

Multi-Criteria Analysis Approach

Cascadia will lead a qualitative multi-criteria analysis (MCA) of ~35 actions from the draft actions list to arrive at a **prioritized shortlist** for the City and Climate Action Planning Group (CAPG) consideration. The MCA assigns qualitative numerical scores to each evaluated action and criterion to arrive at an overall priority score for each action.

This memo provides an overview of the proposed MCA approach. It includes:

- ▶ An overview of the **evaluation steps** for the multi-criteria analysis.
- ▶ Detailed descriptions of the **evaluation criteria**, including sub-criteria definitions and criteria weights.

The Cascadia team and the CAPG developed the draft actions list, using the following key sources:

- ▶ Review of City plans, policies, and programs
- ▶ 2019 Climate Resiliency Recommendations
- ▶ November CAPG meeting
- ▶ November public workshop

The initial actions list contained approximately 120 actions. Cascadia grouped similar actions together to improve implementation potential and clarify how the City plans to pursue resiliency. The draft actions list contains 71 actions. Approximately 35 actions are included in the consultant budget to perform the multi-criteria analysis. Therefore, CAPG prioritized which actions will be evaluated with the MCA; remaining actions can still be included in the Resiliency Plan, but will not include evaluation results.

EVALUATION STEPS

Briefly, the steps are:

1. To arrive at a priority score, **each criterion** is clearly **defined** and assigned a **weight**. These weightings are determined based on relative priorities as indicated by City staff, stakeholders, and the public. This includes survey input from CAPG members. Criteria are divided into **subcriteria** to inform the scoring process. These subcriteria ensure that the evaluation considers the various facets of the criterion; for example, “feasibility” could consider an array of constraints ranging from the City’s level of control, to regulatory, political, and technology constraints.
2. Cascadia develops **qualitative score matrices** to allow for a consistent, objective ranking process. We assign scores for each action based on the criteria definitions and professional judgement drawing from available literature, peer city case studies, our knowledge of City context, engagement results, and consultant experience. Our team also records a **brief rationale** for each action to provide further substantiation. Actions that land on different values for a subcriterion are assigned an average score; each criterion is evaluated on a 1 (low) to 5 (high) scale.
3. Cascadia uses priority scores to arrive at a **prioritized shortlist of actions** for inclusion in the Resiliency Plan. However, it is possible all actions will be moved forward, pending City discretion, CAPG direction, and other ongoing community and stakeholder input.

Example: Distinguishing between two actions

Below are two actions Cascadia evaluated to prepare the City of Everett’s (WA) Climate Action Plan (CAP). While both actions have the same impact, cost/affordability, and co-benefits scores, the second action is substantially more feasible and somewhat more equitable. As a result, the second action received an overall higher score and better achieves the City’s climate goals.

Action	Priority Score	Impact	Equity	Cost/Affordability	Feasibility	Co-benefits
Advocate for regional congestion pricing authority.	2.6	4	1	4	2	3
Accelerate the implementation of the “Complete Streets” policy.	3.4	4	2	4	4	3

Example: Evaluating sub-criteria

In this example, the action’s score for the Impact criterion would be based on where the action lies within the two subcriteria shown below.

Score	Impact	
	Likely to address goals?	Addressing a major need?
1	Voluntary/indirect action with limited reach/scaling	Addresses a very minor need - very low emissions source or very low priority goal for City/community
2	Voluntary/indirect action with broad reach/scale	Addresses a minor need - low emissions source or low priority goal for City/community
3	Voluntary/indirect, but with financial incentives	Addresses an average need - average emissions source or average priority goal for City/community
4	Regulatory/infrastructure project, but with limited reach/scaling	Addresses a higher-than-average need - high emissions source
5	Regulatory/infrastructure project with broad reach/scale	Addresses a very major need - very high emissions source

The action “improve incentives for electric heat pumps,” addresses the high emissions from the buildings sector (thus a 4 for “addressing a major need”) but is an incentive that is likely to have limited reach/scale (thus a 2 for “likely to address goals”). Therefore, the average score is a 3:

Action	Impact		
	Likely to address goals?	Addressing a major need?	Total Impact Score
Improve incentives for electric heat pumps.	2	4	3

EVALUATION CRITERIA

Summary

Based on input from CAPG, best practices, and our expertise and experience, Cascadia has proposed the following criteria to evaluate the draft strategies supporting the Port Angeles Resiliency Plan. Each subcriterion is evaluated on a 1 (low) to 5 (high) scale.

Criterion		Weight	Definition/Subcriteria
Impact		0.25	What is the scope and likelihood that the action will reduce GHG emissions or enhance resiliency? By when? Can impact be measured and tracked?
			Does the action address a major need (i.e., high GHG emissions source or climate risk)?
Cost		0.20	What is the cost to the community and City?
			What are the costs of inaction for this action?
Community Support		0.10	Do residents support/agree with the action?
			Do community stakeholders/partners support/agree with the action?
Feasibility		0.15	What is the City's level of control over implementation?
			Are there regulatory, political, or technological constraints related to action implementation? Is the action adaptable to new technologies?
Equity		0.20	Does the action reduce vulnerability for all populations? Is it fair?
			Are benefits distributed equitably across the community? Do they redress historic inequities?
Co-benefits		0.10	Does the action support public health, the green economy, and healthy natural systems?

Impact

The three proposed subcriteria evaluate impact according to whether the action is focused on the City's highest-emissions sources and/or greatest climate risks, how broadly the action would affect the City/community, how likely is it that the impact will be realized, the timeline of that impact, and the ease of measuring and tracking the impact.

	Likely to address goals (e.g., carbon neutrality by 2030; i.e., scope and likelihood of impact)?	Addressing a major mitigation need?	Addressing a major adaptation need?
1	Very Low - VOLUNTARY strategies (e.g., education/outreach, planning, assessments) that INDIRECTLY reduce emissions and/or enhance resiliency; limited ability to scale (i.e., very low impact/reductions); will be difficult to measure/track impact.	Addresses a very minor need - very low emissions source (water & wastewater, municipal)	Addresses a very minor need - very low climate risk for City/community

	Likely to address goals (e.g., carbon neutrality by 2030; i.e., scope and likelihood of impact)?	Addressing a major mitigation need?	Addressing a major adaptation need?
2	Low – non-monetary incentives, regulation, or capital project that DIRECTLY reduce emissions and/or enhance resilience; VOLUNTARY with ability to scale (i.e., low impact/reductions); may be difficult to measure/track the impact.	Addresses a minor need - low emissions source (energy)	Addresses a minor need - low climate risk for City/community (extreme heat, extreme cold)
3	Moderate - VOLUNTARY/indirect programs that DIRECTLY reduce emissions and/or enhance resilience, but with FINANCIAL INCENTIVES (i.e., moderate impact/reductions); likely able to measure/track impact.	Addresses an average need - average emissions source (waste, process & fugitive emissions)	Addresses an average need - average climate risk for City/community (wildfire, grid resilience, supply chain; risks to part of the economy, i.e. disruption to people’s ability to provide goods and services)
4	High - REGULATORY/INFRASTRUCTURE projects that DIRECTLY reduce emissions and/or enhance resilience, but with limited reach/scaling by any year (if primarily adaptation) or with broad reach/scale that will be realized AFTER 2030 (if primarily mitigation, i.e., high impact/reductions); will be able to measure/track impact.	Addresses a higher-than-average need - high emissions source	Addresses a higher-than-average need - high climate risk for City/community (flooding; indirect risks to overburdened communities, e.g., advances ability to prepare for climate impacts (e.g., ed/outreach), plan that prioritizes managed retreat for low-income communities in flood areas; risks to most of economy, i.e. disruption to people’s ability to provide goods and services)
5	Very High - REGULATORY/INFRASTRUCTURE projects that DIRECTLY reduce emissions and/or enhance resilience with broad reach/scale in any year (if primarily adaptation) or that will be realized BY 2030 (if primarily mitigation, i.e., very high impact/reductions); will be able to measure/track impact.	Addresses a very major need - very high emissions source (transportation, land use, consumption)	Addresses a very major need - very high climate risk for City/community (shoreline change; direct risks to overburdened communities, e.g., build or provide access to in-home cooling or cooling centers, air filtration options; risks to entire economy, i.e., disruption to people’s ability to provide goods and services)

Cost

The cost criterion focuses on financial costs. The three proposed subcriteria assess affordability for the City and community, and the costs of inaction.

	Direct cost to community (over 10 years)	Cost to city (including startup and ongoing maintenance for 10 years)	Costs of inaction
1	Very high – SIGNIFICANT costs across the ENTIRE community	Very high – MAJOR INFRASTRUCTURE/capital improvement project; generally >\$10 million	Very low – failing to implement this strategy will risk MINIMAL costs/damages to the community.

	Direct cost to community (over 10 years)	Cost to city (including startup and ongoing maintenance for 10 years)	Costs of inaction
2	High – SIGNIFICANT costs to SOME in the community	High – MODERATE INFRASTRUCTURE projects and large programs; generally \$1-10 million	Low – failing to implement this strategy will risk MODERATE costs/damages to SOME in the community.
3	Moderate – MODERATE costs across the community	Moderate – SMALL INFRASTRUCTURE projects and LARGER PLANS, policies, and small programs; \$100K-1 million	Moderate – failing to implement this strategy will risk MODERATE costs/damages to the ENTIRE community.
4	Low – MINIMAL costs across the community	Low – SIMPLE policy changes, studies, and small plans; <\$100K	High – failing to implement this strategy will risk SIGNIFICANT costs/damages to SOME in the community.
5	Very low – will NOT present any additional costs to the community; may save money.	Very low – planning strategy or MINIMAL TO NO CITY INVESTMENT; City may already be working on it.	Very high – failing to implement this strategy will risk SIGNIFICANT costs/damages to the ENTIRE community.

Community Support

Community support may vary among residents, stakeholders, and other partners (e.g., implementation partners like Clallam Transit, the business community, the environmental community). Therefore, we propose subcriteria tailored to these sectors of the community. The “stakeholder & partner support/agreement” subcriterion is intended to assess the level of political and other support from partners and stakeholders in the community; political support from government is assessed in the Feasibility criteria.

To evaluate level of support, we consider input from CAPG and City staff input on community perspectives. We may also consider how an action is typically viewed in peer jurisdictions. For example, we may justify a rating by indicating that CAPG is strongly supportive, overall community support is mixed, and that these trends are consistent with peer jurisdictions.

	Resident support/agreement	Stakeholder & partner support/agreement
1	Very low - MOST residents STRONGLY OPPOSE the strategy.	Very low - MOST stakeholders/partners STRONGLY OPPOSE the action.
2	Low - SOME residents STRONGLY OPPOSE the strategy.	Low - SOME stakeholders/partners STRONGLY OPPOSE the action.
3	Moderate - SOME residents OPPOSE and SOME SUPPORT the strategy.	Moderate - SOME stakeholders/partners OPPOSE and SOME SUPPORT the action.
4	High – there is SUPPORT within the resident community.	High – there is SUPPORT among stakeholders/partners for the action.
5	Very high - residents STRONGLY SUPPORT the strategy.	Very high - stakeholders/partners STRONGLY SUPPORT the action.

Feasibility

The feasibility criteria assess the degree of City control over an action’s strategy success and the likely regulatory, political, and technological constraints to implementation. Political constraints are specific to those that are *not* covered by the Community Support criteria, which focuses on support from community partners and stakeholders such as Clallam Transit and the business, environmental, social justice, and other community perspectives. Political constraints assessed as part of Feasibility include the level of City Council support and direction, City staff support and capacity, the regulatory role and level of support of Clallam County, the level of support from local Tribes, alignment or reinforcement of other City, County, and regional policies, plans, programs, and initiatives (including opportunities for shared implementation), whether funding or other needed resources from state and federal entities is easily acquired, and whether the outcome of a legislative process may affect the feasibility of a strategy.

When evaluating constraints, we consider both the number of likely constraints, the likely severity of the constraint, and how difficult the constraints may be to overcome, including how adaptable the action is to new technologies. For example, a rating of “moderate” could be selected if there are regulatory and political constraints (but no or minimal technological constraints) that would be moderately difficult to overcome. In cases where the variables are in two different ratings (e.g., unlikely to encounter challenges, but they would be moderately difficult to overcome), the brief rationale will explain the choice made.

	City role (i.e., level of control)	Regulatory, political, technological constraints
1	Very low - City's role would be largely as ADVOCATE (i.e., action led by external implementing entity)	Very high – action currently UNVIABLE given current regulations, politics, and/or technologies and anticipated opportunity windows. If encountered, challenges are VERY DIFFICULT or IMPOSSIBLE to overcome and/or unable to adapt to new technologies.
2	Low - City would be VOLUNTARY PARTNER with implementing entity	High – action LIKELY to encounter challenges given current regulations, politics, and/or technologies and anticipated opportunity windows. If encountered, challenges are DIFFICULT to overcome and/or difficult to adapt to new technologies.
3	Moderate - City would be OFFICIAL PARTNER (e.g., MOU) with implementing entity	Moderate – action MAY encounter challenges given current regulations, politics, and/or technologies and anticipated opportunity windows. If encountered, challenges are MODERATELY DIFFICULT to overcome and/or moderately difficult to adapt to new technologies.
4	High - City would be FUNDER of implementing entity	Low – action UNLIKELY to encounter challenges given current regulations, politics, and/or technologies and anticipated opportunity windows. If encountered, some or most challenges are RELATIVELY EASY to overcome and/or are relatively easy to adapt to new technologies.
5	Very high - City would be IMPLEMENTER or REGULATOR	Very low – MINIMAL to NO challenges anticipated given current regulations, politics, and/or technologies and anticipated opportunity

City role (i.e., level of control)	Regulatory, political, technological constraints
	windows. If encountered, most challenges are EASILY overcome and/or easily adaptive to new technologies.

Equity

The proposed equity subcriteria focus on reducing climate risks, historic inequities, and distributive justice. Procedural equity is addressed separately, primarily through development and implementation of the Resiliency Plan.

	Reduces vulnerability? Fair?	Distribution of benefits
1	Very low - action will DEFINITELY INCREASE vulnerability for ALL and is UNFAIR to ALL	Very low - ALL benefits and costs are accruing to different sectors of the community and are perpetuating historic inequities
2	Low - action DEFINITELY INCREASES vulnerability for SOME and is UNFAIR to SOME	Low - SOME benefits and costs are accruing to different sectors of the community and are perpetuating historic inequities
3	Moderate/Neutral - action DOES NOT AFFECT VULNERABILITY or FAIRNESS	Moderate/neutral - action DOES NOT distribute benefits and costs in the community in a way that perpetuates historic inequities
4	High - action DEFINITELY REDUCES vulnerability for SOME and is FAIR to SOME	High - MOST benefits are accruing to the sectors of the community that face historic inequities; other sectors of the community may accrue benefits as well
5	Very high - action will DEFINITELY REDUCE vulnerability for ALL and is FAIR to ALL	Very high – MOST or ALL benefits are accruing to the sectors of the community that face historic inequities; other sectors of the community accrue benefits as well

Co-Benefits

Many actions will have benefits beyond greenhouse gas emissions reduction or building climate resilience. Based on City input and context, we have prioritized public health, green economy, and healthy natural systems for evaluation in the MCA. All are very high priorities in the Port Angeles and will be evaluated separately to provide greater transparency around the implications of the Resiliency Plan:

- **Public health:** Even prior to the COVID-19 pandemic, public health is a commonly evaluated co-benefit in climate action planning processes. To avoid double-counting, the equity components of public health are addressed in the equity criteria.
- **Green economy:** A green economy preserves ecosystem functions while maintaining or strengthening quality of life; it achieves balance between forms of capital (i.e., natural, human, economic) and generates jobs and livelihoods locally and regionally that support greening the entire economy. Since other criteria evaluate natural and human capital, we focus this subcriterion on the economic components of the green economy (jobs, infrastructure, markets). The City’s most promising green sectors include:

- Environmental engineering services (coastal and stormwater engineering)
- Zero-waste management, including but not limited to increasing local composite recycling, establishing waste-to-energy facilities (if they have the proper controls in place to ensure net positive benefits to the environment and emissions reduction), and organics collection and processing into compost for local application.
- Blue carbon / carbon-friendly port operations
- Regenerative agriculture
- Smallholder climate-friendly forestry
- **Healthy natural systems:** Healthy natural systems includes the processes and functions that sustain health species, habitats, and ecosystems. Critical and high-priority ecosystems, habitats, and species in Port Angeles include but are not limited to salmon and their habitat, and kelp, eelgrass, and other seagrasses and their habitat.

	Supports public health.	Supports a green economy (e.g., green jobs, infrastructure, and markets).	Supports healthy natural systems (e.g., ecosystems, habitats, and species, and the processes, functions, etc. that sustain them).
1	Very low – NO to MINIMAL support for public health and may negatively affect public health.	Very low - NO to MINIMAL investment in green jobs, infrastructure, and markets for City residents/businesses; NOT TARGETED or is minimally targeted to the City’s most promising green sectors (including education and workforce training).	Very low – NO to MINIMAL support for healthy natural systems and may negatively affect natural systems.
2	Low – Benefits the public health of SOME, but the benefits are likely short-term (i.e., <1 month).	Low – SOME investment in green jobs, infrastructure, and markets for City residents/businesses, but investment is NOT TARGETED or is minimally targeted to the City’s most promising green sectors (including education and workforce training).	Low – INDIRECTLY supports healthy natural systems of any size or priority; benefits expected to last <5 years and/or be limited in reach/scale
3	Moderate – Benefits the public health of SOME for some time (i.e., 1 month to a few years) or benefits the public health of a SIGNIFICANT portion of the population, but the benefits are likely short-term (i.e., <1 month)	Moderate – SOME investment in green jobs, infrastructure, and markets for City residents/businesses; SOME investment is TARGETED to the City’s most promising green sectors (including education and workforce training).	Moderate – DIRECTLY supports SOME healthy natural systems, which may or may not be deemed critical or high-priority in a plan or directive; benefits expected to be short-term (i.e., 5-10 years) and/or limited in reach/scale

	Supports public health.	Supports a green economy (e.g., green jobs, infrastructure, and markets).	Supports healthy natural systems (e.g., ecosystems, habitats, and species, and the processes, functions, etc. that sustain them).
4	High – Persistently benefits the public health of SOME (i.e., 5+ years) or benefits the public health of a SIGNIFICANT portion of the population for some time (i.e., 1 month to a few years).	High – SIGNIFICANT investment in green jobs, infrastructure, and markets for City residents/businesses; SIGNIFICANT investment is TARGETED to the City’s most promising green sectors (including education and workforce training).	High – SIGNIFICANTLY and DIRECTLY supports SOME healthy natural systems, a few of which are deemed CRITICAL or HIGH-PRIORITY in a plan or directive; benefits expected to be short-term (i.e., 5-10 years) but broad in reach/scale
5	Very high – Persistently benefits the public health of a SIGNIFICANT portion of the population (i.e., >5 years).	Very high – VERY SIGNIFICANT investment in green jobs, infrastructure, and markets for City residents/businesses; MOST or all investment is TARGETED to the City’s most promising green sectors (including education and workforce training).	Very high – SIGNIFICANTLY and DIRECTLY supports MANY healthy natural systems or SIGNIFICANTLY and DIRECTLY supports CRITICAL or HIGH-PRIORITY healthy natural systems of any size; benefits expected to persist (i.e., >10 years) and be broad in reach/scale

Criteria Weights

We propose the following criteria weights, based on input from CAPG via a survey and feedback from City staff and Planning Commission on the MCA approach. CAPG survey respondents answered two questions about criteria weights, one qualitative and the other quantitative (see results below). We gave the quantitative results greater influence in the weighting, since the question more strongly encouraged consideration of tradeoffs.

Respondents to both questions rated impact highest, followed by “other” (qualitative question) and equity (quantitative, points-based question). The “other” criteria suggested in the survey included a focus on the most vulnerable, viewing resiliency from the lens of ROI and cost-benefit, and aligning with other North Olympic Peninsula plans, neighboring jurisdictions, and businesses. The first one is addressed in the subcriteria for equity. The ROI approach is addressed by the MCA itself, as impact will be rated most highly and actions with high impact and low cost will be easily discerned in the results.

Criterion	Weighting	Rationale
Impact	0.25	Highest rated in both questions; highest priority for City; primary purpose of the Resiliency Plan
Cost	0.2	Third-highest rated in the points question, but lowest rated in the qualitative question, which suggests an average; high priority for City

Feasibility	0.15	Overall lowest rating across both questions, but still ~3 out of 5; high priority for City
Equity	0.2	Highly rated in both questions; about two-thirds of the rating of Impact in the points question
Community support	0.1	Rated slightly behind cost in points question, but higher in qualitative question; priority for CAPG
Co-benefits	0.1	Lowest-rated in the points question, but highest rated (after impact and equity) in the qualitative question; not a significant emphasis among City staff; suggests an average comparable to community support

Survey results

CAPG members evaluated criteria weights in two ways:

- ▶ **Qualitatively**, by being asked what they thought was most important to consider when choosing actions to build resiliency to climate impacts and reduce carbon pollution in Port Angeles.
- ▶ **Quantitatively**, by being asked to assign 20 points to indicate what is most important to consider when evaluating actions and narrowing down an actions list.

Results from the points-based question show a strong preference for impact; the remaining criteria evened out in their ratings compared to the qualitative question.

PORT ANGELES RESILIENCY PLAN
MULTI-CRITERIA ANALYSIS APPROACH

Figure 1. Responses to the qualitative question about criteria weights.

	LEAST IMPORTANT	(NO LABEL)	MODERATELY IMPORTANT	(NO LABEL)	MOST IMPORTANT	TOTAL	WEIGHTED AVERAGE
Impact: level of resiliency built or emissions reduced	0.00% 0	0.00% 0	10.53% 2	31.58% 6	57.89% 11	19	4.47
Cost: how much money it will cost	5.26% 1	26.32% 5	36.84% 7	15.79% 3	15.79% 3	19	3.11
Equity: whether costs and benefits of action will be distributed fairly across communities or whether actions will avoid disproportionately affecting the most vulnerable in our communities	0.00% 0	5.26% 1	21.05% 4	42.11% 8	31.58% 6	19	4.00
Support: level of community & stakeholder support	5.26% 1	10.53% 2	36.84% 7	31.58% 6	15.79% 3	19	3.42
Feasibility: how easy it will be to implement	10.53% 2	26.32% 5	21.05% 4	21.05% 4	21.05% 4	19	3.16
Realization of co-benefits: additional benefits such as improved public health, job creation, and recovery from COVID-19	0.00% 0	10.53% 2	31.58% 6	15.79% 3	42.11% 8	19	3.89
Other: describe in comment box below	0.00% 0	0.00% 0	16.67% 1	50.00% 3	33.33% 2	6	4.17

Figure 2. Responses to the quantitative, points-based question.

