Future-Planning: Infrastructure and Investment

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Special Thanks To:
THE VISIONARY INFRASTRUCTURE IMPERATIVE:
IMPLEMENTING RESILIENCE IN THE BUILT ENVIRONMENT

Presented by:
Dr. Alexander Mirescu
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WHAT IS URBAN RESILIENCE?

RISK
HAZARD
VULNERABILITY
EXPOSURE

RESILIENCE
RESIST
ABSORB
RECOVER
EVOLVE

80% Cites - 80% Risk - 80% Water
Inevitable - The Water Is Coming!
WHICH FACTORS DRIVE RISK?

Urbanization

Climate Change

Traditional Engineering

Environmental Degradation

Aging Infrastructure

Knowledge Gaps

Cycle of Risk Drivers

- Poverty and Inequality
- Lack of Risk-based Governance
- Exclusion of Key Stakeholders
- Poor Land Use Management
- Neglect of key sectors like transportation, schools, hospitals
## The Principle of 1 to 7

Every 1 USD invested in resilience equals approximately 7 USD for response, recovery and reconstruction. Don’t Just Build Back, Build Back Better

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>2016</th>
<th>Annual Change</th>
<th>Previous 10-Year Average</th>
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</thead>
<tbody>
<tr>
<td>Economic Loss (total)</td>
<td>337</td>
<td>180</td>
<td>87%</td>
<td>190</td>
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<tr>
<td>Nat Cat</td>
<td>330</td>
<td>171</td>
<td>93%</td>
<td>178</td>
</tr>
<tr>
<td>Insured Loss (total)</td>
<td>144</td>
<td>56</td>
<td>158%</td>
<td>58</td>
</tr>
<tr>
<td>Nat Cat</td>
<td>138</td>
<td>48</td>
<td>190%</td>
<td>50</td>
</tr>
</tbody>
</table>
“RESILIENT REAL ESTATE:”
FROM RISK DRIVER TO RISK REDUCER

By 2050, 70% of humans will live in urban areas and cities will host 3 billion additional inhabitants.

Pathways of Achieving Urban Resilience

Municipalities
Incentivize developers to integrate resilient technologies for storm water capture and flood mitigation technology.

Developers
Using resilient design and construction design and engineering as a municipal “give back”
IMPERVIOUS SPACES: RISK OR ASSET?
IMPERVIOUS SPACES: RISK OR ASSET?

Traditional Urban Design Not Dynamic or Innovative

Right of Way - Sidewalks - Parking Lots - Streets - Public Parks – Schools – Hospitals – Traffic Bump Outs

Build, restore, repair impervious spaces with the same technology and design approach

Use cost-effective resilient design:
- Subterranean capture
- Soil cells
- Smart concrete
- GI/Green Roofs
LAYERING URBAN RESILIENCE: TOP TO BOTTOM INTEGRATION

- Higher Elevations May Not Flood, But They Cause Floods
- Reduce Upstream Hydrological Pressure
- Riverine, Coastal, Waterfront
Urban Mobility A Neglected Sector, Yet Largest Municipal Investment

Most Expensive Climate Change Adaptation

Maintenance, Repair, Reconstruction, Disruption and Economic Loss
IMPLEMENTING RESILIENCE: TRANSPORTATION IN THE GTA

SUSTAINABLE ROW CONCRETE PAVEMENT DESIGN FOR CREATING SOIL CELLS
KITCHENER/WATERLOO LRT.
IMPLEMENTING RESILIENCE: TRANSPORTATION IN THE GTA

SUSTAINABLE CONCRETE SIDEWALKS FOR STORMWATER CAPTURE
YORK REGION-VIVA TRANSIT
IMPLEMENTING RESILIENCE: TRANSPORTATION IN THE GTA

SUSTAINABLE CONCRETE PAVEMENT DESIGN FOR SUBTERRANEAN FLOOD WATER CAPTURE

MTO ROADS, HWY'S, SIDEWALKS, PARKING LOTS.
IMPLEMENTING RESILIENCE:
PUSHING THE BOUNDARIES OF GREEN DESIGN AND SUSTAINABLE CONSTRUCTION

Instead of preventing buildings from flooding, wet floodproofing allows water to flow in and out of buildings.

EVERGREEN BRICK WORKS, TORONTO
Closing Remarks

- A complex set of environmental but mostly man-made factors is driving risk
- Disasters are more frequent, intense and expensive
- Not integrating resilience design and engineering is simply bad business: 1 to 7 cost-savings
- Technologies have proven that resilience is cost-effective and easily implementable here in the GTA
- Municipal governments, the private sector and citizens benefit from more resilient, sustainable societies
Trigger Question

Now through 2067
Canada’s bicentennial
Fifty years from now

How might infrastructure investments impact climate resiliency in our future cities?
Focus Topics

Energy  John Purkis, The Natural Step

Housing  Victor Willis, PARC

Mobility  Sanathan Kassiedass, Metrolinx

Public Space  Alex Mirescu, Pontarolo Engineering

Investment + Policy  Sheila Botting, Deloitte
Beth McMahon, Can. Institute of Planners

Please sit at the table where you wish to contribute.
Futures Cone of Possibility
We will “pluralize” the future
Each table builds one possible scenario
Grow
Continued economic growth

https://torontolife.com/city/toronto-tomorrow-toronto-skyline/
Collapse
From one or more reasons
Discipline
Society organizes around guiding values to survive

Photo: George Kraychyk/Hulu, "The Handmaid's Tale"
Transform
As the butterfly emerges from the cocoon

http://dtc-wsuv.org/cccarr/l/transformhumanism/img/space.jpg
Dator’s Generic Images

Grow
Transform
Discipline
Collapse

Each table will build one possible scenario

What is changing? (10 min)

**Signals**

**Trends**

**Drivers**

*Impact Investment*  
*Immigration*

Hodgson & Sharpe, 2007, *Deepening Futures with System Structure*, 128
What is possible? (10 min)

*Turn over the card on your table*

*Gravitate toward the scenario(s) shown*

Consider possible Turning Points

Inflection events with the power to divide systems into *before & after*

9 / 11  
Dems Take House
What is unthinkable? (10 min)

What could this lead to? (forecasting)
What could lead to this? (incasting)

Envision different Tipping Points

Thresholds leading to snowball effects and accelerating change

Fukushima

Ecotopia
What is the story? (10 min)

How does this play out?
Weaving these threads into a coherent narrative,

What name do you give to this world?

How might we invest today, to thrive in this world?
Thank You!

Share your thoughts

eventmobi  @FutureCitiesCA  #FCCSummit2018