and challenges noted throughout all four technical engagement sessions the following overarching recommendations were concluded:

- Highlight existing success stories and plans that met GHG reduction goals for motivation
- Cater incentives to each sector(ie. urban, rural, farms etc.) to increase participation
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