SANDFORD FLEMING FORUM

Municipal Corporation, Community Housing and Commercial Real Estate: Three Inherent Fragilities in Community Resilience

BOMA Toronto

RiskLogik

Southern Harbour
FUTURE READY

ENTUITIVE

decision·partners
insight · judgment · decision making

Snowy River
International Inc

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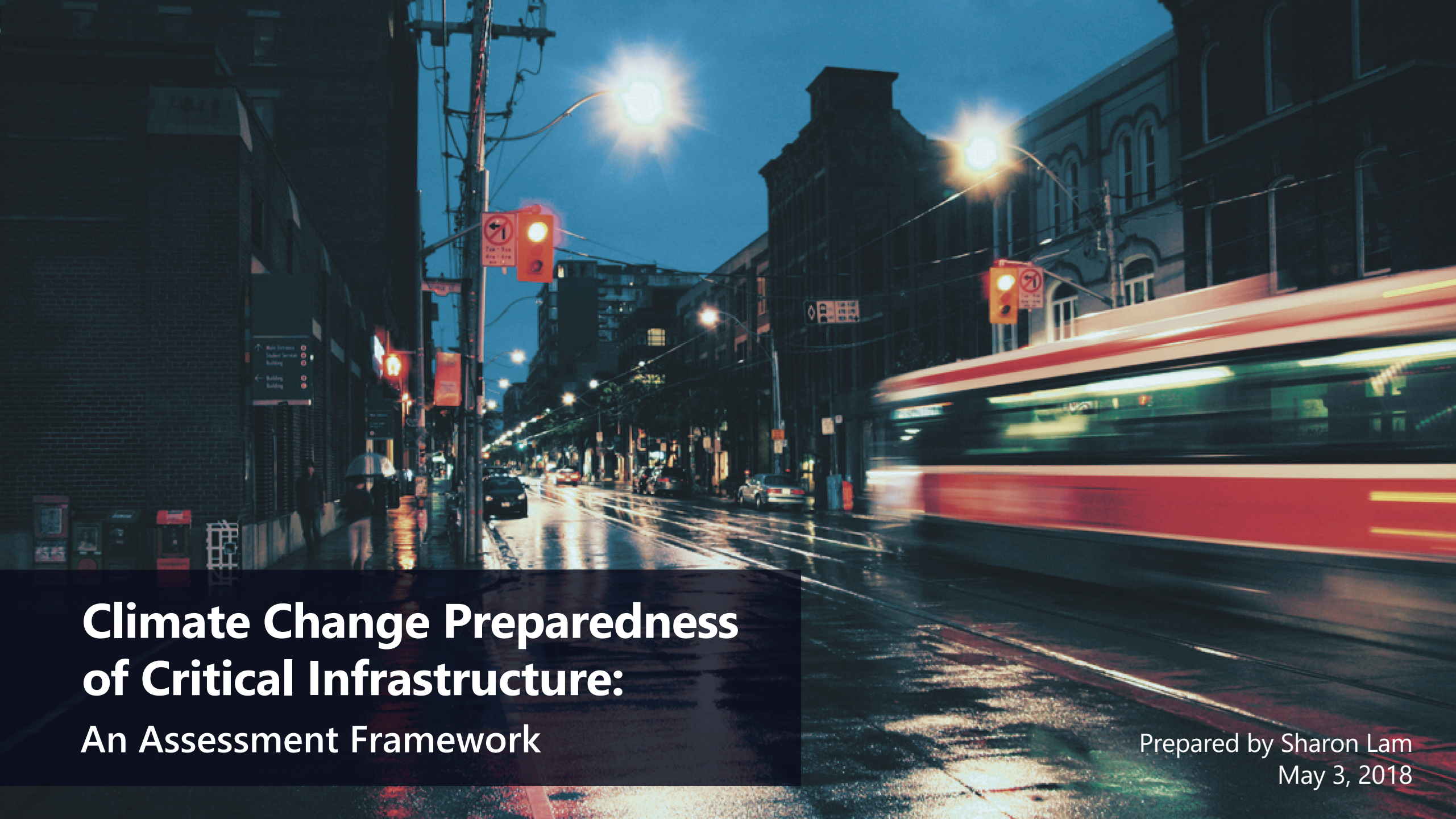


Climate Change Preparedness of Critical Infrastructure:

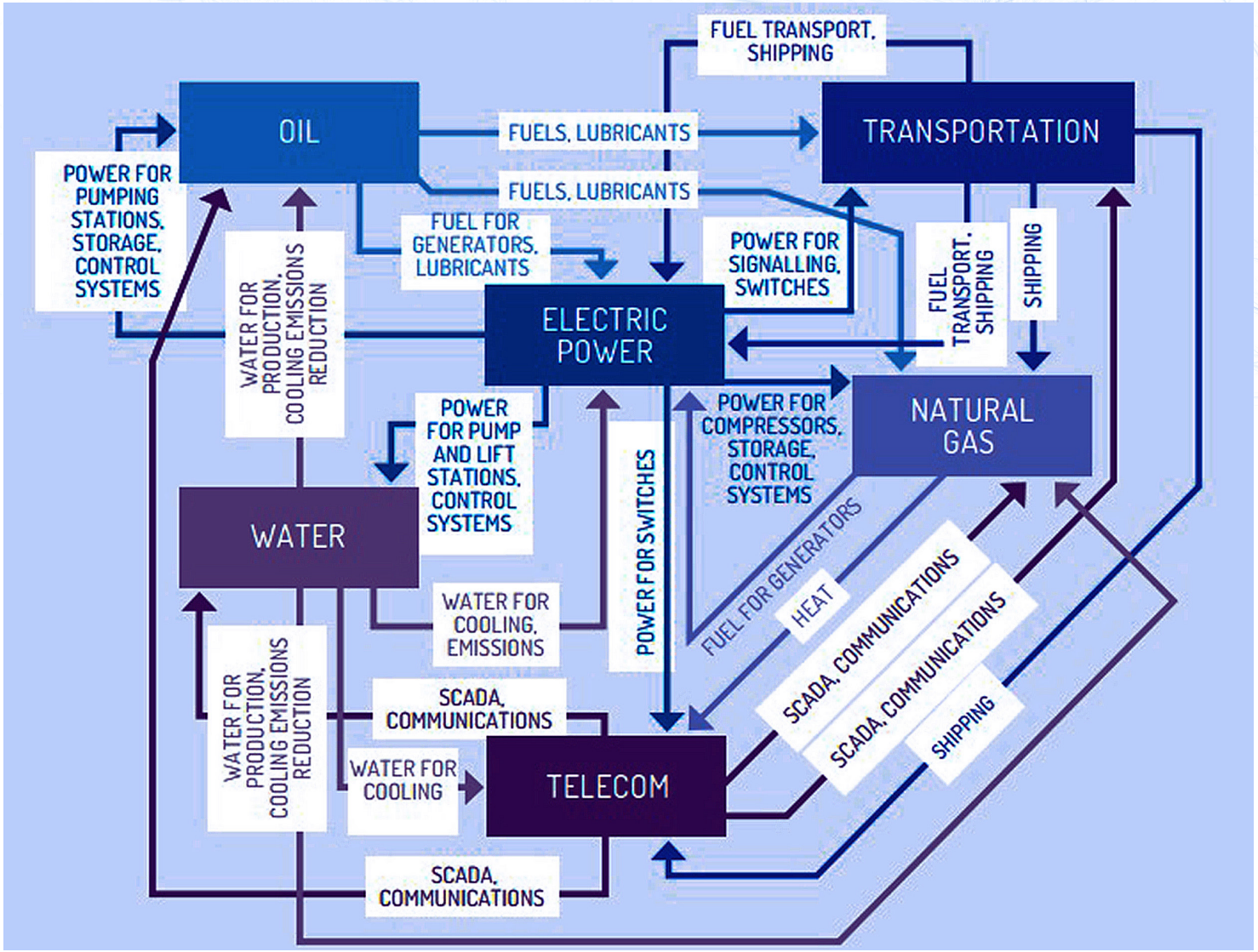
An Assessment Framework

Prepared by Sharon Lam
May 3, 2018

Critical Infrastructure in a Changing Climate

Climate change-related risks:

- Physical impacts
- Legal impacts
- Social/reputational impacts
- Environmental impacts
- Financial impacts
- Broader economic impacts

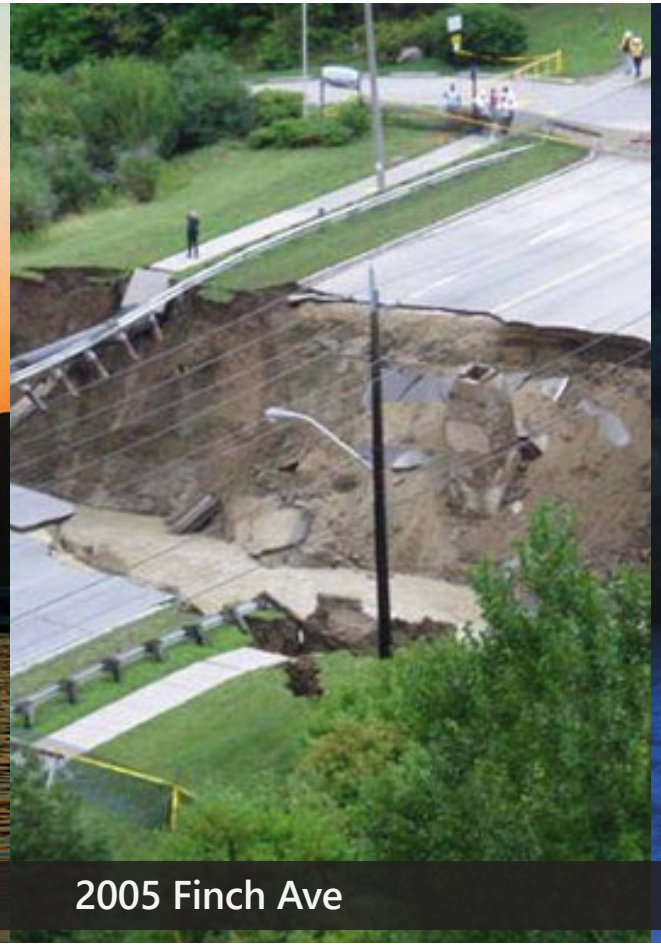


Infrastructure Dependencies & Interdependencies

http://files.em.vic.gov.au/EMV-web/Critical-Infrastructure_Resilience_Strategy_Sept-2016.pdf

Are the critical infrastructure systems in our cities and communities prepared for the effects of climate change?

2003 Northeast Blackout



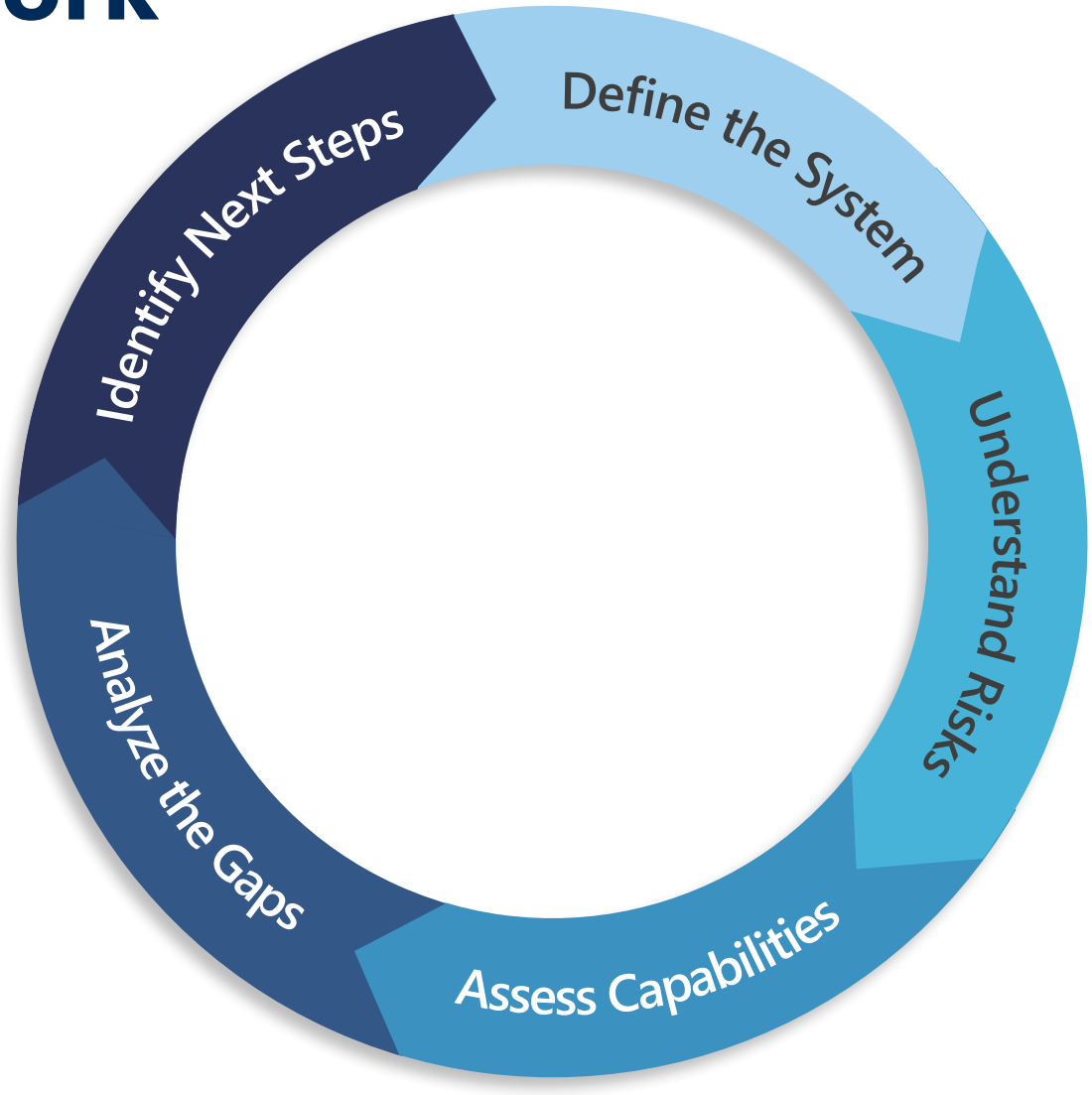
2005 Finch Ave

2013 Floods

2013 Ice Storm

Assessment Framework Overview

Aim: to enable a self-assessment of climate change preparedness by critical infrastructure owners and operators



Framework Development

1. Review of the Literature & Existing Tools

Academic & Other Literature

Resilience, Risk management, Business continuity planning/ management, Emergency/ disaster management, Vulnerability, Foresight, Supply chain management

Existing Tools

8 Tools for Resilience

9 Tools for Risk Management, Vulnerability and Business Continuity Planning

2. Engage Experts to Gather Feedback

Gather expert input

Analyze & integrate responses

3. Revise Assessment Framework

Final report:

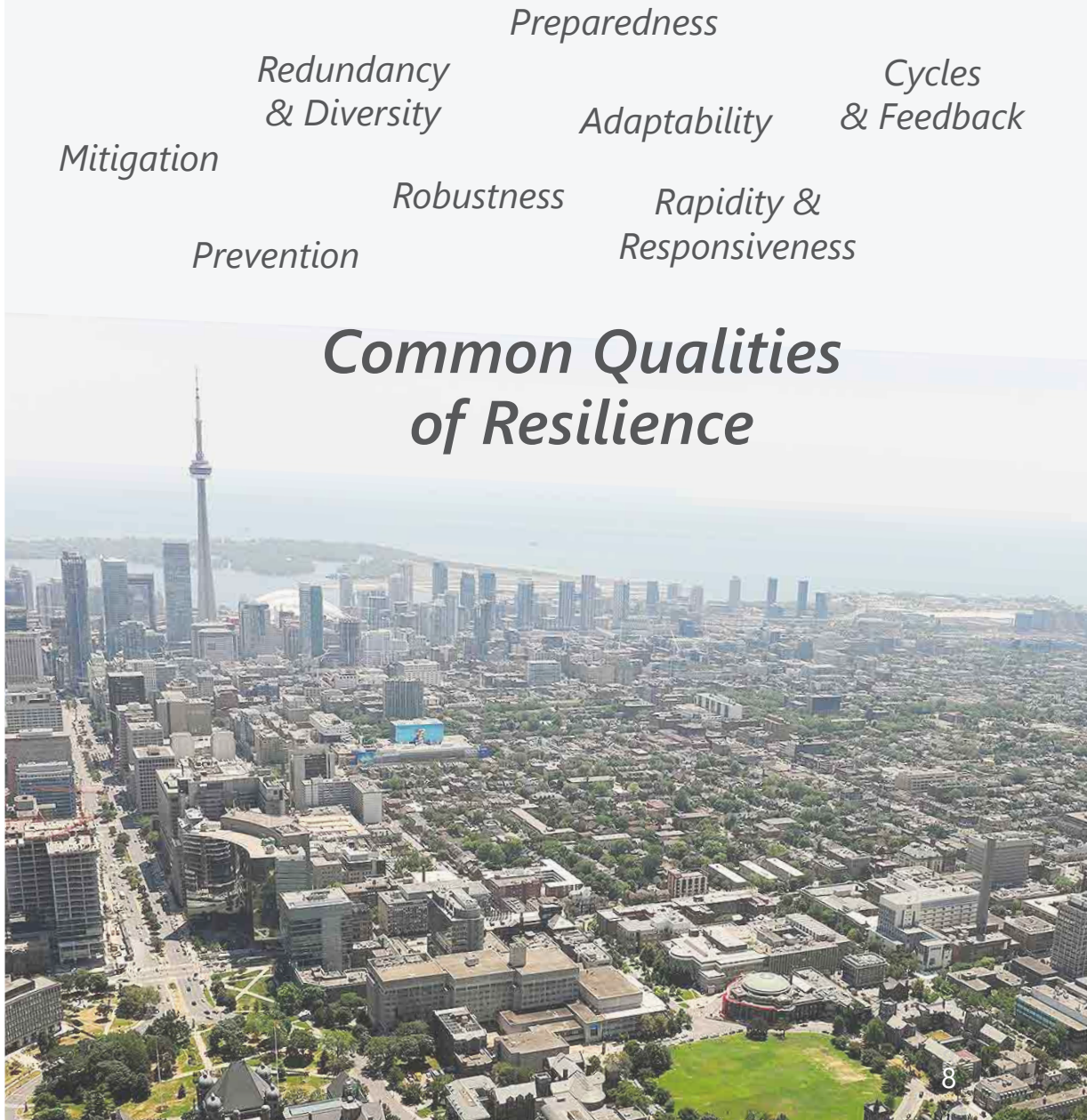
April 4 — Now available

REFINE • SUBMIT • SHARE

What is Critical Infrastructure Resilience?

A resilient system is one that can:

- Recover quickly from acute shocks
- Adapt to long term stresses
- Provide a minimum level of service during disruptions
- Mitigate the impacts of disruptions
- Absorb the effects of shocks
- Coordinate across sectors and networks
- Continually transform through capacity building

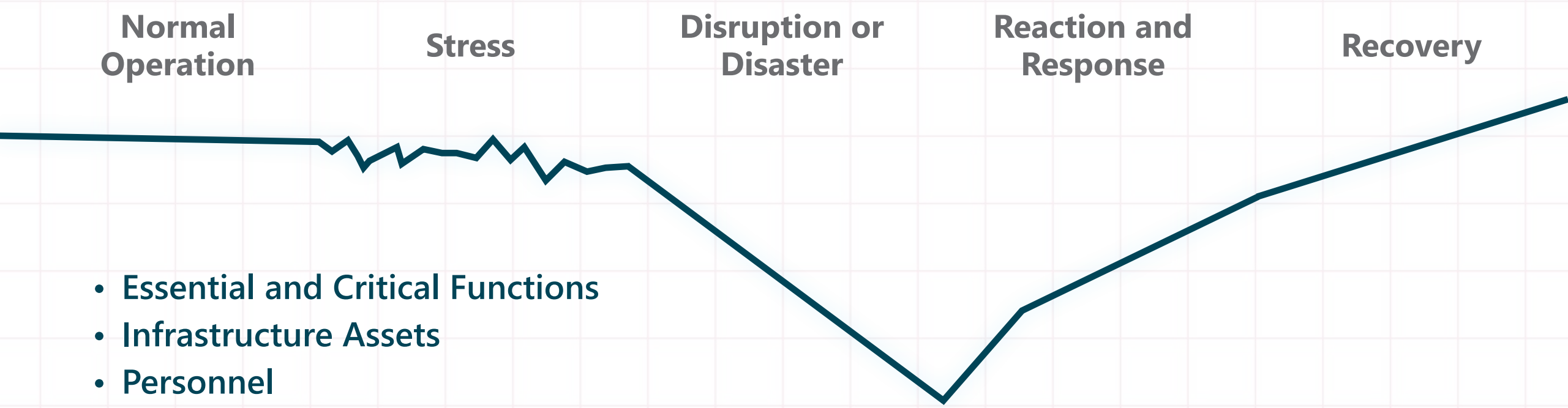


Step 1: Define the System

Establishing the vision of a resilient system
and what the system’s operation depends upon

What does the system need to be capable of?

System Performance across Operating Conditions

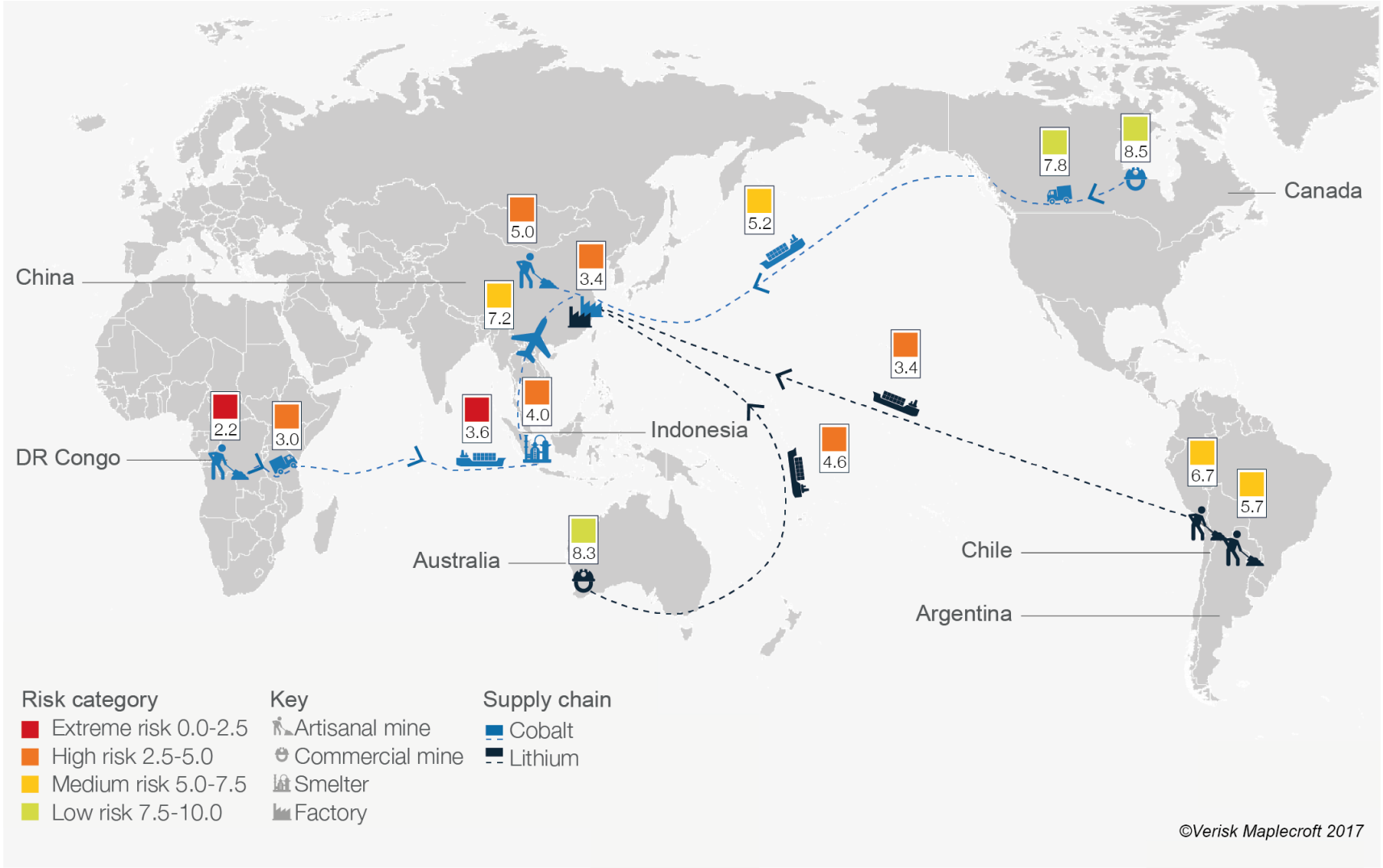


- Essential and Critical Functions
- Infrastructure Assets
- Personnel
- Internal and External Stakeholders
- Operating Boundaries
- Tolerance Thresholds

Supply Network

Factors contributing to supply chain vulnerabilities:

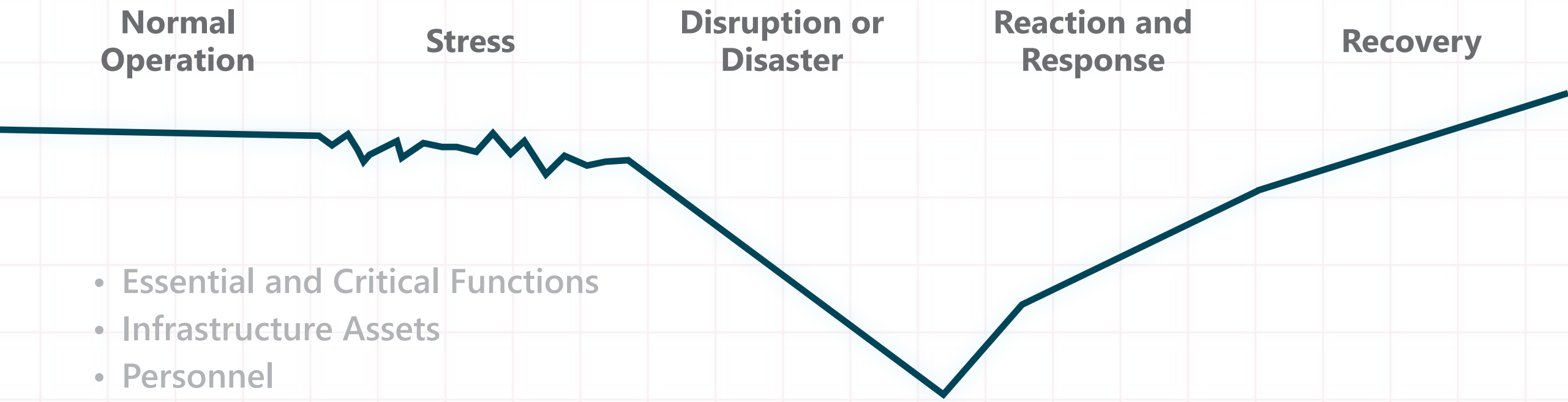
- Globalized supply chains
- Specialized factories
- Centralized distribution
- Increased outsourcing
- Reduced supplier base
- Increased demand volatility
- Technological innovations



https://maplecroft.com/portfolio/new-analysis/2017/10/16/electric-vehicle-boom-heralds-increasing-risk-automobile-sector/

Pettit et al. 2010. Ensuring Supply Chain Resilience: Development of a Conceptual Framework. Journal of Business Logistics, 31(1), 1–21. https://doi.org/10.1002/j.2158-1592.2010.tb00125.x

System Performance across Operating Conditions

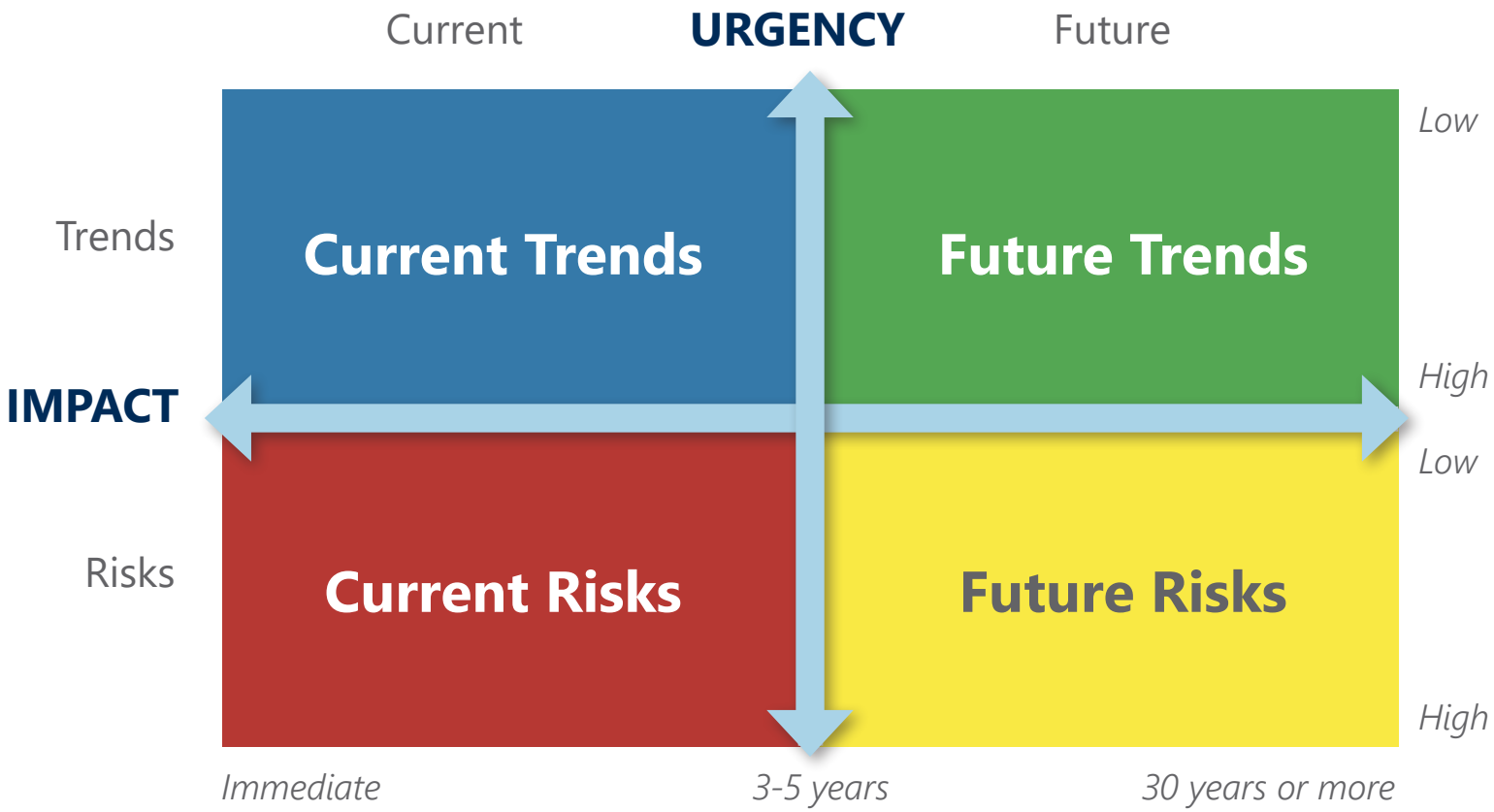


- Essential and Critical Functions
- Infrastructure Assets
- Personnel
- Internal and External Stakeholders
- **Operating Boundaries**
- **Tolerance Thresholds**

Step 2: Understand Risks

Identifying current and future climate change-related risks that can affect the system's ability to continue to operate

Current & Future Climate Change-Related Risks



- Direct and indirect effects affecting system capabilities
- Changes affecting demand and supply
- Concurrence of multiple failures
- Changes in the system and hazards over time

http://globalriskinstitute.org/publications/global-risks-trends-framework-graft-overview/

Step 3: Assess Capabilities

Assessing the capabilities to adaptively manage risks, respond to an incident, recover and learn, and maintain oversight

Organizational Capabilities

Adaptively Managing Risks

- Roles and responsibilities
- Detection and monitoring
- Communications
- Anticipation

Incident reaction and response

- Roles and responsibilities
- Resources
- Plans and documents
- Training
- Communications

Incident recovery and learning

- Roles and responsibilities
- Resources
- Communications
- Learning

Reporting

- Documenting incidents and near-misses
- Succession planning

Supervision or Inspection

- Process for maintaining oversight

Step 4: Analyze the Gaps

Identifying the current strengths, weaknesses and planned actions

Step 5: Identify Next Steps

Setting priorities, planning communications, and determine when the assessment will be revisited

Example of the Scoring for the Section on "Adaptively Managing Risks"

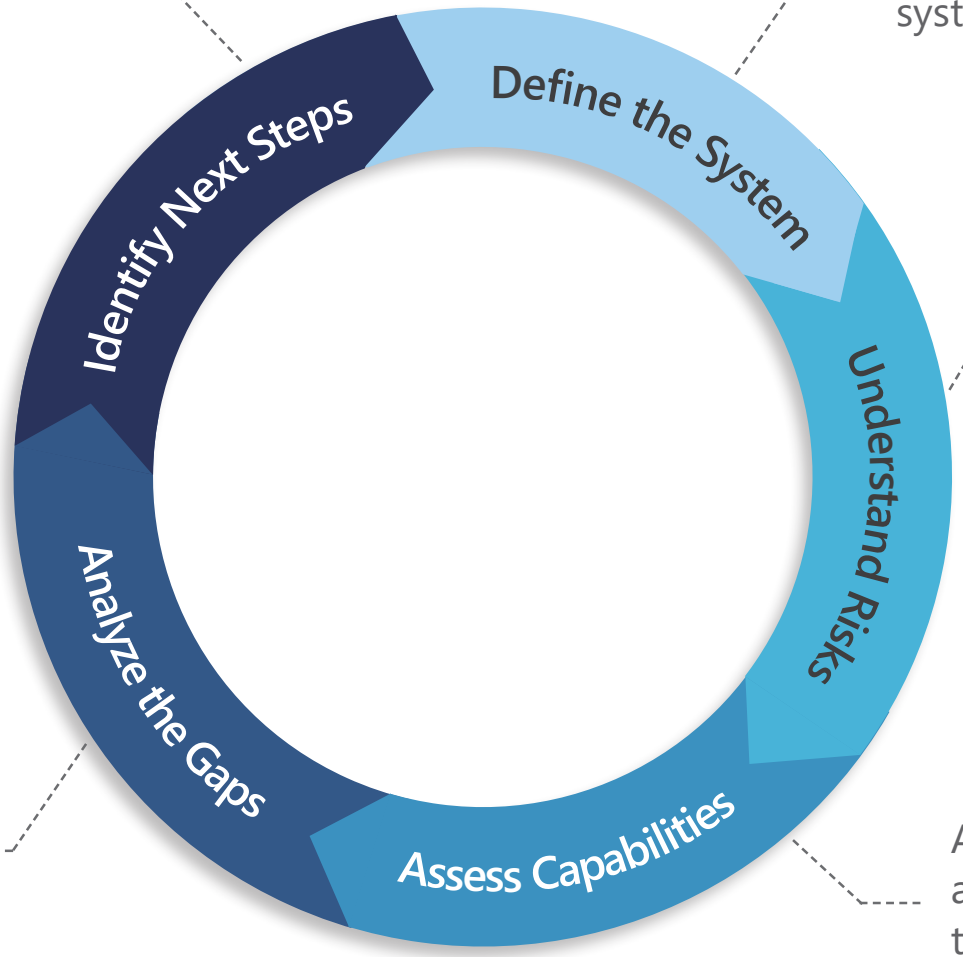
Scoring / Criteria	Not been considered (0)	Planned (0)	Deficient (1)	Inadequate (2)	Acceptable (3)	Satisfactory (4)	Score
1. Roles/Responsibilities					3		3
2. Detection/Monitoring – Internal				2			2
Detecting Weak Signals			1				1
Changes in service demand				2			2
3. Internal Communications (Before Incident)					3		3
Data Sensitivity/Security					3		3
4. Detection/Monitoring – External		0					0
Data Sensitivity/Security		0					0
5. Anticipation	0						0
Collaboration	0						0
New Assessments	0						0

Setting Priorities

Sharing Assessment Results

Continual Monitoring and Assessment

Climate Change Preparedness Assessment Framework



Establishing the vision of a resilient system and what the system's operation depends upon

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The Transformative Possibilities of Resilience

Collaborative • Intentional • Cyclical

Assessing Preparedness & Resilience

Before and after an event

Building Capacity & Reducing Vulnerabilities

Functions-based, equity driven, across sectors and scale, and over time

Thank you

Prepared by Sharon Lam
sharon.lam@mail.utoronto.ca

Supervisors: Dr. Virginia W. Maclaren, Associate Professor & Chair, University of Toronto

& Alexander (Alec) H. Hay, Adjunct Professor, University of Toronto; Principal, Southern Harbour

Project Advisor: David T. MacLeod, Senior Environmental Specialist, City of Toronto