Roadmap to Health

Assessing Adverse and Beneficial Environmental, Social, and Economic Cumulative Exposures

Health Effects Institute

✔ Checklist for Cumulative Impact Assessment

The health of people living in any community can be affected by an array of environmental, social, and economic factors. Numerous studies throughout the scientific literature that document how exposures associated with one or even a few factors might affect human health. The same is not true for understanding how integrated (or cumulative) exposure to all factors can affect health. This checklist forms part of a larger roadmap that contributes to ongoing efforts to advance the practice of assessing cumulative exposures and their impacts in the United States using a tool referred to as cumulative impact assessment (CI assessment). It provides considerations that can inform a CI assessment process (illustrated on the next page), alongside example contexts for how these considerations might be applied in real-world communities. CI assessments can help to reframe scientific and policy discussions so that they encompass the full spectrum of factors that can affect human health and, in so doing, position decision-makers to capitalize on beneficial impacts while avoiding adverse impacts. Because CI assessment processes are highly context-specific, this checklist and the roadmap are not intended to provide prescriptive guidance on the implementation of a CI assessment.

The format of this checklist reflects a four-phase, generic process for CI assessment described in the roadmap (**Figure 1**).

We ask anyone who elects to use the roadmap and checklist to share your experience and any ideas for improving these resources by emailing us at *energy@healtheffects.org*.

This document is Appendix B from HEI Energy Special Report 2 (*https://www.heienergy.org/publications#special*).

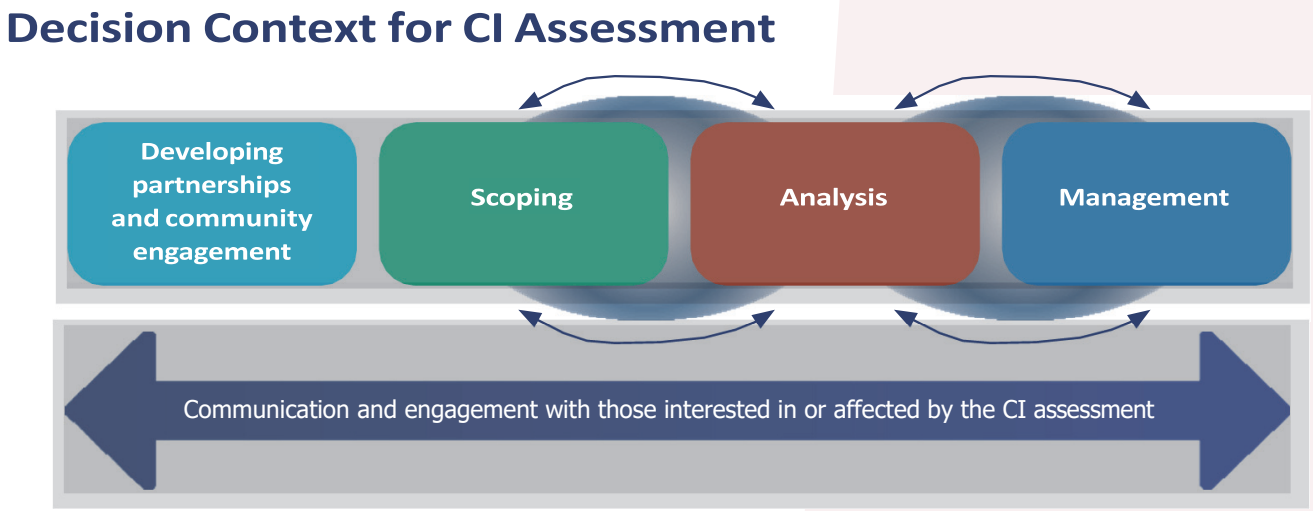

Figure 1. Overview of the four-phase, generic process for CI assessment described in this roadmap, including communication and engagement throughout the CI assessment process (large arrow) and the potential for iteration between phases (shown using thin arrows).

DECISION CONTEXT: WHAT QUESTION OR ISSUE IS BEING ADDRESSED?

The analytical approach and methods used in a CI assessment are shaped by the context in which it is being applied. CI assessment can inform regulatory decisions, and it can also be used for nonregulatory, research, or educational purposes.

1. **What is the decision context for the CI assessment?**
   - ❍ Federal, state, or local regulation
   - ❍ Nonregulatory, research, or educational project
   - ❍ Other

PHASE 1. DEVELOPING PARTNERSHIPS AND COMMUNITY ENGAGEMENT: WHO SHOULD BE INVOLVED?

A key component of the CI assessment process is building partnerships and engaging with people in communities across sectors who are interested in or somehow affected by the decision or activity that has initiated the assessment process. Continued communication and engagement throughout and after the CI assessment process are critical aspects of this phase.

2. Who will lead and who will be involved in the assessment process?

- If the decision context is regulatory, recruit key partners that the regulation requires for participation in the CI assessment process; these might include government officials, industry representatives, research or academic partners, and community members.
- Identify individuals with the following expertise and experience for the project team: policy, industry, research and analysis, environmental health, and community voices.
- Identify other individuals who want to participate in the assessment process, who have been involved in prior research or assessment efforts, and who have not been involved in prior efforts.

3. How will participants be involved in the assessment process?

- Define roles and responsibilities for all assessment participants, which might include project management, data collection, research and analysis, advisory, oversight, and communication.
- Define roles and responsibilities based on interest, expertise, and potential impact on the project implementation and outcomes.
- Define how participants will be compensated, how their information will be protected, and how the assessment process will be facilitated.

4. How will information be communicated throughout and after the assessment process?

- Define how all aspects of the assessment process will be communicated among assessment participants.

5. How will broader engagement occur?

- Define the general public and identify how the public will be involved in the assessment process.
- Define how all aspects of the assessment process, including results, will be communicated to the public.

PHASE 2. SCOPING: WHAT IS THE FULL SCOPE OF EXPOSURES AND FACTORS AND WHAT IS MOST IMPORTANT TO INCLUDE IN THE ASSESSMENT?

The scoping phase of a CI assessment is intended to both explore and set parameters and boundaries for the breadth of the assessment. It consists of identifying and prioritizing which impacts to evaluate in the assessment, determining geographic and temporal boundaries for the assessment, and identifying other related factors that might interact with or affect the impacts being assessed.

6. Identify potential impacts

- If the decision context is regulatory, determine and identify what categories of impacts are required to be assessed (e.g., natural environment, built environment, socioeconomic, health, psychosocial, spiritual, and community-level).
- Define how potential impacts will be identified. Methods can include a literature review, surveys, focus groups, group discussions, multisector forums, or some other mechanism.
- Identify and list potential impacts for an array of factors that might affect human health and well-being of individuals in an affected population; these might include natural environment, built environment, socioeconomic, health, psychosocial, spiritual, and community-level impacts.
- Identify and list what exposures and factors are associated with the identified impacts.
- Ensure that all assessment participants have been consulted on what potential impacts to consider.
- If appropriate, ensure that the general public has had an opportunity to identify potential impacts for consideration in the assessment.

7. Prioritize potential impacts

- Identify potential impacts that are of value to the community; consult community member assessment participants for the best way to survey or speak with other community members.
- Identify potential relationships or potential interactions among and between impacts; consult all assessment participants.
- Identify what data or information is available on identified impacts; consult government partners, industry partners, and research or academic partners for resources.
- Identify the temporal scale and spatial scale of available data and information.
- Determine whether any critical information gaps exist.
- Based on available information, impacts of highest concern, time, labor, and resources, select a final set of impacts and what metrics will be used to assess those impacts in the assessment; endeavor for consensus among all assessment participants.

8. Determine geographic and temporal boundaries

- Determine whether the decision context specifies the geographic and temporal scope of the assessment.
- Determine the spatial extent of activities being assessed and whether prioritized impacts extend beyond these boundaries; consult government partners, industry partners, community members, and research or academic partners.
- Determine spatial scale of assessment (e.g., counties, census tracts, census blocks), which will partly depend on data and information identified in 7.
- Determine what timeframe should constitute the baseline for the assessment and what timeframe should constitute the assessment of impacts into the future; consult all assessment participants. This decision will likely depend on data and information identified in 7).

9. Identify other related factors

- Identify other industries, sources, or activities that are located within the geographic scope of the assessment that might affect, or are the same as, one or more prioritized impacts (such as emissions of air pollutants or greenhouse gases). Consult all assessment participants.
- Determine whether other assessments have been performed for other nearby sources of concern; consult government partners and research or academic partners, and consider conducting a literature review.
- Identify terrain, weather, climatic, or atmospheric conditions within the geographic scope of the assessment that might affect prioritized impacts; consult all assessment participants.

PHASE 3. ANALYSIS: WHAT ANALYTICAL METHODS ARE AVAILABLE AND MOST APPROPRIATE?

The analysis phase of a CI assessment builds and expands on the results of the scoping phase. It includes additional consideration of relationships and interactions among and between impacts and their associated exposures and factors begun in the scoping phase. The analysis phase includes an assessment of baseline conditions of the population in which the CI assessment is being conducted, an assessment of cumulative impacts, and a determination of the significance of cumulative impacts.

10. Assess baseline

- Based on the temporal boundaries identified in item 8, identify time period for the collection of baseline information.
- Collect baseline information on prioritized impacts within the geographies determined in item 8, which might include data on water quality, air quality, health outcomes, and employment rates.
- If additional information is identified as missing in item 6, collect data on missing information. Collection methods might include environmental sampling, remote sensing, surveys, focus groups, or ethnographic research methods.
- Collect data on baseline health status of the community, which might include rates of chronic disease, asthma, quality of life metrics, and healthcare utilization. Data collection is likely to be conducted by government partners or other research and academic partners.

11. Assess cumulative impacts

- If the decision context is regulatory, identify whether certain analytical or other methods are prescribed to assess cumulative impacts.
- Consult all assessment participants to determine appropriate methods for analysis; these might include spatial analysis, statistical modeling, exposure assessment, or scenario modeling.

Considerations for determining appropriate analytical methods (Subsection #11)**:**

- Identify resources available for conducting analysis and modify analytical methodology as needed.
- Determine how the assessment of future changes in prioritized impacts will be conducted.
- Determine how interaction among prioritized impacts will be assessed.
- Determine how tradeoffs between beneficial and adverse impacts will be assessed.
- Determine the appropriateness of including an evaluation of uncertainty for the assessment of cumulative impacts.
- Identify whether certain analytical methods are more relevant to identifying and successfully implementing management strategies for cumulative impacts.
- Determine whether assessment of cumulative impacts will be evaluated among groups of prioritized impacts, or whether a single determination of cumulative impact is more appropriate.
- Analyze cumulative impacts. Analysis likely to be conducted by government, industry, research, or academic partners.

12. Determine the significance of cumulative impacts

- If the decision context is regulatory, identify whether thresholds or methods to determine the significance of cumulative impacts are prescribed in the regulation.
- Determine if there are appropriate thresholds that would constitute significant cumulative impacts. Determination is likely to be a normative and subjective process conducted in consultation with all assessment participants and might include a literature review, review of other impact assessments in the region, consultation among assessment participants and experts outside of assessment participants.
- Evaluate whether cumulative impacts assessed in item 11 surpass the identified thresholds for the assessment.

PHASE 4. MANAGEMENT: WHAT ARE THE OPTIONS FOR ADDRESSING THE OUTCOME OF THE ASSESSMENT?

The management phase of a CI assessment includes the identification and implementation of potential strategies for preventing, minimizing, and monitoring cumulative impacts. The management phase might include iteration with the analysis phase of a CI assessment. This phase might or might not be applicable depending on the decision context for the assessment.

13. Avoid, minimize, and monitor cumulative impacts

- If the decision context is regulatory, determine what management strategies are required to address cumulative impacts; consult all assessment participants. Implementation is likely to be conducted by industry partners alongside government, research, or academic partners.
- Identify the outcome of the assessment and whether significant cumulative impacts have been identified.
- Identify strategies to prevent or minimize cumulative impacts and thresholds identified in the analysis phase. Strategies might include the implementation of technological solutions, modifications of the activities being assessed, or modifications of governance processes. Consult all assessment participants; implementation likely to be conducted by industry partners alongside government, research, or academic partners.
- Determine any strategies to maximize beneficial impacts while minimizing adverse impacts identified in the analysis phase.
- Identify strategies to monitor cumulative impacts identified in the analysis phase. Strategies might include implementing additional data collection and analysis efforts or establishing working groups. Consult all assessment participants; implementation likely to be conducted by industry partners alongside government partners, community members, and research or academic partners.
- Determine how management strategies will be monitored and evaluated. Strategies might include the establishment of working groups and multisector collaboration. Consult all assessment participants; implementation likely to be conducted by industry partners alongside government partners, community members, and research or academic partners.