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The PIEVC Protocol for Infrastructure Climate Risk Assessments

PIEVC CVIIP

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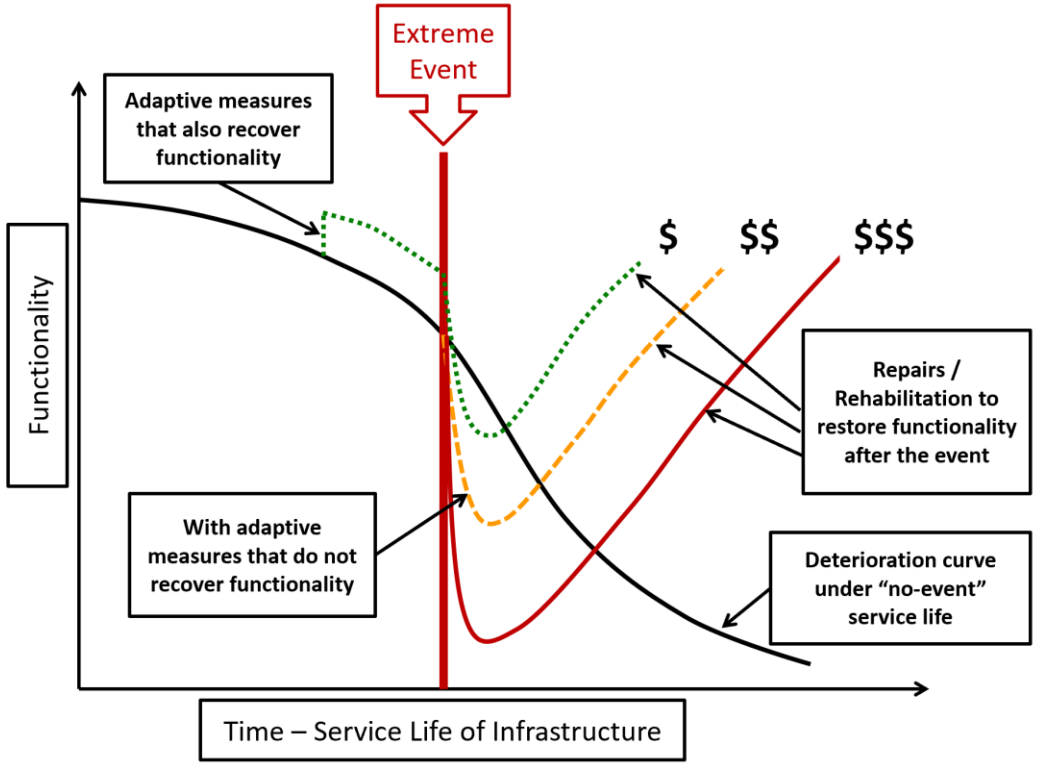
AMONTario – March 23, 2021

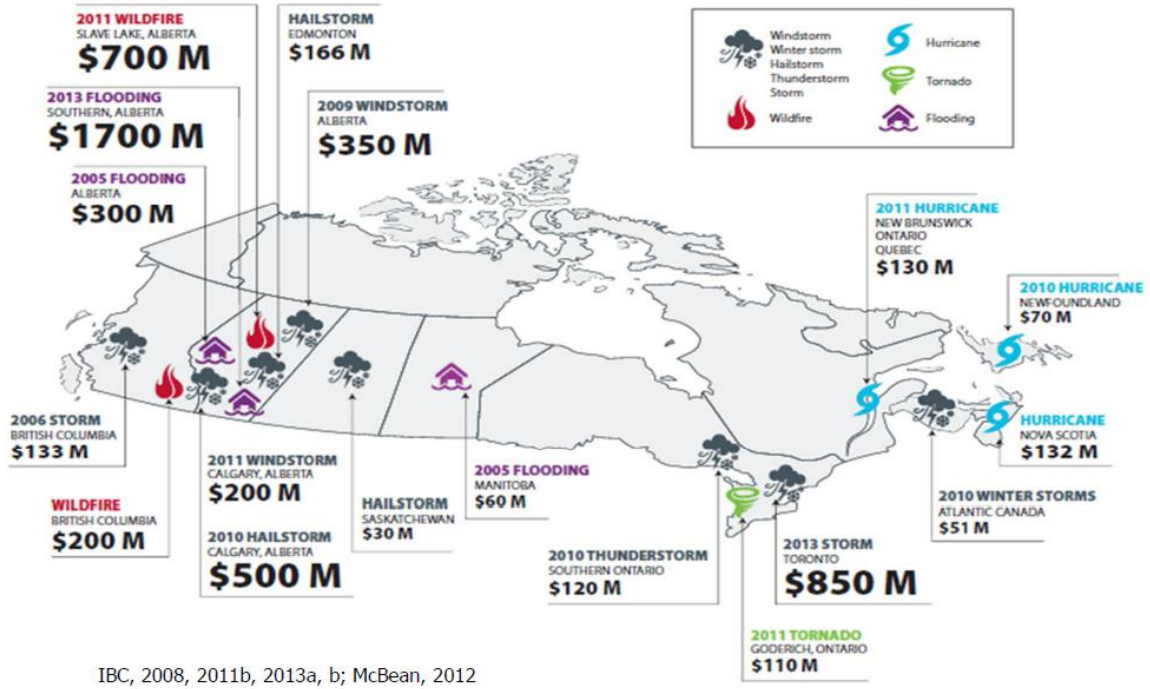
AMONTario
ASSET MANAGEMENT ONTARIO

PIEVC Program

- **Development** beginning in **2005** – **Engineers Canada**, with support from the **Federal Ministry of Natural Resources Canada (NRCan)** to start the Public Infrastructure Engineering Vulnerability Committee (PIEVC)
- **Developed to assist engineers** in factoring climate change impacts into plans for design, operation, maintenance and adaptation of public infrastructure
- **Applied by professional teams** (Engineers, Climate Scientists, Natural Scientists, Planners, Risk Managers, Owners, Operators, Political Decision-Makers, as well as Civil Society stakeholders)

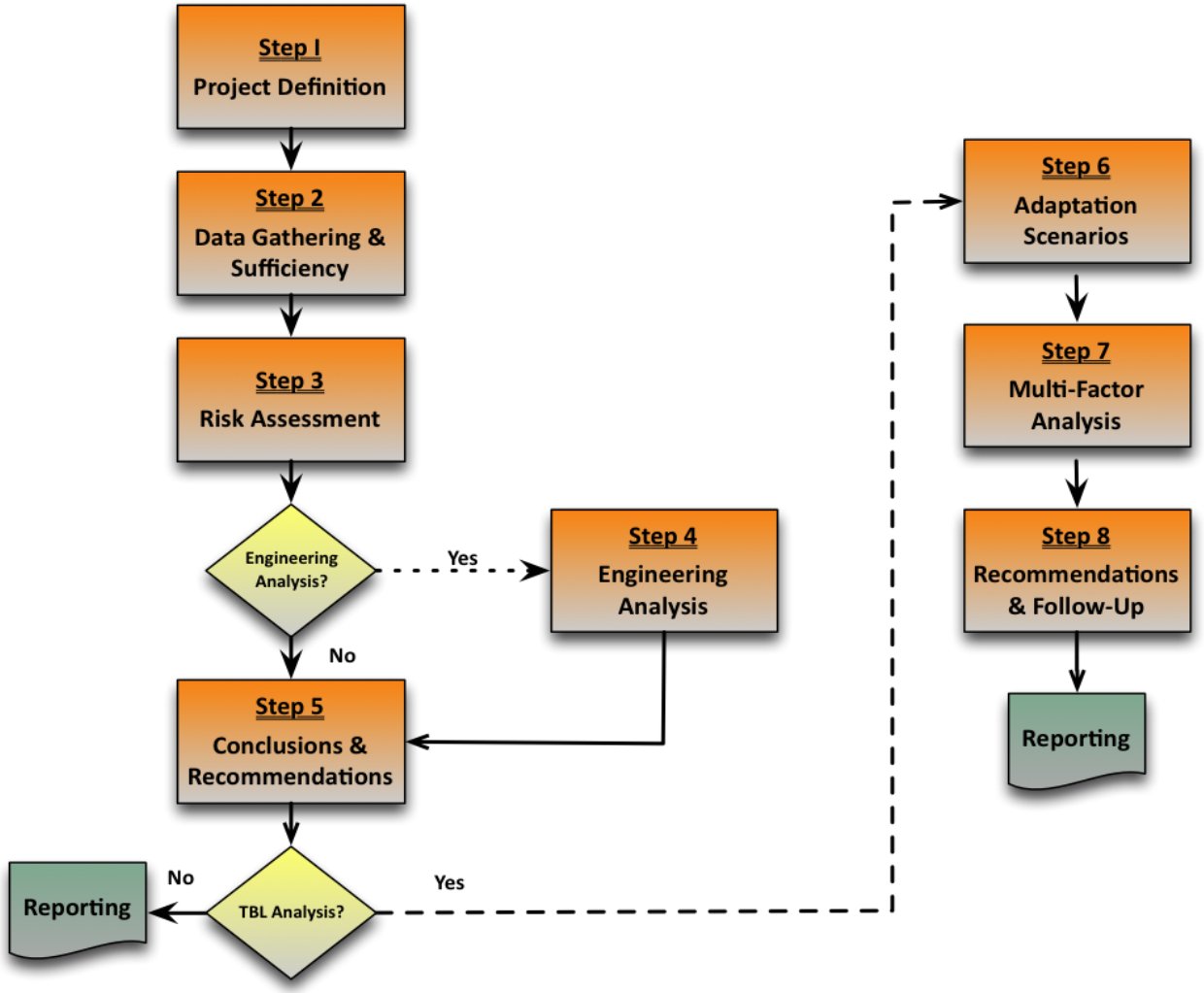
Why do we need Climate Risk Assessments?

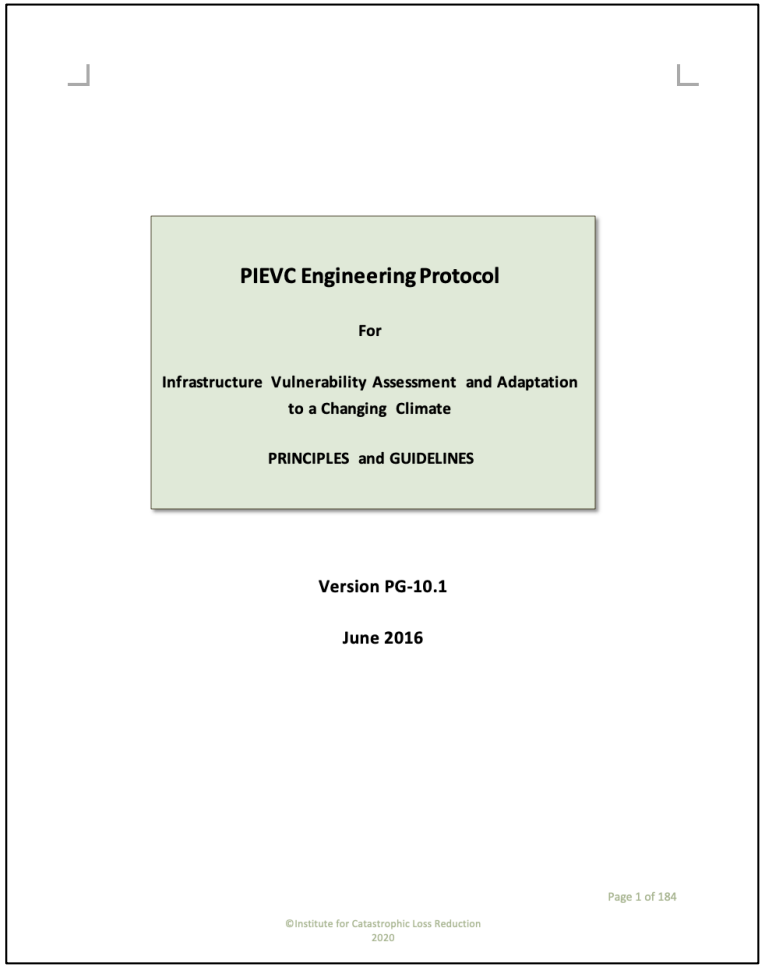




IBC, 2008, 2011b, 2013a, b; McBean, 2012

The PIEVC Protocol Process





PIEVC Engineering Protocol

For

Infrastructure Vulnerability Assessment and Adaptation to a Changing Climate

PRINCIPLES and GUIDELINES

Version PG-10.1

June 2016

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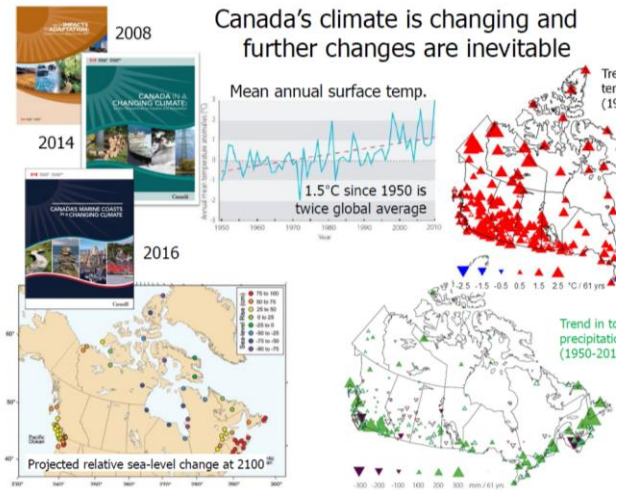
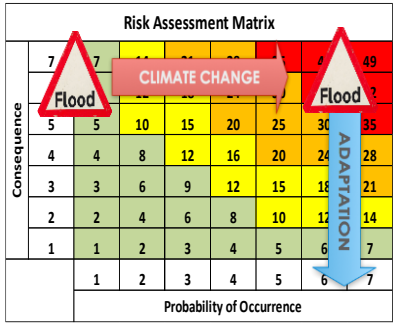
PIEVC Process – *Brief* Overview



Step I
Project Definition

Step 2
Data Gathering & Sufficiency

Step 3
Risk Assessment



Engineering Analysis?

Yes

Step 4
Engineering Analysis

No

Step 5
Conclusions & Recommendations

TBL Analysis?

No

Reporting

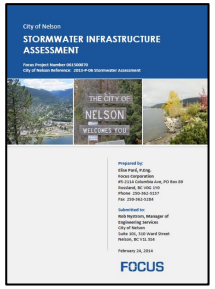
Yes

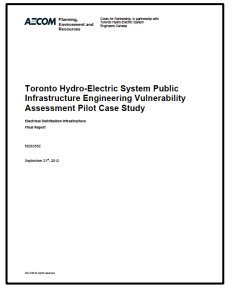
Step 6
Adaptation Scenarios

Step 7
Multi-Factor Analysis

Step 8
Recommendations & Follow-Up

Reporting





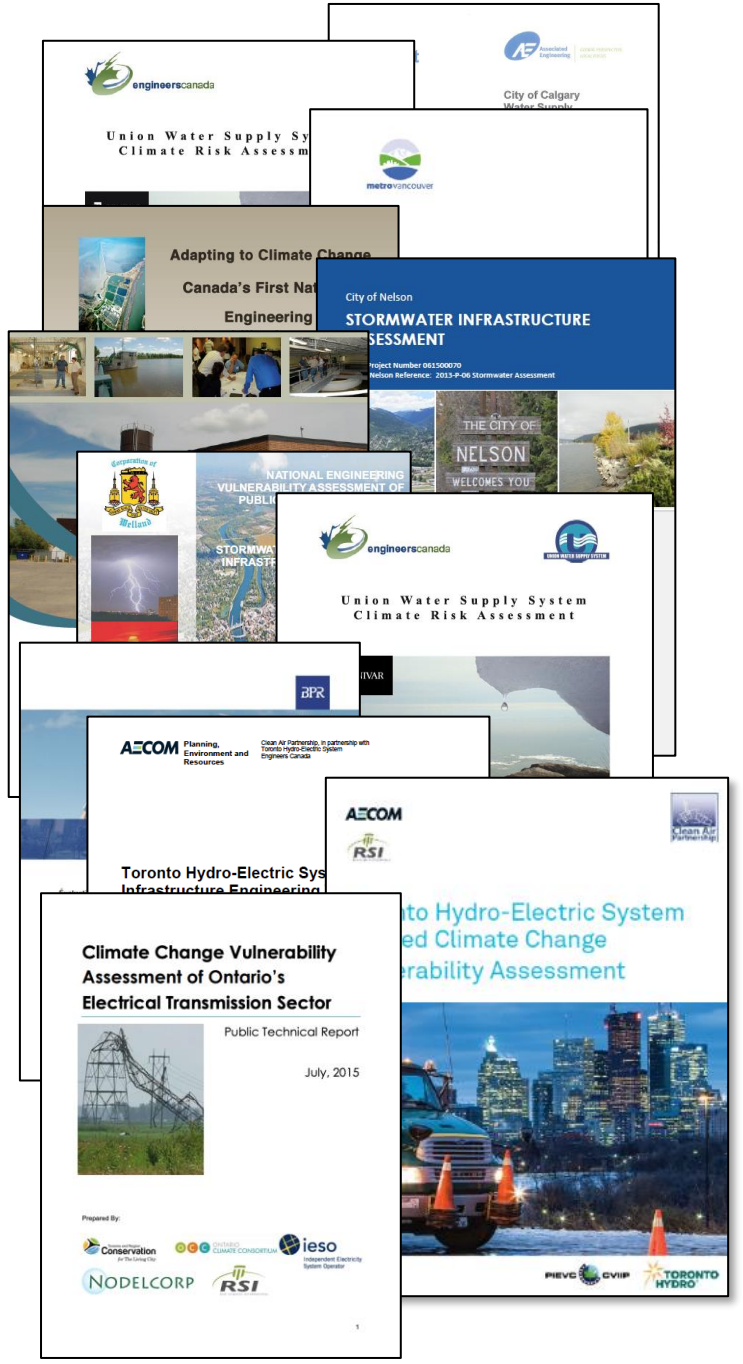
Steps in the PIEVC Process – *Brief* Overview

Step	Description
Preparation	Identify infrastructure Timeline, budget, participants, stakeholders Project team
1: Project Definition	Define infrastructure, components, timelines Define climate parameters of concern Determine risk score method
2: Data Collection, Compilation, Analysis	Identify, compile, historical and future climate data
3: Risk Assessment	Yes/No analysis Probability (likelihood), consequence scores Calculate risk scores and compile into a risk matrix
4: Engineering Analysis (optional)	Climate loads, component capacity analysis
5: Conclusions and Recommendations	Report on risk profile – high, medium, low risks Action: Early (high), future (medium), monitoring (low) Develop adaptation plans and next steps
Reporting	Project Assessment Report All steps documented, include commentary on limitations, gaps, unknowns

PIEVC Protocol Applications

Category	# Completed or In-Progress*
Buildings	15
Water	6
Storm/wastewater	20
Roads, hwys, bridges	13
Transit	2
Coastal, ports	9
Airports	7
Utilities	5
Indigenous, FN	10
International	Applications associated with eight projects and programs
Total (estimated)	~95

**Does not include al INFC Climate Lens applications*



Visit www.pievc.ca for published assessment reports

PIEVC Program Partnership

- EC Divestment process – 2019-2020
- Partnership formed between ICLR, CRI, GIZ
- No payment to assume program – a commitment to maintain and develop the Program
- Maintain primary tenants: Free access for public infrastructure in Canada, publication of reports

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Institute for Catastrophic Loss Reduction

- Formed in 1997: Protect people and property from the impacts of extreme natural events
- Independent, non-profit
- An institute of Western University, developed and supported in partnership with voluntary P&C insurance industry members

Insurance Advisory Committee – ICLR/U of G Basement Flood Protection Lab & WINDEE Dome, UWO

What sets the PIEVC Protocol apart?

- Established method, large number of applications across a wide range of infrastructures
- Made in Canada & **access is free for any public infrastructure in Canada**
- Does not require comprehensive, complete data – a screening process that informs adaptation actions, or more detailed quantitative assessments
- Highly scalable, adaptable – reflected in the wide range of assessments
- Comprehensive network of infrastructure owners, consultants, subject matter experts
- Project workshops are a key component – education, learning, breaking down silos (e.g., a platform for discussion amongst decision makers, design, operations, climate science)
- The Program strives to make assessment reports publicly available via PIEVC.ca
- PIEVC Protocol Training available – IRP Program, via Climate Risk Institute
- Growing international application

Cooperative development of products: PIEVC HLSG Advisory Group

National Federal Government Ministries:
- Natural Resources Canada
- Treasury Board of Canada
- Infrastructure Canada
- Environment and Climate Change Canada
- Public Services and Procurement Canada

Private industry, e.g.:
- AECOM
- WSP
- Wood

Municipal:
- Federation of Canadian Municipalities
- City of Edmonton
- Cowichan Valley Regional District
- ICLEI

Climate Services
- Ouranos
- ECCC Centre for Climate Change Services

International:
- Gesellschaft für Internationale Zusammenarbeit (GIZ), Germany
- *Global Affairs Canada (Federal Ministry)*

Indigenous:
- First Nations Adapt with CIRNAC
- Ontario First Nations Technical Services Corporation

Observers:
- Standards Council of Canada
- National Research Council – Climate Resilient Buildings and Core Public Infrastructure Program
- World Federation of Engineering Organizations (WFEO)

PIEVC Program – Ongoing Projects

Current/2021 priorities for the Program in Canada:

- PIEVC High Level Screening Guide
  - Asset screening
  - Single asset/Portfolio analysis
- Infrastructure Resilience Professional (IRP) Credential – Climate Risk Institute
  - Six course training program including PIEVC Protocol
- National and International Communities of Practice
- Continued support for all users of the PIEVC Protocol

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