

Monitor **Deloitte.**

Port 2050 Scenarios Update

Final Report



Deloitte Inc.

PO Box 49279 - Four Bentall Centre
2800 – 1055 Dunsmuir Street
Vancouver, BC, V7X 1P4

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1 Executive Summary

1.1 Introduction

In 2010, Port Metro Vancouver embarked on a scenario planning process over the course of a year and more than 100 stakeholders were engaged to establish a shared vision for the future of the Vancouver gateway. The initiative, called Port 2050, resulted in the identification of several drivers of change and four scenarios that stakeholders felt described plausible futures that may unfold as we move toward 2050. These scenarios were named: “The Great Transition”, “Rising Tide”, “Missed the Boat” and “Local Fortress”. While the Rising Tide scenario is the one which has typically been used to frame Port Metro Vancouver’s strategy, the outcome of Port 2050 resulted in an outlook that combines elements of “Rising Tide” and “The Great Transition” scenarios. This combination, referred to as the “Anticipated Future” was seen as the most likely course of future events.

In 2014, Port Metro Vancouver engaged Monitor Deloitte to design and deliver a program to test the continued relevancy of the key drivers of change and the scenarios, and to recommend updates as necessary. In recognition of the importance of engaging a wide group of gateway stakeholders - both internal and external to Port Metro Vancouver - the program was designed to be highly collaborative in nature.

In-depth interviews were conducted with Port Metro Vancouver leadership and staff, as well as a diverse group of stakeholders and experts. A highlight of the process was a two day reception and workshop, held on December 4 and 5, 2014 in Vancouver. Over 70 participants attended that workshop, coming from many groups and organizations that have a stake in the future of the gateway such as community groups, First Nations, industry and all levels of government. In addition to the participants that attended the workshop, expert speakers presented on important topics to challenge the participants’ imagination and any pre-conceived assumptions about the future. Based on the interviews, our research, and participant input from the workshop, draft updates to scenarios and key drivers of change were presented and reviewed with Port Metro Vancouver leadership at a workshop held on January 29, 2015. This report presents the recommended updates to Port 2050 key drivers of change and scenarios resulting from the engagement process.

1.2 Key Drivers of Change

The key drivers of change identified in 2010 form the building blocks of the four scenarios. Based on our analysis and the feedback received, very few structural changes to drivers were required and all were confirmed as still being relevant today. The one exception to this was the broadening of the Technological Innovation driver to capture all types of innovation, including policy setting and the regulatory environment, in addition to technology.

The other changes made to the drivers as a result of the update process were in relation to how they are characterized and the issues or uncertainties that were relevant to each driver. Some of these issues and uncertainties include: the increasing importance of public support for port operations and other industrial operations in the region; uncertainty surrounding the rate at which a transition to alternative energy sources may occur and how much change will happen; and an increased focus on how the role of Canada in global energy markets may change through major energy projects and Canada’s competitiveness with other producers. Participants also felt that a key uncertainty was whether greater

alignment will be possible across industry, communities and all levels of government with regard to policy setting, supply chain and infrastructure delivery. This in turn would be a contributing factor to another point of emphasis which was the increasing importance of supply chain efficiency in driving gateway competitiveness.

1.3 Scenario Axes

In order to develop divergent but plausible scenarios, two important and often likely uncertainties or drivers of change are selected for building the scenarios. In the original Port 2050 exercise, the two most critical uncertainties forming the axes were identified as the Capacity of the Gateway and the Global Prosperity Model. These captured many of the components and questions about the future within the key drivers of change. The two critical uncertainties each form one axis of a set of quadrants, and each quadrant frames up a separate potential future or scenario.

The Capacity of Gateway axis corresponds to the nature of supply and incorporates issues of competitiveness, infrastructure, land use, public support to operate, talent, local economic strength and collaboration between port stakeholders. These issues were confirmed as still very relevant with no major revisions being required. However, through the consultation process, several of these trends were identified as particularly important over the last few years and have been emphasized in how the Capacity of the gateway is described. These trends include the greater degree of certainty regarding the lack of industrial land available in the gateway, the importance of developing an integrated and efficient supply chain and the critical importance in driving alignment among gateway stakeholders toward a shared vision and strategy for collaboration.

The Global Prosperity Model axis on the other hand, was the subject of considerable debate throughout the process. As defined in 2010, the Global Prosperity Model axis is fundamentally about the nature of demand and describes patterns around globalization, macroeconomics, energy and potential for a transition to an alternative prosperity model (“triple bottom line” concept). Feedback from participants was varied in regards to these areas. In particular, participants questioned whether such an alternative prosperity model was plausible in the 2050 timeframe. A lot of discussion was also held about whether the uncertainty was mostly around the potential transition to alternative energies and therefore, whether the axis should be renamed to focus on an energy transition. While the role of the energy transition was emphasized in the updated definition of the axis, “Global Prosperity Model” was retained as the name of the axis because it better captures the breadth of factors, such as regulatory drivers for change and shifting social values.

Another view put forward by a number of participants was that economic penalties (e.g. carbon tax) and incentives would always be the major driver for a move toward more environmental and human well-being measures and therefore there really is no “alternative prosperity model”. Another point raised was that the world is already moving along the path towards greater focus on environment and human well-being with environmental regulations and agreements on emissions targets across countries being introduced. In the end, the consensus was that these steps are incremental but not game changing and that a divergent, but still very plausible future, could be a more fundamental shift toward a triple bottom line prosperity model.

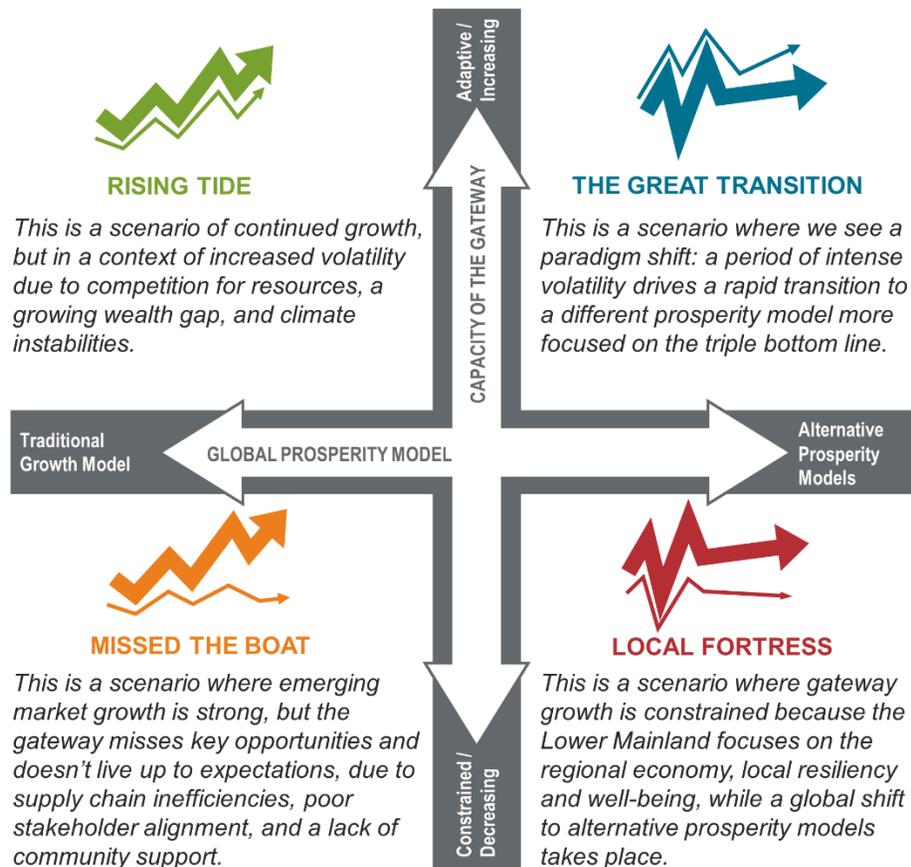
In the end while the name of the Global Prosperity Model axis was not changed, the “status-quo” outcome (or “end-point”) was renamed from “Economic Driven Growth Model” to “Traditional Growth Model”. This change was made to broaden the meaning and reflect the fact that economic drivers are not exclusive to this outcome, and that they also play a role in the “Alternative Prosperity Model”. Additionally, the descriptions of the end-points were changed to be more specific about what the world would look like under each model, so as to remove any ambiguity.

1.4 Scenario Narratives

Finally, each of the four scenarios have been revised to ensure that they reflect the updates to the key drivers of change and the two most critical uncertainties captured in the scenario axes. There were no fundamental changes to any of the Rising Tide, Missed the Boat and Local Fortress scenarios and any changes were focused on aligning the scenario narratives to the updated key drivers of change and the most critical uncertainties forming the axes.

Changes to the Great Transition scenario were more significant than those of the other scenarios. This stemmed from the discussions around the Global Prosperity Model axis and focused on what the transition to alternative prosperity models looks like. While the theme of a move to a different prosperity model is retained, it has been re-framed as more of an inflection point than what was implied by the previous scenario as ‘the world hitting rock bottom’ – the latter idea was not seen as plausible by participants. To make the journey toward an alternative prosperity model seem more plausible, the volatility that is described as becoming significant, has been clarified by describing the events that may embody that volatility. Finally, the idea that economic drivers would form a part of the transition was also emphasized. For example, these economic drivers include economic incentives to use alternative energies and penalties for using hydrocarbons.

The final summary scenario frame based on the updates to the key drivers of change, scenario axes and the scenario narratives is shown below. More underlying detail is provided in the remainder of this report.



2 Introduction

2.1 Purpose of this Report

This report has been compiled by Monitor Deloitte as part of the program to update the Port 2050 scenarios. The purpose of this report is to summarize the Port 2050 Scenario Update process, describe the feedback provided by those consulted throughout the process, and to describe the updated key drivers of change, scenario axes and scenario narratives.

This report is intended to be used as an internal document for Port Metro Vancouver management. The information contained herein is expected to support the preparation of targeted internal and external communications about the updates, and to provide valuable insight for Port Metro Vancouver as part of its strategic business planning process.

2.2 Port 2050 Scenario Update Process: Overview and Background

In 2010, Port Metro Vancouver embarked on a process to develop long term strategic scenarios, describing what the world and Vancouver gateway environments might look like in 2050. The process was highly collaborative in nature and engaged a wide range of representative parties with a stake in the future of the gateway.

The outcome was a set of four scenario narratives which were presented to the public in the 2011 Spring Forum. Trends and factors with the potential to greatly influence the future were also identified as key drivers of change and the scenarios created through this process served as useful inputs for Port Metro Vancouver in developing its long-term strategy and in conducting its annual strategic planning process. The four scenarios were named: “The Great Transition”, “Rising Tide”, “Missed the Boat” and “Local Fortress”.

Approximately four years have passed since the previous Port 2050 Scenario Planning process and Port Metro Vancouver has conducted another scenario planning exercise to test the continued relevancy of the scenarios and drivers of change through a collaborative process with stakeholders of the Vancouver gateway. Monitor Deloitte was engaged to assist Port Metro Vancouver in designing and delivering the program.

2.3 Port 2050 Scenario Update Process: Objectives and Approach

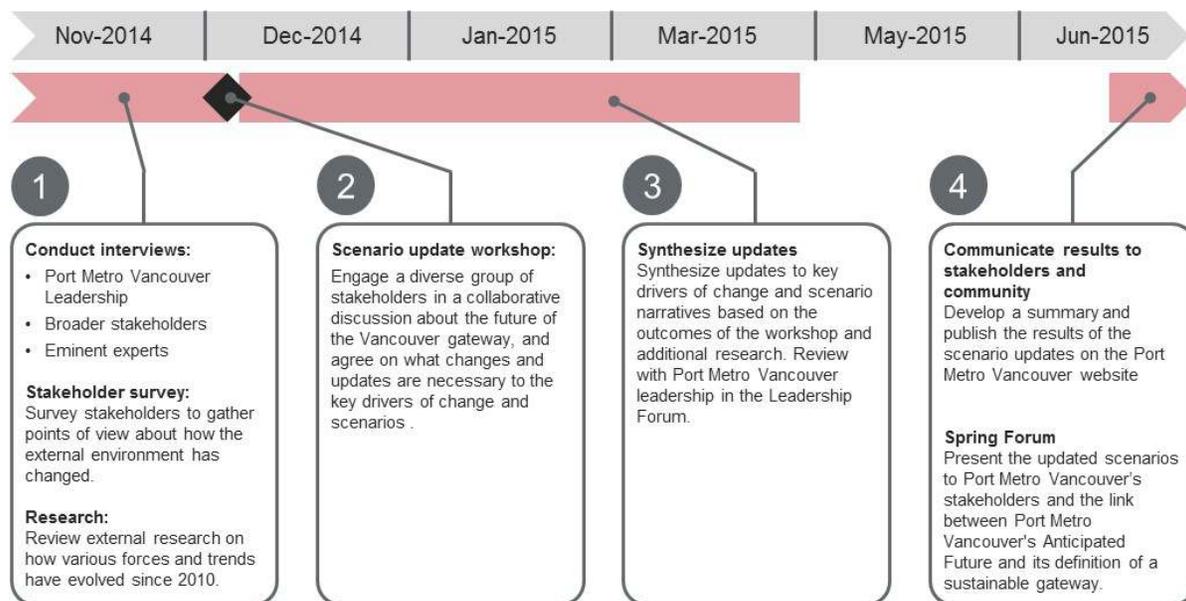
The objectives of the Port 2050 Scenario Update process is consistent with those from 2010 when the first planning exercise was conducted. The goal has been to engage leaders of organizations with a stake in the future of the gateway to answer the following two key questions:

- What is good growth for the gateway and its stakeholders?
- What will the port look like in the next 20 and 40 years?

The objective of this project in 2015 has been to ensure the key drivers of change and the scenarios continue to be relevant to Port Metro Vancouver and all interested parties involved in the future of the gateway including community groups, First Nations, Port Metro Vancouver customers, other industry and all levels of government.

Given the criticality of stakeholder engagement in the Port Metro Vancouver’s scenario planning process, our approach was structured to achieve strong stakeholder participation through interactive working sessions, ensuring endorsements were clarified and confirmed. This was critical to enhancing the ultimate understanding of the scenarios and in future, the strategic choices and actions that Port Metro Vancouver will make over time.

Key activities and the project timeline are shown below:



1. Interviews, Survey and Research

Deloitte conducted interviews with the Port Metro Vancouver leadership team as well as broader stakeholders and eminent experts to understand expert views on the drivers of change. To achieve a wider set of results, a survey was also sent to all workshop invitees to gather thoughts on whether there have been any significant shifts in the external environment influencing the Vancouver gateway since the initial scenarios were developed in 2010. Respondents were also asked to provide input and opinions on the certainties they have about the future, and the uncertainties or drivers of change they believe require more attention. Leading research was also reviewed to identify various forces, trends and uncertainties that have changed since 2010.

2. Scenario Update Workshop

The primary objective of the workshop was to test whether the key drivers of change and scenario descriptions were still relevant in light of any developments and changes in global and regional contexts. A wide range of groups participated in the workshop, including representatives from: industry, government, First Nations and community. Expert speakers were invited to present on key trends and themes highlighted through consultation before the workshop. Topics included: “The World in 2050”, the evolving view on China and Asia, the energy environment, and regional socio-economic trends. The purpose of these presentations was to challenge participants’ views and pre-conceptions about these important topics.

The workshop was highly interactive with participants being asked to break out into groups to review and consider whether updates were required to each of the drivers of change, the scenario axes and the scenarios themselves. The suggested updates reflected participant views on how the world has changed since 2010, and what participants saw as plausible outcomes for the future.

3. Synthesize Updates

Outputs from the workshop were reviewed and analyzed with additional research to synthesize implications, commonalities and differences identified in the workshop across the four scenarios. The analysis was documented and used to update the key drivers of change and scenario narratives. Finally, suggested updates were reviewed with Port Metro Vancouver leadership and the logic of the final scenario narratives was agreed upon.

4. Communicate Results to Stakeholders and Community

This final report has been compiled based on the material developed throughout the project through the survey, various interviews, workshops and Port Metro Vancouver leadership sessions. Port Metro Vancouver will develop communications materials that describe the updated scenarios. The final event of the process will be the Spring Forum in June 2015 when the updated scenarios will be communicated to a broad audience.

Port Metro Vancouver will consider the implications of the updated scenarios on its long-term strategy, and further integrate scenario planning into its annual corporate strategic planning process.

2.4 Selected Influencing Trends Since 2010

The world has undergone significant change in the years since the original Port 2050 scenarios were developed. This changing external environment, both on a global and regional scale, has introduced new uncertainties. On the other hand, some forces that were considered uncertainties in the past are now being seen as relative certainties.

Through the consultation process with experts and stakeholders, as well as additional research on the most significant developments that have the potential to impact the future of the gateway, a number of trends were identified as having been introduced or changed. A selection of the trends identified has been included below to provide an introduction to many of the updates and considerations discussed in this report. The key drivers of change contain additional detail about how uncertainty related to these selected trends, amongst others, could shape the future of the gateway.

1: Increased focus on climate change

An ever increasing body of evidence is clearly pointing to the link between human activity and climate change. With a nearly universal consensus in the scientific community, anthropogenic climate change is recognized as more of a certainty in 2015. In the world's developed economies, corporate citizens are taking climate change more seriously, with many corporate annual reports devoting a section to sustainability and adopting targets for reducing carbon emissions. Despite the consensus in the scientific community, public opinion in some major countries (in particular the USA) remains divided. A March 2014 Gallup poll¹ revealed only 31% of Americans "worry a great deal" about the quality of the environment, down from 34% in 2010. The same survey showed only 24% of Americans say they "worry a great deal" about climate change.

2: Economic recovery and the growing wealth gap

In 2010, the world was still reeling from the effects of the 2008/2009 collapse of the financial markets. At this time, it was not uncommon to see news headlines predicting the near-term end of capitalism. Since 2010, major global equity indices have posted returns in excess of 80 percent². The US economy in particular seems to have had a strong recovery. Despite the strong economic expansion, there is still

¹ <http://www.gallup.com/poll/167843/climate-change-not-top-worry.aspx>

² MSCI World 5-year return: 95.3%, S&P500 5-year return: 88.3% (as of Feb. 12th, 2015)

concern on a number of fronts. Recovery in Europe has been very weak, with worries about the collapse of the Euro persisting. Economic growth in China has also shown a great deal of moderation and there is increasing uncertainty as to the sustainability of future growth in China. Finally, the economic recovery has not benefited all layers of society equally and there is increasing worry about the widening wealth gap. According to a 2014 OXFAM study, the wealth of the 80 richest people was equal to the wealth of the bottom 50 percent of people in the world.³

3: Shifting energy landscape

Since 2010, there has been a significant shift in the global energy production landscape. Technological advancements in the extraction of unconventional oil and gas- including fracking - have contributed to a major increase in US domestic oil and gas production. These developments have led some forecasters⁴ to predict that the US will become energy independent by 2020 – this is a significant change from the thinking that dominated in 2010. Natural gas (LNG in particular), has also received major attention and some long term forecasts from major energy companies predict that, by 2050, natural gas will be the dominant source of energy in the world.⁵

The focus of attention on LNG has been pronounced in BC as well, with several major energy projects being contemplated or awaiting approval. If these projects go forward, there could be significant economic growth for BC. However despite these developments, there remains a great deal of uncertainty in global energy markets. If sustained, the recent drop in oil prices could change the economics of North American oil production. Finally, the link between continued use of fossil fuels and climate change cannot be ignored – in the long run, the reliance on hydrocarbons is not sustainable. The real question is not if, but when, a change to lower carbon sources of energy will take place.

4: Increasing importance of engaging with communities and First Nations

During the last several years, public debate about the benefits of major projects has intensified. While the debate has focused primarily on resource projects such as LNG facilities and the Northern Gateway pipeline, other infrastructure projects are also affected. More than ever before, it is apparent that effective community engagement and public support to operate are critical to successful infrastructure and resource development projects. Another precedent setting development has been the Supreme Court of Canada ruling in *Tsilhqot'in Nation v. British Columbia*. This decision reaffirmed Aboriginal title to a specific tract of land. The implications of this decision to the future of development projects in Canada are not yet entirely clear.

³ <http://www.theguardian.com/business/2015/jan/19/global-wealth-oxfam-inequality-davos-economic-summit-switzerland>

⁴ <http://finance.yahoo.com/news/top-sectors-for-trading-a-domestic-energy-boom-195935484.html>

⁵ Shell Scenarios 2014 – Mountains and Oceans

3 Key Drivers of Change

The building blocks of the Port 2050 scenarios are known as key drivers of change. These represent the most important trends, forecasts and uncertainties that we cannot accurately predict or control, but which are likely to (directly or indirectly) affect the future facing the gateway. As part of the original Port 2050 scenario planning process, many uncertainties and drivers of change were identified through dialogue with Port Metro Vancouver leadership, external experts, and stakeholders. Participants selected the most important of these drivers and agreed on their final characterization as part of the final scenario-building workshop in 2010. The following list represents the seven key drivers of change identified through the Port 2050 process in 2010:

- Capacity to Grow
- Demographics and Shifting Social Values
- Energy Transition
- Gateway Competitiveness
- Geopolitical Stability
- Patterns of Production and Consumption
- Technological Innovation

Based on these key drivers, Port Metro Vancouver has identified a set of specific early warning indicators that are monitored on an on-going basis to highlight how the key drivers of change are changing over time. This in turn helps Port Metro Vancouver identify which of the scenarios may be unfolding based on the changes that are happening.

One of the major goals of the Port 2050 Scenario Update was to test the continued relevancy of the key drivers of change. We followed a highly collaborative process to update these drivers, which involved interviews with Port Metro Vancouver leadership, external stakeholders and experts, and a broader participant workshop on December 5, 2014. This was followed by a detailed review of suggested updates with Port Metro Vancouver leadership.

In summary, the existing list of drivers was confirmed as still being relevant and most important in its role and influence on the future of the gateway. However, a number of new or increasingly important issues or uncertainties were seen to affect each key driver of change. The overall meaning of only one driver was changed, and this was the Technological Innovation driver. The intent of this driver was expanded to capture innovation across all dimensions, for example, technology, policy and regulation. This resulted in it being renamed to “Innovation” so as to reflect this broader intent.

The overall themes and meanings of all other drivers remained largely unchanged but some changes have been made to the uncertainties that characterize each of them. These variations include:

- Increased focus on how the efficiency of the regional supply chain may evolve and whether gateway stakeholders and groups will be able to work together effectively
- Continued increase in importance and relevance of public support to operate, which is relevant across many of the drivers
- A greater degree of uncertainty in terms of the rate at which transition to alternative energy sources may occur; the transition is reframed as one driven by demand for change, rather than scarcity of supply or depletion of the resource base
- Increased focus on Canada's significant role in global energy markets

- Capturing the uncertainty surrounding how changing regulations will impact gateway competitiveness
- Incorporating how the shifting roles of Asia may impact the gateway
- Consideration of what effect the uneven distribution of wealth will have on geopolitical stability
- Making explicit reference to the uncertainties around what innovations could disrupt industries along the supply chain, as well as how quickly organizations will adopt innovative approaches

These uncertainties are described in the context of each key driver of change below.

Please note: For the sections that follow, red text is used to highlight additions or changes to the original definitions of key drivers of change that were developed in 2010.

3.1 Capacity to Grow

The Capacity to Grow driver focuses on the ability of the gateway to respond to increasing demands in trade and volume of goods movement through the port and gateway as a whole. Issues such as the availability of industrial land in the Lower Mainland and the ability of the supply chain to use that land efficiently are considered as part of the Capacity to Grow driver.

Original Definition of the Driver (2010)

- How will pressures from population growth, climate change, or unforeseen factors affect the gateway?
- How will competing views on industrial, residential and agricultural land use be resolved?
- Will the port maintain, strengthen or lose its social license to operate?

Driver Updates

Stakeholders, Port Metro Vancouver leadership and external experts agreed that Capacity to Grow is still a critical driver and the availability of industrial land was confirmed as a major constraint on the ability of the gateway to grow. Recognizing the lack of available industrial land as more of a certainty, participants and Port Metro Vancouver leadership agreed that improving the efficiency of the supply chain would be key to increasing capacity rather than footprint expansion only. In addition, public support to operate was seen as a major factor that would affect a number of the other key drivers of change, in addition to the Capacity to Grow.

The updated definition of the driver includes consideration of how efficiency of the supply chain may change over time and in particular, the ability of gateway participants to utilize limited available industrial land in the most efficient way. A somewhat minor change has been to combine issues dealing with public support to operate into the Demographics and Shifting Social Values driver. This was done to emphasize the close tie between public support to operate and increasing dominance of shifting social values in the landscape of drivers.

Updated Definition

- How will pressures from population growth, climate change, or unforeseen factors affect the gateway?
- How will competing views on industrial, residential and agricultural land use be resolved?
- How will efficiency of the regional supply chain evolve?

3.2 Demographics and Shifting Social Values

The purpose of this driver is to highlight the future impact of population shifts, demographic changes, social views on globalization and sustainability, and attitudes toward development. It is important to recognize that this driver addresses both issues related to the regional perspective, such as shifting local demographics and public support to operate and grow, as well as a global/macro perspective, such as the relative growth rates of major global population centers and the associated effects on external markets important to the gateway.

Original Definition of the Driver (2010)

- What global population shifts will happen? (driven by demographics, migration, or other forces)
- How will these shifts impact goods production and consumption?
- How will the regional population evolve?
- How will social views of globalization and trade evolve?
- How will local views of the port evolve?

Driver Updates

Through the consultation process, no major changes were made and the driver remains focused on population changes and shifting social values. However, there is greater emphasis on the importance of community engagement. As key stakeholders for the gateway, community support will be critical in shaping how the gateway operates and how it expands. As discussed in the Capacity to Grow driver, land remains a major constraint for the gateway and hence the gateway's growth needs to balance with residential and community land needs. For that reason, issues surrounding public support for port/gateway operations were included as part of this driver. It was also expressed through this process that while the last few years have seen some debate around the validity of climate change, this was now seen more as a certainty, and hence would be a key issue shaping public opinion going forward. As a result, social views on sustainability and climate change have received more focus in the revised definition.

Updated Definition

- What global population shifts will happen (driven by demographics, migration, or other forces)?
- How will these shifts impact goods production and consumption?
- How will the regional population evolve?
- How will societal views of sustainability and climate change unfold regionally and globally?
- How will varying public support for operations and growth impact the gateway?

3.3 Energy Transition

This driver focuses on issues dealing with the shift from a global energy base dominated by hydrocarbons to greater use of alternative energy sources. Uncertainties related to the viability of alternative fuels, the pace and timing of the transition, and the impacts of that transition on the global transportation industry are all considered as part of the Energy Transition driver. Furthermore, this driver could be considered to be one of the most important given the large role it plays in driving and characterizing the shift to an alternative prosperity model in both the Great Transition and Local Fortress scenarios.

Original Definition of the Driver (2010)

- When will the world reach "peak oil"?
- What will the implications be for global goods transport?

- Will higher energy prices dominate?
- What alternatives to hydrocarbons will develop, and how quickly?

Driver Updates

During the consultation process, participants described how a transition to alternative forms of energy is likely to be driven by people's desire to move away from carbon-based fuels in order to slow climate change, rather than the world running out of oil. As a result, greater emphasis is now given to the demand side of the change (that is, the desire to move away from hydrocarbons) rather than the supply side (that is, hydrocarbons running out and the world reaching "peak oil"). The driver has also been updated to reflect the fact that high oil prices are not a critical factor today, given the recent drop in price.

Finally, Canada's role in the energy markets has been included as a key uncertainty within this driver. This reflects the current situation of a significant number and scale of major energy projects that may, or may not go ahead in BC and Canada.

Updated Definition

- What alternatives to hydrocarbons will develop, and how quickly?
- What will the implications be for global goods transport?
- **What role will Canada play in global energy markets?**

3.4 Gateway Competitiveness

The Gateway Competitiveness driver focuses on the competitive position of the gateway with respect to its ability to attract business, labour, investment and trade. In this context, cost, efficiency, and reliability are seen as the primary measures of competitiveness. However, other factors of competitiveness, such as the level of sustainability, are also important to the degree to which these other measures are valued by the gateway's customers and other stakeholders.

Original Definition of the Driver (2010)

- How attractive will the gateway be for business, labour, investors and trade?
- How productive will the gateway's labour force be?
- Will gateway actors share a common strategy?

Driver Updates

This driver was seen to be very closely tied to the Capacity to Grow driver, and the gateway's increased capacity will be a key component of its competitiveness. Port Metro Vancouver leadership, experts and participants saw the efficiency of the gateway's supply chain as a critical driver in this regard. A very important component of this driver and the scenarios themselves, was highlighted as the ability of various gateway and regional stakeholders (including government and industry) to work together towards the creation of an efficient, integrated and cost-competitive supply chain. As a result, the driver has been updated to emphasize uncertainties around the productiveness of the regional skilled labor force and whether gateway actors will work together to achieve a competitive regional supply chain.

The regulatory and legislative environment was identified as continuing to be highly uncertain, which is reflected in the updated definition. This ties closely to the ability of all levels of government to work together, particularly the many municipalities with direct interests in the gateway as a hub for trade.

Lastly, consideration of whether the gateway will cooperate with other ports, such as Port of Prince Rupert, was included as a key factor that may alleviate the limitations on land availability in the gateway, and acknowledges the inherent linkages between ports as part of their supply chains.

Updated Definition

- How competitive will the gateway be for business, labour, investors and trade?
- How will the gateway's productivity change over time?
- Will gateway stakeholders and other groups manage to work together to develop an integrated, reliable and competitive supply chain?
- Will the gateway be able to cooperate and align with other ports?
- How will changing regulation and legislation impact gateway competitiveness?

3.5 Geopolitical Stability

The Geopolitical Stability driver has a dominant focus on the volatility of the geopolitical environment and how the shifting balances of power might affect the gateway – both directly and indirectly - by impacting the external markets which the gateway relies for trade. Coming out of the Global Financial Crisis in 2010, the real potential for changes in the dominant political powers across the world was recognized. Primarily this focused on China's, and the rest of Asia's, continued growth path demonstrating dominance and strength in an environment of floundering Western economies.

Original Definition of the Driver (2010)

- How will the rise of new political economic actors, shifting balances of power and the relative fortunes of the US and Canada affect the gateway?
- In what arenas will Asia dominate?
- How volatile will the geopolitical environment be?

Driver Updates

This driver was still seen to be valid and very much increasing in importance in light of geopolitical instability such as what has been seen in Ukraine, Crimea and Middle East. The scenarios describe the concept of volatility and this driver forms the cornerstone of that volatility. The volatility manifests itself through the global energy markets and trade patterns which have been highlighted in the updates to this driver.

Asia continues to be perceived as critically important in this driver, however, whether it would “dominate” was not seen as a given. This uncertainty was reframed to consider what roles the various countries within Asia would play in the evolving geopolitical environment along with the role that Asia overall would play in trade globally.

Another critical theme seen to be a major uncertainty is the impact increasingly uneven distribution of wealth across the world will have on stability. It is a relative certainty that it will continue to be uneven, at least for a time, but how it will play out and its impacts are unclear.

Updated Definition

- How will the rise of new political economic actors, shifting balances of power and the relative fortunes of the US and Canada affect the gateway?
- How will shifting roles of Asia impact the gateway?
- How volatile will the geopolitical environment be and how will it impact global energy markets and trade?
- What effect will uneven distribution of wealth have on geopolitical stability?

3.6 Patterns of Production and Consumption

The Patterns of Production and Consumption driver focuses on the changes in the mix of trading commodities and patterns, and the potential redistribution of global centers of manufacturing and consumption. This driver is closely linked to several other drivers, including: Demographics and Shifting Social Values, Geopolitical Stability, and Energy Transition, and it represents both the supply and demand components of the scenarios.

Original Definition of the Driver (2010)

- How will trade patterns shift through 2050?
- How will changing locations of consumers and goods producers impact trade flows?
- How will demand for key gateway commodities shift over time?

Driver Updates

This driver remains largely unchanged and continues to focus on changes in trade patterns and locations of consumers and producers. The consultation process highlighted several additional trends relevant to this driver, such as the belief that while there is likely to be a change in the mix of trading commodities, the demand for Canadian resources is likely to stay strong. The discussion focused on how technology innovation and evolving social views on globalization might influence this trend. As a result, the driver has been updated to capture the uncertainty around how technology and varying energy and manufacturing costs could disrupt the locations of goods production.

The trend in “re-onshoring” of manufacturing from Asia to North America raised a level of uncertainty as to how the location of manufacturing, both globally and within Asia may change. In particular, where goods are produced in Asia could have an effect on the location of major trade routes, which would have a significant impact on the gateway.

Updated Definition

- How will trade patterns shift through 2050?
- How will changing locations of consumers and goods producers impact trade flows?
- How will demand for key gateway commodities shift over time?
- How will technology and changing costs of energy impact where goods are produced?

3.7 Innovation

The Innovation Driver looks at how technological, social and policy innovation will impact the global shipping and manufacturing industries, and the ability of the gateway to leverage innovation and adapt to these changes. Note that this is different to the original definition of the driver as explained below.

Original Definition of the Driver (2010)

- How will technology improve goods movement and handling?
- How large will ships get?
- What new transport technologies will emerge?
- What innovations could disrupt the transportation and logistics industries?

Driver Updates

As shown, the original definition of the driver focused solely on technological innovation. While technological innovations were seen as some of the most critical drivers of uncertainty for the future, it

was recognized that there are many other areas where innovation is important for the future of the gateway. As such, the driver has been expanded to include policy setting and the regulatory environment.

Therefore, the driver has been renamed from “Technological Innovation” to “Innovation”. It also includes further detail around the impact that innovation could have on manufacturing and the regional supply chain.

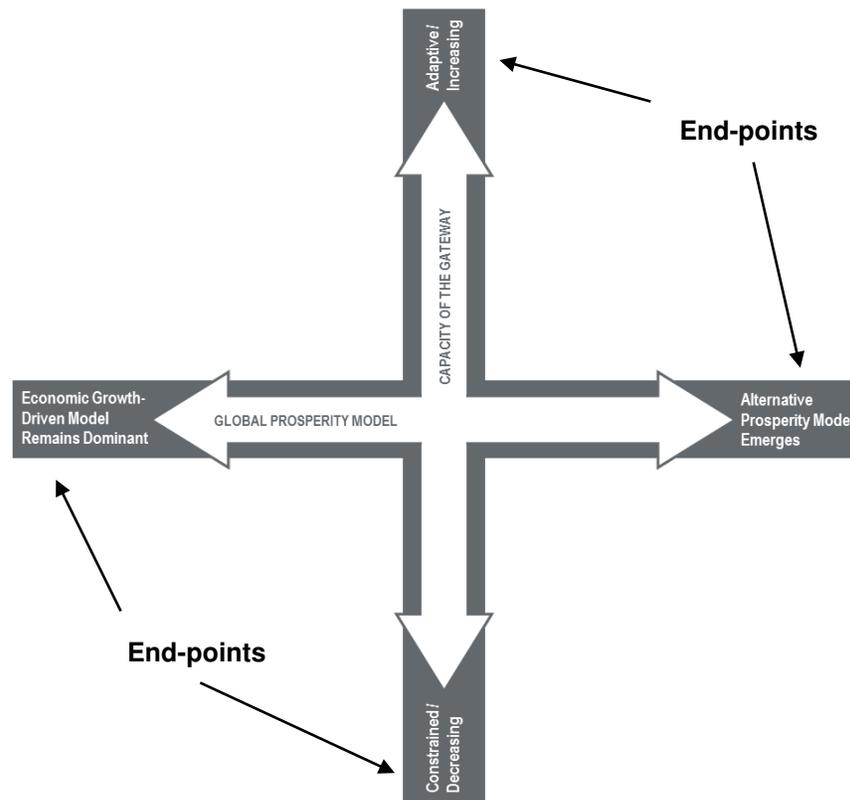
Updated Definition

- How will technology improve goods movement and handling?
- How large will ships get and how will this impact supply chains?
- What new transport technologies will emerge?
- What innovations could disrupt transportation, logistics and manufacturing industries?
- How quickly will the gateway adopt innovation in supply chain technologies?
- How will innovation in areas such as regulation and public policy development impact the gateway?

4 Scenario Axes

Scenario planning methodology best practice involves the use of scenario frames to help define the various futures, or scenarios, that could play out in the future. Scenario frames are created by crossing two of the most important and sometimes most likely uncertainties to delineate a matrix (or frame). Uncertainties or drivers of change are often grouped to form the axes of the scenario frame. The end-points of each axis represent the plausible extremes of how the associated uncertainty might play out in the future. In this way, the scenarios have inherent divergence which helps to form quite different futures, depending on how the stakeholders believe the world is evolving.

A useful consideration in selecting which two axes to use in creating the scenario frame is to select uncertainties or drivers of change that do not depend on each other. In the case of the original Port 2050 scenarios, the seven drivers of change were distilled into two critical uncertainties that formed the scenario frame axes. These were the Capacity of the Gateway and the Global Prosperity Model. The scenario frame developed in 2010 is shown below:



The Capacity of the Gateway axis corresponds to the nature of supply and incorporates issues of competitiveness, infrastructure, land use, public support for operations, talent, local economic strength and collaboration between port stakeholders.

The Global Prosperity Model axis corresponds to the nature of demand, describes patterns around globalization, macroeconomics and energy.

Through the detailed and collaborative process followed for identifying updates to the Port 2050 scenarios, it has been confirmed the Capacity of the Gateway axis continues to be one of the most critical uncertainties and remains largely unchanged. Having said that, it follows that the various updates to the drivers grouped under this supply-side axis also flow through to the definition of this axis. For example, there is greater emphasis on the uncertainty around gateway actors working together to achieve alignment across industry, communities and all levels of government, thereby improving regional supply chain efficiency and overall gateway competitiveness.

The updates to the Global Prosperity Model Axis were more substantial and involved strengthening the linkage between the transition to alternative prosperity models and the energy transition, as well as emphasizing the importance of economic drivers to precipitate the transition. As for the other axis, the updates made to the demand-side drivers flow through to the respective Global Prosperity Model axis.

The various changes to the axes are described in more detail in the remainder of this section.

4.1 Capacity of the Gateway

As originally conceived in 2010, this axis was seen to be focused on the gateway and the region more broadly, rather than the global environment. The two extremes for how this axis could play out, also called “end-points” (as shown in the above diagram) of the axis, were described as:

- “Adaptive/Increasing” Capacity of the Gateway: at this end-point, the capacity of the gateway was seen to be adaptive and/or increasing, meaning the gateway is able to respond, adapt, cooperate and thrive in changing circumstances.
- “Constrained/Decreasing” Capacity of the Gateway: at this end-point, the capacity of the gateway was seen to be constrained and/or decreasing. In scenarios on this end of the axis, the gateway as a whole is challenged by any number of factors – both internal and external – that limit its ability to adapt, grow and be successful.

Summary of Updates

Feedback from stakeholder and expert interviews, workshop participants, and Port Metro Vancouver leadership indicated that this axis remains relevant, and that no major revisions to the axis were required. The feedback on the axis, along with the updates to the key drivers of change which are considered to form a part of this axis, did however indicate several key themes which are relevant to this axis. Those themes include:

- The lack of available industrial land for the expansion of the gateway supply chain is more certain
- The ability of gateway stakeholders and regional actors to develop an integrated and efficient supply chain is seen as key to increasing the capacity of the gateway and its competitive positioning
- Alignment of various gateway stakeholders and the stakeholders’ ability to create a shared vision and strategy for achieving an efficient and integrated supply chain is seen as critical
- Public support to operate and grow is seen as an increasingly important factor and the opportunity for the port to be a focal point of alignment and engagement was also discussed – a particular challenge highlighted was that there appears to be a disconnect in how society views the role of resource development and trade in Canada’s success and growth

In light of the themes noted above, the definition of this axis and its endpoints were revised to incorporate a greater emphasis on the importance of creating an integrated and efficient supply chain, and creating alignment between the gateway’s stakeholders and regional actors (including: industry, government,

community and First Nations). The name of the axis and the names of the end-points remained unchanged.

Revised Definition

Included below is the updated description of the axis and its end-points.

Axis description:

The Capacity of the Gateway axis incorporates issues of competitiveness, supply chain efficiency, land use, public support to operate, talent, local economic strength and collaboration between gateway stakeholders and regional actors. It encompasses Port Metro Vancouver, but is about the gateway and region more broadly.

End-point descriptions:



Adaptive / Increasing:

The gateway as a whole is able to adapt, cooperate and thrive in changing circumstances. Increasing alignment between gateway stakeholders and regional actors, including various levels of government, leads to a more integrated, efficient and competitive gateway supply chain. Port Metro Vancouver takes a central role in facilitating alignment and engagement of various stakeholders, and public support to operate is seen as an integrating force.

Constrained / Decreasing:

The gateway as a whole is challenged by any number of factors – both internal and external – that limit its ability to adapt, grow and be successful. Lack of alignment among gateway stakeholders and regional actors, including various levels of government, hinders the development of an integrated, efficient and competitive gateway supply chain. Port Metro Vancouver does not take a central role in facilitating stakeholder engagement and alignment, and public support to operate is seen as a compliance requirement.

4.2 Global Prosperity Model

As originally defined in 2010, the Global Prosperity Model axis describes patterns around globalization, macroeconomics and energy, and is fundamentally about the nature of demand. A key defining component of the axis is the degree to which a global shift in social values and attitudes toward improving human well-being and the environment would occur. The two “end-points” of this axis were described as:

- “Economic Growth-Driven Model Remains Dominant”: on the far left of the axis, the current economic growth-driven model was seen to remain dominant. This assumes a continuation of the current system, including globalization, traditional economic measures of GDP and growth, and the predominant use of hydrocarbon-based energy. While significant changes do happen, there is no paradigm shift in scenarios on the left side of the axis.
- “Alternative Prosperity Model Emerges”: on the far right, an alternative prosperity model was seen to emerge. This assumes a fundamental change in the nature of globalization, economic growth and definitions around prosperity that assign greater importance to values such as environmental quality and human well-being. Also included within this axis was a transition to a post-carbon economy, and a demographic and social transformation that could emerge from a new generation of leadership.

Summary of Updates

Throughout the consultation process, a significant amount of debate and discussion centered on the plausibility of a transition to an alternative prosperity model, what that alternative prosperity model might look like, and the journey which would lead to such a change within the time period under consideration (by 2050). In addition, the Energy Transition driver of change was highlighted as being of particular importance and closely linked to the Global Prosperity Model axis in general. Highlights of those discussions included the following general themes:

- Energy transition to cleaner/alternative sources of energy is certain to happen (in fact, it is already happening), at least to some degree, on both ends of the axis. However, the rate of change is less certain.
- “Altruism” is not likely to be a sufficient driver for a transition to an alternative (e.g. triple bottom line) model of global prosperity. A shift toward a different prosperity model would still have to be supported by economic fundamentals.
- Increasing global volatility, driven by climate change, growing wealth inequality, and a number of other factors were seen as key feature of scenarios on the left side of the axis.
- While a transition to different prosperity models and alternative energy sources may take place, such a change is likely to occur with varying degrees of adoption and at different rates across the world.
- Technology plays an important role in this axis, and that role is different depending on the end-point. On the left side of the axis, technology is an enabler of growth, while on the right side of the axis, technology is seen as a driver of efficiency. Technology also plays a key part as an enabler of a trend toward “regionalization” of manufacturing (e.g. on-shoring).
- In order to present a plausible journey toward an alternative prosperity model, the scenarios on the right side of the Global Prosperity Model Axis need to feature a series of catastrophic events (e.g., natural disaster related to climate change), which “shock” the world into action and precipitate the transition.

While the name of the Global Prosperity Model axis was not changed, some fundamental components of the axis definition were revised. This in turn led to updates of the end-point names, and their corresponding descriptions. In line with feedback from participants, the definition of the axis now emphasizes the role of energy, social views toward human well-being and the environment, along with the changing patterns of production and consumption. Scenarios on the left side of the axis were updated to feature increasing global volatility, and to emphasize slower rate of energy transition away from hydrocarbon based fuels (while recognizing that some level of transition still takes place). Scenarios on the right side of the axis were updated to feature a faster and deeper transition away from fossil fuels, a period of significant volatility that precipitates the move to the alternative prosperity model, and a regionalization of manufacturing enabled by technological advances, and the continued decrease in costs of technology.

The names of the end-points were changed to “Traditional Growth Model” and “Alternative Prosperity Models”, and the definitions of the end-points were revised to include more specific examples that characterize each end-state in 2050.

It is important to note some of the feedback about the Global Prosperity Model axis focused more on “how” the world would transition to the alternative prosperity model, rather than the definition of the axis and end-states themselves. As such, this feedback on “how” the transition would happen was directly incorporated into the scenario narratives (included in the next section of this report).

Revised Definition

Included below is the updated description of the axis and its end-points.

Axis description:

The Global Prosperity Model axis describes patterns around energy, globalization, shifting patterns of production and consumption, macroeconomics, and social views and attitudes toward human well-being and the environment. This axis is fundamentally about the nature of demand.



End-point descriptions:

Traditional Growth Model:

On the far left of the axis, the current economic growth-driven model remains dominant. This assumes a continuation of globalization, traditional economic measures of GDP and growth, and continued dominance of hydrocarbon based energy, with renewable energy comprising less than 20 percent of the total energy mix. Along with continued economic growth, scenarios on this side of the axis feature increased volatility due to climate change effects and an increasing wealth gap.

Alternative Prosperity Models:

On the far right, alternative prosperity models emerge. This assumes a change in the nature of globalization, economic growth and definitions around prosperity which take into account externalities such as the cost of climate change. Values such as environmental quality and human well-being are assigned greater importance in scenarios on this side of the axis. Within this axis, we also include the transition away from hydrocarbon based energy, with alternative energy comprising more than 50 percent of the total energy mix, globally.

5 Scenario Narratives

Scenario planning is a method that helps assess current strategy, develop options and choose options by providing a way of answering questions such as:

- How well do we think our strategy positions us for the future?
- How can we creatively and dramatically expand the set of alternative strategies being considered?
- How can we build the ability to deal with uncertainty into our strategy?

Scenario planning provides a means for ordering perceptions about how the future may play out and determining what strategic decisions today offer the best chance of success tomorrow. It challenges management, and stakeholders, to revisit assumptions about the industry and environment in which they operate and consider a wider range of possibilities about where they may head in the future. This exploration results in a broader, more innovative view about future growth opportunities and risks.

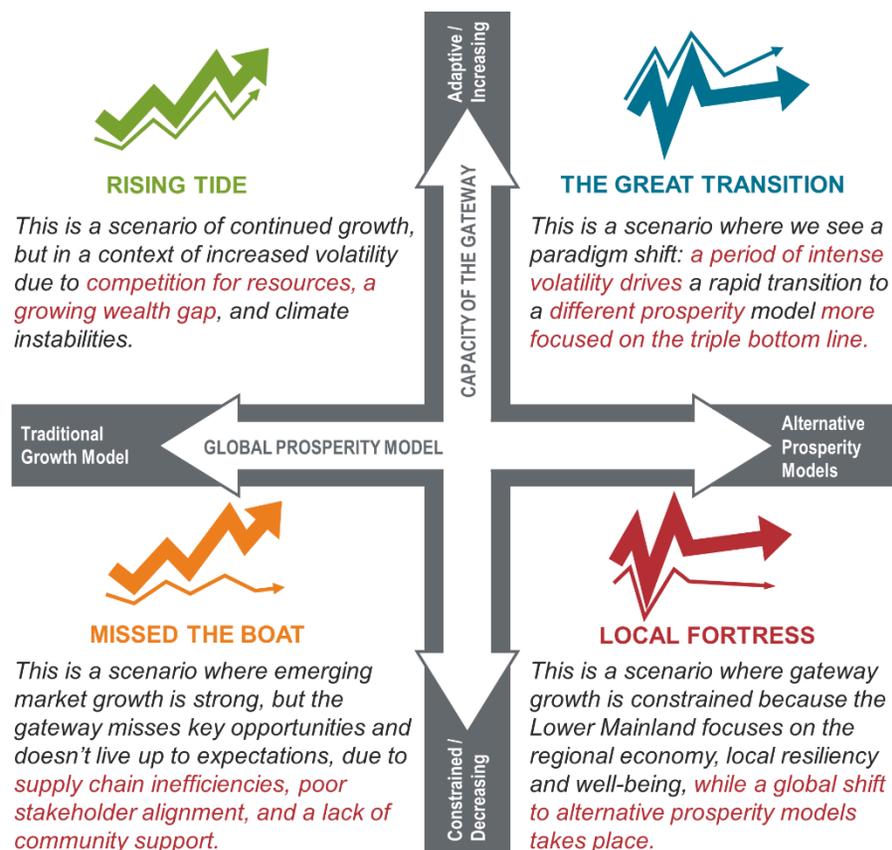
The point of scenario planning is not to predict the most probable future. Rather, the objective is to develop and test strategic choices under a variety of plausible futures. Doing this exercise proactively and essentially rehearsing for multiple futures, strengthens an organization's ability to recognize, adapt to, and take advantage of, changes in the industry over time. In order for them to be useful, scenarios must be plausible, relevant and challenging; they also need to differ from one another and cover the range of possibilities that we could face as a port and a gateway.

Four scenario narratives were originally created as part of the Port 2050 process in 2010, as described later. These scenarios reflected the key drivers of change and uncertainties that were considered the most relevant and likely to influence the future of the gateway. In conducting the Port 2050 scenario review process, a key point of focus was to ensure:

1. Updates to drivers of change and axes were flowed through to the scenario narratives to describe "how" the future would play out.
2. The scenarios continue to be relevant, sufficiently divergent but plausible. This is a key ingredient to a successful scenario planning process.

As described previously, a highly collaborative process was followed for updating the Port 2050 scenarios and specific feedback was sought from participants and experts on what they believed was still relevant or required change in the narratives themselves. This generated many of the updates suggested in this section; but many updates were flowed through to the narratives from the respective updates in the drivers of change and the axes.

The revised scenario narratives presented below incorporate the updates which emerged through the consulting process. A critical consideration in making the updates was to maintain consistency between the key drivers of change, the scenario axes and the scenario narratives. The over-arching test conducted regularly throughout this process was to ensure the scenario narratives maintain sufficient divergence but remain plausible, while also retaining some of the essential elements of the original scenarios. The revised scenario frame with brief descriptions of the scenarios are shown in the diagram below:



Please note: For the sections that follow, red text is used to highlight additions and changes to the original scenario narratives that were developed in 2010.

5.1 Scenario 1: Local Fortress

Introduction

As originally conceived in 2010, the Local Fortress Scenario described a future where gateway growth is constrained because the Lower Mainland focuses on the regional economy, local resiliency and well-being. This drive to focus more locally was in response to additional global economic crises and a slowdown in Asian growth which depressed global trade worldwide. Therefore, gateway activity is downsized in the original scenario with short-sea shipping and regional trade doing well. This was further supported by the localization of manufacturing, specifically through 3D printing. The collapse of the Canadian real-estate bubble was a theme of the original scenario and in the drive toward greater inward focus, the gateway was described as becoming much less global and less tolerant of world views.

Participants in the December workshop initially had difficulty seeing this scenario as plausible. However, through further discussion they did envisage a future where such significant inward focus and reduced global trade could occur. In arriving at that conclusion, there were some variations to key themes suggested by the participants. These suggestions included:

- The Lower Mainland would never completely transform into a solely service / tourism based industry and lose its roots as hub for trade.

- Only some large energy projects would move ahead using the Lower Mainland for trade (e.g. LNG) but globally, energy transition is picking up pace and there is a change in the energy commodity mix.
- Whilst it may not transform completely, the Lower Mainland becomes a lifestyle oasis and attracts a like-minded demographic looking to retire and enjoy the lifestyle benefits. This change was seen to drive up real-estate prices and erode affordability, contrary to the original narrative of a bursting real-estate bubble.

Summary of Updates

Ultimately, no fundamental changes have been made to the scenario and it retains the theme that the gateway takes an inward focus resulting in unintended consequences of increasing isolation, and a reduction in its role as a hub for trade.

To ensure the narrative is aligned with the main elements of the Global Prosperity Model axis, a greater emphasis was placed on the key role of shifting social values and attitudes toward human well-being and the environment, and how these shifting attitudes would impact a transition to alternative energy sources and contribute to localization of manufacturing. The narrative for the global context was also changed to give greater emphasis to the muted economic recovery of the middle class and to acknowledge the strong recovery of the financial markets from 2010 to 2015. The focus on 3D printing was also expanded to capture overall innovation and technology advancements which help to drive greater local and regional manufacturing.

In terms of the regional context, the idea the Lower Mainland real-estate bubble would burst was replaced with the theme of continued foreign investment further driving up housing prices and driving down affordability. Finally, specific reference to “cottage industries” in the original scenario were replaced with a focus on increasing service and tourism sectors. Vancouver still largely becomes a lifestyle oasis and while some large energy projects still go-ahead, they use alternative ports for trade due to the isolation and poor competitiveness of the gateway.

Revised Scenario Narrative

This is a scenario where gateway growth is constrained because the Lower Mainland focuses on the regional economy, local resiliency and well-being, while a global shift to alternative prosperity models takes place.

A ‘local fortress’ emerges as a reaction to a weak recovery of the middle class and a slowdown in Asian growth, which in turn depresses and changes consumption patterns worldwide. Gateway activity is downsized and shifts toward services, tourism and local agriculture. Short-sea shipping and the cruise ship industry do well with a regional, west coast focus. In the end, the region’s early choices to become a “lifestyle region” come back to haunt it, as its vitality and hopes of being a global hub diminish over time.

World Context 2015 – 2030: Middle Class Hollowing

It seems the middle class in Europe and North America never really recovered from the 2008 economic crisis. Although recoveries occur, and the wealthy prosper with periods of high stock market returns, there are few meaningful improvements for the middle class. Many find themselves on the economic sidelines – unemployed, or stuck in poor paying jobs with affordability declining. Then, around 2020, economic growth in emerging markets slows due to a range of challenges, including environmental and political. While major economies such as China are far from collapsing, it is clear that decades of breakneck growth are taking their toll. Even the global energy consumption patterns are changing faster than

expected. In an effort to address growing environmental problems, the transition from coal to cleaner energy sources such as natural gas and solar, takes place rapidly, even in emerging markets.

This back-to-basics ethos isn't all doom and gloom. With a slower pace of economic growth, people turn more of their attention toward personal well-being, community and the environment. Business does well in non-traditional sectors: spirituality, health, community (virtual and physical) and learning. In a 2030 survey, most people report being no more or less happy than they were in the previous decade. The overall economic slowdown also has its advantages as it takes pressure off the environment toward the end of this period.

Regional/National Context: 2015 – 2030: Lifestyle Oasis

Within this uncertain economic climate, the wealthiest segments of the population look for safe places to store and preserve their capital. Vancouver, with its natural beauty and location on the Pacific Rim, is seen as an attractive real-estate market and a place to retire and enjoy the lifestyle. The influx of foreign capital continues to drive up Vancouver's real-estate prices, exacerbating the affordability problem for the middle class and intensifying competition for industrial land for real estate development, particularly around the Burrard Inlet.

At the same time, local industry, community and various levels of government do not manage to reach a shared vision and strategy for the gateway. In particular, local governments and communities see local self-sufficiency as important to achieving greater sustainability. The local legislative environment focuses on this and many port and infrastructure projects do not go forward, with community opposition to industrial development intensifying. First Nations also assert their land claims and choose to preserve traditional lands in favor of industrial development. Despite the lack of alignment, some of BC's major energy projects still go ahead due to high global demand for natural gas, while other opportunities are missed. Those projects mostly end up using the Port of Prince Rupert for trade.

With rising housing prices and a shrinking industrial base in the gateway, many young people are forced further into the suburbs or away from the gateway entirely in search of jobs. Even the growth of shared ownership models for major expenditures such as vehicles and houses cannot entirely mitigate this trend. As people move to the suburbs, they are forced to commute further from their homes. This situation causes a labour supply shortage, putting a further damper on industrial growth. The industry base that does remain in the gateway increasingly shifts toward tourism, services and local agriculture.

World Context 2030 – 2050: Technology Changes the Game

By 2035, the global economy is recovering, but this time the recovery is different than before. The economic slowdowns in the previous two decades had a lasting impact on global consumption patterns and attitudes, with people in developed countries increasingly doing more with less, or buying smarter. In fact, the word "consumer" is used less and less, a sign of the times. Also, with the new generation, an increased awareness on human well-being and the environment prevails.

Advances in automation and manufacturing technologies enable a shift to more local production. Given the potential to reduce transportation costs – both monetary and environmental – these innovations are rapidly adopted. This, in turn, disrupts entire global supply chains, which reinforces the localization of manufacturing even further. Trade volumes diminish as supply chains simplify to move smaller quantities of raw materials to local facilities adjacent to retail locations. Toward the end of the scenario, advances in alternative energy technologies create viable alternatives for a transition away from fossil fuels; with the new global attitudes toward the environment, this transition happens rapidly. By 2050, alternative and renewable energy sources account for more than 50 percent of energy production.

Regional/National Context 2030 – 2050: Beware of Unintended Consequences

Toward the end of this scenario, the Lower Mainland looks very different than it did in 2015. In many areas, including Burrard Inlet, waterfront industry has given way to residential uses and tourism amenities. Having access to clean and affordable hydroelectric power, local manufacturing also does well. The 2030s sees local interest groups gaining increasing influence and a high degree of control in decision making and shaping the direction of the region. With the shift toward tourism and local manufacturing, the cruise ship industry and short sea shipping are vibrant. Some people view this transition as a positive outcome. For those who can afford it, the Lower Mainland is still a pleasant place to live and visit.

Around 2040, the region has become a lifestyle bubble for many, a place to retire and retreat. Commodities such as coal are no longer exported through the gateway and trade is increasingly routed to other ports at increased costs to Canadian shippers. With an older population, the demand for social services in the Lower Mainland has substantially increased, but a reduced economic base means the region is reliant on the rest of the country to help pay the bills. Conversely, the reduction of trade through the gateway has negative effects on the rest of Canada and in the 2040s, trade is predominately moving through other ports on the North-Western Seaboard.

Ultimately, while still ethnically diverse, the region is paradoxically less global and more inwardly focused. Looking back, that creative tension between business and community was an important source of balance and vitality in the region. While achieving its own focus on environmental sustainability and human well-being objectives, the region has pushed major industry and many of its residents outside of the Lower Mainland and the area has lost some of its character, vibrancy and its sense of authenticity.

5.2 Scenario 2: Missed the Boat

Introduction

The original narrative of this scenario from the 2010 planning exercise envisioned strong growth in emerging markets and focused on the gateway's regional challenges to meet the growing demand and remain competitive. As played out in the scenario, the gateway ultimately fails to meet this challenge because of problems with supply chain issues, poor coordination amongst gateway actors, lack of community support for trade and diminishing industry support for trade through the gateway.

Feedback from the December participant workshop focused primarily on providing additional detail of how a lack of alignment among the various parties could set the stage for this scenario to play out:

- Misalignment between various levels of government, and a lack of support from other parts of the country will have negative impact on gateway infrastructure development.
- Failure to engage the public and secure public support to operate will inhibit growth and make it difficult to operate.
- Lack of coordination in the early part of the scenario results in lasting consequences – especially in terms of Canada being “locked-out” of key emerging markets.
- Inability of gateway actors to work together toward a shared vision to create an efficient and reliable supply chain will damage the “brand” of the gateway and eventually lead the gateway to lose out to competing gateways.

Summary of Updates

Based on feedback that was received, and additional discussions with Port Metro Vancouver leadership, the global context of this scenario remained largely unchanged, however the narrative was modified to more closely align the global context with the updates to the Global Prosperity Model axis. Most notably, the themes around the growing wealth gap and its role in contributing to significant volatility was clarified.

It is also recognized in the updated scenario that many incremental changes are occurring around a move to more renewable energy sources and incentives or penalties for high-carbon energy are being put in place across the world. However, these will not grow in scale and will not form a ground-swell of change at a global level around triple bottom line principles as is seen in the Great Transition and Local Fortress scenarios.

Changes to the narrative in the regional/national context were focused on drawing a clear link between how a lack of alignment among industry, government and community coupled with each group “digging-in” on their opposing views, leads to poor competitiveness and attractiveness of the gateway for trade. The gateway is then locked out of trade with key emerging markets and many of the major regional energy projects do not go ahead because of these issues. Ultimately, this leads to a structural decline in gateway competitiveness and the negative effects of declining trade through the gateway has also been emphasized for both the gateway and the rest of Canada.

Revised Scenario Narrative

This is a scenario where emerging market growth is strong, but the gateway misses key opportunities and doesn't live up to expectations, due to **supply chain inefficiencies, poor stakeholder alignment, and a lack of community support.**

Competitiveness worsens. Meanwhile, a game-changer emerges: trade patterns shift to favour trade routes between emerging economies, which over 40 years affects the entire west coast. Climate change is still an issue, and will need to be dealt with by future generations.

World Context 2015-2030: Emerging Markets Rising

This is a world in which emerging markets drive global growth and reap the lion's share of the benefits. The current prosperity model is delivering the economic goods, proving resilient and the best route to global stability and raising standards of living.

During the 2020s, new energy technologies, a shift away from coal toward cleaner natural gas, and sustainable supply chain efficiencies help mitigate the impact of this growth on the environment, though deteriorating environmental quality continues to be a concern, something the world would have to deal with later.

Things look promising in the first 10 to 15 years. The economy picks up as the emerging world — China, India, Brazil and even parts of Africa, grow rapidly. In the same way as the Asian Tiger economies rose up in the late 20th century, this growth creates a virtuous cycle of greater prosperity and social progress in these countries. Of course, this growth is not without challenges; while prosperity is increasing in many parts of the world, so is the gap in wealth between the rich and the poor. Despite a few regional conflicts, a relative sense of stability is maintained on a global level. With rising prosperity and wealth of emerging economies, their power and influence on the global stage also increases. By 2030, it becomes clear the geopolitical centre of gravity is shifting toward the emerging economies.

Regional/National Context 2015-2030: Hands tied

Despite these favourable global conditions, the gateway falls well short of hopes and expectations. The reasons are both internal and external. On the one hand, it's unable to overcome key challenges, from labour issues to corridor and supply chain inefficiencies, losing out to competing ports. Community support for continued port activity and growth wanes because of ongoing operational impacts and a poor understanding of the gateway's value.

In these early years, the gateway has a hard time making a compelling case against community and industry concerns as it receives the bulk of blame for the chronic gridlock in the Lower Mainland. A lack of

alignment and shared strategy among the municipal, provincial and federal governments aggravates the situation. Without a clear direction, key public infrastructure improvement projects are delayed or fail to proceed as a result of insufficient funding and community opposition. The consequences of the gateway's inability to address these early challenges leads to a self-perpetuating cascade of events.

Traffic increases steadily, largely a result of more cars on the road from a growing population - but what people notice most is the increase in trucks. The impact of gridlock, noise and pollution – combined with ever increasing competition for land for real estate development causes public support for the port to erode further. As parties with opposing views to trade and development dig-in, reaching a compromise seems like an increasingly distant possibility. In other parts of the province, the lack of alignment and declining public support results in construction delays of major resource projects. By 2020, other exporting countries establish long-term supply contracts with key emerging markets such as India and within Asia, locking Canada out for decades to come.

With all these things going on, it is increasingly hard to attract qualified people to the industry and the gateway in particular. So just when the gateway needs world-class employees to take it to the next level, this talent is going elsewhere. By the late 2020s, it is clear that the “brand” of the gateway has been irreparably damaged. With a strained infrastructure and declining supply chain efficiency and competitiveness, industry support also falls away, preferring to operate in other trade routes.

World Context 2030-2050: Heading South

Towards the end of this scenario, these concerns become trivial, as it appears a sustained drop in west coast port activity is occurring. While everyone focuses on local competition, a structural shift in trade patterns towards the southern hemisphere begins to take place. This trend makes sense given the new geography of global demand and supply, with Africa being a rising low-cost manufacturing centre, in addition to other places like Vietnam, China and India having strong local consumption. As the focus of global manufacturing shifts from East Asia to South Asia and Southeast Asia, trade volumes through the Suez Canal to eastern North America boom at the expense of Pacific trade and west coast ports.

Regional/National Context 2030-2050: Missed the Boat

By the end of this scenario, not only does the gateway miss the boat early, but also the boats increasingly choose to take a miss on the Lower Mainland. East coast ports take up some of the lost capacity, but it is clear that Canada as a whole is worse-off because of the decline of the gateway as a hub of trade. It is also clear the changes that took place are structural in nature, and virtually impossible to reverse. Could the gateway have hedged and anticipated these shifts, if it wasn't so preoccupied with local challenges? Maybe, maybe not. This was no longer a relevant conversation. The future had moved on.

5.3 Scenario 3: Rising Tide

Introduction

The original narrative of the Rising Tide scenario is one of continued growth in both a global and regional context, but the growth is accompanied by increased volatility to resource conflicts and climate instabilities. Canada's economy performs well because its natural resources are in demand and a series of “resource wars” over key commodities occur in particular regions of the world. While the gateway struggles to adapt at first, the situation improves as it adapts its competencies, the flexibility of its supply chain and systems, and establishes good global relationships. The long-term climate change dilemma continues and the idea of running out of resources is a key theme that closes the scenario.

Feedback from workshop participants and Port Metro Vancouver leadership on the Rising Tide scenario focused on painting a more vivid picture of what the global volatility would look like, and recognizing that a

shift to alternative sources of energy would still take place in this scenario, albeit at a slower pace than in the Great Transition. Specifically, the feedback focused on the following themes:

- Re-frame the idea of “resource wars” to represent a more general competition for resources.
- Develop of a collaboration model among gateway stakeholders to create an efficient and reliable supply chain is seen as a key feature of this scenario.
- Volatility remains a key theme and is seen to have increased by participants; specific examples of what this volatility looks like should be included.
- There is a gradual energy transition, driven by social change, economic incentives and technologies.

Summary of Updates

As with Missed the Boat, the main themes of the Rising Tide scenario remained largely unchanged; however the idea of “resource wars” in the early part of the scenario was re-framed into a more general competition for resources. Volatility remains a key theme throughout the scenario, and several examples of how this volatility could manifest were included in the narrative. The increasing wealth-gap was specifically identified as being a key driver of volatility.

Collaboration among gateway stakeholders to develop an efficient and reliable supply chain was seen as a key feature of this scenario and additional detail was provided around how such collaboration would lead to improvements in the supply chain. The importance of alignment among all levels of government was also given greater prominence.

Climate change remains a major theme in this scenario and it was augmented to emphasize a slow energy transition driven by gradual increases in social change, technology and economic incentives for the transition to alternative energy.

Revised Scenario Narrative

This is a scenario of continued growth, but in a context of increased volatility due to competition for resources, a growing wealth gap, and climate instabilities.

Canada prospers, because its resources are in high demand and Canada’s global brand is strong. However, the gateway struggles to adapt at first, lacking nimbleness and scalability. After building the right capacities and relationships, the gateway positions itself as resourceful and reliable. At the end, despite the turbulence, trade increases but climate change remains a serious challenge, and **the wealth gap continues to increase, driving greater volatility and competition for resources.**

World Context 2015 – 2030: Turbulent Times

At first glance, this is the most familiar and desirable world, the future the gateway anticipates with current trends continuing from the rise of the emerging markets, greater globalization and growth.

But when played out, these forces drive a period of **continuing and even increased** economic, geo-political and social volatility. **Competition for limited resources, climate change, and a growing gap in the distribution of wealth are all factors which drive this turbulence.**

Global resource scarcity is largely due to rapid growth in emerging economies out-stripping supply. **With billions of people in Asia, India, South America and eventually Africa becoming increasingly global consumers, the demand for food, water, energy and raw materials skyrockets.** This situation is exacerbated by climate change, the **effects of which continue to be felt around the world in extreme weather events and impacts.** **Despite a transition from coal to cleaner natural gas among developed countries, their rapid growth somewhat outpaces efforts to contain the environmental impacts.**

The widening wealth gap is another side-effect of rapid growth. While overall, the standard of living is increasing in many parts of the world, the difference between the rich and the poor is growing even faster. This effect is visible on an international level, but also within countries, and even within cities. Increasing tensions manifest as a series of regional conflicts, demonstrations and discontent. News of a government collapse somewhere in the developing world is becoming more regular.

Overall, Canada benefits from these instabilities because it is seen as a safe bet in a risky world and a reliable source for much needed resources. By now, Canada, and BC in particular, are wealthy and more confident places. Before long, it is Canada brokering key agreements at a global level. The most prominent deal is the Arctic Accords, which create new international standards for shipping through the northern passageways, since they became navigable by 2030. With the economic pie expanding, every port along the west coast benefits.

Regional/National Context: 2015 – 2030: The Adaptive Challenge

In this scenario, the main challenge for the gateway is how to operate in a rapidly changing world, where instability is the new norm.

To overcome internal and external challenges in improving the gateway's capacity to grow, **new adaptive competencies, flexible systems and partnerships among gateway stakeholders and communities prove vital. Key amongst these are the partnerships forged between industry and First Nations. These result in a framework that ensures environmental protection while striking a balance between equitable distribution of prosperity and a streamlined approval process for new development projects.** The federal and provincial governments are proactive allies as well, with a supportive national transportation policy and strategy. Furthermore, public support for trade in the region and the port itself helps to establish alignment amongst stakeholders and communities quite quickly.

Driven by growing demand for natural gas, several key LNG and energy-related projects in BC move forward, solidifying Canada's role as a significant player in the global energy markets. The additional revenue from these projects supports key investments in gateway infrastructure.

Land use issues remain challenging and competition for industrial land increases, but an integrated and efficient supply chain begins to emerge as collaboration amongst gateway stakeholders and communities improves and key infrastructure investments are made. Integrative planning, intensification of land use, and adoption of new automation technology increases capacity and improves the competitiveness of the gateway supply chain despite the constrained availability of land.

World & Regional/National Context 2030 – 2050: Water Rising

But all was not well with the environment — another catalyst for global instability. By 2040, years ahead of schedule the impacts of climate change are being seen on a large scale. **Major climate-related disasters have increased in frequency and severity**, and global water levels have risen by one meter, with temperatures around four degrees Celsius warmer. This happened far faster than most experts had forecast and is catastrophic in many parts of the world.

No longer able to ignore its effects, a number of governments implement carbon taxes and other economic incentives to help stop climate change, but actions are sporadic and are not universally adopted. Technological developments also continue to reduce the cost of alternative energy which becomes cost competitive in an increasing number of applications. While renewable energy sources slowly increase through the years, carbon remains dominant with slow and gradual reductions in usage.

In Canada, the effects of climate change materialize as severe droughts in the prairie provinces and major flooding in coastal areas. Fortunately, Canada's wealth helps compensate for the worst effects and weather the shocks, with billions of dollars going into climate change mitigation infrastructure.

Meanwhile, climate change and other pressures on ecological services are increasing, thus highlighting a long-term dilemma. **Increasing competition to provide resources and higher-carbon energy will drive sustained volatility. This may even drive some high-cost producers out of the market.** As the “curse of resources” theory points out, few places manage this well, preferring the short-term profit at the expense of the future. The eventual solution: a sovereign wealth fund which takes a percentage of profits and invests them into future industries. In fact, this scenario may be a precursor to “The Great Transition”.

5.4 Scenario 4: The Great Transition

Introduction

As originally written in 2010, the Great Transition was seen as a scenario with a rough and risky beginning, leading into a paradigm shift in terms of how wealth is perceived by people around the world. In addition, a rapid transition to a post-industrial/post-carbon model takes place. This paradigm shift was seen to result from the world “hitting rock bottom” due to a rapid move to a post-carbon economy and a new world order. New global leadership was established and new metrics for prosperity were institutionalized (the triple bottom line) with a change in how Wall Street measures prosperity. This impacted business models around the world driving net reductions in trade. While there are many losers in this scenario, the gateway is seen as a winner because of its superior competitiveness coming from early investments in low-carbon and sustainable supply chain practices and industrial operations.

While the notion of altruism was not expressly stated as a key component of this scenario, many participants believed it came out in the previous narrative as a key reason for the transition to an alternative prosperity model. Many participants also expressed that any transition would not be so fast or turbulent.

The feedback received on this scenario revolved around the following themes:

- There must be strong economic incentives to drive change and reform. It is not likely that the world will shift to a different Global Prosperity Model for altruistic reasons, as economic realities will always be a primary factor in decision making.
- The fast rate at which the energy transition takes place in this scenario was questioned and participants believed it would be more gradual given that it is already occurring (e.g. carbon taxes).
- Trade and prosperity were seen to go hand in hand; Participants found it difficult to envision a model where trade decreases while prosperity increased.
- In order to precipitate a move toward an alternate prosperity model, there would have to be some major events which shock the world into action and greater clarity around what those events would be is necessary.

Summary of Updates

The Great Transition scenario has been changed more than the other scenarios due to the fundamental nature of the considerations raised by participants and the variations in the Global Prosperity Model axis. While there is still a transition to an alternative prosperity model during the scenario, it is framed as more of an inflection point than the world “hitting rock bottom”.

The levels of economic and geo-political volatility surrounding the transition have been clarified and this, coupled with significant human and climate-change driven catastrophes motivate an aligned response from key countries. The events described precipitate an increased focus on environmental sustainability and governments start to more rapidly introduce legislation and regulation to achieve outcomes related to environmental sustainability and human well-being. There is also a greater focus on cost of production measures that begin to include consideration of these factors. The rate at which this change occurs

around the world is emphasized as variable to reflect different rates of change between developing countries and those in the developed world.

Greater emphasis is given to the ability of the gateway to establish an efficient overall supply chain, particularly as a way of helping to resolve land availability issues for industrial operations. The theme of greater alignment achieved between communities, industry and all levels of government has also been amplified. This, along with the low-carbon supply chain, puts the gateway in a position of competitive advantage for regional and international trade.

The transition toward a dominance of renewable and alternative energy sources has been clarified to highlight that by 2050, these forms of energy will represent more than 50 percent of energy production. This acknowledges that the transition happens, but will be somewhat slower than what was implied by the previous version of the scenario.

Revised Scenario Narrative

This is a scenario where we see a paradigm shift: a period of intense volatility drives rapid transition to a different prosperity model more focused on the triple bottom line.

A rough period at first leads into a time of significant volatility in the 2020s that precipitates a move to new global leadership and an amplified focus on additional prosperity metrics (triple bottom line). This creates new, more sustainable (and rebalanced) consumption and production patterns. While there are many losers along the way, the gateway becomes a global winner. A key factor in driving this transition is far-sighted, bold and collaborative leadership at multiple levels — from industry and communities to First Nations and all levels of government.

World Context 2015 – 2030: Rocky Transition

The first 15 years is a rocky period that sees significant volatility across many areas including global energy markets, the geo-political stage, and the environment, to name a few. While oil prices remain low for the first couple of years, the momentum to develop renewable energy sources at these low oil prices continues at a modest pace. Alternative energy moves down a classic technology curve, attracting investment and making these technologies competitive relative to carbon-based fuels. Economies in the developed world continue to post modest growth, while developing countries have varying growth patterns. At the same time, the effects of climate change through increased frequency and intensity of storms, floods and droughts across the world become more and more profound.

In the mid-2020s, there is a confluence of shocking catastrophes, some caused by humans such as a significant oil spill on the Great Barrier Reef which decimates the world treasure, and natural disasters such as a Category 5 hurricane that crosses into New York, razing much of the city. Eastern Europe experiences further destabilization, food security crises and eco-terrorism are becoming more common with levels of economic, commodity, and trade volatility that reach new highs. Out of these crises, however, emerges a new generation of global leadership in Western and Emerging economies.

By the end of the 2020s, there is growing global consensus that stronger action is required to try and mitigate climate change and to also deal with the increasing inequalities in wealth across the globe. The groundswell of change in social values toward environmental and human well-being has been building across many of the stronger and most populous countries and becomes mainstream. Governments respond to this and lead the development and implementation of a series of structural global reforms and policy innovations. A global dialogue, thanks to the use of social media, makes this possible and an inflection point in how prosperity is viewed and measured occurs by 2030. This includes more widespread adoption of carbon taxes and triple bottom line prosperity metrics to supplement GDP/GNP, which get adopted as metrics by major equity markets. As part of this, there is greater focus on the true cost of production, which includes externalities related to environmental and human well-being impacts.

These changes enable a very different growth model, one that balances the economy, environment and human well-being. Many traditional business models are disrupted, resulting in significant imbalances in

the workforce as employers adjust to this new economy. Impact investing continues to grow in popularity as people seek to support and benefit from the increased focus on environmental and social factors.

Regional/National Context: 2015 – 2030: Business As Usual – But Not For Long

Meanwhile, the Lower Mainland proves itself to be relatively resilient throughout this period. It is still rocky for many, but early leadership in sustainability really pays off. All those experiments and policies at the municipal, community, and business level make the region more prepared for what is coming. Even the most skeptical are convinced that investing in new sustainable approaches early on was the right direction.

Despite the global volatility in the first 10 years, BC fares better than most because of its valuable commodities and resources. We progressively see the coexistence of both carbon-based fuels and expanding alternative energy approaches. The influence of communities and lobby groups continues to increase rapidly over the first decade and governments establish regional economic incentives and penalties to drive more sustainable operations – BC is one of the regions in the world going through this change early. As developing countries play catch-up with the developed world, commodities such as coal, oil and grain, are still in hot demand in the first 15 years.

Following the rest of the world, the port and shipping industries continue to operate under the “business as usual” scenario as trade continues to rise. Regionally, forward-thinking leaders within the shipping, port and logistics industries create a consortium to explore carbon neutral breakthroughs in supply chain technologies. Through this collaboration, the gateway actually becomes more and more competitive as regional supply chains become more efficient. This manifests itself in many ways including better use of the limited available industrial land. Local to Federal Governments and communities increasingly align around the gateway’s and Canada’s role in global trade and this leads to alignment of policies and regulation, enabling progressively greater capacity of the gateway. Public support increases as the moves to more sustainable business practices are recognized. These factors result in major energy projects moving forward, driving further growth of trade in the gateway. Through these actions, the region has begun to adopt triple-bottom line principles of prosperity; however this is tempered by the volume and necessity of trade globally.

The real wake-up call, however, occurs when oil prices start to rise precipitously and the region responds to global catastrophes with an increased drive for greater action around climate change. The collaboration by forward-thinking leaders proves to have been successful in preparing the industry for the realities of the energy transition and the move to adaptation of additional bottom line measures; as a result, shipping outperforms alternative transportation modalities, such as air cargo and trucking, for a long time. This also improves the industry’s reputation in neighbouring communities and even attracts some high level sustainability talent from other industries.

World Context 2030 – 2050: Better Off

Despite the structural reforms to triple bottom line principles, we see both new and old models muddled together and adopted to varying degrees across developed and developing countries. This creates a period of confusion and uncertainty and adjacent countries start to collaborate and work together. More robust local and regional economies begin to form, which pivot around key regions providing resiliency and buffering against everything from financial bubbles to food shortages. Adoption of triple bottom line measures is rapid and by 2035, all countries in the G20 have prescribed to it both in principle and formal measurement of corporate success.

The result is that by 2040, the benefits of globalization are more evenly dispersed; poverty levels are in decline, and the inequality between the richest and the poorest begins to narrow more rapidly. Social impact investing becomes a significant component of equity markets and returns are bolstered. So while global trade still exists, the patterns are slower and different, with a mix between local and global manufacturing.

In the late 2040s, renewable and alternative energy sources reach an all-time high, accounting for over 50 percent of the world's energy production. These years also see the continued shift towards a mix of local, regional and global manufacturing. The increase in local and regional manufacturing is largely a result of the reestablishment of manufacturing made viable by decreased costs of technology and the continued momentum in innovative approaches to production. By 2050 the world is far better off than anyone had expected.

Regional/National Context 2030 – 2050: New Patterns of Production and Consumption

Very soon after the global carbon tax and triple bottom line metrics are implemented, they have an impact on trade patterns. Fortunately, the result is a net positive impact for marine transportation and related industries, since shipping and the supply chain through Vancouver are more carbon friendly than other gateways and modalities. Indeed, by 2035 the gateway is seen as a leader through its low-carbon supply chain. The investments in fast public transportation also prove to be invaluable as they help drive down emissions and reduce congestion. The establishment of shared economic and ownership models for everything from vehicles to real estate progressively improve affordability for society and corporations in the gateway region.

These trends pave the way for the formation of more balanced land use policies and more land starts to become available for industrial usage in the late 2030s. Coupled with the leaps forward in gateway supply chain efficiency and technological advancements, the overall capacity of the gateway increases and changing patterns of trade can be supported. It is not only the gateway that benefits from this; Canada's own variable patterns of production and consumption can be handled effectively, further cementing the gateway's national role.

The focus on low-carbon supply chain solutions pay off for the gateway, as the broad-based demand for sustainable transport and logistics solutions puts the gateway at a significant competitive advantage as being one of the few ports that can truly offer this. For the gateway, this boost to shipping means by 2050 we are exporting just as much as we import, including more value-added goods that are increasingly being produced in BC as part of the new energy economy.

6 Appendix

6.1 Glossary of Terms

Included below is a list of commonly used terms in this document:

Term	Description
Scenario	Rich, data-driven, stories and hypotheses about the future that can help you make better decisions today. Together, a set of scenarios forms an organizing framework that can be used to make sense of conflicting or ambiguous market signals more holistically — today, and as they appear over time
Scenario Frame	Typically a 2x2 matrix that describes four quite divergent but plausible scenarios based on the intersection of two drivers of change (Critical Uncertainties). It sets the context for the scenarios based on those axes and helps to communicate the Current World Scenario, and the Anticipated Future (or Official Future)
Critical Uncertainties	An issue / force / trend that we cannot accurately predict, control or influence, but is likely to (directly or indirectly) affect the future of the industry landscape and hence our business Critical uncertainties typically form the axes of the scenario matrix.
Drivers of Change (“Drivers”)	Synonymous with critical uncertainties, they can be used in the axes to frame scenarios. Drivers of change are the fundamental levers behind several critical uncertainties and in that way, in some cases they can be implicit in the scenario axes.
Relative Certainties	An issue/force/trend that is likely to affect the future landscape, and we are relatively clear about how it will play out. Relative certainties often act as the strategic assumptions by which scenario and strategic planning are performed.
Early Warning Indicators	Events that are considered to be indicators or ‘guide posts’ for how a particular scenario may be unfold, such as what one may read in newspaper headlines that correspond with the changes described as part of a scenario. Early warning indicators are typically identified for all scenarios in a matrix in case an alternative future to what is anticipated starts to unfold.
Current World Scenario	The scenario in the Scenario Matrix that stakeholders believe is the one in which Port Metro Vancouver currently exists. This helps to frame the strategic shifts that an organization may need to make as it considers the world moving from where it is today, to an anticipated future.

Anticipated Future (or Official Future)	The scenario that Port Metro Vancouver believes will unfold and therefore, is the one upon which the Port Metro Vancouver would use to consider the strategic choices it makes as it develops its short, medium and longer-term corporate-wide strategy.
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6.2 Stakeholder and Expert Interview Summaries

Monitor Deloitte conducted interviews with the Port Metro Vancouver leadership team as well as broader stakeholders and eminent experts to understand their views on the drivers of change. The following people were interviewed:

Port Metro Vancouver Internal Stakeholders

Robin Silvester	CEO
Peter Xotta	VP Planning & Operations
Larry Sawrenko	Director, Finance
Heather Courville	Director, Real Estate
Carrie Brown	Director, Environmental Programs

External Stakeholders

Carol Mason	Chief Administrative Officer, Metro Vancouver
Michael Henderson	Exec. Director, MPMO West
Brad Johnston	GM Coal Logistics and Business Planning, Teck
Harry Mah	Burrardview Community Association
Kendal Woo	Environment Canada

Subject Matter Experts

George Cambanis	Global Leader, Shipping and Ports, Deloitte
Ramez Naam	Futurist, Author, Associate Professor – Singularity University
Ken DeWoskin	Senior Advisor to the Deloitte China Center and SVP, The Conference Board
Andrew Ramlo	Exec. Director, Urban Futures Institute
Warren Jestin	Chief Economist, Scotiabank

Each of the interviewees was asked to provide feedback on five questions, each of which was to identify potential updates that may be required to the Port 2050 key drivers of change and scenarios. To protect the privacy of the individuals who were interviewed, we summarized the feedback into general themes, highlighting themes which were consistent among interviewees, as well as topics with little alignment, or responses which were unique. The interview responses are presented by question.

Question 1: Looking back over the last four years, have there been any new significant issues, changes or developments in the external environment which might change the scenarios as developed in 2010?

Themes that were consistent:

- There will be an increased focus on climate change, driving a move towards sustainable energy. However, the growth in Asia Pacific will challenge the pace such a change can occur.
- The focus has moved from the economy in 2010 to energy today. In the future it may move more towards water.
- Global economic growth has been slower than predicted in 2010.
- The emerging world will account for a vast majority of growth, despite the fact that growth in China has slowed. This will result in a world in which economic power is concentrated in China.
- First Nations issues are higher profile than they were in 2010, with greater levels of consultation becoming the norm.
- Energy issues result in uncertainty driven by potential impacts of oil prices and the Arab spring.
- Increasing global volatility seems here to stay.
- There is an increasing importance of social media as a tool to connect globally and drive changes to the status quo. This was not fully considered in 2010.
- Ships are getting bigger so terminals need to keep growing to stay competitive. At the same time the Port is going to find it even more difficult to acquire new land.
- There is uncertainty around Vancouver's desire to continue to be a port city in the future.

Diverging/Unique viewpoints:

- Never in history has innovation been more important to shipping
- Public opposition is growing louder, often through use of social media outlets to pressure companies to change
- International governments are becoming activists for the first time.
- The competitive environment is going to become more challenging as additional competitors emerge and the US market is taken away by other countries.
- US is still a significant growth market, growth is expected at 30M people every 10 years.
- Carbon regulations in China and the US put pressure on coal, and we see a sharp decline in China coal imports.
- A sharp decline in price of solar, wind, energy storage is expected.
- Re-on shoring of manufacturing in North America is driven through increased automation.

Question 2: As you think about the external environment of the Vancouver gateway over the next 35 years, what external forces are you certain will influence its future?

Themes that were consistent:

- Increased concern around climate change will receive huge focus and the world will make increasingly large efforts against. This will change the energy and geographic landscape
- The global economy will continue to grow, particularly in Asia Pacific and the US
- The ageing population in Canada is going to be a significant issue which will have an impact on the port in terms of labour force and productivity.
- The population in Canada is going to continue to grow, and immigration will be an important part of this
- There will be pressure on the port to expand which will require great investment and have a major effect on infrastructure. We will be in competition with transportation projects for funding requests and the work that is going to be required to upgrade infrastructure may cost more than what the region can afford with the current funding model.

- Energy transition is a question of when, not if
- Geopolitical volatility is always going to be there
- There will be an increased movement of people from rural to urban areas

Diverging/Unique viewpoints:

- Trade will still exist between nations, and will, with some bumps, grow in the long term
- The population existing in Asia today is going to have a huge re-orientation toward internal consumption, the pace at which this happens is less certain
- In the medium term, slow growth in the European market in a certainty, driven in part by slow population growth
- Security issues will become less of a concern and it is less likely now that security issues will drive the port
- If LNG question is not resolved quickly, we will be locked out of this market for a very long time
- We are at a pivot point in the next couple of years – what we decide now will influence us for the next 30 years
- Within the next 35 years there will be more competition for land. By implication, demand for land in Vancouver is going to go up.
- Steel and timber will still be used 35 years from now.
- Food demands (and trade) will grow significantly e.g. grain and therefore agricultural products such as Potash, driven by the fact that China’s population control (the last real major control on global population) has now gone. Therefore, Canada will be a major player given its agricultural land, however, there is uncertainty around what rate will it increase.
- Agricultural land will need to move to accommodate population increases, but it will take a major shock to drive change in the land allocation e.g. unemployment and unaffordability.

Question 3: By contrast, what do you feel are the largest uncertainties facing the industry and the region over the next 35 years and do you think these will require a variation to the existing scenarios or drivers?

Themes that were consistent:

- There is uncertainty around where manufacturing will happen in the future. Chinese firms are shifting manufacturing to South-East Asia due to increasing local labour costs. We are also seeing some manufacturing moving back to North America and Mexico. China is also experimenting with manufacturing in Sub-Saharan Africa. We do not know which of these trends, in any, will dominate in the future.
- Whilst climate change is certain, the impact is less certain. For example, we do not know the extent and speed at which water levels will change and the impact this will have on population, agriculture and industry in BC and the rest of Canada. There may be knock-on implications on trade routes to and from the gateway.
- The level of future funding is an uncertainty. This very much depends on the extent to which the government will continue to drive investment in the gateway and infrastructure investment.
- The global economy will impact the port. The strength of the Canadian dollar in the future, how volatile the financial markets will be and future interest rates are all unknown.
- Where economic growth happens and how fast it happens, particularly in countries such as China, India and Sub-Saharan Africa, is largely unknown, but will impact trade.
- The gateway’s ability to secure and maintain public support to operate in largely unknown.

Diverging/Unique viewpoints:

- There is a possibility of creating a regional model to plan on a regional basis.
- We do not know whether the port will get approval for terminal 2.
- It is difficult to predict the future demand for commodities. From a resource perspective both supply and demand are very unpredictable but are important for decision making.

- We are uncertain on what the focus will be of the international community in the future, what will be the post 2020 goals?
- Regulation changes are unknown for the future. There could be development of further regulations to protect Canadians with respect to mine development, the LNG industry and GHG emissions.
- The global energy mix is major uncertainty
 - LNG going ahead in western Canada
 - How quickly will the world shift to renewables
 - What will be the demand/price of oil
- Future land use and land use policy is a big unknown. The region is geographically constrained, and most of the big brown-field redevelopment sites have been done. This means that new additions will have to go into communities, which will be contentious.

Question 4: What are some of the assumptions that should not be held about the future of the Vancouver gateway?

Themes that were consistent:

- There is an assumption that because of our strategic position as a gateway into Canada / North America we have a huge competitive advantage. However, all that needs to happen is another port is opened, or there is a change in legislation and this assumption no longer holds.
- Similarly, we are viewed as a popular cruise ship destination. All that needs to happen is a change in US legislation (for ships to be allowed to stop at multiple ports of call) and this disappears.
- The continued growth of China and Asia Pacific, and the fact that we will successfully penetrate these markets, is also an assumption that we should be wary of.
- We should not assume that the funding model can remain the same in the future. We will need to look for other innovative funding models.
- Assumptions that our trading partners will remain the same are flawed – we should not assume trade with US will remain as open as it is today.
- An assumption that current product and commodity mix (i.e. import/export) will stay the same should not be held.
- We cannot assume that the way of life in Canada is getting better continuously in the future.

Diverging/Unique viewpoints:

- Growth forecasts show a straight line increase in growth; however we should not assume such forecasts are correct.
- We should not assume that competition will remain as it is today. For example, there will be changes in competition for LNG
- We should not hold the assumption that trade routes will stay the same.
- That democracy and rule of law will persist in South America may not be true.

Question 5: Do you feel that the uncertainties captured in the axes of the scenario matrix are still the most appropriate for framing up the scenarios? Are the end-points still appropriate?

Themes that were consistent:

- The axes are still appropriate to frame up the scenarios, and all scenarios feel plausible
- The reality may be a combination of elements from each scenario, but certain things in each box are going to happen
- Expectation is that we will end up somewhere between “Rising Tide” and “Great Transition”
- The energy environment is not as clear in the scenario narrative as it should be
- The global prosperity axis should be more about energy and the environment

- There is significant risk in ‘de-industrializing’ the economy, Western Europe is a good example of this. This may make the far right of the model not so appealing.
 - The “Great Transition” scenario is still plausible when we look at societal change and demands, how Obama is now restricting coal fired power, etc.

Diverging/Unique viewpoints:

- It is not expected that we will see the case where all decisions are driven by bottom line entirely
- Security of the population, such as the impact of coal on the security of human health, is not really reflected in the framework.
- We need to make it clear within the framework that the Port is going to find it increasingly difficult to acquire new land and that the growth of other ports will be a big driver in the future.
- Within 30 years there will be much less hydrocarbons, which should be reflected in the scenarios.
- There is a general feeling of optimism that the top scenarios are more plausible based on the assumption that the economy will continue to grow
- The “Missed the Boat” scenario is not plausible
- The “Great Transition” scenario is too extreme – it needs to be re-cast to a more gradual change, as by default, things happen in an incremental fashion.
- The wording of some of the scenarios is too strong, it is expected that it will not be such an extreme future
- There is no end to capitalism on the horizon
- It is difficult to imagine a world without steel
- There has been some focus on 3D printing, however, it is not expected that this will replace manufacturing. Containers bring goods that printing can never compete with, so this won’t really impact things at all.

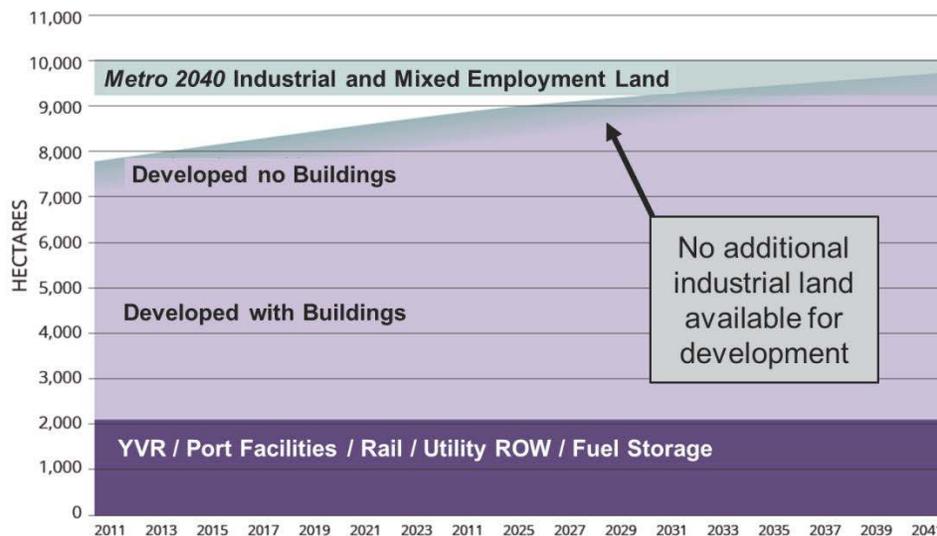
6.3 Drivers of Change Data-Pack

Capacity to Grow

How will usage of industrial land in the gateway change?

- Between 2011 and 2013 about 60 hectares of industrial land were lost to other uses including real estate and commercial buildings such as shopping centers.
- In the last 30 years, the City of Vancouver has re-designated 187 hectares of industrial land to other uses such as commercial and residential. City of Richmond has converted 320 hectares, Burnaby 706 hectares and Surrey 1,771 hectares.
- Metro Vancouver projects a shortage of industrial land in the 2020's.

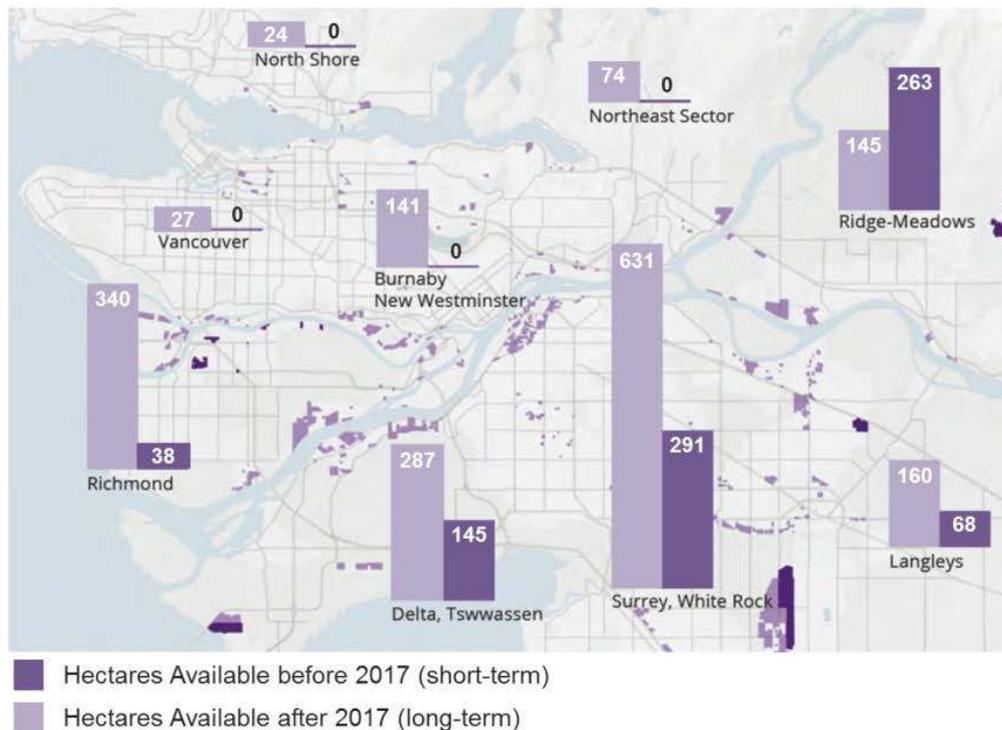
Current and Projected Industrial Land Availability



Sources: Metro Vancouver, Progress toward Shaping our Future, 2014
 Metro Vancouver, Opportunities for the Intensive Use of Industrial Land, 2013

- In 2012, Metro Vancouver completed a market readiness assessment on the remaining undeveloped industrial land in the region.
- The study concluded that prior to 2017, 1,800 hectares or 70% of vacant industrial land will be available for development. After 2017, only 805 hectares or 30% of vacant land will be available for development.
- Only a subset of available industrial land in the region is suitable for port-related activities

Industrial Land Available for Development (before and after 2017)



How difficult will it be to maintain public acceptance to operate?

- A 2014 survey by Triton Environmental Consulting concluded that very few people in BC considered themselves to be “very well informed” about the major development projects happening in the province.
- In general, British Columbians that are more informed about major projects are also more polarized in their views.
- “Environmental impact” is the most common reason those in local communities give for being opposed to local projects, and “economic benefits” is the most common reason for being in favor.
- The most significant factor for driving public opinion is the degree to which the safety and well-being of people in the local community could be affected.
- Project steps widely regarded as the most important were: measurement of outcomes, strong leadership and oversight, including transparency, respect for regulations and ethics.
- Based on analysis by Meltwater News on all Canadian media coverage mentioning Port Metro Vancouver (with or without reference to businesses operating within the port) the overall tone of articles has shifted positively since 2012. After a slight year-over-year improvement in 2013, the proportion of positively toned articles has increased even further in the first half of 2014.
- From 2012 to 2013, total website traffic for both Port Metro Vancouver and Canada Place increased by 25% - as interest in Port Metro Vancouver activities has increased, positive feedback regarding these activities has been sustained.

Positive versus negative tone of articles mentioning Port Metro Vancouver



Sources: Port Metro Vancouver, Evaluating Port 2050, 2014
Triton Environmental Consulting: Social License Through the Public Eye, 2014

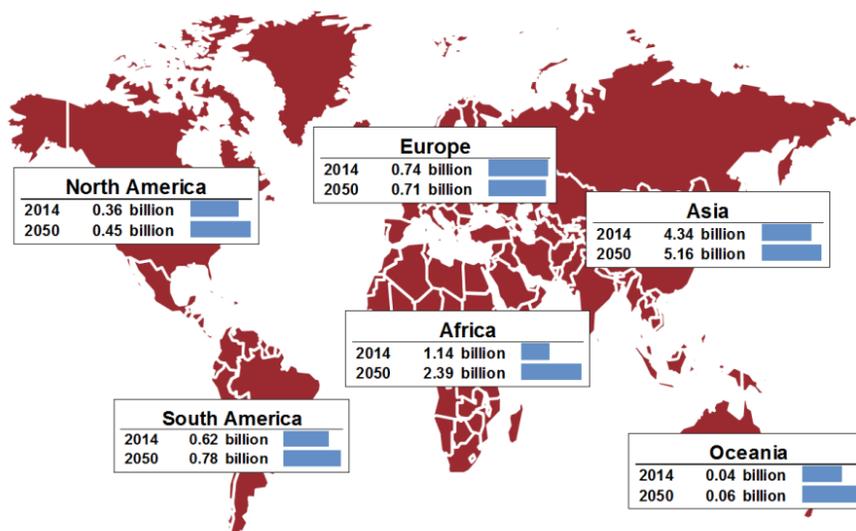
Demographics and Shifting Social Values

What will be the impact of changing demographics?

- According to the United Nations, World population is projected to grow by 31.8% to 9.6 billion by 2050.
- Much of the demographic change up to 2050 will take place in less developed regions. Collectively, these regions will account for 98% of the expected increment to world population in this period.
- Asia, where population is expected to increase by 0.8 billion through to 2050 and Africa, where the population is expected to grow by 1.3 billion will be the largest contributors to global population growth

Population by continent in 2014 and 2050 (bars show relative change)

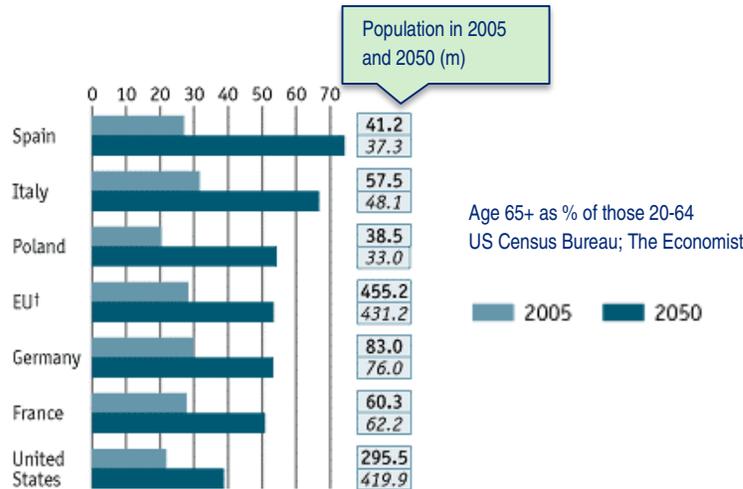
Population by continent in 2014 and 2050
(bars show relative change)



Sources: United Nations, World Population Ageing, 2013
United Nations, World Population 2300

- The median age of the population will continue to increase globally from 26 years in 2010 to 36 in 2050.
- In developed regions, the share of the population aged 60 and over is projected to increase from 23% in 2013 to 32% in 2050.
- By 2040-2050, life expectancy is projected to increase from 78 to 83 years in more developed regions and from 68 to 75 years in less developed regions. Longer life spans will contribute to the future aging in all major regions of the world.
- Changing demographics will have wide ranging consequences on labour productivity, healthcare spending and many other segments of the economy

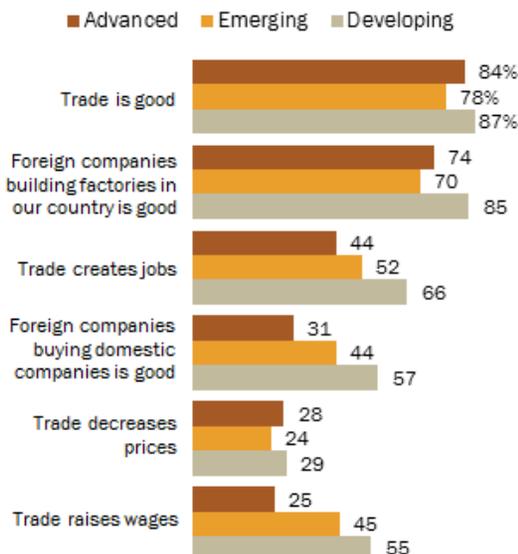
Rising Dependence – Old-age dependency ratio* . %



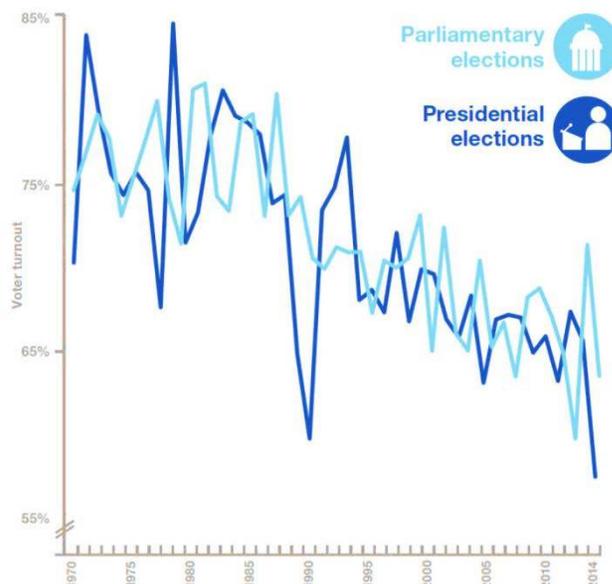
What are some of the trends in global and regional social values?

- Digitalization that has taken place over the past fifteen years has fundamentally changed the social values of many societies. As of January, 2014, 74% of online adults are using social networking sites to connect with each other.
- According to Pew Research Center, global public embraces economic globalization with reservations. Only 31% say trade is very good for their economy. Just over half believe that trade creates jobs and only 45% believe that trade increases wages.
- According to the World Economic Forum Outlook on the Global Agenda, the weakening of representative democracy will be the fifth most important trend of 2015.
- The increasing disillusionment with government has been illustrated in the decline of participation for recent democratic elections. In Canada, voter turnout decreased from 65% in 2006 to 61% in 2011 and in Germany, decreased from 78% in 2005 to 72% in 2011.

Mixed views on Trade and Investment



How has the worldwide voter turnout changed over time?

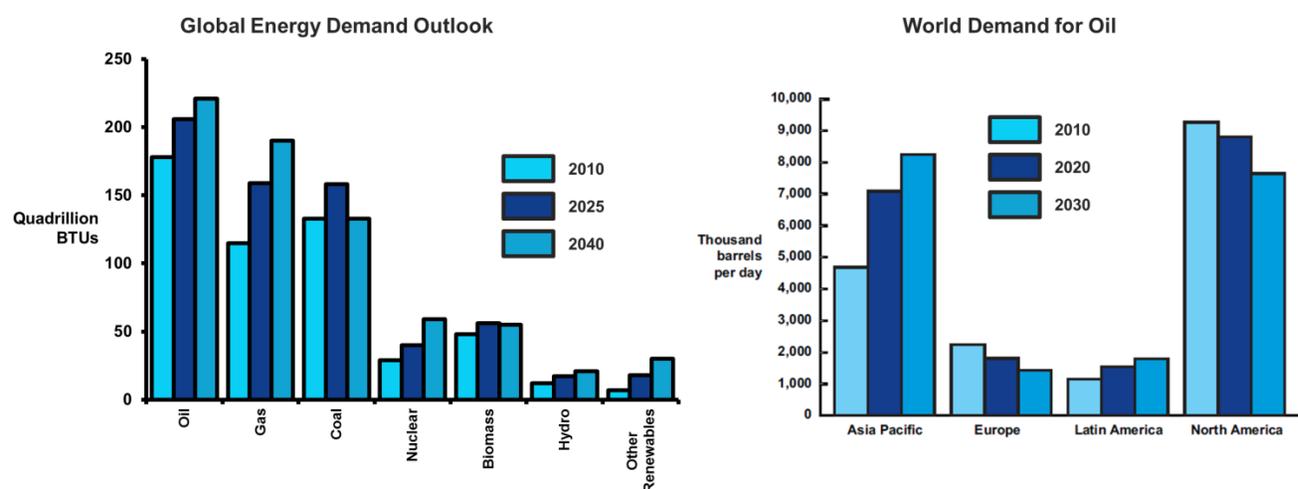


Sources: World Economic Forum, Outlook on the Global Agenda, 2014
Pew Research Center, Spring 2014 Global Attitudes Survey

Energy Transition

What alternatives to hydrocarbons will develop, and how quickly?

- Renewable energy supplies will grow by close to 60% by 2040, led by hydro, wind and solar.
- In 2040 around 15% of world's energy needs are expected to come from renewable sources (excluding nuclear)
- Despite reduction of nuclear energy generating capacity in some developed countries, China and India are expected to increase their nuclear capacity by over 15 times by 2040.
- While significant growth in renewable energy sources will occur, fossil fuels are still expected to account for nearly 77% of world's energy in 2030.
- Demand for oil is projected to rise by approximately 25% through 2030, led by increased commercial transportation activity.

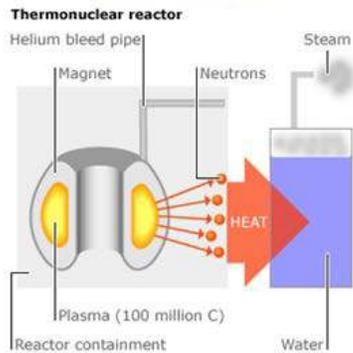


Sources: World Economic Forum Energy Vision 2013
 White House fact sheet, US-China Joint Announcement on Climate Change
 ExxonMobil Outlook for Energy: A View to 2040, 2014

Energy technologies: in what areas might we see breakthroughs?

- Based in southern France, International Thermonuclear Experimental Reactor (ITER) is an international collaborative project to build the world's first net positive (in terms of energy output) fusion reactor.
- The project will cost over €16 billion and take over 30 years to complete.
- If successfully developed, commercial nuclear fusion could completely change the world energy landscape.
- Carbon capture and sequestration is the process of removing carbon from the atmosphere and depositing it in a reservoir.
- A single carbon sequestration project proposed as a JV with the University of Utah was estimated to have the capacity to store the emissions from at least six 500 MW coal fired power plants for 50 years.
- To support electricity sector decarbonisation, an estimated 310 Gigawatts of additional grid-connected electricity storage capacity would be needed in the US, Europe, China and India.
- Recently developed by MIT, a liquid metal battery technology promises to store energy for less than \$500/kWhr – less than a third the cost of current battery technologies and able to absorb current over 10 times higher than any existing battery technology.

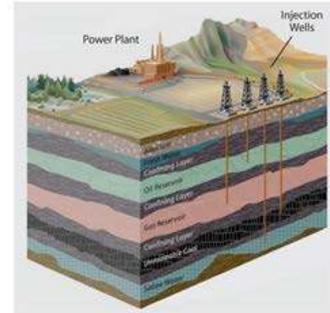
ITER Reactor Concept



Energy Storage Technologies



Carbon Sequestration



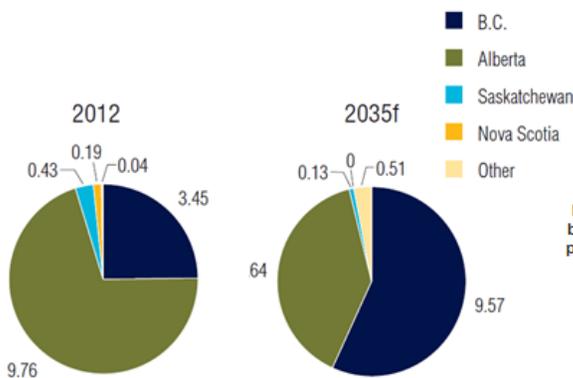
Sources: www.iter.org

University of Utah Joint Venture to Commercialize Carbon Storage Technology
 International Energy Agency: Energy Storage Technology Roadmap
 Bloomberg: MIT's Liquid Metal Stores Solar Power Until After Sundown

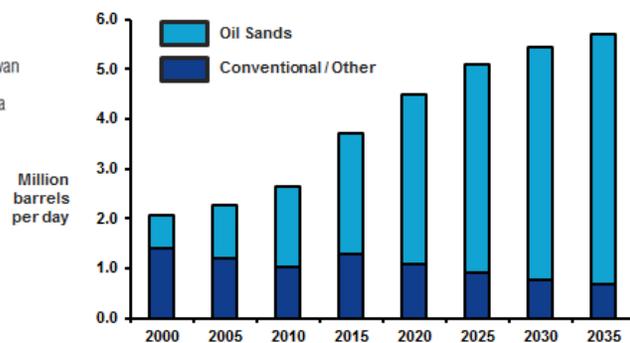
What will be Western Canada's role in energy production?

- Around 750 trillion cubic feet of marketable tight and shale gas exists across Canada; over 70% are concentrated in Western Canada.
- Canada's natural gas production is expected to increase from 13.9 billion cubic feet per day (bcf/d) in 2012 to 16.9 bcf/d in 2035.
- This outlook depends on whether the development of LNG export capacity goes ahead.
- Bitumen production from Alberta's Oil Sands is expected to increase from 2.0 million barrels per day (mmbd) currently to 5 mmbd in 2035.
- The current oil transportation system will run out of spare capacity around 2018 and if no new pipelines are constructed, the production outlook will be severely cut back.
- In aggregate, Canada's energy exports are expected to rise from \$57 billion per year to more than \$140 billion in 2035.

Canada's Natural Gas Production (bcf/d) in 2012 and 2035f



Western Canada's Oil Production Forecast



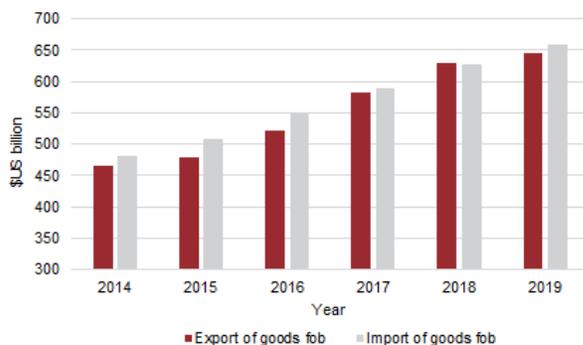
Sources: Conference Board of Canada, Canadian Outlook Long-Term Economic Forecast 2014

Gateway Competitiveness

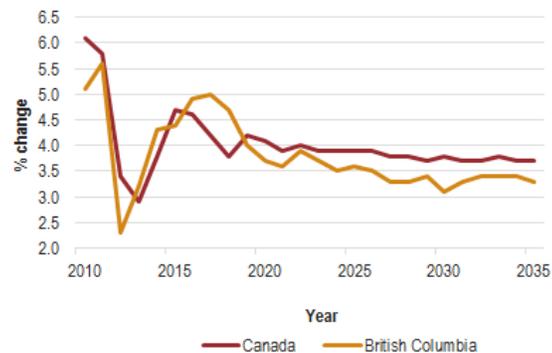
What role will the Vancouver gateway play in the economic future of Canada?

- According to the Economist Intelligence Unit, the Canadian economy is highly dependent on trade, even more so than the US.
- Statistics Canada reported that in 2013, the value of imports grew by 2.6% from C\$474.5bn in 2012 to a record C\$486.7bn.
- With Canada's exports and imports expected to increase from 2014-2019, the gateway will continue to play an increasingly important role in Canada's economic future.
- Port Metro Vancouver trades \$184 billion in goods (based on 2013 cargo volumes) with more than 160 trading economies annually. This represents nearly 20% of Canada's combined trade volume.
- According to the Economist Intelligence Unit, the Canadian economy is forecasted to expand by an average of 2.2% per year in real terms between 2013 and 2030.
- Based on this forecast, as the US faces a period of slower growth, Canada's large resource endowment, which gives it exposure to China and other emerging markets will play a bigger role in driving growth.
- In 2012, Port Metro Vancouver contributed \$9.7 billion (0.5%) in GDP to the Canadian economy.

Forecast Summary of Exports and Imports in Canada (2014-2019)



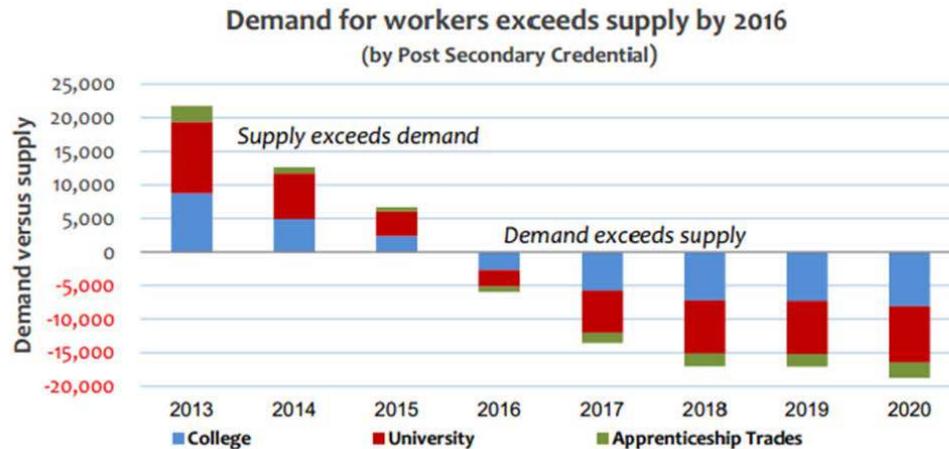
Canada and British Columbia Real GDP Growth (2010-2035)



Sources: Economist Intelligence Unit, Canada: Overview, 2014
Port Metro Vancouver, Statistics Overview, 2013

How attractive will the gateway be for business, labour and trade?

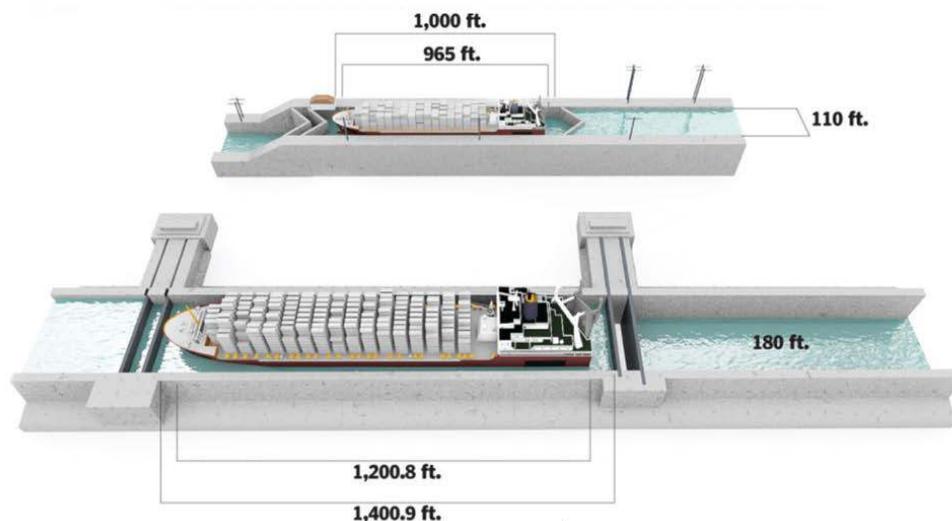
- In January 2013, BC's six research universities prepared a Labour Market Profile illustrating the challenges and opportunities that lie ahead for the province's rapidly evolving labour market.
- The study finds that as early as 2016, the province will reach a talent deficit, with the number of jobs exceeding the number of qualified people. This deficit will continue to grow through to 2020.
- In 2020, approximately 18,800 jobs requiring post-secondary education will go unfilled, and 2,300 requiring trades training.
- Competition for skilled trades will intensify as a result of multiple competing projects, including the National Shipbuilding Procurement Strategy and development of LNG projects
- In the long term, a lower population growth rate, and a lower labour participation rate (as a result of the ageing population), BC will continue to be challenged by slow labour force growth of 0.7% / year from 2021 to 2035.



Sources: The Research Universities' Council of BC: BD Labour Market Profile, 2013
Journal of Commerce Group, <http://www.joc.com/special-topics/west-coast-ports>

- Canada's West Coast container ports stayed level in the first quarter of 2013 after experiencing robust growth in 2011.
- Overall, U.S. ports hold the biggest share of West Coast traffic, with the bulk of that handled by Southern California ports, which holds 62% of the overall market share. The Canadian market share on the West Coast is up from 12.7% in 2011 to 14.4% in 2013.
- The Panama Canal expansion project, which will be completed in 2016, will double the capacity of that shipping route. Container ships passing through the widened canal will be able to carry 3 times the cargo of current ships.
- "The Panama Canal development will change the landscape of the country and the way the goods move around the world."

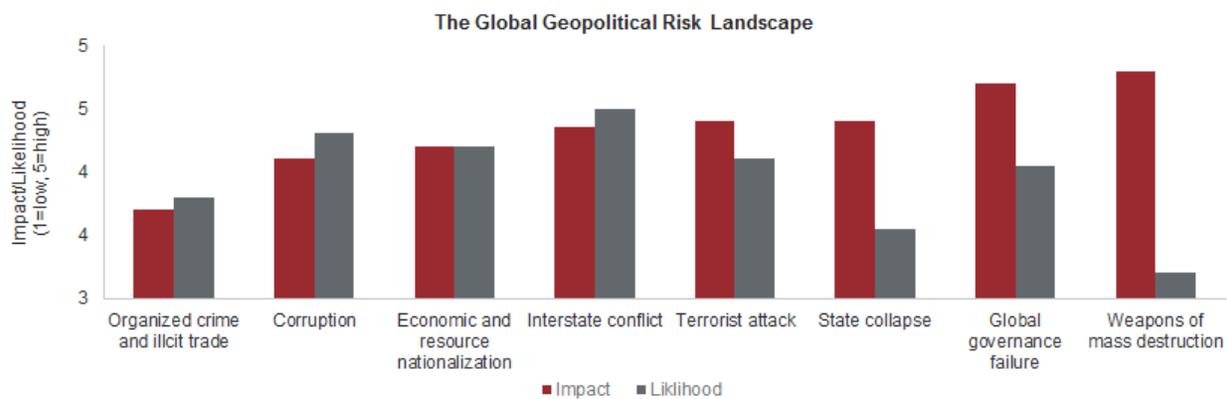
Panama Canal development will enable passage for cargo ships 3 times the size of today's cargo ships



Geopolitical Stability

How volatile will the geopolitical environment be?

- According to the World Economic Forum, the world is increasingly witnessing people raising voices, taking action and challenging the foundations of political, economic and social systems.
- Geopolitical crisis, which have been erupting with frequency over the last four years, will continue to pose a risk to global stability, decreasing global economic and business confidence.
- Geopolitical risks will not only affect the interaction between countries but will also affect, and be affected by, developments in three sectors that are critical to the well-being of the global economy: energy, financial services and healthcare.
- In 2014, the World Economic Forum completed an assessment of Global Risk, including the Global Geopolitical Risk Landscape.
- The study categorized the most common causes of the volatility in the geopolitical environment to include organized crime and illicit trade, significant and widespread corruption, economic and resource nationalization, threat of terrorist attacks and state collapse, global governance failure and weapons of mass destruction.
- The study found that interstate conflict is the most likely of the risks, while weapons of mass destruction and global governance failure are the risks with the greatest potential impact.

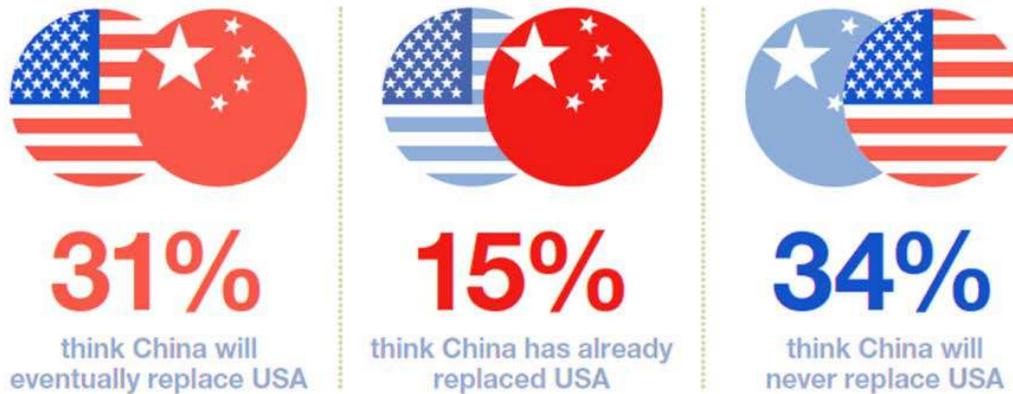


Sources: World Economic Forum, Global Risk 2014

How will the role of China and Asia change?

- According to the World Economic Forum Outlook on the Global Agenda 2015, a shift in the global political order is evident in the rise of China and its uncertain role on the world stage.
- This study revealed that 15% of respondents across all regions believe China has overtaken the US as the world's leading superpower and 31% believe that it will eventually overtake the US.
- As this shift in global power continues, China's growing political power will generate tensions with its neighbours such as Japan, which will force China look to strengthen ties with the US.

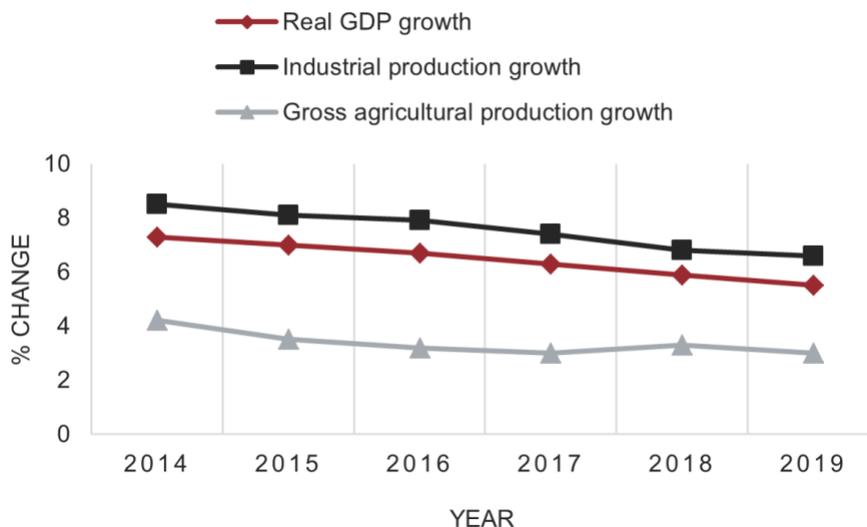
Will China eventually replace the USA as the world's leading superpower?



Source: World Economic Forum, Outlook on the Global Agenda 2015

- According to the Economist Intelligence Unit, despite positive growth prospects, the Asia Pacific region faces inherent challenges including structural economic reforms, effective management of urbanization and geopolitical conflicts.
- In order to address these challenges, there must be a common concept of community through the wider East Asia Pacific that involves economic, political, security and socio-cultural concepts.
- The Economist Intelligence Unit expects real GDP growth in China to average 6.3% a year in 2015-2019.

Economic outlook for China (2014-2019)

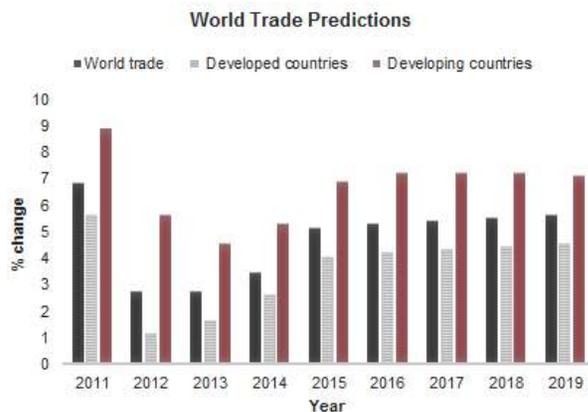


Source: Economist Intelligence Unit, China: Economic Forecast, 2014

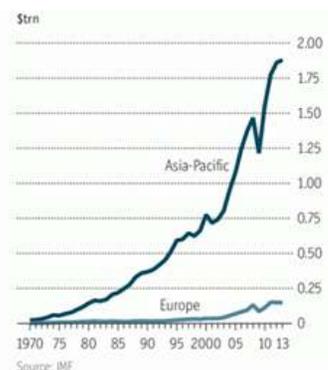
Patterns of Production and Consumption

How will trade patterns shift through to 2050?

- According to the Economist Intelligence Unit, trade patterns will be increasingly focused around Asia, the Middle East and Africa over the next 5 years.
- Developing countries will continue to become an even more dominant force in global trade. These developing regions are forecasted to average 7% growth in world trade between 2015-2019.
- The 21 economies of the Trans-Pacific partnership now account for nearly 50% of global trade with this number expected to increase as trade strengthens in participating countries.
- According to the IMF, trade between the Americas and Asia Pacific has increased significantly since 1970 and has greatly surpassed trade with Europe.
- According to the Government of Canada, the Asia Pacific gateway and Corridor Initiative will continue to be key to Canada's long term prosperity and growth
- Port Metro Vancouver has been involved in several projects in the initiative including the recent completion of the Robert Banks Causeway Overpass in October 2014.



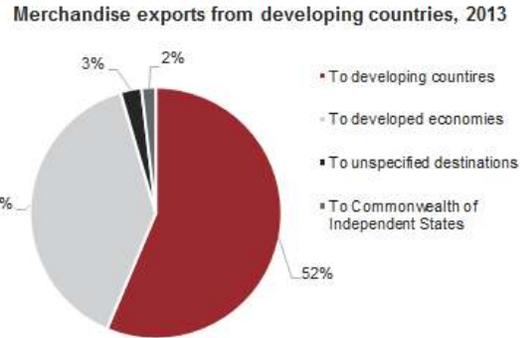
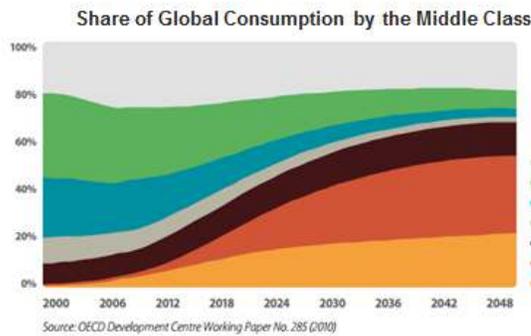
Two-way merchandise trade between the Americas and: Asia Pacific and Europe



Sources: The Economist Intelligence Unit, Global Forecasting Service: World Trade, 2014

How will changing locations of producers and consumers impact trade?

- According the World Economic Outlook on the Global Agenda 2014, consumption will continue to increase significantly as the middle class in emerging markets continue to grow.
- By 2020, Asia's middle class will explode to 1.75 billion.
- By 2020, consumption in both China and India will increase by over 300%, compared to a 48% increase in the United States.
- According to the Economic Intelligence Unit, global trade patterns will be driven by strong income growth and increased demand in these rapid-growth markets.
- According to a study conducted by the World Trade Organization on International Trade in 2013, over half of merchandise exports from developing economies were sent to other developing economies. This is predicted to increase as consumption levels in developing countries grow.
- The study found that the growth of intra-regional trade among Asia's new economic superpowers will lead to a renewed concentration of global demand.
- This shift will be an important consideration for exporters when making strategic plans and decisions over the next 20-30 years.



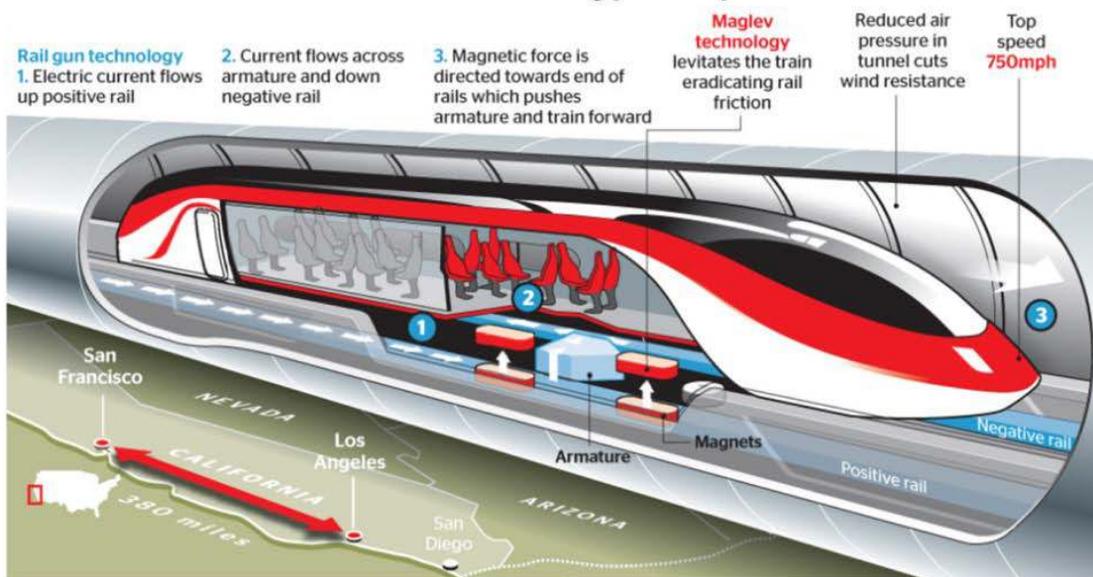
Sources: World Economic Forum Outlook on the Global Agenda 2014
 World Trade Organization, International Trade Statistics, 2014
 OECD Development Center Working Paper No. 285, 2010

6.3.1 Technological Innovation

To what extent will technology improve goods movement and handling?

- One example of potentially ground-breaking transportation technology is Elon Musk’s (CEO of Tesla Motors) Hyperloop concept.
- The idea involves aluminum transportation pods being accelerated by electromagnets through a vacuum tube to velocities over 1,000 km/h
- Proposed design would be able to transport passengers from San Francisco to Los Angeles in 35 minutes at a price of \$20 (vs. 2.5 hrs. and \$85 for high speed train)
- While the concept is based on existing technology, critics argue that the construction costs as proposed by Musk (\$6 billion to build a line between SF and LA) are underestimated by a factor of 10

How would the Hyperloop work?



Source: BBC News: Is Musk’s Hyperloop just a pipe dream?
 Tesla Motors: http://www.teslamotors.com/sites/default/files/blog_attachments/hyperloop_alpha3.pdf

- Rolls-Royce PLC has announced that it is already designing completely unmanned cargo ships.
- The company claims that drone ships would be safer, cheaper and less polluting than traditional cargo ships.
- “Now the technology is at the level where we can make this happen, and society is moving in this direction – If we want to do this, now is the time to move” – Oskar Lavander, RR VP of Innovation and marine engineering.
- Unmanned ships are expected to be 5% lighter and burn 15% less fuel than traditional ships
- EU is funding a \$4.8 million study that involves simulated sea trials to assess the costs and benefits of unmanned cargo ships.

Rolls-Royce is designing unmanned cargo ships



What innovations could disrupt transportation & logistics industries?

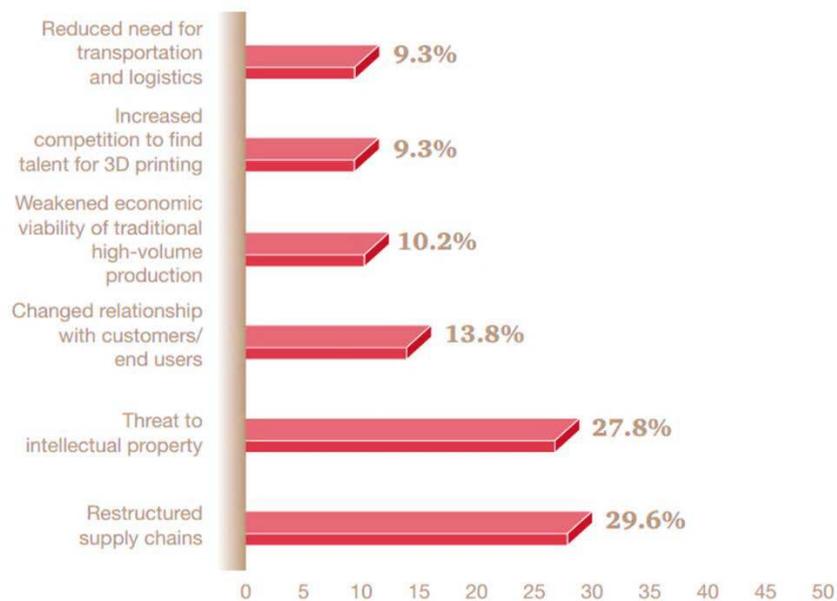
- 3D printing (3DP) is an additive manufacturing technology that allows the automated creation or printing of three dimensional objects.
- At present 3DP is mostly used to create prototypes of mechanical objects. More recently 3DP has been used to produce spare parts and injection molds. It is estimated that this can reduce the cost of making some components by 70%
- In the short term, 3DP is expected to have a significant impact on medical industry by allowing doctors to replicate prosthetics that are an exact match for human body parts (teeth, etc.)
- Proponents of 3DP argue that in the long term, as the technology overcomes current limitations and becomes widespread, it will counter globalization by allowing end-users to make their own products and reducing the need to transport finished goods.
- Goods produced using 3DP have an annual value of approximately \$2 billion, but this figure is growing at 300% per year.

Examples of parts produced using 3D Printing



- In June 2014, PWC and the Manufacturing Institute surveyed over 100 industrial manufacturers for their views on how the 3D printing industry will develop and its impact on global supply chains.
- 70% of surveyed manufacturers believe that in the next 3-5 years, 3DP will be used to produce obsolete parts; 57% believe it will be used for after-market parts.

Q. If and when 3D printing is widely adopted, what will be the most disruptive effect on US manufacturing?

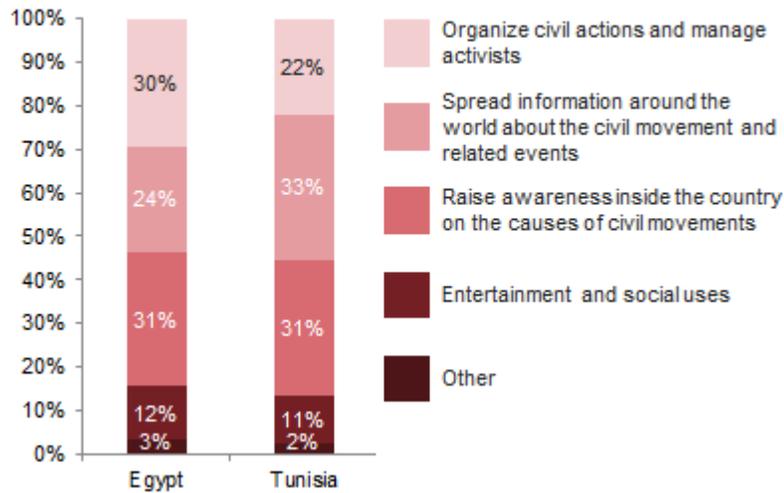


Sources: Wohlers Associates, Additive Manufacturing and 3D Printing State of the Industry, 2013
 PWC – Another dimension, Bryan Borzykowski, July 2014
 PWC – 3D printing and the new shape of industrial manufacturing, June 2014

How will increasing connectivity change business and society?

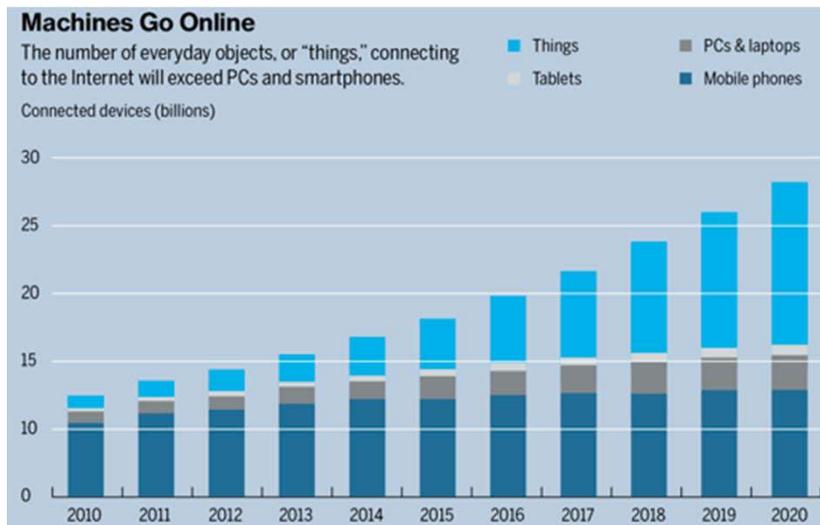
- The Arab Spring movement was a revolutionary wave that swept through the Arab world starting in December 2010
- By December 2013, rulers had been forced from power in: Tunisia, Egypt, Libya and Yemen. Additionally, major protests took place in Bahrain, Syria, Algeria Iraq, Jordan, Kuwait, Morocco, Israel and Sudan.
- A study by the Dubai School of Government provides empirical evidence suggesting that the growth of social media in the region and the shift in usage trends played a critical role in mobilization, empowerment, shaping opinions and influencing change.

The Main Usage of Facebook during the Arab Spring civil movements in early 2011



Sources: Dubai School of Government, Arab Social Media Report

- In 2014, Economist Intelligence Unit conducted a study on business and social impacts of hyperconnectivity - a term that describes the intense connectivity between people, places, things and organizations enabled by the Internet, mobile technology and the Internet of things
- The internet of things is enabling manufacturers to turn to data-driven smart manufacturing allowing shorter, more customized production runs.
- The Internet is worth more to the global economy (in terms of GDP) than traditional industries such as agriculture or energy



Sources: Economist Intelligence Unit: The Hyperconnected Economy, 2014

6.4 Port 2050 Web Brochure (developed in 2011)

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PORT SCO

A PORT METRO VANCOUVER INITIATIVE



PORT METRO
vancouver

How do you plan for the long term in a rapidly changing and uncertain world?

This question highlights a major challenge for large organizations the world over, from corporations to governments, who have to make large bets on the future.



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- 5 ABOUT PORT 2050
- 6 THE PORT 2050 PROCESS
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- 10 THE SCENARIOS
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- 26 SUMMARY AND CONCLUSION



PRESIDENT'S MESSAGE

"The best way to predict the future is to invent it."

Alan Kay **AMERICAN COMPUTER SCIENTIST**

In 1970, Port Metro Vancouver handled approximately 27 million metric tonnes of cargo and the population of Canada was 21 million people.

Forty years later, in 2010, we handled more than 118 million metric tonnes of cargo while Canada's population was 34.3 million. In those 40 years, the Canadian population increased by more than 60 per cent and the total cargo volume at the Port more than quadrupled.

Canada is a trading nation, and our Port grows in response to the needs of individuals and the economy. In the simplest terms, our population growth drives international trade.

As we think about our growth strategy going forward, we asked ourselves: What will Port Metro Vancouver look like in 20 years? In 40 years? And what does sustainable growth for the Gateway and its stakeholders look like?

To help us answer these complex questions about an unknown future, we turned to scenario planning. Scenario planning is a tool that allows us to have an ongoing strategic conversation about the emerging future. It allows organizations — like Port Metro Vancouver — to make better decisions about our future today, while remaining open to big shifts in the business environment.

The purpose was not to identify future events, but to highlight significant forces that can push our future in different directions. It was about making these forces clear, so that if they do happen, we will recognize them and be prepared to act.

A great deal of thought and collaboration has gone into the Port 2050 initiative. In this report, we are pleased to present the results of the process and the four scenarios that were produced by Gateway stakeholders.

The outcomes cover a diverse range of perspectives. We hope you find the scenarios to be provocative and challenging, in a positive way. We have not shied away from the negative possibilities; rather, we see these as opportunities to inform our planning going forward.

Reflecting on the scenarios further, there are two we don't see as desirable for us as a Port and a Gateway. A third reflects where we believe we are heading in the short to medium term, and the fourth is the direction we think our industry — and the world — could be heading in the longer term. We have labelled these last two scenarios our Anticipated Future.

By making comprehensive decisions today that will lead to lasting success in our Anticipated Future, our industry can lead a major change in thinking and act to deliver sustainable growth. We must deliver growth not only in key infrastructure, but in the way we understand and operate the entire supply chain and in the way we share the impacts and benefits of trade.

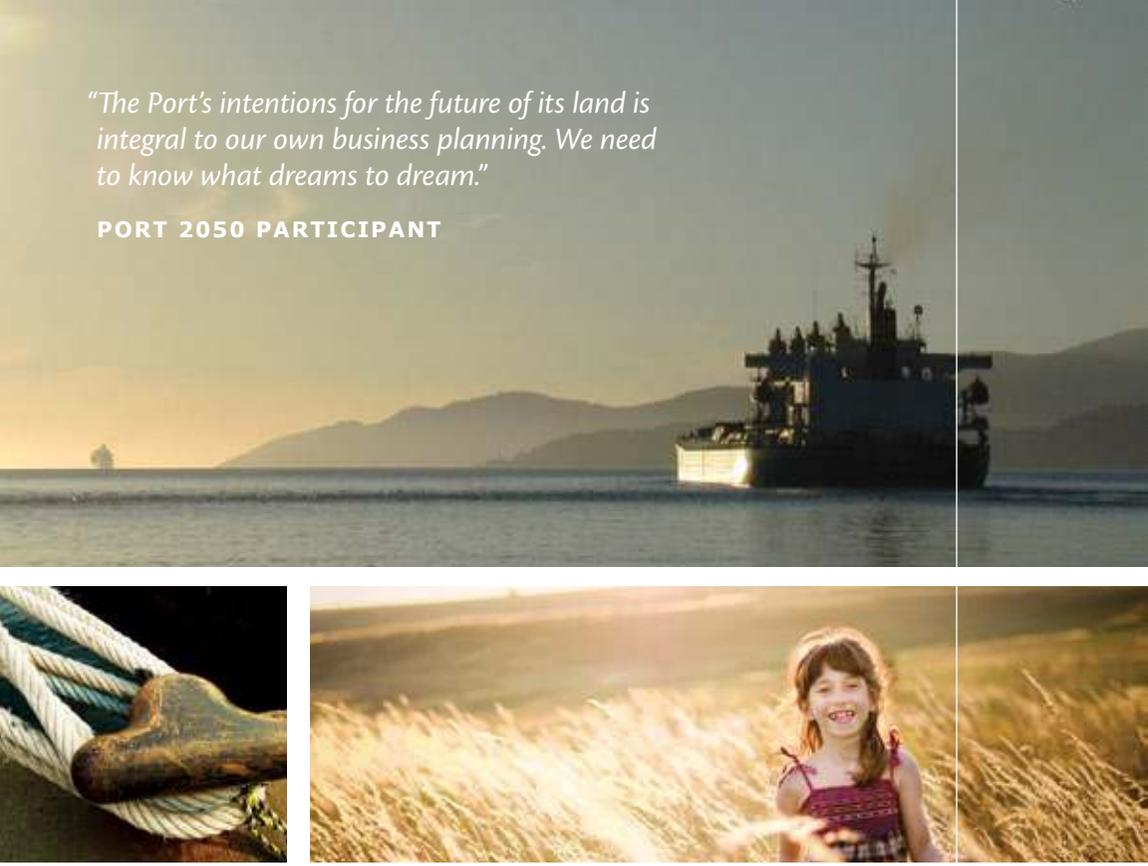
We believe the year 2050 looks bright for Port Metro Vancouver, our stakeholders and the communities we serve. We are building our plans to be ready for, and to understand and thrive in, the future ahead of us. It will take hard work, relentless collaboration and commitment to see it fulfilled. We see this already happening on Canada's West Coast, every day.

We hope you will continue along this path with us.

Robin Silvester
President and Chief Executive Officer

"The Port's intentions for the future of its land is integral to our own business planning. We need to know what dreams to dream."

PORT 2050 PARTICIPANT



ABOUT PORT 2050

In 2010, Port Metro Vancouver embarked on a strategic visioning process called Port 2050. Our goal was to engage representative parties with a stake in the future of the Gateway to create a strategic vision for our shared future by exploring the answers to two key questions:

What is good growth for the Gateway and its stakeholders?

What will the Port look like in the next 20 and 40 years?

Our objectives were threefold:

- To deepen our collective knowledge by co-developing long-range strategic insight and foresight.
- To build adaptive capabilities through the creation of long-range strategic visioning tools and leadership skills.
- To support the co-creation of a better future for the Gateway through effective engagement and collaboration.

Through the Port 2050 process, four scenarios for the future of the Port and the Gateway emerged, which we have named "The Great Transition," "Rising Tide," "Missed the Boat" and "Local Fortress."

These scenarios are designed to help us think about the future and the alternative ways it may develop. They are challenging, feasible and all describe some inevitable changes to the way we — and our industry partners — do business.

THE PORT 2050 PROCESS

With the initial mandate from our board of directors, the Port 2050 process began in earnest in the Fall of 2010.

By design, Port 2050 aimed to engage a representative mix of port stakeholders in a frank and collaborative discussion about the future of the Port and the Gateway. Throughout the process, more than 100 people — leaders from our terminal operators and tenants, railways, industry organizations, government agencies, municipalities, community liaison groups and First Nations — participated in the process with our board members, executive team and employees.

To lead us through this complex process, we retained the services of Adaptive Edge, a consultancy that specializes in strategic foresight and futures thinking. With their guidance, we developed a timeline that would emphasize the interconnected nature of our goals and would allow us to explore topics that could shape our shared future.

This approach sought to capture the knowledge, interests and aspirations of our industry stakeholders and community partners. We emerged from the process with a greater understanding of a diverse range of perspectives, enabling us to gain the strategic insight we needed.

EXPERT PANEL SERIES

To launch the Port 2050 process, participants were invited to a series of panel discussions held over three days in October 2010. Panelists were selected on their ability to inform our future thinking and spanned a diverse range of disciplines — some industry-specific, while others represented broader macro trends likely to shape the business environment. Each panel was organized around a particular theme: global maritime operations and investments; Gateway sustainability; Gateway competitiveness; our social landscape; and sustainable and efficient freight mobility.

STAKEHOLDER DIALOGUES

Throughout the following month, we held smaller group conversations with our participants. While the panel series illuminated future trends, these stakeholder dialogues focused on listening to the unique perspectives of our participants about the current and future Gateway-related issues that directly impact their businesses, their livelihoods and the livability of their communities. Each conversation included a cross-section of participants to encourage differing and sometimes conflicting perspectives. A rich discourse ensued and the key themes and issues that emerged throughout those conversations were captured.

SCENARIO BUILDING WORKSHOP

Following the panel discussions and the small group conversations, more than 100 participants joined Port Metro Vancouver directors and employees at a scenario building workshop, held in February 2011. The workshop was designed to challenge participants to think ambitiously about the future of Port Metro Vancouver and the Gateway.



WHY SCENARIO PLANNING?

To help us proactively create the future we want by thinking in terms of multiple possibilities.

To encourage us to imagine what might happen if our expectations for the future do not come true.

To strive for innovation and creativity by requiring that we think farther out into the future than we normally take the time to do.

Using a highly participatory process over the two-day workshop, the group developed four preliminary scenarios on the future of the Port, the Gateway and our collective business environment. Each of these scenarios was enriched by the wide range of perspectives, knowledge and aspirations brought to the exercise.

Following the workshop, the Port 2050 team further refined the preliminary scenarios with additional research, in-depth analysis and a series of internal workshops to test the plausibility of scenario details and identify their strategic implications. The final scenarios that emerged contain the essential elements identified in the preliminary scenarios, which were further developed. The result is four very different and plausible visions of the future, which will be described more fully in the following pages.

ABOUT SCENARIO PLANNING

Over the last 40 years, scenario planning has emerged as a leading strategic tool, a proven way to make flexible long-term plans and manage uncertainties.

Scenario planning helps us proactively create the future we want by thinking in terms of multiple possibilities and by plotting a course between prediction and paralysis. It is also a critical tool to improve our decisions in the present, because it helps us expand our perspective, identify new opportunities and adjust our strategies on an ongoing basis.

It is important to remember that scenarios are not predictions. Rather, they are alternative stories of the future; they depict how current events and trends could play out over time. Scenarios describe a range of possibilities that

incorporate both the expected and unexpected, as well as conventional and unconventional thinking.

In order for them to be useful, scenarios must be plausible, relevant and challenging; they also need to differ from one another and cover the range of possibilities that we could face as a port and a Gateway.

The building blocks of scenarios are known as key drivers of change, which represent important trends, forecasts and uncertainties facing the Gateway. Many drivers of change were identified throughout the Port 2050 process and the final characterizations were agreed upon at the final scenario-building workshop. Participants ranked these driving forces and future factors on levels of both importance and uncertainty. The intersection of these critical issues forms the basis for the Port 2050 scenarios.

CAPACITY TO GROW

How will pressures from population growth, climate change, or unforeseen factors affect the Gateway? How will competing views on industrial, residential and agricultural land use be resolved? Will the Port maintain, strengthen or lose its social license to operate?

DEMOGRAPHICS AND SHIFTING SOCIAL VALUES

What global population shifts will happen — driven by demographics, migration, or other forces? How will these shifts impact goods production and consumption? How will the regional population evolve? How will social views of globalization and trade evolve? How will local views of the Port evolve?

ENERGY TRANSITION

When will the world reach “peak oil”? What will the implications be for global goods transport? Will higher energy prices dominate? What alternatives to hydrocarbons will develop, and how quickly?

GATEWAY COMPETITIVENESS

How attractive will the Gateway be for business, labour, investors and trade? How productive will the Gateway’s labour force be? Will Gateway actors share a common strategy?

GEOPOLITICAL STABILITY

How will the rise of new political economic actors, shifting balances of power and the relative fortunes of the US and Canada affect the Gateway? In what arenas will Asia dominate? How volatile will the geopolitical environment be?

PATTERNS OF PRODUCTION AND CONSUMPTION

How will trade patterns shift through 2050? How will changing locations of consumers and goods producers impact trade flows? How will demand for key Gateway commodities shift over time?

TECHNOLOGICAL INNOVATION

How will technology improve goods movement and handling? How large will ships get? What new transport technologies will emerge? What innovations could disrupt the transportation and logistics industries?



"A port isn't just a local thing. It brings the world to you and you take things to the world. So it requires a global perspective."

PORT 2050 PARTICIPANT

THE SCENARIOS

In order to challenge our thinking and build divergent scenarios, we developed a matrix by crossing two axes, delineating four separate future environments. These two axes represent the most important and most uncertain drivers of change, allowing our scenarios to be as rich as possible and include multiple trends and possibilities.

HORIZONTAL AXIS: GLOBAL PROSPERITY MODEL

The Global Prosperity Model axis describes patterns around globalization, macroeconomics and energy, and is fundamentally about the nature of demand.

On the far left of the axis, the current economic growth-driven model remains dominant. This assumes a continuation of our current system, including globalization, traditional economic measures of GDP and growth, and the predominant use of hydrocarbon-based energy. While significant changes do happen, there is no paradigm shift in scenarios on the left side of the axis.

On the far right, an alternative prosperity model emerges. This assumes a fundamental change in the nature of globalization, economic growth and definitions around prosperity that assign greater importance to values such as environmental quality and human well-being. Within this axis, we also include the transition to a post-carbon economy as well as a demographic and social transformation that could emerge from a new generation of leadership.

VERTICAL AXIS: THE CAPACITY OF THE GATEWAY

The Capacity of Gateway axis incorporates issues of competitiveness, infrastructure, land use, social license, talent, local economic strength and collaboration between port stakeholders. Fundamentally, this axis is about the nature of supply. It encompasses Port Metro Vancouver, but is about the Gateway and region more broadly.

At the bottom of this axis, we find capacity constrained and/or decreasing. In scenarios on this side of the axis, the Gateway as a whole is challenged by any number of factors — both internal and external — that limit its ability to adapt, grow and be successful.

At the top of the axis, capacity is adaptive and/or increasing, meaning the Gateway is able to respond, adapt, cooperate and thrive in changing circumstances.

ABOUT OUR SCENARIOS

On the pages that follow, we share with you the four scenarios that were developed through the Port 2050 process. They are written in a narrative format, to encourage us to imagine our world 40 years from now. When reading them, it is important to focus not on whether you agree with or like the scenarios, but to consider whether they make us more prepared for the risks and opportunities ahead.

These are by no means exhaustive outlooks. And while no single scenario is likely to accurately reflect how the future will unfold, they are useful tools to help us imagine the potential implications of the decisions we make today by testing them in a range of possible futures.

Adaptive/
Increasing



RISING TIDE

This is a scenario of continued growth, but in a context of increased volatility due to resource conflicts and climate instabilities.



THE GREAT TRANSITION

This is a scenario where we see a paradigm shift— a rapid transition to a post-industrial/ post-carbon model.

CAPACITY OF THE GATEWAY

Economic Growth-
Driven Model
Remains Dominant

GLOBAL PROSPERITY MODEL

Alternative
Prosperity
Model Emerges



MISSED THE BOAT

This is a scenario where emerging market growth is strong, but the Gateway misses key opportunities and doesn't live up to expectations, due to problems with supply chain issues, poor coordination, lack of community buy-in and diminishing industry support.



LOCAL FORTRESS

This is a scenario where Gateway growth is constrained because the Lower Mainland focuses on the regional economy, local resiliency and well-being.

Constrained/
Decreasing

Thick Line = Growth of Broader Economy
Thin Line = Growth of the Gateway



LOCAL
FORTRESS

This is a scenario where Gateway growth is constrained because the Lower Mainland focuses on the regional economy, local resiliency and well-being.

A 'local fortress' emerges as a reaction to additional global economic crises and a slowdown in Asian growth, which in turn depresses and changes consumption patterns worldwide. Gateway activity is downsized, but still services cottage industries. Short-sea shipping does well with a regional, West Coast focus. In the end, the region's early choices to become a "lifestyle region" come back to haunt it, as its vitality and hopes of being a global hub diminish over time.

WORLD CONTEXT 2010-2030: MIDDLE CLASS HOLLOWING

It seems like the global economic crisis of 2008 never really ended. Although recoveries occur, waves of multiple economic crises continue, never really allowing the Canadian middle class to rebound. Domestically, Canada witnesses a real estate bubble bursting as Baby Boomers start to downsize and off-load their homes in the suburbs. Then, around 2020, economic growth in emerging markets slows due to a range of challenges, including environmental and political. While major economies such as China are far from collapsing, it is clear that decades of breakneck growth are taking their toll.

These economic slowdowns impact global consumption patterns, with people in developed countries increasingly doing more with less, or buying smarter. In fact, the word "consumer" is used less and less, a sign of the times.

This back-to-basics ethos isn't all doom and gloom, however. Business does well in non-traditional sectors: spirituality, health and well-being, community (virtual and physical) and learning. In a 2020 survey, most people report being no more or less happy than they were in the previous decade. Meanwhile, the wealthiest segments of society continue to lead a highly material lifestyle; consumption in luxury goods show no signs of abating. However, the overall economic slowdown has its advantages as it takes pressure off the environment.

GATEWAY CONTEXT 2010-2030: REGIONALIZATION OF TRADE AND MINDSETS

Within this economic climate, the benefits of globalization are being called into question. Local politicians argue persuasively that the region would be less vulnerable and more resilient if it focuses on local manufacturing, food production and cottage industries. With fewer household dollars to spend, most people agree.

Over time, the industry is forced to downsize and relocate activities outside of the Inner Harbour of Burrard Inlet. The silver lining is that the Fraser River is still active given the rise of cottage industries. In fact, while policies become more protectionist and mindsets are more insular, trade flows more regionally, which in turn boosts coastal shipping.

WORLD CONTEXT 2030-2050: TECHNOLOGY CHANGES THE GAME

Just as the economy recovers in the middle of this scenario, a technological game-changer reinforces the shift to more local production.

A computer fabrication process known as 3D printing emerges, allowing for the local production of many goods using sophisticated equipment and software. This technology can produce almost everything from watches to shoes to basic electronics — consumer goods that previously had been imported.

Over the decades, 3D printing becomes quite a reliable method for creating a whole range of goods and products. This, in turn, disrupts entire global supply chains, which reinforces the localization of manufacturing even further. Trade volumes diminish as supply chains simplify to move smaller quantities of raw materials to local facilities adjacent to retail locations. Moving semi-finished components and packaged goods becomes a thing of the past.

GATEWAY CONTEXT 2030-2050: BEWARE OF UNINTENDED CONSEQUENCES

Toward the end of this scenario, the Lower Mainland looks very different than it did in 2011. In many areas, including Burrard Inlet, waterfront industry has given way to residential uses and tourism amenities. Some people view this transition as a positive outcome. For those who can afford it, the Lower Mainland is still a pleasant place to live and visit. But something important has been lost in this urban experiment. The region has become a lifestyle bubble for many; a place to retire and retreat.

While ethnically still diverse, the region is paradoxically less global, more inwardly focused and less tolerant of different worldviews. Looking back, that creative tension between business and community was an important source of balance and vitality in the region. By pushing major industry outside of the Lower Mainland, the area lost some of its character, vibrancy and its sense of authenticity.



MISSED
THE BOAT

This is a scenario where emerging market growth is strong, but the Gateway misses key opportunities and doesn't live up to expectations, due to problems with supply chain issues, poor coordination, lack of community buy-in and diminishing industry support.

Competitiveness worsens. Meanwhile, a game-changer emerges: trade patterns shift to favour more south-to-south routes, which over 40 years affects the entire West Coast. Climate change is still an issue, but is mitigated in part due to technological innovation.

WORLD CONTEXT 2010-2030: BRICS RISING

This is a world in which emerging markets drive global growth and reap the lion's share of the benefits. The current prosperity model is delivering the economic goods, proving resilient and the best route to global stability and raising standards of living.

New energy technologies and sustainable supply chain efficiencies help mitigate the impact of this growth on the environment, though deteriorating environmental quality continues to be a concern — something the world would have to deal with later.

Things look promising in the early years. The economy picks up as the Emerging World — China, India, Brazil and even parts of Africa — grow rapidly. This is déjà vu all over again. In the same way as the Asian Tiger economies rose up in the late 20th century, this growth creates a virtuous cycle of greater prosperity, stability and social progress in these countries. Even concerns about a growing global population are mitigated as increasing prosperity puts a damper on birth rates. So the handwringing about the end of capitalism, which loomed large during the dark years of 2007-2010, dissipated faster than a monsoon rain. Even Dubai makes it back in the headlines again, trying to reclaim its position as the Miracle in the Desert. Indeed, Dubai's advantage is its close proximity to billions of middle class consumers. And geopolitically, it becomes clear that the centre of gravity is shifting to that part of the world.

GATEWAY CONTEXT 2010-2030: HANDS TIED

Despite these favourable global conditions, the Gateway falls well short of hopes and expectations. The reasons are both internal and external. On the one hand, it's unable to overcome key challenges, from labour issues to corridor and supply chain inefficiencies, losing out to other competitors both north and south. Community support for continued port activity wanes because of ongoing operational impacts, and a poor understanding of the Gateway's value. More surprisingly, industry support also falls away given all of the Gateway's challenges, preferring to operate in other trade routes.

In these early years, the Gateway has a hard time making a compelling case against community and industry concerns, as it receives the bulk of blame for the chronic gridlock in the Lower Mainland. To be fair, the increasing traffic is largely a result of more cars on the road from a growing population fuelled by an increase in immigration. But what people notice the most is the increase of trucks. As residents become increasingly vocal in their opposition to port activity, even the pro-industry groups find themselves backing away from advocating Gateway expansion.

With all these things going on, it is increasingly hard to attract qualified people to the industry and the Gateway in particular. So just when the Gateway needs world-class employees to take it to the next level, this talent is going elsewhere.

WORLD CONTEXT 2030-2050: HEADING SOUTH

Towards the end of this scenario, these concerns become trivial, as it appears a sustained drop in West Coast port activity is occurring. While everyone focuses on local competition, a structure shift in trade patterns towards the southern hemisphere begins to take place. This trend makes sense given the new geography of global demand and supply, with Africa being a rising low-cost manufacturing centre, taken together with other places like Vietnam, China and India having strong local consumption. As the focus of global manufacturing shifts from East Asia to South Asia and South-East Asia, trade volumes through the Suez Canal to eastern North America boom at the expense of Pacific trade and West Coast ports.

GATEWAY CONTEXT 2030-2050: MISSED THE BOAT

By the end of this scenario, not only does the Gateway miss the boat early, but also the boats increasingly choose to take a miss on the Lower Mainland, with other cheaper and closer options nearer to key markets. Could the Gateway have hedged and anticipated these shifts, if it wasn't so preoccupied with local challenges? Maybe, maybe not. This was no longer a relevant conversation. The future had moved on.



This is a scenario of continued growth, but in a context of increased volatility due to resource conflicts and climate instabilities.

Canada prospers, because its resources are in high demand and Canada's global brand is strong. However, the Gateway struggles to adapt at first, lacking nimbleness and scalability. After building the right capacities and relationships, the Gateway positions itself as resourceful and reliable. At the end, despite the turbulence, trade increases, but climate change remains a serious challenge.

WORLD CONTEXT 2010-2030: THE RISE OF RESOURCE WARS

At first glance, this is the most familiar and desirable world, the future that the Gateway anticipates with current trends continuing — from the rise of the emerging markets, greater globalization and growth.

But when played out, these forces are far from incremental or business as usual. Rather, in this scenario we see how they drive a period of volatility. Two things drive this turbulence: first the transition to a multi-polar world, with emerging markets increasingly at odds with each other and the West; second, a series of "resource wars" over key commodities in several hot spots around the world.

Global resources scarcity is largely due to rapid growth out-stripping supply, combined with failed ecological management, especially in emerging markets. This situation is exacerbated by climate change, which gathers momentum during this scenario and is no longer in dispute. So while global growth is also creating a "rising tide" for the bottom of the economic paradigm, we are also seeing visible increases in water levels around the world, which only adds to the uncertainty.

Overall, Canada benefits from these instabilities because it is seen as a safe bet in a risky world, a reliable source for much needed resources. By now, Canada, and B.C. in particular, are wealthy and more confident places. Before long, it is Canada brokering key agreements at a global level. The most prominent deal is the Arctic Accords, which create new international standards for shipping through the northern passageways, since they became navigable for the summer

months by 2030. With the economic pie expanding, every port along the West Coast benefits. Greater cross-border collaboration occurs among Pacific Northwest ports, thanks to a special security zone arrangement.

GATEWAY CONTEXT 2010-2030: THE ADAPTIVE CHALLENGE

In this scenario, the main challenge for the Gateway is how to operate in a rapidly changing world, where instability is the new norm.

To overcome key internal and external barriers, the Gateway develops a hybrid "for-benefit" corporate model. As part of this model, an emphasis is placed on new adaptive competencies, flexible systems and good global relationships, with the complexion of the Gateway looking more like the world it serves. These changes, however, are painful and not everyone likes this new direction.

Land use issues also remain challenging. But tensions are overcome — not fully, but satisfactorily to most stakeholders — with innovative planning and cutting-edge urban design that favours density, allowing for industrial and agricultural land to do more with less. Community champions are essential, creating greater visibility and facilitating collaborative problem solving. Novel partnerships are crucial, especially with First Nations. The federal and provincial governments are proactive allies as well, with a supportive national transportation policy and strategy.

WORLD & GATEWAY CONTEXT 2030-2050: WATER RISING AND A CURSE OF RESOURCES, CANADIAN STYLE?

But all was not well with the environment — another catalyst for global instability. By 2040, years ahead of schedule, the impacts of climate change are being seen on a large scale. On average, global water levels have risen by one metre, with temperatures around four degrees Celsius warmer. This happened far faster than most experts had forecast and is catastrophic in many parts of the world.

Fortunately, Canada's wealth helps compensate for the worst effects, with billions of dollars going into climate change mitigation infrastructure. But hardships are found everywhere as different challenges emerge, such as new diseases and severe droughts in the Prairie Provinces. But again, thanks to Canada's financial resources, the country is able to weather these shocks.

Meanwhile, climate change and other pressures on ecological services are increasing, thus highlighting a long-term dilemma. At some point, resources are going to run out and the current model will prove unsustainable. How will B.C. and Canada prepare for this? How will they diversify the economy while times are good? As the "curse of resources" theory points out, few places manage this well, preferring the short-term profit at the expense of the future. The eventual solution: a Norwegian-style sovereign wealth fund which takes a percentage of profits and invests these into future industries. In fact, this scenario may be a precursor to "The Great Transition."



THE GREAT TRANSITION

This is a scenario where we see a paradigm shift — a rapid transition to a post-industrial/post-carbon model.

A rough and risky period at first, a threshold is crossed mid-scenario due to new global leadership and the successful institutionalization of new metrics (“triple bottom line”). This creates new, more sustainable (and rebalanced) consumption and production patterns. While there are many losers, the Gateway becomes a global winner. A key factor: far-sighted, bold and collaborative leadership at multiple levels — from industry and communities to First Nations and all levels of government.

WORLD CONTEXT 2010-2030: ROCKY TRANSITION

Through the first 20 years, there is a rocky and risky transition, as the shift to a post-carbon economy happens much faster and more profoundly than anyone had expected. We see both new and old models muddled together, creating a period of confusion and uncertainty. Many traditional business models are disrupted, resulting in significant imbalances in the workforce as employers adjust to this new economy. The threat of a global systemic collapse looms with food security crises, eco-terrorism and challenges to the US dollar.

Out of these crises, however, emerges a new generation of global leadership, and many of these leaders are non-Western. Over the next 20 years, through a mixture of bottom up and top down leadership, a new world order emerges. A global dialogue, thanks to the use of social media, makes this possible. A key tipping point occurs in 2030, with a series of structural global reforms and policy innovations: a carbon tax and Triple Bottom Line prosperity metrics to supplement GDP/GNP, plus a voluntary shift in Wall Street measures. This enables a very different growth model, one that balances the economy, environment and human well-being.

GATEWAY CONTEXT 2010-2030: BUSINESS AS USUAL — BUT NOT FOR LONG

Meanwhile, the Lower Mainland proves itself to be relatively resilient throughout this period. It is still rocky for many, but early leadership in sustainability really pays off. All those experiments and policies at the municipal, community and

business level make the region more prepared for what is coming. The investments in fast public transportation prove to be invaluable. Even the most skeptical are convinced that investing in new sustainable approaches early on was the right direction.

Despite the global volatility, B.C. also fares better than most because of its valuable commodities and resources. In the early part of this scenario, the world is in the throes of this energy transition, which doesn’t happen smoothly. For a while, we see the coexistence of both carbon-based fuels and alternative energy approaches. The Emerging World is still playing catch up with the West in terms of consumption, which is far below quality of life standards. Therefore, commodities, like coal, oil and wheat, are in hot demand in the first 20 years.

Following the rest of the world, the port and shipping industries operate under the “business as usual” scenario as trade continues to rise. The wake-up call, however, occurs when oil prices start to rise precipitously. While other industries wait for this cycle to return to normal, forward-thinking leaders within the shipping, port and logistics industries create a consortium to explore carbon neutral breakthroughs in supply chain technologies. This collaboration proves to be very farsighted and is successful in preparing the industry for the new post-carbon realities; as a result, shipping outperforms alternative transportation modalities, like air cargo and trucking, for a long time. This also improves the industry’s reputation in neighbouring communities and even attracts some high level sustainability talent from other industries.

WORLD CONTEXT 2030-2050: BETTER OFF

Looking back, when global breakdown during the 2020s seemed inevitable, by 2050 the world is far better off than anyone had expected. The benefits of globalization are more evenly dispersed; poverty levels are in sharp decline. In addition, there are robust local and regional economies that pivot around key regions, which provide resiliency and buffering against everything from financial bubbles to food shortages. So while global trade still exists, the patterns are slower and different, with a mix between local and global manufacturing.

GATEWAY CONTEXT 2030-2050: NEW PATTERNS OF PRODUCTION AND CONSUMPTION

Very soon after the global carbon tax and Triple Bottom Line metrics are implemented, they have an impact on trade patterns. Fortunately, the result is a net positive impact for marine transportation and related industries, since shipping and the supply chain through Vancouver are more carbon-friendly than other gateways and modalities.

For the Gateway, this boost to shipping means we are exporting just as much as we import, including more value-added goods that are increasingly being produced in B.C. as part of the new energy economy. Anticipating the shifting business environment, the Gateway becomes a leader in the creation of a zero-carbon supply chain throughout its logistics network. This approach starts to pay off within a few years, as businesses and their customers are looking for low-carbon solutions and alternatives. The Gateway gains significant competitive advantage as being one of the few ports that can offer this.



“Sustainability. I think the community will not put up with anything less.”

PORT 2050 PARTICIPANT



OUR ANTICIPATED FUTURE

When we looked at these four scenarios, we asked ourselves “where do we think we are now?” and “where would we like to see ourselves in 40 years?”

Upon consideration of all four scenarios, it should be no surprise that a world with decreased capacity, limited growth and missed opportunities is not desirable for Vancouver’s Gateway. Rather, we want a future where growth is anticipated, enabled, considered; where pinch-points are understood in advance; where we tackle our challenges in the context of benefits.

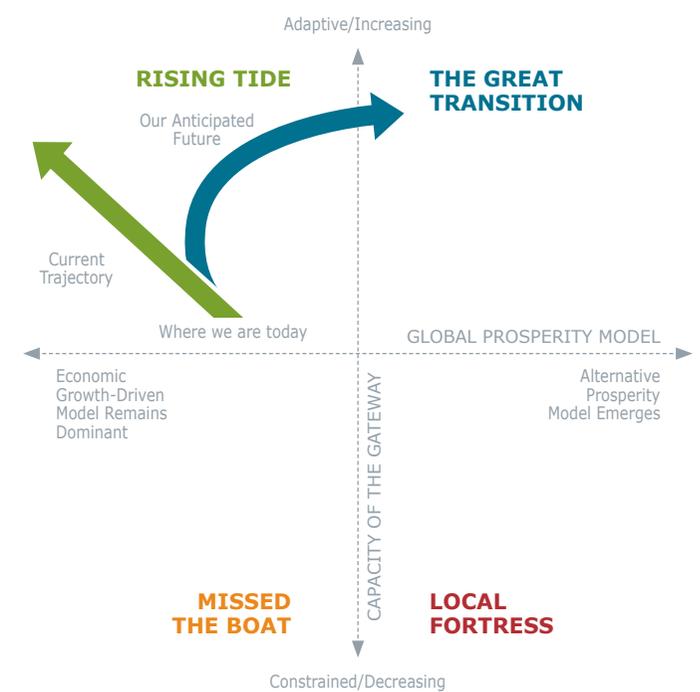
In our future, our responsibility to and for economic generation is understood, respected and supported in host communities because we work together toward common goals; relationships are built and strengthened. Growth means integration resulting in capacity availability, congestion-free or manageable corridors, integrated road and rail interface and sustainable growth solutions. Leadership replaces regulation. We do things because it’s the best business solution that brings with it the most positive environmental and social impact.

What emerged is what we are now calling our Anticipated Future. This is an outlook that involves considerable growth across cargo sectors while eventually transitioning to a business environment where a true triple bottom line approach becomes the accepted and expected measure of success.

With this in mind, we determined that a portion of our Anticipated Future is found in the Rising Tide scenario. This is the future our strategy has traditionally assumed. While this is the most familiar outlook and — generally speaking — a continuation of the *status quo*, there are many aspects of Rising Tide that are not desirable, namely the potential for resource scarcity and economic turbulence.

Therefore, we also felt that The Great Transition is a plausible outcome from a longer term and broader view, especially given the many deep drivers of change we identified in this process. This scenario has the benefit of containing elements of our future vision in a way that matches the direction in which the overall business environment may be evolving. Many aspects of The Great Transition are preferable to the other three scenarios, as long as progress occurs in a manageable way and key risks are mitigated.

OUR ANTICIPATED FUTURE



The Gateway is uniquely well positioned for success in both scenarios. By anticipating this transition and preparing for it, we recognize that, collectively, we could gain strategic advantage.

As we move forward, questions that challenge our longer term thinking include: in what ways do Port Metro Vancouver and the Gateway want to shape and guide this transition? What are the points of influence where we can participate or lead?

FROM HERE TO 2050

Developing the Port 2050 scenarios has revealed important implications for Port Metro Vancouver’s strategy and operations and will continue to do so as this process and its outcomes deepen and become established within the organization. The following are several areas we will be paying close attention to within our business:

STRATEGIC VISION

One of the first things we have done is revise our strategic vision and mission statements. What we heard during the Port 2050 process is that there is an opportunity for Port Metro Vancouver to take a stronger leadership role locally, nationally and globally. This could take many forms, including a new and more active relationship with our stakeholders, or a more prominent advocacy position regarding regional development.

Our new mission and vision statements can be found on the back page of this publication. We believe the revised statements reflect this leadership opportunity for Port Metro Vancouver, as well as our commitment to sustainable growth for the benefit of the communities we serve, both locally and across Canada.

THEMES TO CONSIDER

Every scenario process shines a light on the question: what are those competencies of the future we need to develop to thrive? Through this process, we identified the following competencies that Port Metro Vancouver needs to nurture and advance:

- Full Gateway supply chain coordination, including strategic use of technology
- Breakthrough approaches toward land use and our overall footprint
- Leadership and innovation around increased productivity and energy efficiency
- Community partnerships
- Multi-stakeholder engagement and collaboration
- Our ability to attract top talent
- Our adaptive capacity
- Our ability to manage complexity

CONTINUED ENGAGEMENT WITH STAKEHOLDERS

Port Metro Vancouver has an opportunity to use this scenario work to engage with our stakeholders in a positive and productive strategic conversation about our shared future, a key objective of this process. Receiving stakeholder feedback on the strategic implications for the Gateway will both deepen our understanding of each others’ goals as well as create opportunities for further collaboration.

RESEARCH ON INEVITABLE FACTORS

There are some factors that we believe will be inevitable within our scenario time frame. For example, even this early on, it seems almost certain that we will experience an energy transition as carbon-based energy prices increase and resources become scarcer. This transition will have a major impact on Gateway activity and is likely to become increasingly influential in shaping future opportunities and challenges.

Other inevitable factors include:

- Increasing volatility and complexity
- Climate change and the local implications of global impacts
- Technological advances, both within the shipping industry and in broader society
- Demographic changes, and how such changes will affect community and regional values

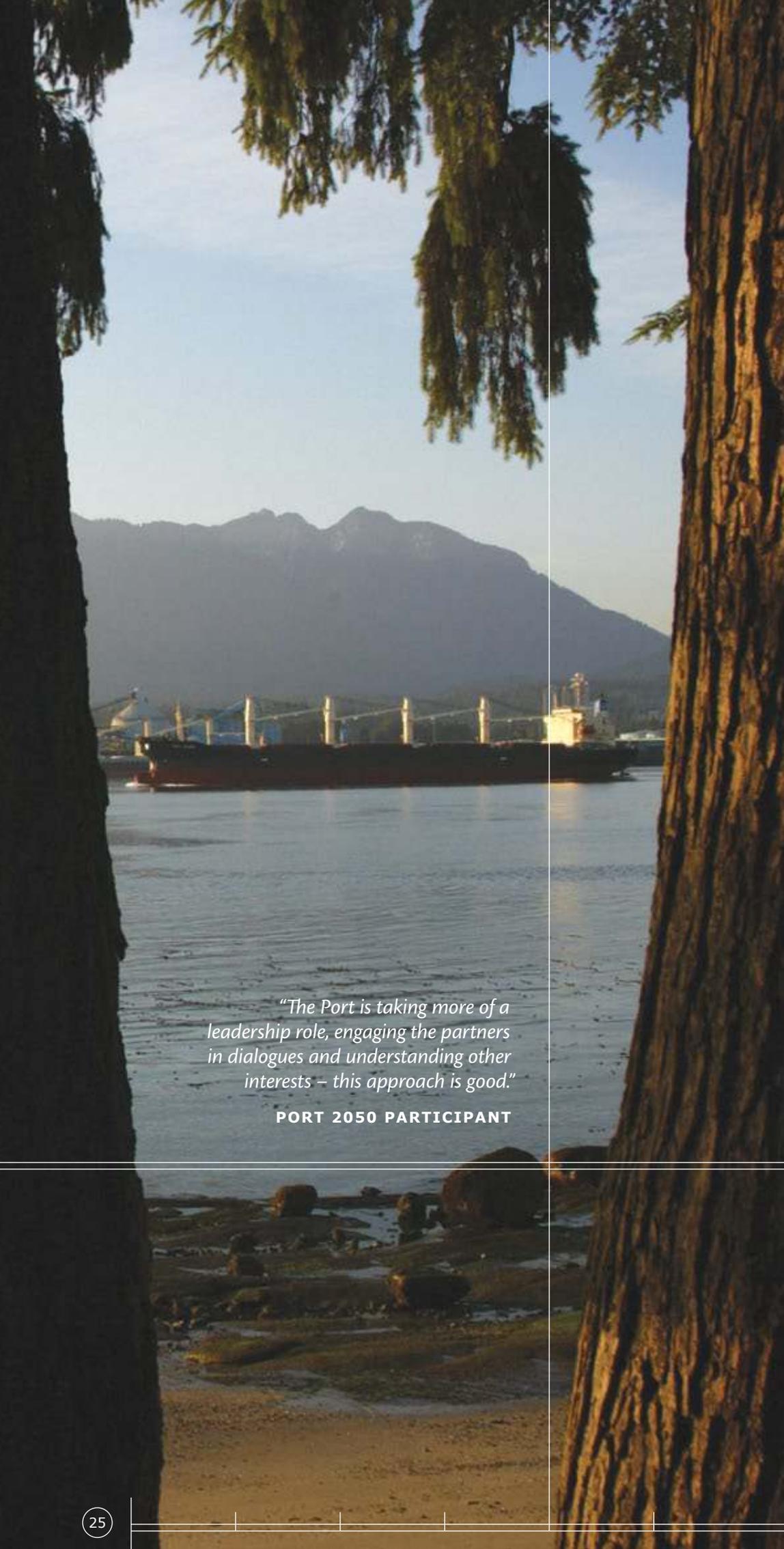
FOCUS ON INNOVATION

This is a longer-term priority that involves small or large experiments, pilot projects, collaborative initiatives and new products and services that enable the organization to test, sense and learn for the future in a relatively low-risk way. The most effective (and often only) way to manage future uncertainties is to do some “action learning;” that is, try things in the field, then gather data and learning from that experience, and either scale the results or take a different approach.

WATCHING FOR CHANGE

To help us spot key shifts in the business environment early on, we are compiling a list of early warning indicators, or critical developments that might suggest we are heading toward one scenario over another. The benefits of watching for these indicators include better risk management and increased competitive advantage.

INDICATOR CATEGORY	WHAT WE WILL WATCH FOR (EXAMPLES)
Social (values, demographics)	Changes in consumption patterns; community acceptance of Port operations; reception of corporate social responsibility principles
Technology	Rise of new manufacturing methods; investments in new energies; sustainable supply chain technologies
Trade flows/patterns	Trade policy; oil prices; foreign investment in emerging markets
Economic	Commodity pricing; changes to for-profit business model; growth of emerging economies
Environment/climate	Change in policy/regulation; increase in weather anomalies
Political	Political instability at home and abroad



“The Port is taking more of a leadership role, engaging the partners in dialogues and understanding other interests – this approach is good.”

PORT 2050 PARTICIPANT

SUMMARY AND CONCLUSION

We have come a long way since 1970, when the population of Canada was 21 million people and Port Metro Vancouver handled approximately 27 million metric tonnes of cargo.

Forty years from today, what will the Port look like? And what does good growth mean for us, our Gateway stakeholders and communities between now and 2050?

Those were the questions that guided us through this Port 2050 project, ultimately leading us to the development of the four plausible, relevant and challenging scenarios outlined in this report.

The “Local Fortress” and “Missed the Boat” scenarios describe worlds with decreased adaptability and capacity in the Gateway, where growth is constrained and opportunities are missed. As an organization with a mandate to facilitate trade in the best interest of all Canadians, these scenarios are difficult for us to embrace.

“Rising Tide” and “The Great Transition,” on the other hand, illustrate a future with increasing capacity and, ultimately, more sustainable production and consumption patterns and a new paradigm shift in how society values and measures prosperity.

We recognize that different scenarios will appeal to different readers. We have elected to focus our short-term future goals towards “Rising Tide,” with a 2050 vision leading us towards “The Great Transition.” We believe this trajectory can successfully balance interests to the benefit of all our industry and community partners.

How will we get from here to 2050? It is a progression that is already underway in the Gateway, where recent focus has been on collaboration, sustainable growth and community engagement.

Our revised strategic vision and mission statements will help guide our business priorities, shape new initiatives and ultimately infiltrate every aspect of Port Metro Vancouver’s operations, beginning in the near term with a substantial update of our Land Use Plan. This new direction will help us understand, anticipate and plan for a transitioning global social and economic environment.

But we can’t — and won’t — be able to make it on our own.

We believe this process represents an important milestone for the Port in terms of taking a more open, collaborative approach to charting our future.

What we have discovered is that there is a strong desire among many Gateway stakeholders and communities for a continued and sustained high level of engagement and collaboration in planning for our shared future.

It is our hope that, in 2050, we will look back four decades and be proud of the choices we’ve made, and how far we have come, together.

Thank you to the Gateway stakeholders, community liaison committee members, employees, First Nations and thought leaders who participated in the Port 2050 process. Your insight, expertise and time are greatly appreciated.



PORT 2050
A PORT METRO VANCOUVER INITIATIVE





PORT METRO
vancouver

OUR MISSION

*To lead the growth of Canada's Pacific Gateway in a manner
that enhances the well-being of Canadians.*

OUR VISION

*To be the most efficient and sustainable Gateway
for the customers we serve, benefiting communities locally
and across the nation.*

VANCOUVER OFFICE

100 The Pointe, 999 Canada Place
Vancouver, BC Canada V6C 3T4

Toll Free in North America:

1.866.767.8826

Phone: 604.665.9000

Fax: 1.866.284.4271

E-mail: info@portmetrovancover.com

portmetrovancover.com

Canada