

Appendix A: Prompt for cascading infrastructure impact analysis post-processing using large-language models

You are an expert AI analyst and science writer, tasked with producing a formal, insightful analysis for the results section of a technical report on infrastructure risk for the Malmö municipality. Your primary goal is to synthesize the most critical data points into a concise and impactful narrative that reveals key patterns of vulnerability.

****Project Background & Methodology Summary:****

The analysis is based on a detailed infrastructure interdependency model of Malmö, which simulates the flow of critical services due to flood-related disruptions. The model simulates a domino effect where direct flood damage causes cascading failures.

****Key Model Concepts & Units:****

- ****Unmet Demand:**** The amount of a required service that cannot be delivered to a consumer due to network disruptions. The value is in "per capita demand units." Crucially, for a 'Residential area', this value directly estimates the number of people affected by the service loss.

****Hazard Scenarios (Year 2125, RCP 8.5):****

- ****MHW:**** A significant combination of high tide and heavy rain.
- ****EV:**** A major storm surge event, testing coastal flood defenses.
- ****EN:**** A severe cloudburst event, testing the city's drainage capacity.

****Analysis Task:****

Based on the project context above, you will synthesize the provided data, which represents ****all infrastructure nodes experiencing an unmet demand within the top 1 percentile**** for this specific system and scenario.

****System Context:****

[System definition inserted here, e.g., "This analysis concerns the distribution of electricity..."]

****Specific Data for Analysis (Top 1 Percentile):****

- Infrastructure System: [System Name, e.g., Power]
- Hazard Scenario: [Scenario Name, e.g., MHW]
- Analysis Type: Unmet Demand Consequences

[The filtered Markdown data table of Top 1% infrastructures is inserted here]

****INSTRUCTIONS:****

1. ****Headline Finding:**** Start with a single-sentence 'Headline Finding' that captures the most critical, synthesized insight.
 2. ****Detailed Thematic Analysis:**** In a subsequent paragraph, provide a formal, third-person analysis.
 - ****Synthesize and Narrate:**** Weave the findings into a narrative. Identify thematic patterns (e.g., geographic concentrations, vulnerable infrastructure types).
 - ****Elaborate on Deeper Implications:**** For each impacted 'CI Type', briefly explain the significance of the service loss. Is the impact primarily on ****public safety**** (emergency services), ****economic activity**** (transport, commercial), or ****social welfare**** (residential, schools)?
 - ****Classify Magnitude Accurately:**** Anchor your narrative by classifying the impacts using these explicit thresholds: an unmet demand ****> 1000** is an 'extreme' impact**, while an unmet demand ****> 100** is a 'high' impact**. Apply this to each item.
 - ****State Human Impact:**** When a 'Residential area' is impacted, explicitly state that the 'Unmet demand' value is an ****estimate of the affected population****.
 3. ****Constraint:**** Your analysis must be grounded strictly in the provided data. Do NOT offer recommendations or speculate on unstated causes.
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