



CIS-TRM2 Town Hall meeting AM Agenda

8:30 Welcome and introductions

The Civil Infrastructure Systems (CIS) technology road map:
context
process

Results of TRM Phase 1

Objectives of Phase 2

Break

Discussions: **CIS short/medium term technology development needs**

Infrastructure asset management and decision support

Transportation structures

Environmental structures (water, wastewater)

Priorities: **convergence and consensus**

Lunch





CIS-TRM2 Town Hall meeting - PM Agenda

Discussions: CIS technology challenges to meet needs

What essential elements should these technologies have?

What is needed in terms of knowledge, processes, tools, materials?

What are barriers to development and implementation?

What are recommended actions/steps? To whom?

Priorities: convergence and consensus

Break

Key recommendations

Session wrap-up

4:00 Adjourn



NRC-CNRC



The Civil Infrastructure Systems (CIS) Technology Road Map: Context and Process

Guy Félio, NRC



NRC-CNRC



Canada's Infrastructure: lifelines of our communities

⇒ More than \$ 1.6 trillion in assets

- roads, bridges, water treatment and distribution, storm and wastewater collection and treatment, energy transmission, etc.
- Large annual expenditures > \$25 billion
- However: annual investment deficit of more than \$ 2 billion with debt today exceeding \$ 57 billion
- On average reached close to 80% of service life
- 59% is more than 50 years old, with 28% more than 80 years old

⇒ Fragmented industry

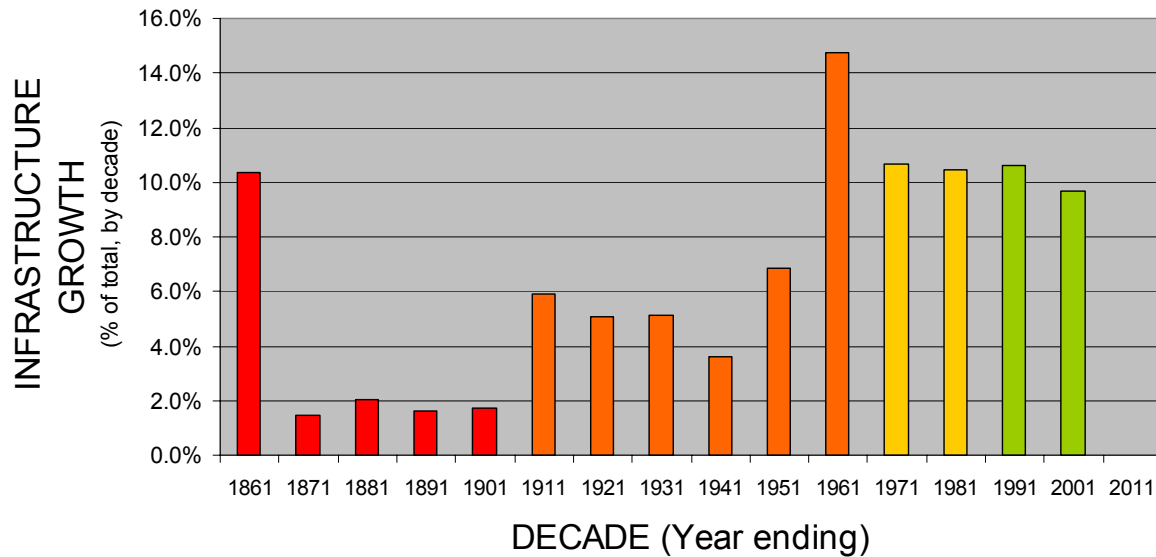
⇒ Technology and funding gaps





INFRASTRUCTURE DEVELOPMENT PROFILE

(Based on population growth profile of CANADA)



Courtesy: R.V. Anderson Associates

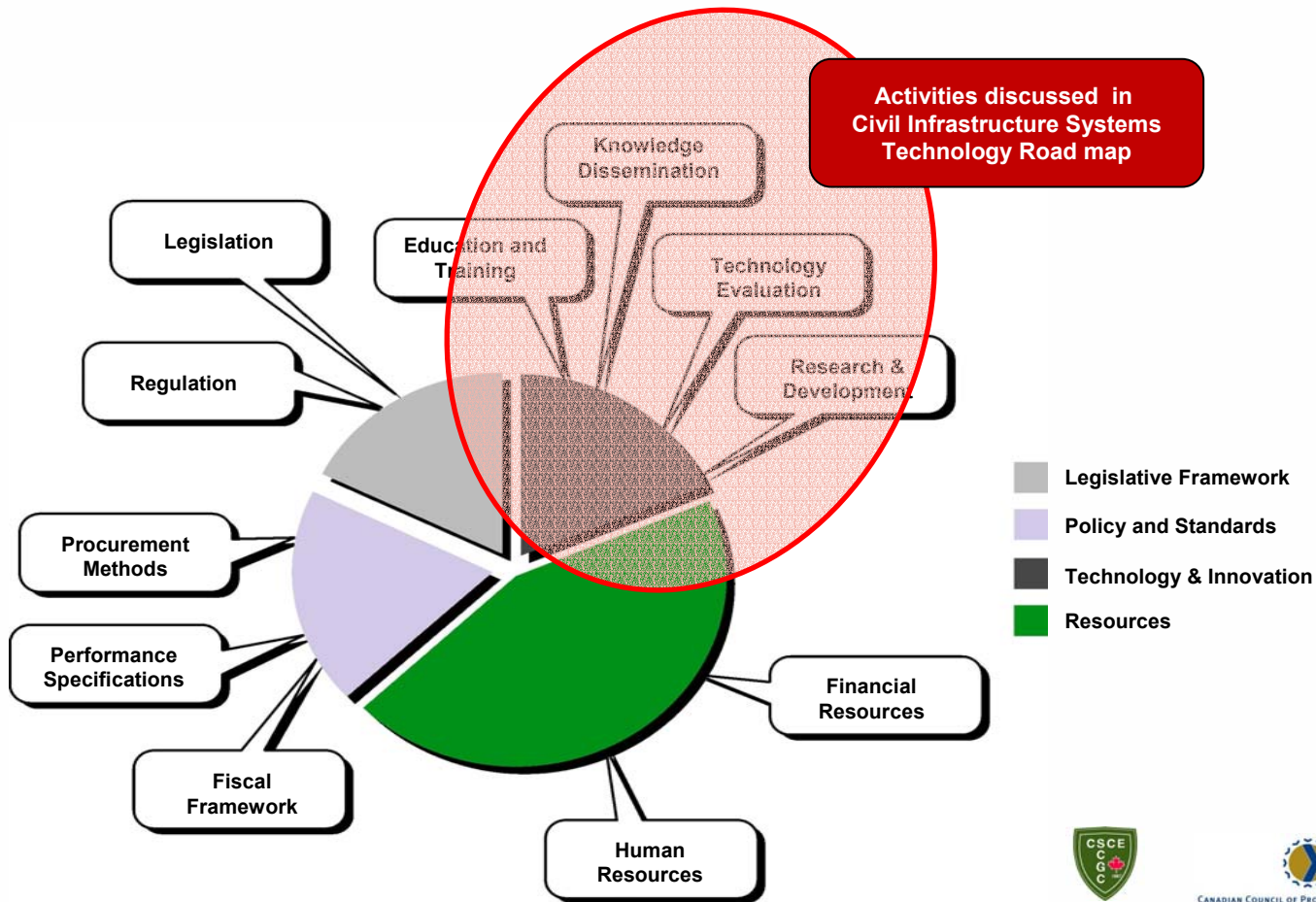


Estimated Remaining Life for Buried Infrastructure
(Recognizing shorter life expectancies for materials developed in post-war eras)





Responding to Canada's Infrastructure needs





Technology road mapping (1)

⇒ Definition

- Is a planning process driven by the projected needs of tomorrow's markets
- Via the TRM process, companies in a given sector can pool their resources and work together with academia and governments, to look from 2-10 years into the future and determine what their specific market will require.
- This TRM process is **led by industry, and facilitated by government.**



NRC-CNRC



Technology road mapping (2)

- ⇒ Predicts the technologies imperative to addressing future markets
- ⇒ Charts a path for commercialising the right technologies
- ⇒ Helps industry seize new market opportunities
- ⇒ Guides technology R&D decisions
- ⇒ Builds new partnerships
- ⇒ Provides crucial input to government policy





Technology road mapping (3)

⇒ General process

- In a consensus building process through stakeholder involvement and consultations:
 - Establish "Market" needs
 - Identify technology challenges to meet these needs
 - Identify R&D and other issues for the development and adoption of these technologies





CIS technology road map - process (1)

⇒ Phased TRM

- Phase 1: Macro analysis
 - Identify major market (needs) trends and broad technology challenges
 - Background paper (Dr. I. Moore @ Queen's U)
 - Two Town Hall meetings (Waterloo + Regina)
- Phase 2: Detailed road map
 - In depth analysis of issues from Phase 1
 - Further consultations (BC, QC, Atlantic)
 - Final TRM report June 2003
 - Public release: CSCE conference in Moncton)





CIS technology road map - process (2)

⇒ TRM funding partners

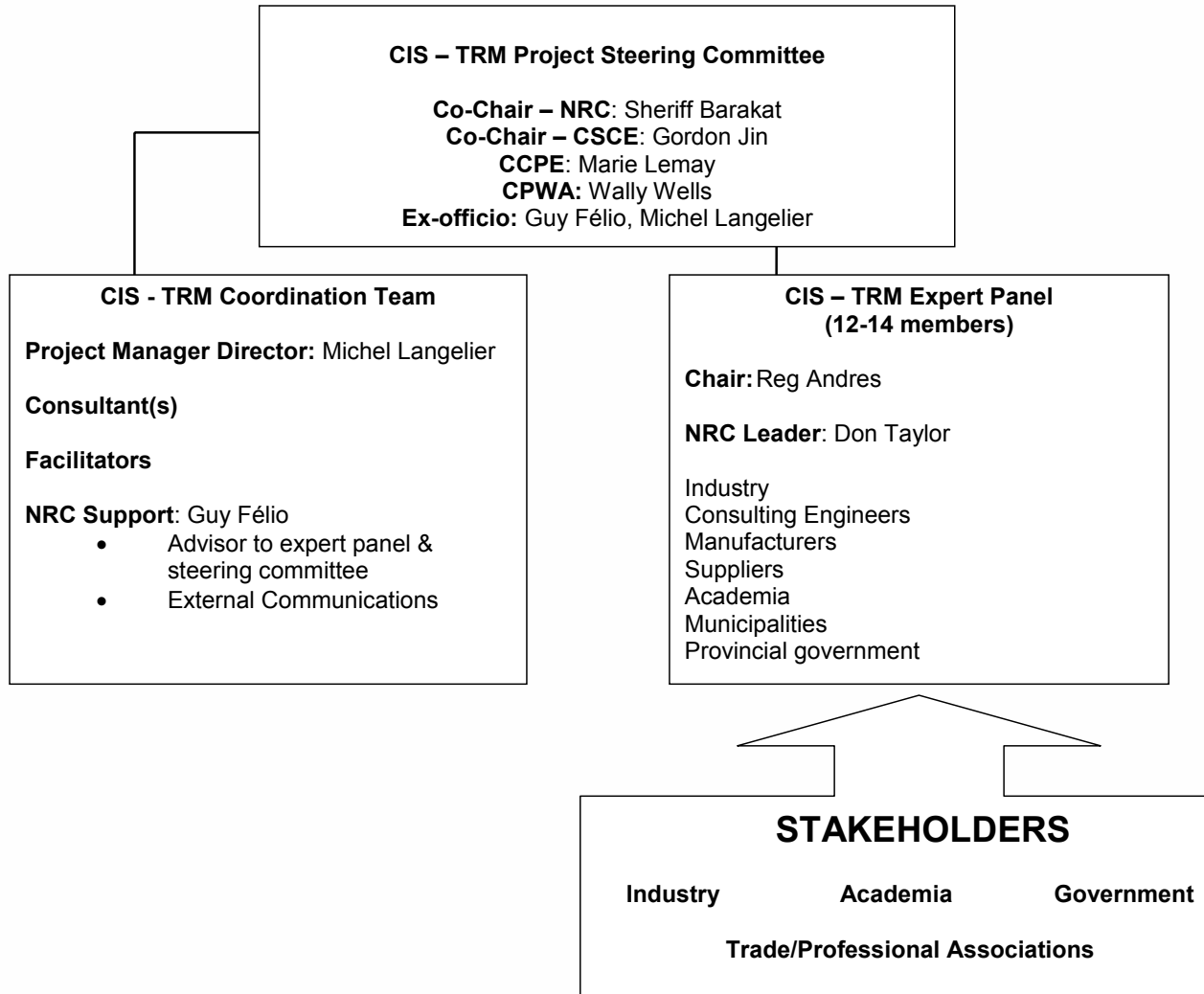
- CSCE, NRC, CCPE, CPWA
- Form Steering Committee

⇒ TRM Expert Panel

- Cross Canada, multi-stakeholder composition
 - municipalities, academia, consulting, contractor
- Responsible for TRM studies, consultations and recommendations

⇒ TRM Organizational structure







CIS technology road map - process (3)

⇒ In the context of this project, CIS will be limited to:

- **Transportation structures** (including roads, bridges, sidewalks, airports, etc. but not the transportation fleets such as buses, airplanes, etc.)
- **Environmental structures** (including drinking water, storm and wastewater systems, solid waste recycling and disposal facilities, etc.)
- **Elements of information technologies (IT) and environmental technologies** will, when appropriate, be considered in the above infrastructure systems and considered in the study.





CIS technology road map - process (4)

⇒ The TRM will aim at answering key questions related to CIS:

- In the next 5 to 10 years, what will the needs of owners, operators, and builders of CIS be in terms of technology?
- What are the technology challenges associated with the needs identified above?
- Related to the above technology challenges:
 - What are the needs in terms of R&D?
 - What are the needs in terms of transfer and adoption of these technologies?





The CIS-TRM: Phase 1 summary ⁽¹⁾

⇒ Phase 1 - Macro-analysis

- Focused on high level needs and opportunities
- Documented infrastructure needs study used as background document for consultations
- Two successful regional town-hall meetings
 - Regina and Waterloo (in September 2002)
 - More than 70 participants from industry (consulting engineers, manufacturers and suppliers, contractors, municipal public works and decision-making, academia and governments)
- Wide distribution of brief for comments

⇒ National consensus across stakeholders emerged





The CIS-TRM: Phase 1 Priorities (1)

⇒ Highly qualified, skilled labour force

- Continuing education and training
- "Adaptive" education system in line with industry needs
- Multi-disciplinary approach
- Etc.

⇒ National Infrastructure Policy

- Long term
- Variety of funding mechanisms and procurement options
- Includes dedicated R&D funding
- Levels of service in-line with public expectations and resources
- Etc.





The CIS-TRM: Phase 1 Priorities (2)

⇒ Life cycle costs

- Account for indirect and intangible costs (social, environmental)
- Define service life for benchmark and life cycle analysis
- LC benefits in asset management plan
- Predictive models
- Condition analysis techniques
- Prediction/ processes of Life cycles performance of new materials
- Etc.

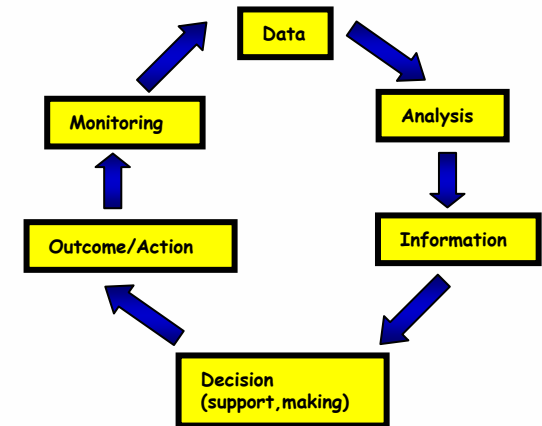




The CIS-TRM: Phase 1 Priorities (3)

⇒ Systems approach to CIS - integrated asset management

- Define critical CIS systems that need to be integrated in holistic system
- Integrated decision-making models
- Performance indicators and benchmarking
- Standard data models, shared accessible
- Collaboration of public utilities
- Etc.





The CIS-TRM: Phase 1 Priorities (4)

⇒ Condition assessment and performance prediction

- "know what's there"
- Non-intrusive and non invasive methods
- Long-term failure mechanisms and deterioration mechanisms and models
- Predictive models that include future demand and deterioration conditions
- Uncomplicated equipment/durable
- Standard testing/Interpretation methods (national)
- Results formatted to feed the decision-making system
- Etc.





The CIS-TRM: Phase 1 Priorities (5)

⇒ Decision Support Systems

- Expert/ knowledge based systems
- Risk models
- Analysis tools (Structural)
- Characterization of decision levels and information needs
- Etc.

⇒ Shared experiences

- Case studies - look at existing models
- Multidisciplinary projects
- Online infrastructure information to share
- Etc.





The CIS-TRM: Phase 1 Priorities (6)

⇒ Performance specifications

- Sensors for performance measurement- real time
- Define Performance- system approach
- Pre-qualification of products/ materials/ sources
- Tools supporting value (engineering) analysis
- Etc.

⇒ Smart systems

- Systems that monitor condition status and deterioration rate
- Smart/intelligent materials
- Nanotechnology applications
- Etc.





Questions ?





Discussions (1)

⇒ CIS short/medium term technology development needs

- Infrastructure asset management and decision support
- Transportation structures
- Environmental structures (water, wastewater)

⇒ Priorities: convergence and consensus





Discussions (2)

⇒ **CIS technology challenges to meet needs**

- What essential elements should these technologies have?
- What is needed in terms of knowledge, processes, tools, materials?
- What are barriers to development and implementation?
- What are recommended actions/steps? To whom?

⇒ **Priorities: convergence and consensus**





Wrap-up

⇒ Key recommendations

