

# Nanaimo Regional General Hospital: Assessing Climate Risks & Opportunities



ADAPTATION

A forward-thinking group at Nanaimo Hospital developed a comprehensive climate risk assessment matrix which is becoming an integral part of their organizational decision-making. Future hospital retrofits will potentially include increased cooling capacity, enhanced air filtration, and other measures to reduce costs, greenhouse gas emissions, and protect the facility and its patients from the potential effects of climate change.

## Project Summary

The effects of climate change on hospitals are felt not just in facilities, but in public health. Heat waves and cold snaps, storms, wildfires, drought, and flooding can cause critical system failures that lead to service disruptions, temporary evacuations, and even closures, resulting in health emergencies for individual patients and the community at large.

In 2015, recognizing that energy efficiency and climate change mitigation alone weren't enough, the Island Health Energy Management team held a workshop about climate adaptation at Nanaimo Regional General Hospital (NRGH), a 55,000 m<sup>2</sup> hospital campus serving 350,000 people on Vancouver Island. Island Health had some seed money to cover the cost of a consulting team that would carry out a risk assessment so one of Island Health's Energy Managers stepped up to lead the project. Island Health subsequently requested and received additional funding from NRCan before issuing a request for proposals and awarding the consulting contract in December of 2016. That's when the project started to get traction.

The Public Infrastructure Engineering Vulnerability Committee (PIEVC) of Engineers Canada has developed a rigorous risk assessment protocol (see Figure 1) to determine the vulnerability of infrastructure to climate change. The Nanaimo working group licensed that protocol, and applied it to their hospital campus to assess the degree of risk to each piece of infrastructure.

Figure 1 — PIEVC Risk Assessment Protocol



## Benefits

1. Preventing climate-related emergencies is dramatically less costly than recovering from them, both in terms of dollars spent and health impacts on the population.
2. Nanaimo's risk assessment matrix is allowing Island Health to make rational decisions about capital investments in the context of future likely climate impacts.
3. The project has called attention to the fact that some energy consumption projects actually enhance resiliency to climate change. For example, saving water now means a future water shortage will take longer to impact the hospital.
4. Current building codes are based on historical weather, not the future. Experience gained in this project is influencing what engineering associations tell their membership, and will help to inform standards and building codes where appropriate.



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Over the course of the project, the team encountered several challenges, including jurisdictional authority, hierarchical systems (system redundancies and different exposures), and non-infrastructure (operational) issues. Key to overcoming these was a commitment to communication and collaboration, with a number of cross-disciplinary meetings held to share information among key stakeholders.

At one large workshop the team invited as many stakeholders within Island Health as possible (including corporate directors), together with climate scientists, engineers, and other representatives from external organizations experienced with climate science and the PIEVC protocol. Another workshop was smaller; here they defined the yes/no matrix for possible negative climate interactions on infrastructure. Anything rated 'yes' received more exploration.

## Results

Nanaimo Regional General Hospital's risk assessment project has triggered a revision to Island Health's sustainability policy, to ensure that climate change is taken into account in all future retrofits and new construction.

Next steps for Island Health will include pursuing key retrofits and upgrades informed by the report, which also provides a prioritization list synchronized with capital asset renewal plans. These include the following:

- increased cooling capacity and redundancy,
- load shedding strategies,
- reinstalling return air systems and/or enhanced filtration system,
- implementing a back-up potable water supply.

The health authority is also planning risk assessments at other facilities using one or more of the following: PIEVC protocol, an additional assessment tool adapted from the US Dept. of Health & Human Services, cross dependency software, or public safety assessments.

Addressing the vulnerabilities identified in this project has become one of Island Health's objectives in their Annual Priorities Plan. They are also ensuring that new construction and major renovations use future climate projections to inform design.

With its comprehensive and collaborative climate risk assessment matrix, Nanaimo Regional General Hospital is working toward making its campus more resilient today, and minimizing the risk of climate-related emergencies, public health crises, and unforeseen costs in the future.

## Lessons Learned

1. Secure a strong mandate from management to ensure adequate input from clinicians and other subject matter experts.
2. If possible, don't just pick one tool and stop there. The PIEVC protocol is very good but there are health-sector tools that can be added to the mix for a more comprehensive assessment. Make it an ongoing, iterative effort.
3. Use a range of future climate projections, at whatever level of detail is available.
4. Consider interdependencies and not just single pairs of weather and infrastructure interactions. Three different failures could be manageable on their own, but catastrophic if they happen simultaneously.
5. Make climate-related risk assessment part of your day-to-day business. Incorporate it into your decision-making process for expansions, retrofits, upgrades, and any other capital expenditures.



# Related Resources & Links

- Public Infrastructure Engineering Vulnerability Committee (PIEVC) – Engineers Canada  
<https://pievc.ca/>
- Climate Change Adaptation in B.C. – Government of B.C. Resources  
<http://www2.gov.bc.ca/gov/content/environment/climate-change/adaptation/resources>
- Retooling for Climate Change – Fraser Basin Council  
<http://www.retooling.ca/>
- Plan2Adapt – Pacific Climate Impacts Consortium  
<https://www.pacificclimate.org/analysis-tools/plan2adapt>
- Pacific Institute for Climate Solutions (PICS)  
<http://www.pics.uvic.ca/>

## Climate Change and Healthcare Resources:

- Canadian Coalition of Green Healthcare  
<http://greenhealthcare.ca/>
- Sustainable and Climate-Resilient Health Care Facilities Toolkit  
<https://toolkit.climate.gov/tool/sustainable-and-climate-resilient-health-care-facilities-toolkit>
- Health Care Facilities Resilient to Climate Change Impacts  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4276665/>
- Government of Canada: Climate change and public health fact sheet:  
<https://www.canada.ca/en/public-health/services/health-promotion/environmental-public-health-climate-change/climate-change-public-health-factsheets.html>

## Regional Climate Change Projections:

- Climate Projections for the Capital Region  
[https://www.crd.bc.ca/docs/default-source/climate-action-pdf/reports/2017-07-17\\_climateprojectionsforthecapitalregion\\_final.pdf](https://www.crd.bc.ca/docs/default-source/climate-action-pdf/reports/2017-07-17_climateprojectionsforthecapitalregion_final.pdf)
- Climate Projections for the Cowichan Valley Regional District  
<https://www.cvrld.bc.ca/DocumentCenter/View/81884>
- Climate Projections for Metro Vancouver  
<http://www.metrovancouver.org/services/air-quality/AirQualityPublications/ClimateProjectionsForMetroVancouver.pdf>

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### *Questions and additional support:*

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