What is this?

This info-mural outlines over 350 milestones needed to achieve a sustainable world in 2050. It also identifies 40 plus "must haves" (the yellow boxes) that are required to be on track for a sustainable 2050." In addition there are approx. 40 High Risks that must not happen if we are to achieve the goals outlined in the Measures of Success at the right hand side of this mural.

How did it get made?

Strategists from 29 of the 200 companies that comprise the World Business Council for Sustainable Development met for 18 months in task forces and small groups to analyze this set of milestones. Then Bob Horn, Stanford University, and CEO of MacroVU® Analytics, who was synthesizer for the project, created this visual info-mural. (hornbob@earthlink.net)

What can you do with it?

Companies, regions, cities, countries, associations are using it for strategic explorations and conversations and public & stakeholder education.

How do I get a printed copy?

Printed & laminated copies (4x14 feet) available from Foresight Canada, foresightcanada@shaw.ca Toll free in North America 1-888-673-3537 1-403-673-3537 voice +1-403-673-2114 fax

Pathway toward a sustainable 2050

World Business Council for Sustainable Development **2010**

VISION 2050: THE NEW AGENDA FOR BUSINESS

Under the WBCSD's Vision 2050 Project, twenty-nine WBCSD member companies developed a vision of a world well on the way to sustainability by 2050 and the pathways leading to that world.

This mural is a basis for visualizing the possible pathways. The mural is meant to provide a tool for discussion, exploration, and developing a common language to help countries, businesses, NGOs, international organizations and individuals assess the degree to which we are on track to accomplishing the vision.

This pathways mural represents just one part of the WBCSD Vision 2050 project. After creating a rough idea of what a sustainable world might look like in our mural containing the 22 elements of the Vision for 2050, we asked the question: what do each of the decades preceding 2050 what would have to be in place for the world to be on track for a sustainable 2050? This process is often called "backcasting." The results are presented here in the form of pathways.

Perhaps the most significant components of the mural are (1) the yellow boxes, which together present a statement of the 40 plus milestones that we believe to be must happen - for the world to reach 2050 in a sustainable way; and (2) the measurement system on the right side of the mural, which creates a kind of prototype for a global dashboard.

The mural presents a large number of interconnected, complex and controversial issues and options. It gives a sense of possible eventualities, not precise predictions. Therefore, the dates, graphs, and numbers are approximations.

This mural is released in the name of the WBCSD. It is the result of an 18-month collaborative effort among representatives from companies and external experts, supported by the WBCSD secretariat. Like other WBCSD projects, Vision 2050 has been developed with participants from locations around the world. Developed in close consultation with the project members and several other consultants/advisors, the mural was reviewed by the project team members to ensure a broad agreement with its principal views and perspectives. However, this does not necessarily mean every member company necessarily endorses or agrees with every statement in the mural. Furthermore, the final version of the mural shall be at the discretion of the readers.

The content of the mural is aligned – as far as possible – with the content of the parallel Vision 2050 report. Perfect alignment is, however, neither possible or desirable due to the different characteristics. Viewers may wish to contact WBCSD for copies of a report.

Project member companies

ABB, Alstom, Anglo American plc, ArcelorMittal SA, Duke Energy Corporation, E.ON AG, Eskom Holdings Limited, Evonik Industries AG, FALCK Renewables S.p.A., Ford Motor Co., Gas Natural SDG, Grupo Nacional Provincial, S.A.B., Holcim Ltd., Hitachi Technologies Limited, Osaka Gas Co. Ltd., PricewaterhouseCoopers LLP, Rio Tinto plc, Royal Philips Electronics NV, Sony Corporation, Skandinavisk ASA, Syngenta International AG, The Shell Group of companies, The Tata Group, Toshiba, The Tokyo Electric Power Company Inc., Toyota Motor Corporation, Unicore, Vattenfall AB, Volkswagen AG, Weyerhaeuser Company

World Business Council for Sustainable Development

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2010s

ENERGY AND POWER - Meet increasing demand while stabilizing global temperature increase to 2 degrees Celsius – equivalent to approx. 450 ppm CO2 in atmosphere

Price of carbon in place, preferably on a global basis. Tax incentives / subsidies drive renewables expansion. Proven commercial viability of CCS.

Required to be on track for 2050: Energy R&D increases rapidly

Required to be on track for 2050: Major collection of international agreements on technology transfer, including mechanisms to diffuse them

Required to be on track for 2050: Carbon has a price - cap & trade or carbon tax begin to transition to a global carbon price of $50/ton

Carbon Prices, R&D and international partnering accelerate. Deployment of concentrated solar power continues into the next decade

Required to be on track for 2050: Carbon sequestration funded for 1 gtpa

Roughly 10 demonstration Carbon Capture & Sequestration (CCS) projects underway to seek size

Policies to increase energy efficiency and reduce energy consumption

Clustering energy subsidies phased out and increased investment in renewables and energy efficiency

Global expansions of renewables & fossil fuels peak

Big risk: Failure to deploy energy efficiency, leading to long term lock-in

Big risk: Failure of global capture sequestration (CCS)

BUILDINGS - Energy efficient and comfortable living and working spaces

Tough energy efficiency regulations begin

Approx. 40% emissions related

40%

Required to be on track for a sustainable 2050: Energy efficiency strategies and building standards

- Revisit international standards periodically to ensure continuous improvement
- Ensure that standards are enforced, that compliance and enforcement is the most cost-effective policy
- Measure and improve compliance rates
- Common standards set to discourage trade in sub-efficient appliances.

Mainstream learnings from first experiment of zero-carbon, net-positive buildings and communities

Retrofitting of city infrastructure becoming global mega-industry as move to urban centers

Tax incentives and subsidies beginning to enable energy-efficiency investments with longer payback periods

Building energy efficiency policies in most OECD countries

Integrated building design practices between developers, contractors etc. Integrated design practices are the norm

MOBILITY - Low carbon

R&D and more deployment for low carbon mobility

Required to be on track for a sustainable 2050: Transport R&D and deployment

- Support for advanced combustion vehicles (hybrid and plug-in hybrid electric vehicles, clean diesel and gasoline vehicles, natural gas vehicles, and 2nd generation biofuels)
- Support for R&D and deployment of 2nd and 3rd generation biofuels
- 2012 Policy to Hybrid Electric Vehicles (PHEV)

Required to be on track for a sustainable 2050: Transport energy efficiency strategies

- In addition to vehicle efficiency, policies for safety and freight logistics and regulations and standards

Required to be on track for a sustainable 2050: Transport energy efficiency strategies

- Policies to support the deployment of advanced vehicles and fuels
- Standards set for medium and heavy duty vehicles
- Incentives set for hybrid and plug-in hybrid vehicles

Fossil-fuel use begins to drop

Major initiatives to increase city & urban transport efficiency, including integrated urban planning, transit oriented planning, bus rapid transit, and non-motorized transport

Sustainable biofuel production ramps up to meet demand for aviation, marine and land transport

Urban planning principles and practices are used to address patterns of development and cities

Global standards regime for energy efficiency of appliances

Big risk: Insufficient growing area available for biofuels

Big risk: Major open-cycle ecotoxicity

MATERIALS - Closed-loop society

Accounting standards begin

Manufacturing processes more than one third of all CO2 emissions. Significant potential for half of those emissions: Chemicals and petrochemicals also make significant contributions

Required to be on track for a sustainable 2050: Accounting standards and indicators & rules for accounting for the sustainable use of materials. These make establish the true cost of primary and secondary materials

Global business begins to reduce product waste in packaging & products

Validation of Cradle to Cradle approach

Application Carbon Storage for Industrial Processes is complex

Required to be on track for a sustainable 2050: New landfill regulations begin to set standards for landfill gas capture & reuse

Major CO2 reduction on the way

Significant changes during this decade - Cement - Steel - Petrochemicals - Pulp & paper

Countries and individual companies and users more sensitive to material use

Big risk: Peak oil brings high prices before a renewables transition

GLOBAL ECONOMY, FINANCE, & BUSINESS MODELS - Transform contemporary industrial capitalism into sustainable capitalism

Internalize carbon costs

Externalities internalized and monetized. Companies and consumers internalize this risk and opportunity decision-making. These accounting changes will require new international standards and common systems on ecosystem services.

Required to be on track for a sustainable 2050: Technology transfer to developing countries

Global agreement on carbon emissions reductions of more than 50% of CO2 and other emissions

Thanks to a global carbon price, technology transfer to developing countries is in full swing

Global Accounting standards

Major Global Economic Depression

Significant changes during this decade - Finance - Insurance - Banks - Investment - Internalization of cost of CO2 and other GHG effects on decisions

Big risk: Failure to achieve a global carbon price regime

2020s

GOVERNANCE - Enable transformations in global economy and planetary sustainability by 2050

Growing awareness of need to cooperate

Big risk: Failure of international governance to emerge

Big risk: Failure rise of networks increases

Big risk: Failure of drug and crime organizations

A rules-based system is set in motion to limit the number of countries that can withdraw from the Kyoto Protocol to once per quarter/year

Cyclo-possibly in the decade - Russia, China, and the European Union to protect their interests in the Arctic - Control of Africa from Sahara desert to Cape of Good Hope

Big risk: Failure of governance to collaborate in increasingly fragmented world

PEOPLE: VALUES, BEHAVIOURS, AND DEVELOPMENT - Well on the way to meeting basic needs of all people by 2050

Eco-awareness spreads rapidly

Universal primary and secondary education has been achieved in all countries, with replacement levels. More women educated and engaged in economic activities, leading to improved health of women and their children

Eco-aware consumers lead the way in a shift to sustainable and low-carbon lifestyles, resource efficiency, ecological and social responsibility. Companies and industrial sectors with business, community needs, and global resilience

"Are people and planet" becomes the mantra for business and consumers

If not NOW, WHEN?

Sometime during this decade

Required to be on track for a sustainable 2050: Education for sustainable development

Many educational systems incorporate sustainability, ecosystem services, and incorporate the concept of natural capital. Many companies in mainstreaming those services into curricula

Big risk: Failure to achieve universal education

AGRICULTURE - Feed 9 Billion People by 2050

Doubling & tripling of yields

Required to be on track for a sustainable 2050: To feed 9 billion people by 2050, crop yields must increase by 2.2 times in developing countries and 1.4 times in developed countries. Agricultural expansion limited to about 5 million hectares per year

Increasing knowledge of agriculture's contributions to climate change and impacts on ecosystems

Asian, Pacific water efficiency doubles

Russia & Ukraine triple wheat yield via improved agricultural practices

Increase yields for all major staples crops in most regions, except Europe

Big risk: Failure to increase yields

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

FOREST - Sufficient timber and fuel for 9 billion people by 2050 while reducing carbon emissions significantly

Global action on deforestation

Required to be on track for a sustainable 2050: Reduction of deforestation by 50% by 2030 and by 100% by 2050 (including the Reducing Emissions from Deforestation and Forest Degradation (REDD) mechanism)

Carbon Capture & Storage for Industrial Processes

Planted forest area: 140 M hectares

Natural forest area: 3,600 M hectares

Increased demand for fuel, timber, materials and other products

Increased demand for fuel, timber, materials and other products

Major breakthroughs in forest biotechnology

Modified forests planted rapidly for a tree level of carbon stored for various commercial purposes, thus providing another carbon bank.

Harvesting from modified forests as well as from natural forests that can be sustainably managed for primary products

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

ECOSYSTEMS & BIODIVERSITY - Maintain and restore

Natural literacy spreads

Required to be on track for a sustainable 2050: Donor countries increase the investment in biodiversity to 0.1% of GDP to begin to grow the global conservation base and reward biodiversity protection. This provides the kind of protection that the market can not provide alone

Required to be on track for a sustainable 2050: Payments for ecosystem services

Habitats enlarged, enhanced and protected

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

2030s

ENERGY AND POWER

Rapid scale-up of renewables

Big risk: Failure of energy efficiency, leading to long term lock-in

Big risk: Failure of global capture sequestration (CCS)

New energy mix in place

Big risk: Peak oil happens before alternatives fully deployed

Big risk: Major open-cycle ecotoxicity

BUILDINGS

Global standards

Countries completing the mandatory energy efficiency of all appliances

Energy-saving behaviors as a cultural norm become common across many countries

Urban planning principles and practices are used to address patterns of development and cities

Global standards regime for energy efficiency of appliances

Strict enforcement

Building energy codes for new buildings are strictly enforced

All appliances manufactured are efficient

Real-time adaptive management by computers run many urban systems

Significant proportions of building heat and electricity needs being generated on site

MOBILITY

Fossil-fuel use begins to drop

Hydrogen-powered vehicles begin to factor in the marketplace

Vehicles electric: air & shore using sustainable biofuels

Access to mobility is improved for the one billion people in rural areas who lack it

High speed electric rail has begun to replace short-haul flights in most developed countries

Liberalization of the rail sector and open access to infrastructure

Rapid transition to renewable fuels

Rapid transition to renewable fuels

Consumers have instantaneous, accurate, and transparent information on vehicle performance

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

MATERIALS

Advanced materials design common

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Closed loop manufacturing common

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Social value in business

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Hyper-innovative economy

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

GLOBAL ECONOMY, FINANCE, & BUSINESS MODELS

Global accounting standards

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

2030s

GOVERNANCE

Global coordination spreads

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Widespread implementation of solutions

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Coordination for a safer planet

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

PEOPLE: VALUES, BEHAVIOURS, AND DEVELOPMENT

Urgency drives education

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

New eco-awareness lifestyles

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Massive shift in values

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

AGRICULTURE

Eco-footprint standards developed, spread

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

More yields double

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Yield targets close to achievement

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

FOREST

Wood prices incorporate carbon

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Deforestation reduced significantly

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Plentiful sustainable forest products and services

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

ECOSYSTEMS & BIODIVERSITY

Habitats enlarged, enhanced and protected

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Sustainable management of habitats

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

Earth's regenerative capacity improves

Big risk: Failure to achieve new forestry practices

Big risk: Failure to achieve new agricultural practices

2040s

ENERGY AND POWER

BUILDINGS

MOBILITY

MATERIALS

GLOBAL ECONOMY, FINANCE, & BUSINESS MODELS

GOVERNANCE

PEOPLE: VALUES, BEHAVIOURS, AND DEVELOPMENT

AGRICULTURE

FOREST

ECOSYSTEMS & BIODIVERSITY

2050 - MEASURES OF SUCCESS

ENERGY AND POWER

BUILDINGS

MOBILITY

MATERIALS

GLOBAL ECONOMY, FINANCE, & BUSINESS MODELS

GOVERNANCE

PEOPLE: VALUES, BEHAVIOURS, AND DEVELOPMENT

AGRICULTURE

FOREST

ECOSYSTEMS & BIODIVERSITY