

# S2S QUEST II Conference Report

## Background

Quality Urban Energy Systems of Tomorrow (QUEST) is a collaborative that encourages governments, local industry and citizens to support integrated approaches to providing energy services in urban areas. The current Canadian Government has established a target to reduce Greenhouse Gas (GHG) emissions by 60% to 70% by 2050. Achieving this target will have significant implications for both the mix of energy supply and end-use energy demand. To date, the focus of the discussion has been on the use of carbon reduction instruments such as a carbon tax or cap-and-trade systems to reduce GHG emissions from large point sources. Yet 50% of emissions in Canada come from urban energy uses such as heating, lighting and transportation. To achieve a reduction of 60% in emissions, the QUEST collaborative believes that this end-use sector must be addressed.

With this opportunity in mind, the QUEST I Conference focused on a strategy to reduce GHG emissions through the implementation of Integrated Urban Energy Systems (IUES)<sup>1</sup>. This integrated, smaller scale more-distributed energy systems approach is dramatically different from current energy systems and would require major changes in thinking, investment and policy.

While efforts to raise the profile of integrated urban energy systems within policy discussions has had success, it was recognized that further work is needed to fully understand how energy use could evolve in the future and the challenges to implementing integrated urban energy systems. As a result, and in preparation for QUEST II, a scenario planning project was undertaken to explore and broaden thinking on how future end-use energy patterns could unfold. The specific products generated in the scenario planning process are available in separate documents.

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<sup>1</sup> The key features of Integrated Urban Energy Systems (IUES) included: (1) an integrated system approach to land-use, energy, transport, water and waste management; (2) greater emphasis placed on achieving efficiency for the systems as a whole and on creating systems that are more resource efficient, adaptable, resilient and sustainable; (3) clustered, higher density, self-reliant, mixed use developments of energy efficient housing, commercial space; (4) industry which facilitate implementation of more efficient, accessible and affordable energy, water, waste and transportation infrastructures; (5) district energy/utility grids and cascading of energy use between industrial, commercial and residential applications; (6) smaller scale urban energy systems, distributed more widely, located closer to and within buildings integrated with elements of buildings, and integrated with other infrastructure systems; and (7) increasing contribution from multiple local energy sources: solar; geothermal; energy from landfill and municipal, agricultural and forestry waste; wind; hydro; supplemented by larger scale electricity and gas grids as necessary. Examples in Canada and around the world show that compared to a traditional approach, over 50% reduction in grid energy use can be achieved using an integrated approach.

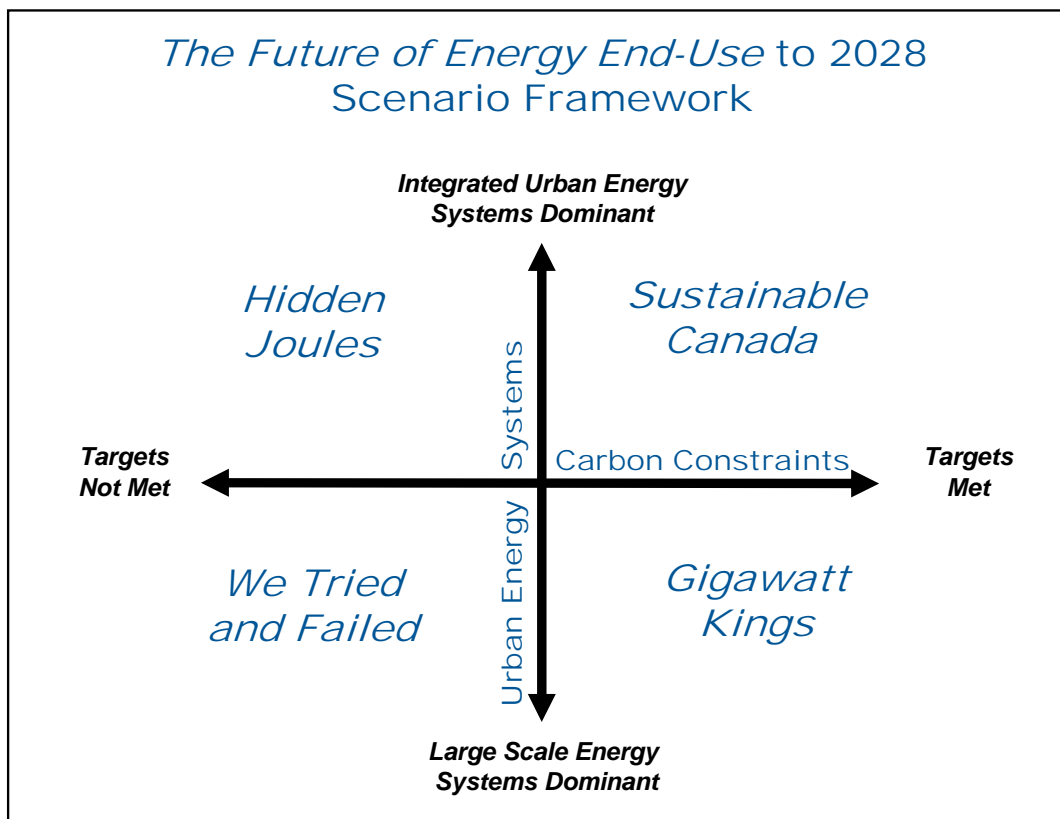
## Conference Objectives

On November 25-26, 2008, the QUEST scenarios were used by QUEST II Conference participants as a vehicle: (1) to continue the QUEST conversation; (2) to surface important opportunities, challenges and learnings related to the implementation of IUES; and (3) to inform the process of setting broad goals for the QUEST collaborative and to identify potential actions for the QUEST Core Group to consider pursuing in 2009. The remainder of this report provides a brief summary of the QUEST scenarios and a summary of the specific results achieved at the QUEST II Conference.

## The QUEST Scenarios

Scenarios are alternative descriptions of the future. They are stories, images or maps describing a range of different futures focused on a specific area, topic or question. They define a range of possible future outcomes. The objective is to gain insight into the forces and factors shaping the future and the key uncertainties leading to a range of future outcomes. Scenarios are a vehicle for strategic conversation to build shared understanding, encourage creative thinking and provide a context for strategy development and action. The QUEST scenario framework is illustrated graphically in Figure 1 below.

**Figure 1**



A table summarizing the key characteristics of the QUEST scenarios is presented below:

<p><b>Hidden Joules</b></p> <ul style="list-style-type: none"> <li>▪ Limited commitment to GHG targets; senior governments distracted by competing priorities</li> <li>▪ Municipal champions overcome barriers &amp; build partnerships to initiate projects</li> <li>▪ Initially focus on small &amp; manageable opportunities</li> <li>▪ Conflicting signals lead to “system stuck in transition”</li> <li>▪ Diffusion slow then accelerating; projects to integration to institutional planning</li> <li>▪ By 2028 targets not met but IUES accelerating</li> </ul>	<p><b>Sustainable Canada</b></p> <ul style="list-style-type: none"> <li>▪ Significant shift in social values, environmental costing accepted</li> <li>▪ New paradigms in Canada about urban development and urban energy systems</li> <li>▪ Thinking supported by alternative energy technology</li> <li>▪ Optimize existing investments</li> <li>▪ Progressively advance and adopt new approaches and technology over time to effect a system-wide transition</li> <li>▪ By 2028, targets for a 30% reduction in GHG emissions are achieved and Canada is on track to achieve a 60% reduction by 2050</li> </ul>
<p><b>We Tried and Failed</b></p> <ul style="list-style-type: none"> <li>▪ Carbon concerns mount with solutions predominantly focused on large-scale emitters</li> <li>▪ Environmental management efforts fall to basic enforcement and compliance</li> <li>▪ Green trade barriers emerge</li> <li>▪ Environment degrades, Canadian competitiveness is hampered, Canada’s social fabric tattered</li> <li>▪ As the world starts to embrace alternative energy, Canada does not have the capacity to embrace new opportunities and we remain dependent on silos &amp; large-scale energy systems</li> <li>▪ By 2028, having missed its GHG targets, Canada is at risk of falling further behind</li> </ul>	<p><b>Gigawatt Kings</b></p> <ul style="list-style-type: none"> <li>▪ Climate change urgent national issue; commitment to targets</li> <li>▪ US leads in developing system of GHG constraints</li> <li>▪ Focus on regulation &amp; control</li> <li>▪ Large scale infrastructure &amp; technology solutions seen as only path to meeting GHG targets; massive investment in nuclear, IGCC, CCS, natural gas</li> <li>▪ Problem-solution “fix-it” mentality precludes long term systems thinking</li> <li>▪ Cities little influence; suburban growth; car-centred society</li> <li>▪ By 2028, GHG target met through massive investment in nuclear &amp; CCS</li> </ul>

## Scenario Implications

The opportunities, challenges and learnings related to the implementation of IUES identified by the six breakout groups in Breakout Session 1 are as follows:

**Group #1:**                      Facilitator: Brent Gilmour  
     Rapporteurs: John Rilett & Chris Bataille

### Sustainable Canada

#### Top 5 Challenges

- Aging infrastructure for energy supply and distribution
- Aligning responsibility with authority
- A driver for urgency is currently missing
- Overcoming “all or none” thinking – no one focuses on transition
- Education and communication is required to develop a common vision for the environment and sustain attention over the long term

#### Top 5 Opportunities

- Drive innovation and technological innovation
- Position Canada as a leader for the 21st century economy
- Integrated decision making improves efficiencies and leads to better decision making
- Economic turmoil (crisis) offers opportunity to become more self reliant
- Pride of self ownership – community support for energy and environmental projects

#### Top 5 Learnings & Insights

- Full cost accounting will change everything
- Don't underestimate the transition process
- Time and effort in the near term pays off (discounting aside)
- Learn from experience and complexity
- Embrace change – willingness to change is required
- The more closely we copy natural systems, the more successful our energy system and communities will be



- If we believe it, we may not need QUEST
- Even if the scenario works, it leaves us vulnerable – it is a less resilient and secure system
- Challenges of creating an internally-consistent scenario

## Hidden Joules

### Top 5 Challenges

- Fragmented approach – no senior government leadership
- Financing difficult – municipalities have challenges accessing money
- Many projects but no overall system approach
- Fragmented markets – lack of economies of scale
- Requires strong, motivated local leadership with little help

### Top 5 Opportunities

- Local creativity and innovation
- Local involvement in solutions creates ownership
- Non-GHG benefits (e.g., local quality of life, efficiency gains, financial savings, etc.)
- Metrics for measuring progress and quality of life instituted at a local level
- Resiliency increases – distributed systems seen as less vulnerable

### Top 5 Learnings & Insights

- Need all levels of government and good leadership
- Need built-in economic incentives
- Local level involvement is important – but they need help (e.g., regulation, taxation powers, legal restrictions, etc.)
- All scenarios need discussion on role of private sector and civil society - need private sector ownership, support, partnerships, and innovation
- Reaching GHG goals requires large-scale co-ordination – cannot occur project by project.

**Group #3:** Facilitator: John Nyboer  
Rapporteur: David Foster

## Hidden Joules

### Top 5 Challenges

- Short-term thinking overwhelms agenda, QUEST requires a longer-term perspective
- “Double vision” leads to contradictory directions
- A high degree of inertia inhibits movement from pilot scale to full implementation
- Lack of capacity at municipal level: knowledge, leadership, governance, vision and especially financial
- Lack of cohesive perspective at provincial and national levels undermines action at the local level

### Top 5 Opportunities

- Actions must be based on strong cooperative partnerships, allowing shared learning and risk sharing
- Utilization of case studies to learn from and share with other communities
- “Champion” cities serve as test-beds to measure and quantify benefits
- More likely to increase citizen involvement and civic-mindedness
- Cities can move faster than provincial or federal governments

### Top 5 Learnings & Insights

- There may be a “tipping point” where enough discrete initiatives have succeeded to change paradigms more widely
- Having a wide spectrum of isolated initiatives may provide a better opportunity for “winners” to emerge
- It may be more possible to achieve a unified perspective on carbon costs through dialogue at the community level
- Having a wide array of local initiatives may open potential for funding support by other levels of government

## Gigawatt Kings

### Top 5 Challenges

- Very appealing scenario to central governments
- Certainty of Gigawatt Kings versus QUEST vision

- QUEST does not address key issues that Gigawatt Kings does (e.g., oil sands emissions, carbon capture and storage, etc.)
- Supply focus with government and utilities underwriting key risks creates lots of “free-ridership”
- Even more challenging for QUEST vision if U.S. takes Gigawatt Kings route

### **Top 5 Opportunities**

- QUEST vision avoids “lock-in”
- There needs to be some form of organization to channel investments to IUES
- Strengthening of grid consistent with QUEST approach
- QUEST vision offers more opportunity for “complementarity” and can address other issues like water, waste and resilience
- NIMBYism avoided

### **Top 5 Learnings & Insights**

- Gigawatt Kings is depressing because it is so credible, government friendly and potentially voter-friendly
- QUEST must address the issues of certainty-of-outcome and financial credibility - a compelling story must be told that can be substantiated

**Group #4:** Facilitator: Martin Lee-Gosselin  
Rapporteur: Susan Davidson

## **We Tried and Failed**

### **Top 5 Challenges**

- Wilful blindness about consumerism
- Government quagmire with the absence of political will
- Economic challenges outweigh environmental concerns
- Workforce not trained in IUES
- Natural capital in serious decline (e.g., forests, farmland, oceans, etc.)

### **Top 5 Opportunities**

- Shift in governance - public reaction to “Canada is brown”
- External investors make greener processes a condition of investment

- Generation preparing for the glaring lack of opportunity ahead - teens will be leaders with all others behind
- Education revitalized by global, environmental and fiscal realities
- Crisis “wake up” galvanizes action from industry, technology developers and individuals

### **Top 5 Learnings & Insights**

- Infrastructure will continue to be built - choices about how to build cannot be avoided
- The management of Canada’s natural resources - do it or external forces will do it for us
- Education and training - need to shift gears in 2008 to prepare for 2028
- Solutions cannot be only top-down - must engage the grass roots
- Know-how and technology - will have to get knowledge from somewhere else if Canada is unable to develop it

### **Sustainable Canada**

#### **Top 5 Challenges**

- Talented people: attracting, nurturing and solving immigration and inclusiveness barriers to have the “right” people at the “right” time
- Resolving counterproductive and conflicting regulations
- Finding creative solutions to concerns about the privacy and proximity of urban dwellers
- Avoiding backlash from complacency and from the bits of integration that go wrong
- Keeping sustainable cities at the top of funding priorities

#### **Top 5 Opportunities**

- Holistic community development with the emergence of new and attractive ways to live
- Bringing public, private and shared modes of transport into a well-functioning integrated system
- Attracting a critical and diverse mass of creative talent to Canadian cities
- Exporting community sustainability know-how, training and technology to other countries

- Establishing full environmental costing “makes” the business case for investment in energy efficiency projects

### **Top 5 Learnings & Insights**

- Need to manage popular and political expectations - including the timing and the phasing of the transition
- New types of collaboration will be indispensable - among stakeholders who have historically avoided one another
- Individuals cannot avoid being engaged - learning how best to do this needs facilitation
- Governments may need to unlearn old habits if they are to facilitate the transition to sustainability
- This is a journey - it will be necessary to pause every few years and check the roadmap and our reading of it.

**Group #5:** Facilitator: Greg MacGillivray  
Rapporteur: Tony Macerollo

### **Sustainable Canada**

#### **Top 5 Challenges**

- Against the backdrop of volatile energy prices, staying the course and not getting stuck in transition
- Developing business and economic models that incorporate environmental and social components - implications for data and metrics
- Maintaining and intensifying the connection between local action and global outcomes
- Emerging disparities across communities
- Recognition that we’re just turning the corner - climate change strategies will be required beyond 2028

#### **Top 5 Opportunities**

- Aspirational opportunities emerge - not just actions driven by fear
- Markets deliver results from new business models that incorporate broader social and environmental factors
- Re-invigorated investment in education
- Citizens use new information about how their local choices deliver environmental benefits or consequences

- The proliferation of new energy choices and technologies could conceivably drive energy costs down

### **Top 5 Learnings & Insights**

- Education and information empowers people
- Truly national commitments and strategies can overcome institutional rigidities - leadership is important
- Metrics, performance targets motivate improvements
- Continuous improvement in the context of connecting costs and benefits to behaviour
- Agility in technology choices
- The need to embrace and manage complexity and to build the capacity for systems thinking

### **We Tried and Failed**

#### **Top 5 Challenges**

- Extended apathy - the “boiled frog” syndrome - challenges going forward that become too large to comprehend
- The risk of regional fragmentation and political alienation - the future of the country at risk?
- Unintended consequences in other environmental areas (e.g., water, air, land, ecosystems etc.)
- Loss of green economic opportunities.
- Less energy system resiliency
- Advancing IUES becomes next to impossible

#### **Top 5 Opportunities**

- Learn from others - late mover advantage
- Good traditional infrastructure - but could lead to a breaking point
- Visions get driven from the bottom (after we’ve gone over the cliff)
- Lots of “dirty” energy to export with decent reliability
- Canada makes money doing the world’s dirty work

### **Top 5 Learnings & Insights**

- This is today - large bets, command and control, turf wars, etc. characterize the discussion - we operate in silos, we react
- Public lacks the appetite for change
- Leadership, vision and public engagement are all required
- Opportunities and capacity to act withers over time
- The status quo is not secure - ride the wave of change or be swamped by it - do you want to be at the table or on the menu
- Politics matters

**Group #6:** Facilitator: Arden Brummell  
Rapporteurs: Shannon Watt & Gary Ralston

### Hidden Joules

#### Top 5 Challenges

- Balkanized by-laws and regulations impact businesses
- Ad-hoc approach – communities integrate what they can control
- Local risks and failures lead to political churn
- Need to value externalities
- Incompatible solutions

#### Top 5 Opportunities

- Local leadership, skills and knowledge
- Shared leadership, vision for change, current state versus state creative tension
- Communities take charge - local building and development codes and local transit
- Cities more nimble
- Increased identity and loyalty to place - community buy-in
- City-to-city learning – varied learning – multiple pilot projects
- Cheapest feasible solution

#### Top 5 Learnings & Insights

- Failure to value externalities overwhelms local success
- Importance of leadership

- Incubating leadership
- Municipalities are a key source of learning and of momentum for change
- Local governments have a distinct role to play – relying on communities to take charge does not necessarily equal failure

## Gigawatt Kings

### Top 5 Challenges

- Much money on a few opportunities - one or a few technological solutions
- Gigawatt Kings fail to fully exploit the potential for change or innovation
- Backlash against federal command and control approaches
- Lack of engagement of citizens - lack of buy-in
- A massive system that runs the risk of unintended consequences (e.g., reliability issues inherent in large, complex systems)

### Top 5 Opportunities

- Technology opportunities
- Economies of scale – lower cost
- The scenario does not rule out pursuing the “other 50%” at the municipal level
- System change via pricing carbon
- The scenario certainly will expedite implementation of clean energy

### Top 5 Learnings & Insights

- Keep in mind the mega-goals of sustainability, resilience and liveable communities - Gigawatt Kings is short-sighted
- At least this scenario would not involve a revolutionary shift in business or political power – the incumbents are still in the mainstream of the solution
- This may be what the general public want – not personal lifting
- We need coordinated evaluation of externalities – full-cost accounting
- Policies that achieve the target without local input may not be optimal

## Broad Goals for the QUEST Collaborative

For purposes of the breakout sessions, goals were defined as broad expressions of success. It was also noted that broad goals could be aspirational or multi-generational in nature and should be focused on the what and not the how. Broad goals could also be described as a statement of future being and also have a number of attributes (e.g., a what, an increase or decrease in the what, a numeric dimension, a relevant timeframe, etc.). This section of the report summarizes the broad goals identified in the course of the QUEST II Conference.

### (a) 18 Broad Goals Identified by the Breakout Groups

The 18 broad goals identified by the six breakout groups in Breakout Session 2 are as follows:

#### Top 3 Goals – Group 1

- Promote the notion of creating a “sustainability vision” for Canada and collaborate with like-minded organizations to create a functional support network
- Articulate the IES story in credible quantitative and, where appropriate, qualitative terms to include GHGs, energy efficiency and other co-benefits by fall 2009
- By 2010, identify one community in each province and territory to participate in an IES project - identify appropriate partners and barriers - target project implementation by 2015

#### Top 3 Goals – Group 2

- Ultimate goal: Happiness and quality of life.
- Social/Policy goal: Sustainable, emission-free, resilient, reliable energy, water, transportation and waste systems (closed-loop systems)
- Intermediate goal: Conservation and waste reduction, resources efficiency (whole system), fuel switching

#### Top 3 Goals – Group 3

- Targets are set - in 5 years every municipality has set an energy target
- Demonstrations take place - within 5 years we have demonstrated applications of IUES with all attributes across Canada

- We have a value proposition: Within 5 years we have ability to “light-up” QUEST for policy-makers at all three levels of government as a viable option
- Quantify benefits and risks - determine value of benefits - educate audiences about this story addressing technical feasibility, commercial viability and political workability
- Alignment is achieved: Within 5 years we begin to see alignment of urban energy systems with the QUEST integrated approach

#### **Top 3 Goals – Group 4**

- Agree on a common understanding of IUES and the metrics that are central to it
- Commitment of all three levels of government to a decision-making process to achieve IUES
- Create a culture of urban sustainability

#### **Top 3 Goals – Group 5**

- 100% zero-waste communities by 2028 (reduce, reuse, recycle, no land fill, closed loop, balancing heating and cooling)
- Financial price on carbon designed to drive reductions in CO2 by 2015
- Canadian communities have the highest quality of life and the highest energy productivity (sustainability, inclusiveness, health, individual opportunity, diversity measures)

#### **Top 3 Goals – Group 6**

- Build links and credibility with Federal Government and among provincial governments
- Quantify outcomes and create common metrics
- Research components and linkages across urban systems

#### **(b) 5 Goal Areas Identified in the Plenary**

Led by Mr. Michael Harcourt, Honorary QUEST Chair, the 18 goals were narrowed to 5 goal areas that were briefly discussed. The 5 goal areas that were discussed in the plenary are as follows:

- (1) An IUES vision for Canada exists.
- (2) The Canadian Federal Government and all provincial and municipal governments are engaged and aligned on the IUES opportunity.

- (3) There is a culture of urban sustainability in support of the IUES vision.
- (4) IUES have been implemented in all Canadian communities by 2050.
- (5) There are adequate metrics to support the pursuit of IUES.

### (c) Single Aspirational Goal Identified in the Plenary

After some discussion, there was broad consensus that all of the goals identified would support the achievement of a single, aspirational goal for QUEST. This single goal was articulated as follows:

Every community in Canada operating as an Integrated Urban Energy System (IUES) by 2050, and accordingly, all community development and redevelopment incorporates Integrated Urban Energy Systems.

### Specific Actions

Conference participants recommended specific actions for the QUEST Core Group to consider pursuing in 2009. These actions, grouped by S2S into themes, are as follows:

#### **Vision, Organization and Resourcing**

- Develop a “terms of reference” for the QUEST “package” that incorporates a communications plan, metrics, and other features.
- Define an appropriate level of organization for the QUEST collaborative (e.g., Mainstream vs. informal? A QUEST secretariat?).
- Identify and support a roster of QUEST “champions”.
- Develop sustainable resourcing for the QUEST collaborative.

#### **Political and Policy Action**

- Deliver the QUEST “package” to all three levels of government.
- Develop and exploit a “political mobilization track” to advance IUES and the QUEST vision that engages and potentially advances the QUEST “ask” to the Federal and provincial governments (e.g., Ministers are talking about QUEST and IUES) and that also supports the continued leadership of local municipal governments.
- Develop an inventory of Federal, provincial and municipal government policy enablers.

#### **Technology**

- Develop and fund an IUES technology strategy.

## Metrics, Tools and Best Practices

- Complete a “Size of the Prize” study including relevant and robust energy and GHG emission metrics.
- Complete a generic business case that would also incorporate a modeling tool that could be used by organizations to quantify IUES benefits.
- Develop an inventory of successful projects, best practices and funding sources.
- Encourage the Canadian Institute of Urban Planners to broadly agree to and support an energy goal.
- Deliver baseline energy and GHG emissions data to all communities.

## Communications and Marketing

- Develop a QUEST communications plan.
- Write and share the QUEST “pitch” or “ask” stories for IUES that are targeted to engage a variety of important audiences (e.g., Federal Government, provincial governments, municipal governments, consumers, developers, regulators, potential QUEST partners, etc.).
- Develop a mentoring-focused Adopt-a-Community program to inform, educate and support communities and municipalities working at the local level.
- Develop and invite organizations on a QUEST Learning Journey that profiles successful IUES pilots and projects.

## S2S Closing Observations

The many rich conversations at QUEST II underscored that QUEST is a journey and not a destination and that QUEST is about what we value in terms of the benefits and opportunities presented by IUES. There is a need to embrace change and also a need to embrace the notion that there is no certainty or security in the status quo. As a true collaborative, it can also be said that no one owns QUEST and that everyone owns QUEST.

The QUEST scenarios were helpful in surfacing important opportunities, challenges and learnings related to the implementation of IUES. These implications helped to inform the process of setting broad goals and specific actions for the QUEST collaborative, and in the process, further validated the QUEST vision developed at the QUEST I Conference. We trust that this report will assist the QUEST Core Group in the completion of the draft *QUEST Policy and Next Steps* paper. In our view, the path forward will require significant collaboration and continued leadership.