

9



BBE Scenario Development

BBE Scenarios Group
Facilitator: Informetrica Limited
September 3, 2003

10/30/03

BBE Scenarios

1

Agenda

- **Review SWOC**
- **NRC Foresight Project**
- **Review Driving Forces**
- **Adding Value to the NRC Scenarios**
- **Adoption of Scenarios**
- **Renaming Scenarios**

Major Biotech Issues

- Global developments in biotech
- Public confidence and security
- Adequate public resources for science-based regulation and public R&D
 - Funds
 - Human Resources
 - Mandate
 - Specialization
- Ubiquitous Nature of Biotech

10/30/03

BBE Scenarios

3

The pace of change is not in the hands of Canadian industry or governments alone.

Public confidence can change quickly. “Security” includes the notion of defined liability for consequences.

If something is declared as “GRAS” - or “generally regarded as safe” - by governments are they liable for any subsequent effects?

“Specialization” refers to the development of international standards and the acceptance of testing by others, as they accept our testing.

Biotech is affecting developments in health, agriculture, industrial processes, fuels, criminology,

The Question?

- The “Business Idea”
- The BBE or “Carbohydrate” Economy can emerge as the major source of feedstocks and materials in Canada over the next twenty years, with the majority of feedstocks produced in Canada.

This is the "goal" that was adopted at the June SWOT session. Does it need to be refocused, or restated, or elaborated, or anything?

SWOC Analysis

	PLUS	MINUS	
INSIDE	Strengths	Weaknesses	CAN BE CHANGED
OUTSIDE	Opportunities	Challenges Threats	FIXED

10/30/03

BBE Scenarios

5

The acronym SWOC or SWOT is based on an approach that details the Strengths, Weaknesses, Opportunities, and Challenges or Threats to an organization or entity.

This is used by strategic planners in large organizations as part of the development of scenarios and other planning exercises.

The strengths and weaknesses are “inside” the organization, and as such are thought of as controllable or changeable.

The opportunities and challenges (or threats) are those presented by the external environment, or “outside” and as such are taken to be fixed or exogenous.

The first step is to identify the characteristics. Then a discussion of how to take advantage of them follows.

Swoc summary (1)

STRENGTHS

abundant resources
trust in government
active provinces
concerned public
growth potential
bio-tech clusters

WEAKNESSES

pressure on resources
jurisdictional divisions
ineffective adjustments
uninformed public
insufficient investment
fragmented industry

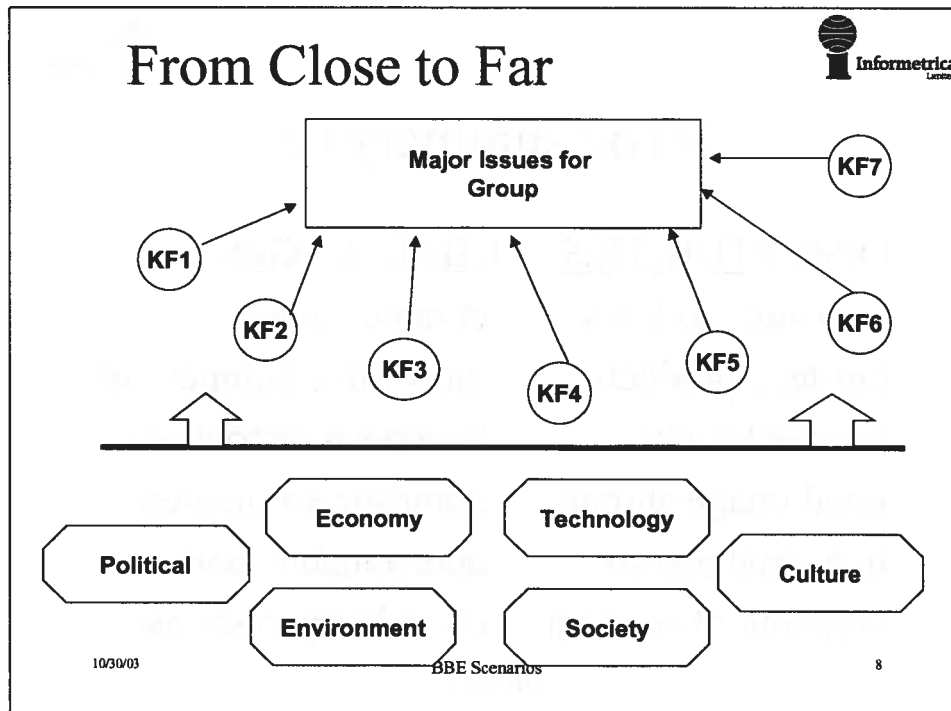
Swoc summary (2)

OPPORTUNITIES

proximity to USA
bio-tech products
bio-feedstocks
good image abroad
industrial growth
greening of economy

CHALLENGES

climate change
innovative competitors
European restrictions
domestic ambivalence
questionable markets
oil industry response



To bring these concepts together, consider the following diagram, and starting with the “major issues” box.

Important issues are for the group to identify. As a starting point we have taken the Bio-based economy (BBE) or “Carbohydrate” economy in Canada.

Key factors (KF) are those that directly impinge on the major issues. Usually there is some possibility of affecting the way in which the key factor affects the issues, or even in choosing different levels of the key factor.

Driving forces in turn affect one or more of the key factors, either directly or in a more roundabout manner. Some of the obvious groupings of driving forces can be considered under the labels of economic, society, culture, political, environmental, and technology,

Other **driving forces** could include international agreements, actions outside of Canada by international organizations, globalization of business decisions, financial system shocks, etc.

NRC Presentation

- Jack Smith

Foresight Scenarios

- 1. Agility Canada - *Canada makes good.*
- 2. Apocalypse Redux (Gaia Strikes Back) - *Environmental and social collapse.*
- 3. Insecure Cocoon - *Crime and terrorism on the upswing.*
- 4. Muddling Along - *Business as usual.*
- 5. O Say can you C (Merger USA) - *Canada becomes a de facto U.S. state.*

More Scenarios

- 6. Techno-Ban - *Backlash against technology.*
- 7. Techno-Ethics - *Life in balance - appropriate and sustainable technology.*
- 8. Techno-Mania - *Anything goes, as long as you can pay for it.*
- 9. Virtual Avatar - *Cyberspace becomes dominant mode of human interaction.*
- 10. You Are What You Invent - *Skunk-works group, designing technology proposals.*

Driving Forces

- Important to Issues at Hand
- Uncertain over Time Frame
- NRC used **bold** to identify DF in each scenario description

Adding Value to the NRC Scenarios

- **Review the Driving Forces**
- **Adoption of Scenarios**
 - **Re-focus on BBE**
 - **Embellish for our use**
- **Renaming Scenarios**
- **Application to Policy**

Driving Forces

<ul style="list-style-type: none">• Society• Culture• Economy	<ul style="list-style-type: none">• Politics• Environment• Technology
--	--

- Distinction between “outside” and “inside” communities
- Predetermined versus uncertainties
- (Hopes and fears for the future)

A general set of categories that help to organize the various driving forces are as above.

In some cases these same driving forces may have different influences inside and outside the country, the community, or the corporation.

Not all driving forces are “uncertain”, or at least, for your specific purposes it will be wise to consider some of the driving forces as “relatively” certain, or “predetermined”. But this decision has as much to do with the issues at hand as it does to any fundamental characteristic of the driving force.

One way to elicit a response from a group is to ask them what their hopes and fears about the future are. One often can identify the major uncertainties, with the fears representing the ‘downside’ and the hopes, the “upside”.

Society

- Immigration
- Aging population, declining birth rates
- Breakdown of transitions (school to work to retirement)
- Intergenerational & gender concerns
- Labour force participation rates
- Reorganization of work
- Learning society - education & training
- Social programs
- Balance between choices and bonds

Culture

- “Global teenager”
- Global culture
- Openness to indigenous culture/teachings
- Natural healing/goods
- Canadian media
- International media
- The Civil Society

Economy

- Fiscal & monetary policies
- Competition policy
- Demand for high skills
- Resource developments
- Rest-of-world growth
- Access to international markets
- Shift of industrial structure towards information & services
- Polarization of incomes and work
- Emphasis on quality products

Politics

- Decentralization & off-loading
- Devolution to local level
- Business & consumer confidence
 - Euphoria or depression
- Constitutional reform
- Unity issue
- Regulatory reform
- Incomes policies
- Public priority to aboriginal issues

Environment

- Actions to reduce:
 - Greenhouse gas emissions
 - Other air emissions (SO_x, NO_x, ozone)
 - Water pollution
 - Solid wastes
- Preservation of wilderness
- Ecology movement
- Depletion of natural resources
- Alternative energy sources
- Limits to growth

10/30/03

BBE Scenarios

19

Will the federal and provincial governments undertake significant measures to reduce greenhouse gas emissions? How about water pollution? Handling of toxic wastes and garbage?

If “global warming” translates into more extremes in weather, will this result in major changes?

If ocean levels rise, will there be a need for massive infrastructure spending along the coasts?

Will demand for “wilderness” affect Aboriginal activities?

Technology

- Productivity growth
- Information technologies
- Globalization of information
- Increased access to learning
- Intellectual property regimes
- Basic Research
- Biotechnology

Biotech Driving Forces

- Intellectual property laws
- R&D (public and private)
- Human Genome Project
- Global research regime
- Public perceptions of bio-hazards
- International developments
- Regulatory approaches
- Success of biotech firms

10/30/03

BBE Scenarios

21

The group considered the driving forces above as the major ones, and then grouped them by major sector (Global, Canadian government, Canadian business, and the Canadian public)

The items marked with three asterisks are those most uncertain, and the dimensions considered in developing the scenarios.

Global

- R&D
- Trade & Commercialization
- Regulatory Regime ***
- International Agreements ***
 - Bio-diversity
 - Bio-safety
- International experiences & consumer confidence ***
- North - South struggles

10/30/03

BBE Scenarios

22

In the past, the US fostered an approach to basic science, made available to the world as a “public good”. But as less basic science is supported by governments and more focus is on building intellectual property rights, the US policy is beginning to change towards an IP regime.

There are also uncertainties about a number of dimensions, anchored in the decisions made by many countries around the world. Large MNCs are constantly pushing for favorable rulings, subsidies, and supports to develop strong property rights from their R&D efforts.

Government - Canadian

- Basic R&D
- Procurement
- Regulatory Efforts ***
 - Science-based
 - Synergy with economic development
 - Specialization

There is uncertainty about the capacity of the federal government to develop a strong, science-based regulatory regime in biotech. If this is done, then it can also help the development of a Canadian industry and provide us with useful “chips” in bargaining for specialization in regulation with other countries.

Basic R&D, publicly funded, is also a potential driving force, allowing for Canada to participate in the world of “public good” research, rather than “lining up” for licensing under intellectual property rights regimes.

Business - Canadian

- **Financing**
 - Investor Confidence
 - Innovative capacity - dynamic
 - Tax, interest rates, ..., knowledge
- **Intellectual Property Regime**
- **Management and skilled HR infrastructure**
- **Access to Markets *****
- **Regulatory Efficiency (\$, Time)**

10/30/03

BBE Scenarios

24

The driving force with most uncertainty was the access to markets in both Canada and abroad for biotech products.

Most other forces were seen as manageable, or likely to be highly correlated with more basic developments.

Public Perceptions ***

- Knowledge base
- Growing skepticism - Ontario Hydro, breast implants, blood system
- Options
- Perceived Benefits
- Binary events
- Sense of Involvement

10/30/03

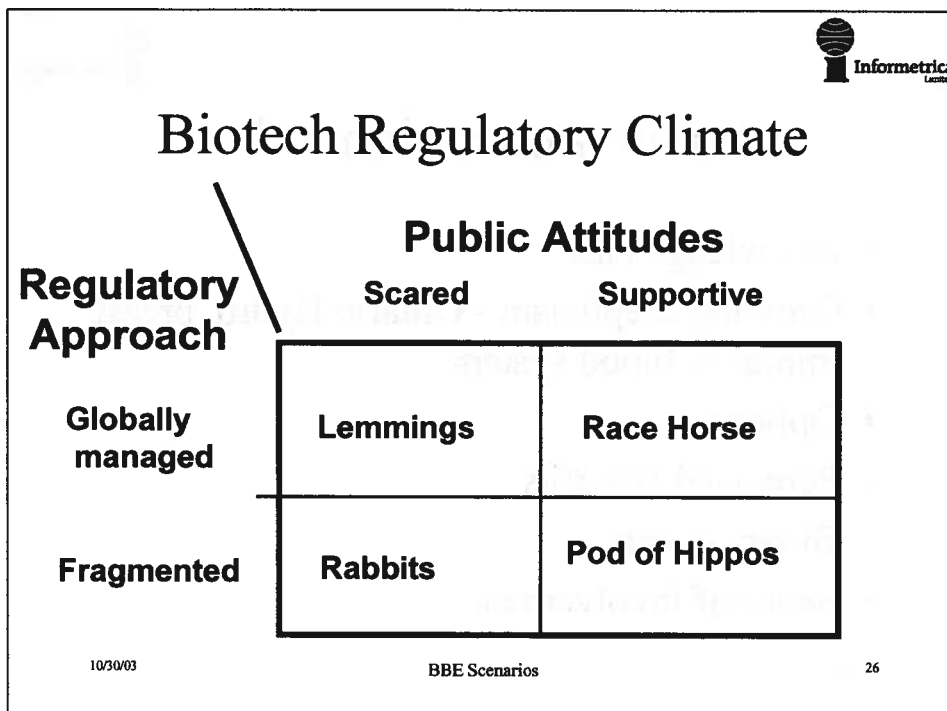
BBE Scenarios

25

Although some public surveys indicate broad public support for biotech, there is a feeling that this support is very thin, and subject to quick evaporation under the glare of one or more public failures or adverse publicity from some of the growing voices of caution.

The extremes are seen as a “visceral” dislike for things biotech at one end, to a broad, evidence-based confidence in most biotech products.

Building such confidence requires confidence in the regulatory system, as well as a good public understanding of the science and safeguards that are employed.



The Issue: How might the biotech regulatory climate evolve, given the uncertainties about regulatory policies and public confidence?

The two main uncertainties used for these scenarios are the nature of the federal regulatory process and the public confidence in biotech.

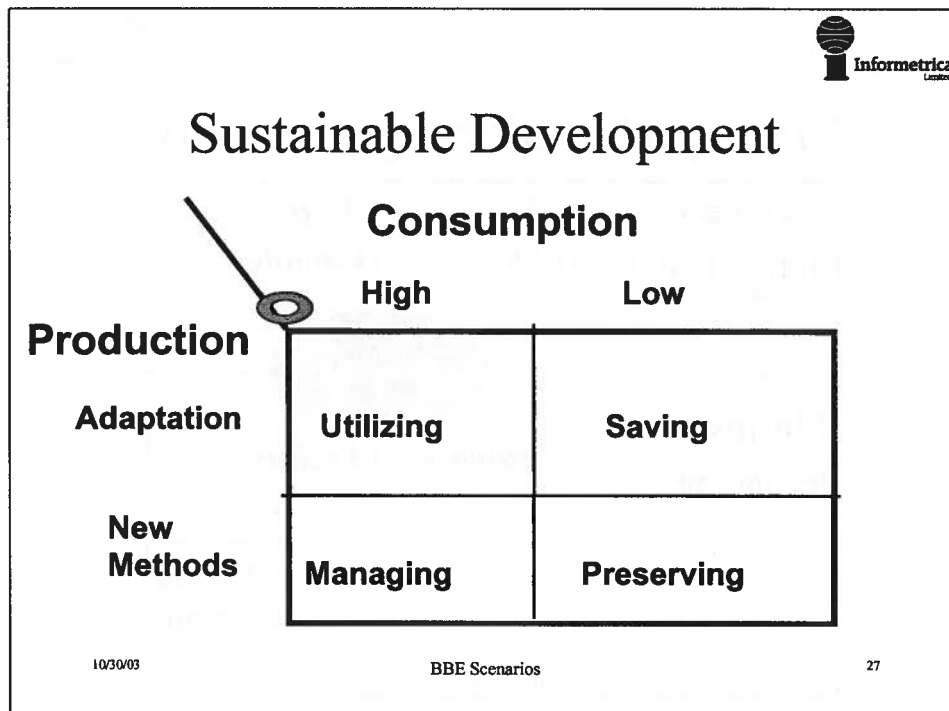
The “names” were assigned by the group, choosing animals as befits a Biotech exercise.

Lemmings - A well-managed regulatory environment, coordinating with international developments, nevertheless runs into public boycotts of some biotech products as a result of the fears about the products, particularly in the food chain. BST remains a controversial product.

Race Horse - Public confidence is high in biotech, fostered by the open processes of governments and the science-based regulatory regime. Although often coordinating with international groups, Canada is perceived as a leader in both the scientific and ethical dimensions of biotech. The Canadian biotech industry benefits from this broad-based public support, both through the financing window and as a result of many young people choosing a career in one of the biotech occupations.

Rabbits - With a scared public and fragmented regulatory approach, each biotech application is “on its own”, with as many failing to become adopted as make it through. Canada is under continued attack from its international trading partners who see the failure to approve products as a trade barrier. At the same time, public attitudes are hostile to new biotech products. Canadian companies find it impossible to raise money, since there is no investor confidence.

Hippo Pod - With public support biotech products take root in Canada, but the adoption rate runs behind that of most countries as federal departments squabble over regulatory responsibilities. There is little growth in biotech exports as most firms have established their bases abroad.



The Issue: "... assumption that sustainability implies that the present environmental risks are regarded as unacceptable and that there is a willingness to make social adjustments." (WRR, p.43)

Nature of adjustments

Utilizing - only minimal adjustments needed; current levels of production and only modest changes to production processes in the longer term are required.

Saving - the solution is to be sought in changing consumption volume or patterns primarily (e.g., reduced energy demand and animal protein)

Managing - the response to current high levels of consumption is to be found in a new technology or switching feedstocks (e.g., new energy sources, biotech, R&D)

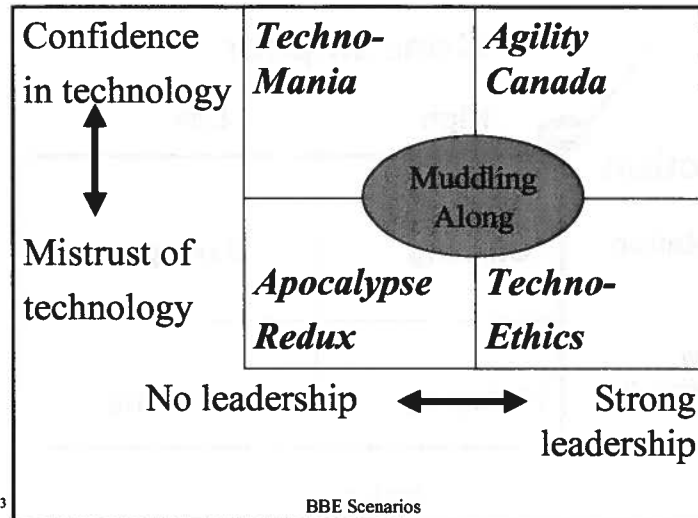
Preserving - Both consumption reductions and changes to the production processes are needed in order to avoid major environmental problems.

(Adapted from WRR, Table 2.1, p.44)

Scientific Council for Government Policy (WRR), **Sustained Risks: a Lasting Phenomenon**, Report #44 (Hague, Netherlands, 1995), pp.205.

The green circle represents the "status quo" or current position. Movement from here is down and to the right.

Mixing & matching scenarios



Five of the NRC scenarios have been juxtaposed to provide one possible context in which to think through possibilities within the BBE as they relate to various federal policy options.

Breakout Session

Sketching In "Learning Scenarios"

- Divide into four working groups
- Each group is assigned one NRC scenario
- Template is distributed and explained
- Groups adapt/extend assigned scenarios
- Groups discuss and fill in templates
- Groups choose person to report scenario

October Meeting Agenda

- Review the New Scenarios
- TOWS to trigger policy ideas
- Using Scenarios
 - Policy robustness
 - Communication
 - Research priorities
- Reports from “Task Forces”

May also want to review the Primer project.