



Vision 2050

The new agenda for business
in brief



About *Vision 2050*

This is a brief synthesis of the full Vision 2050: The New Agenda for Business report. It provides a quick overview of the Vision 2050 findings while the longer report provides more detailed information on the actions needed to get to our vision for 2050 and the opportunities this presents for business. This brief report follows the content structure of the longer report, starting with a Message from the co-chairs and an Executive summary followed by the Business-as-usual Outlook, the Vision, Pathway, Opportunities and Conclusion.

Under the *Vision 2050* project of the World Business Council for Sustainable Development (WBCSD), 29 WBCSD member companies developed a vision of a world well on the way to sustainability by 2050, and a pathway leading to that world – a pathway that will require fundamental changes in governance structures, economic frameworks, business and human behavior. It emerged that these changes are necessary, feasible and offer tremendous business opportunities for companies that turn sustainability into strategy.

The *Vision 2050* project addresses three questions: What does a sustainable world look like? How can we realize it? What are the roles business can play in ensuring more rapid progress toward that world?

Vision 2050 is the result of a collaborative effort. The project was governed by four co-chair companies, and the content

developed by 29 companies through working with each other, with hundreds of representatives from business, government and civil society, with regional partners and with experts. It also builds on WBCSD reports and work done by others. This brief report is complemented by murals, presentation decks and a toolkit. The *Vision 2050* work provides a basis for interaction with other enterprises, civil society and governments about how a sustainable future can be realized. We hope to challenge companies to rethink their products, services and strategies, envisioning new opportunities that put sustainability at the center, to communicate with and motivate employees and their boards, and to develop leadership positions in the wider world. We invite governments to consider the policies and regulations needed to guide and organize society and give markets incentives to move toward sustainability, and people to make a difference in their daily lives.

A platform for dialogue – not a blueprint

Vision 2050 does not offer a prescriptive plan or blueprint but provides a platform for dialogue, for asking questions. Its highest value may be in our narrative of the gap between *Vision 2050* and a business-as-usual world, and the queries and dilemmas it raises.

For business and others, the biggest unanswered questions are “How do we get there?” “What form of

governance will make the changes needed happen at the speed and scale required?”

On these issues, we indicate our willingness, support and leadership, and invite all stakeholders – business, government and civil society – to join the exploration and effort.

Project co-chairs

Samuel A. DiPiazza Jr.,
PricewaterhouseCoopers
Idar Kreutzer, Storebrand
Michael Mack, Syngenta
International
Mohammad A. Zaidi, Alcoa

Project member companies

Accenture, Alcoa, Allianz, ArcelorMittal, The Boeing Company, Duke Energy Corporation, E.ON, Eskom, Evonik Industries, FALCK Group, Fortum Corporation, GDF SUEZ, GrupoNueva, Holcim, Infosys Technologies, Osaka Gas Co., PricewaterhouseCoopers, The Procter & Gamble Company, Rio Tinto, Royal Philips Electronics, Sony Corporation, Storebrand, Syngenta International, The Tokyo Electric Power Company, Toyota Motor Corporation, Umicore, Vattenfall, Volkswagen, Weyerhaeuser Company

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Per Sandberg, Project Director
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Message from the co-chairs

Many of the 29 WBCSD member companies that have laid out this vision have been operating for more than a century and have seen the future come and go, many times. As business leaders, we are used to planning for the future and making assumptions about what it will be like.

But never before has the future held as many questions, and with such serious consequences depending on the answers. And never before has the shape of the future depended so much on what we – business, government, citizens – do today.

The *Vision 2050* project has been a collaborative effort among the 29 companies, supported by the WBCSD secretariat, the wider business community and regional network partners around the world, in mapping out not what we think will be, nor what we fear will be, but what could be. Given the megatrends of climate change, global population growth and urbanization, and given the best

efforts of business, governments and society, *Vision 2050* is a picture of the best possible outcome for the human population and the planet it lives on over the next four decades.

In a nutshell, that outcome would be a planet of around 9 billion people, all living well – with enough food, clean water, sanitation, shelter, mobility, education and health to make for wellness – within the limits of what this small, fragile planet can supply and renew, every day.

This vision is supported by a pathway, nine key areas of action, and “must haves” that will need to be navigated to achieve it.

The best news is that we found the pathway and its elements marked by massive opportunities: to do more with less, to create value, to prosper, and to advance the human condition. For us, these are a key takeaway, because, at the fundamental level, opportunity is what makes business grow

and prosper. And many of these opportunities will be in emerging markets.

An equally firm finding is that business-as-usual cannot get us to sustainability or secure economic and social prosperity; these can be achieved only through radical change, starting now. To play its role, business will still need to do what business does best: innovate, adapt, collaborate and execute. These activities will change along with the partnerships that we form with other businesses, governments, academia and non-governmental organizations in order to get it right for all. And we must get it right.

We would like to thank our colleagues in the member companies who worked so hard and skillfully in producing this report, and to thank the members of the WBCSD secretariat and the many consultants, experts and regional contributors who supported and advised us.



Samuel A. DiPiazza
CEO, PricewaterhouseCoopers
(Retired)



Michael Mack
CEO, Syngenta



Idar Kreutzer
Group CEO, Storebrand



Dr. Mohammad A. Zaidi
EVP and CTO, Alcoa

Executive summary

In 2050, around 9 billion people live well, and within the limits of the planet

Just 40 years from now, some 30% more people will be living on this planet. For business, the good news is that this growth will deliver billions of new consumers who want homes and cars and television sets. The bad news is that shrinking resources and potentially changing climates will limit the ability of all 9 billion of us to attain or maintain the consumptive lifestyle that is commensurate with wealth in today's affluent markets.

In the WBCSD's *Vision 2050* project, 29 global companies representing 14 industries tackled this dilemma. They developed a vision, based on dialogues in 20 countries with several hundred companies as well as experts, of a world on-track toward sustainability by 2050. This will be a world in which the global population is not just living on the planet, but living well and within the limits of the planet. By "living well", we are describing a standard of living where people have access to and the ability to afford education, healthcare, mobility, the basics of food, water, energy and shelter, and consumer goods. By "living within the limits of the planet", we mean living in such a way that this standard of living can be sustained with the available natural resources and without further harm to biodiversity, climate and other ecosystems.

At first this Vision may read like a utopian ideal, considering how far it seems to be from the world of today. But that is neither the intention of this report, nor the reality. With or without *Vision 2050*, life in 2050 will be radically different for all of us. *Vision 2050* is the best available star to steer by today, based on the observations, projections and expectations of the companies and experts who contributed to this effort. This guiding star is an attempt to help leaders across governments, businesses and civil society avoid repeating mistakes of the past – making decisions in isolation that result in unintended consequences for people, the environment and planet Earth. *Vision 2050* seeks to provide a common understanding so leaders can make the decisions that deliver the best outcomes possible for human development over the next four decades. It is also a platform for ongoing dialogue, so we can continue to raise the important questions we must answer in order to make progress in this uncharted territory.

Attaining the Vision: The pathway

A pathway was developed and nine elements of this pathway detailed to connect this sustainable future with the present. The goal was to see what a real, global attempt at sustainable development – with all the radical policy and lifestyle changes this would entail – would mean for business and markets in general and for the individual participating sectors. The elements

of the pathway demonstrate that behavior change and social innovation are as crucial as better solutions and technological innovation. All types of ingenuity will be needed over the next 40 years. Although distinct, the elements also show the interconnectedness of issues such as water, food and energy – relationships that must be considered in an integrated and holistic way, with tradeoffs that must be understood and addressed.

The critical pathway includes:

- Addressing the development needs of billions of people, enabling education and economic empowerment, particularly of women, and developing radically more eco-efficient solutions, lifestyles and behavior
- Incorporating the cost of externalities, starting with carbon, ecosystem services and water
- Doubling of agricultural output without increasing the amount of land or water used
- Halting deforestation and increasing yields from planted forests
- Halving carbon emissions worldwide (based on 2005 levels) by 2050, with greenhouse gas emissions peaking around 2020 through a shift to low-carbon energy systems and highly improved demand-side energy efficiency
- Providing universal access to low-carbon mobility
- Delivering a four-to-tenfold improvement in the use of resources and materials.

“Humanity has largely had an exploitative relationship with our planet; we can, and should, aim to make this a symbiotic one.”

Michael Mack, Syngenta

Making these changes – and more – will enable us to consume just over one planet’s worth of ecological resources in 2050, as opposed to the 2.3 planets we will be using if we continue on the business-as-usual path we are on today.

Vast opportunities

The transformation ahead represents vast opportunities in a broad range of business segments as the global challenges of growth, urbanization, scarcity and environmental change become the key strategic drivers for business in the coming decade. In natural resources, health and education alone, the broad order of magnitude of some of these could be around US\$ 0.5-1.5 trillion per annum in 2020, rising to between US\$ 3-10 trillion per annum in 2050 at today’s prices, which is around 1.5-4.5% of world GDP in 2050.

Opportunities range from developing and maintaining low-carbon, zero-waste cities, mobility and infrastructure to improving and managing biocapacity, ecosystems, lifestyles and livelihoods.

Enabling these changes will also create opportunities for finance, information/communication technology and partnerships. There will be new opportunities to be realized, different external priorities and partners to be engaged and a myriad of risks to navigate and adapt to. Smarter systems, smarter people, smarter designs and smarter businesses will prevail.

A radical new landscape for business

There will be a new agenda for business leaders. Political and business constituencies will shift from thinking of climate change and resource constraints as environmental problems to economic ones related to the sharing of opportunity and costs. A model of growth and progress will be sought that is based on a balanced use of renewable resources and recycling those that are not. This will spur a green race, with countries and business working together as well as competing to get ahead. Business leaders will benefit from this change by thinking about local and global challenges as more than just costs and things to be worried about, and instead using them as an impetus for investments that open up the search for solutions and the realization of opportunities.

The transformation will bring with it huge shifts in terms of regulation, markets, consumer preferences, the pricing of inputs, and the measurement of profit and loss; all of which will impact business. Rather than follow change, business must lead this transformation by doing what business does best: cost-effectively creating solutions that people need and want. The difference is that the new solutions will be based on a global and local market place with “true values and costs”, the “truth” being established by the limits of the planet and what it takes to live well within them. Business, consumers and policy-makers will experiment,

and, through multi-stakeholder collaboration, systemic thinking and co-innovation, find solutions to make a sustainable world achievable and desirable. This is opportunistic business strategy at its best.

Business leaders must also run their companies successfully under present framework conditions while helping to lead society toward the new framework conditions of sustainability, working closely with political and social leaders in doing this. It will mean new partnerships for business with governments and civil society groups and more systemic thinking and approaches to manage challenges and opportunities such as a doubling of urban populations by 2050. Business leaders will need to manage companies through unprecedented transformational change, in parallel with governments getting the right policies and incentives in place.

It can be done

The participating companies strongly believe that the world already has the knowledge, science, technologies, skills and financial resources needed to achieve *Vision 2050* but the foundations for much of what is required will need to be laid at speed and scale in the next decade. At the same time, the map is far from complete. There are still many significant questions to be answered about governance, global frameworks for commerce, roles and responsibilities, and risks. Nevertheless, these can be answered in time for progress to be made.

Business-as-usual outlook to 2050

We have what is needed to live well, within the limits of the planet: the scientific knowledge, proven and emerging technologies, financial assets and instant communications. Nevertheless, today our societies are on a dangerously unsustainable track. The story is one of growth in populations and consumption (in most countries) compounded by inertia stemming from inadequate governance and policy responses necessary to manage this growth. The result is degradation of the environment and societies.

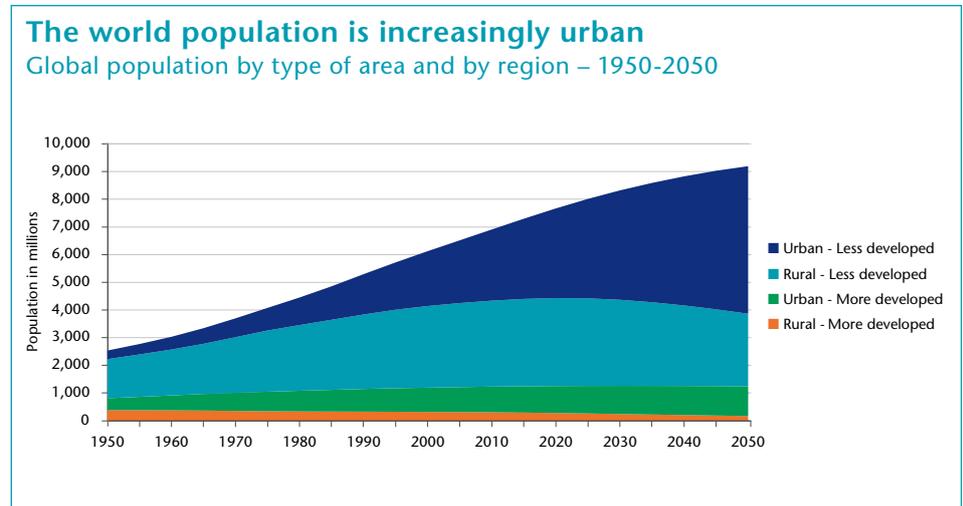
Growth: Population, urbanization and consumption

Between now and 2050 the global population is expected to increase from 6.9 billion to more than 9 billion, with 98% of this growth happening in the developing and emerging world, according to UN estimates. The global urban population will double. Meanwhile, populations are aging and stabilizing in many developed countries. Local demographic patterns will become increasingly diverse.

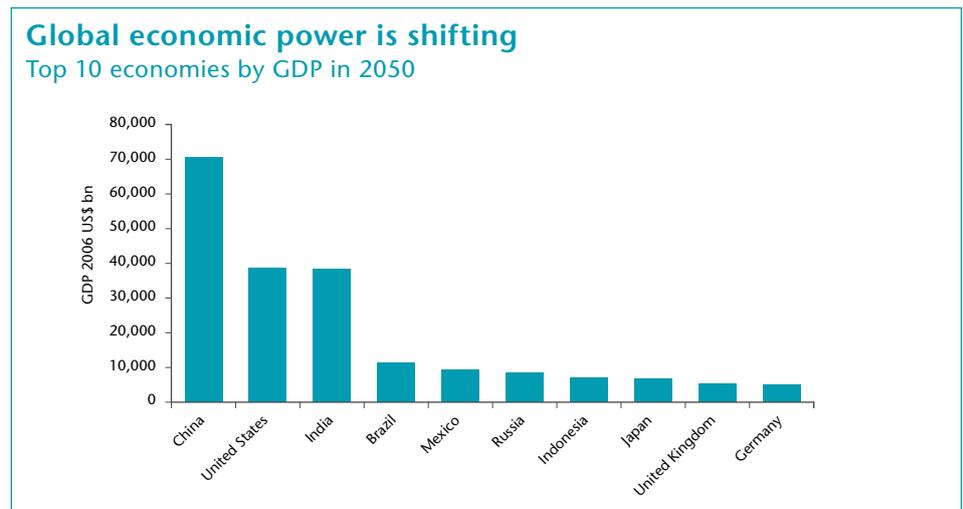
There have been improvements in recent decades in terms of economic growth in many parts of the world, as well as in areas such as infant and maternal mortality, food supply, and access to clean water and education. However, extreme poverty continues to persist.

Most of the economic growth will happen in developing or emerging economies. Many people will be moving up the economic ladder toward a middle class standard of living,

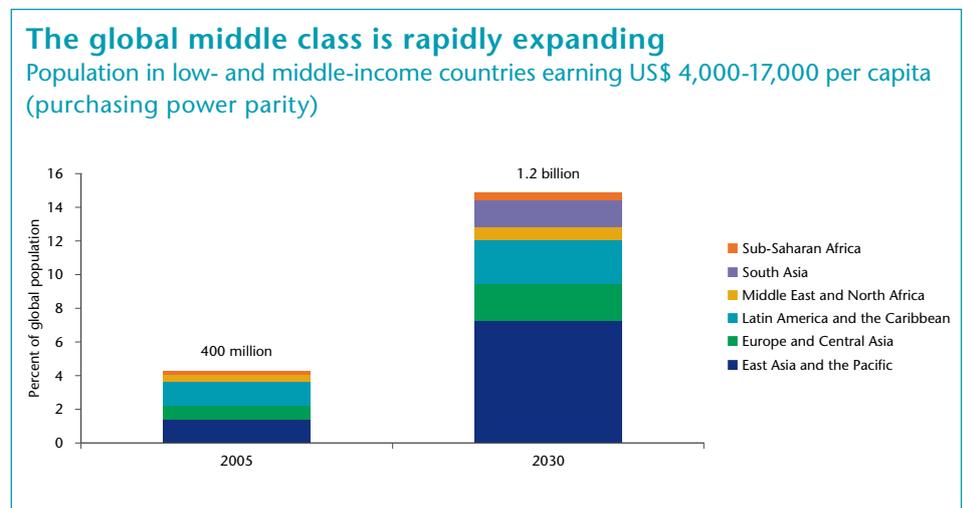
Figure 1: Outlook to 2050 – Growth



Source: UN Population Division, *World Population Prospects: The 2008 Revision*, 2008

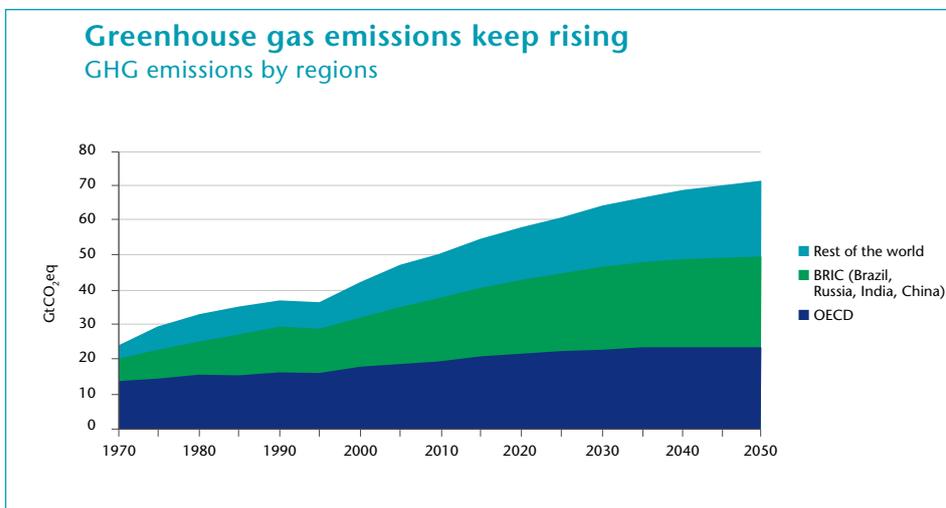


Source: Goldman Sachs, *BRICs and Beyond*, 2007

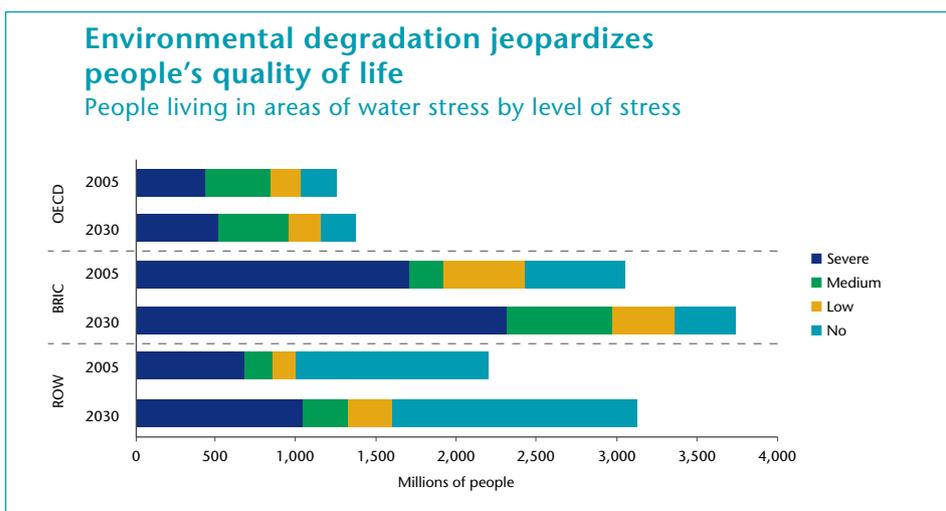


Source: World Bank, *Global Economic Prospects*, 2007

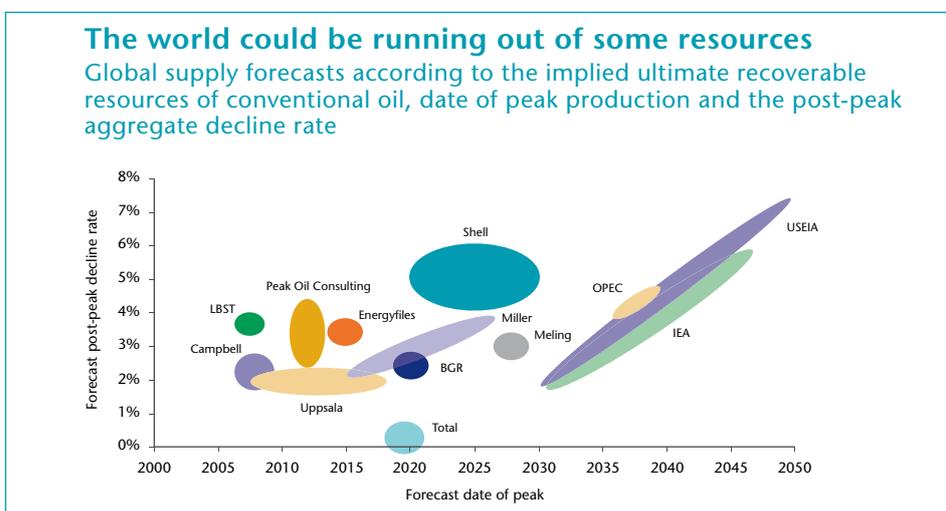
Figure 2: Outlook to 2050 – Degradation



Source: OECD, *Environmental Outlook to 2030*, 2008



Source: OECD, *Environmental Outlook to 2030*, 2008



Source: UKERC, *The Global Oil Depletion Report*, 2009

consuming many more resources per capita. As this growth and development takes place, substantial changes will be required in all countries in order for 9 billion people to live well, within the limits of one planet by 2050.

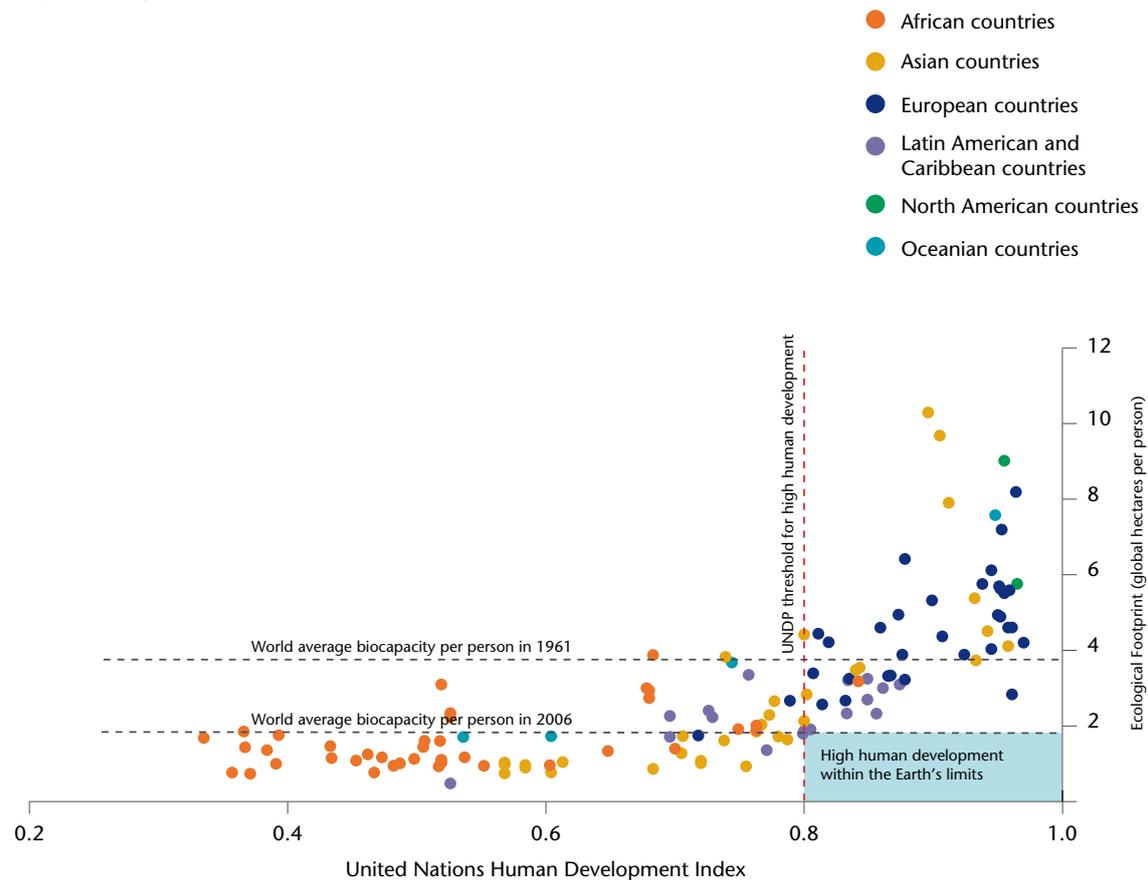
Inertia and inadequate governance

The governance and policy responses to manage this growth often happen in silos and are limited by short-term, localized political pressures, and thus fall short of the level of commitment needed to make significant progress. In addition, the choices countries, companies, communities and individuals make are often characterized by inertia due to short-term goals and self interest. Continuing to invest in polluting or energy-inefficient types of infrastructure and opting for high-footprint consumer lifestyle preferences are examples of such choices that perpetuate the status quo.

Degradation: Climate change and deteriorating ecosystems

The Millennium Ecosystem Assessment found that 15 of the 24 ecosystem services they evaluated have been degraded over the past half century. A rapid and continuing rise in the use of fossil fuel-based energy and an accelerating use of natural resources are continuing to affect key ecosystem services, threatening supplies of food, freshwater, wood fiber and fish. More frequent and severe weather disasters, droughts and famines are also impacting communities around the world.

Box 1: Meeting the dual goals of sustainability – High human development and low ecological impact



© Global Footprint Network (2009). Data from Global Footprint Network National Footprint Accounts, 2009 Edition; UNDP Human Development Report, 2009

The chart sums up the challenge of sustainable development: meeting human demands within the ecological limits of the planet. It is a snapshot showing how different countries perform according to the United Nations Development Programme's (UNDP) Human Development Index (HDI) and Global Footprint Network's Ecological Footprint. In countries to the left of the vertical line marking a score of less than 0.8 on the HDI, a high level of development, as defined by UNDP, has not been attained. Countries above the horizontal dotted line and to the right of the vertical line have achieved a high level of development but place more demand on nature than could be sustained if everyone in the world lived this way.

In order to move toward a sustainable future the world will need to address all dimensions of this chart – the concepts of success and progress, the biocapacity available per person, as well as helping countries either improve their levels of development or reduce their ecological impact (several countries face both challenges). In *Vision 2050* we have identified five types of major changes that will be required:

1. Buy into the vision: accept the constraints and opportunities of a world in which 9 billion people live well and within the limits of the planet
2. Redefine success and progress at national, corporate and individual levels
3. Get more out of the planet by increasing bioproductivity
4. Develop solutions to lower ecological impacts while maintaining quality of life in countries that have high human development but are overusing ecological capacity
5. Improve levels of human development in countries below the threshold for high human development without increasing their ecological impact beyond acceptable limits.

"Vision 2050 lays out the challenges, pathway and options that business can use to create an opportunistic strategy, both regionally and globally, that will lead to a sustainable world."

Mohammad A. Zaidi, Alcoa



The Vision

In 2050, some 9 billion people live well, and within the limits of the planet. The global population has begun to stabilize, mainly due to the education and economic empowerment of women and increased urbanization. More than 6 billion people, two-thirds of the population, live in cities. People have the means to meet their basic human needs, including the need for dignified lives and meaningful roles in their communities.

Diversity and interdependence

Countries and cultures remain diverse and heterogeneous, but education through secondary school and universal connectivity have made people more aware of the realities of their planet and everyone on it. The “One World – People and Planet” ideal is embedded and practiced globally, emphasizing interdependence among all people and dependence on the Earth. There are still conflicts, disasters, shocks, crime and terrorism, but societies are resilient, able to withstand disruption and quickly recover.

People, companies and governments are forward looking, problem solving, resilient and experimental – understanding that security is achieved through working together and adapting rapidly in a fast-changing world.

A different economic reality

Economic growth has been decoupled from ecosystem destruction and material consumption, and re-coupled with

sustainable economic development and societal well-being. Society has redefined the notion of prosperity and successful lifestyles, as well as the bases of profit and loss, progress and value creation to include more long-term considerations such as environmental impacts and personal and societal well-being.

The global economic landscape also looks different from that of the turn of the century. The term “developing country” is rarely used, as most economies are either developed or emerging. Asian and American countries and companies play a more significant role in and influence the norms of international trade, finance, innovation and governance alongside a few of the nations that have established their success in the previous 100 years. Multiple perspectives are integrated. Capital, ideas, best practices and solutions disseminate in all directions.

Multi-partner governance

Nations and the roles of governments continue to evolve. Governance systems skillfully make decisions at the most appropriate local level. Nations “pool sovereignty” where necessary to manage international systems and challenges such as disease, climate, water, fisheries, conflicts and commons. They encourage local governance and connect neighborhoods to a mosaic of partners, be they grassroots groups or international organizations, to help local groups manage issues like adaptation to climate change and

access to water and sanitation. Much governance happens at community, city and regional levels. It is a complex yet efficiently connected world.

In markets: Innovating and deploying solutions

Governance also enables and guides markets by clarifying limits and establishing frameworks that promote transparency, inclusiveness, internalized externalities, and other characteristics of sustainability. These systems define targets, create a level playing field and eliminate barriers, enabling business to innovate and to develop and deploy solutions. For business, this level playing field means that true values, including externalities such as environmental impact and the benefit of ecosystem services, are built into the marketplace for all competitors. Reward systems recognize sustainable behavior and as a result business can deliver solutions that are both sustainable and competitive. Consumers can choose sustainable products not just because they are sustainable but because they deliver better value.

Dealing with climate change

Society prepares for, and adapts to, climate change; this adaptation is achieved largely through joint efforts between different countries and communities. Integrated and systemic approaches are used to manage agriculture, forestry, water and urban transport, energy and communications.

Efforts to mitigate further changes in climate continue. Harmful emissions have been significantly reduced and a low-carbon society has been enabled through the efficient use of clean energy and resources.

Circular, closed-looped and networked designs that help people to live well, within one planet drive successful industry and reduce the need for primary resource extraction. Closed-loop systems make the concept of waste obsolete. They use waste as an input and resource, eliminating waste accumulation on land, in air or in water. Used products and materials can be reengineered to function again for multiple and distinct purposes or reduced to raw materials for manufacturing other products.

The efficient use of materials, including waste and pollution management, is many times greater than at the turn of the century, enabled by collaboration and knowledge sharing. Improvements in areas such as water consumption efficiency and reuse, energy, wastewater treatment, forest management and agriculture keep humanity on track toward living within the carrying capacity of the planet. Ecosystem degradation has been reversed, and ecosystem services are valued, maintained and enhanced; biodiversity is being better managed, is flourishing, and continues to enable societies to prosper.

An evolved workplace and evolved employers

The leading companies are those that, through their core businesses, help society manage the world's major challenges. They have worked through the radical transformation of both internal corporate values and external market restructuring that has occurred in the four decades leading up to 2050, a transformation that many other companies have not survived but in which multitudes of new ones have been spawned.

As survivors, these companies are more flexible, more adept at engaging with diverse partners and customers, and more skilled at responding to rapid changes on all fronts. As operations, they have demonstrated a focused and proactive culture of eliminating energy and materials waste. They have discovered that this circular, closed-loop culture not only reduces pollution: it also makes them more collaborative and competitive. As employers, these businesses have helped train and develop a more creative society that is better able to manage the conflicting challenges of creating and maintaining sufficient jobs while improving labor productivity. Training has also resulted in a sufficient pool of talent available to implement the changes needed. People, as employees, have learned to be more flexible too, and to move easily to where jobs exist.

Pathway to 2050

A pathway is a set of descriptions that illustrates the transition to a certain scenario, in this case *Vision 2050*. The pathway outlined in this chapter gives a macro perspective of the move toward a more sustainable world. Nine elements of this pathway, or critical areas in which actions need to be taken over the next four decades, provide a more detailed picture. The nine areas covered are values and behaviors, human development, economy, agriculture, forests, energy and power, buildings, mobility and materials. The pathway and its elements neither prescribe nor predict, but are plausible stories the companies have created by “backcasting”, working back from the vision for 2050 and identifying the changes needed to reach it.

We see two timeframes: the Turbulent Teens, from 2010 to 2020, and Transformation Time, from 2020 to 2050. The Turbulent Teens is a period of energy and dynamism for the global vision of sustainability. It is a formative decade for the ideas and relationships that will take place in the 30 years to follow.

From 2020 to 2050, the traits formed during the first decade mature into more consistent knowledge, behavior and solutions. It is a period of growing consensus as well as wrenching change in many parts of society – climate, economic power, population – and a time for fundamental change in markets that redefines values, profits and success.

Turbulent Teens (2010-2020): Crisis, clarity, action

The global financial crisis at the end of the previous decade rocks people’s faith in business and governments, spurring a quest for renewal of trust and cooperation. This takes the form of a mix of new alliances to rebuild trust and find answers to many of the tough questions society faces (see box 2). Government, academia, business and a range of stakeholders, including society, work closely together on trade and economic development, the design of systems and metrics to measure progress, climate change solutions, technology deployment, improving forest and farm yields, urban renewal, health and education, and shifting values and behaviors toward sustainability.

During this period, it becomes clear that swift, radical and coordinated actions are required at many levels, by multiple partners. This new sense of urgency helps establish the conditions needed to move global growth onto a more sustainable path. Crucial among these is a carbon price and a network of linked emissions trading frameworks, along with policies to avoid deforestation and promote agricultural research. These developments also help finance the transition to a low-carbon economy in developing countries. Better management of ecosystem services and deployment of technologies improve eco-efficiency and bioproductivity. Greenhouse gas emissions peak and start to fall and biodiversity begins to flourish.

Rebuilding the economy, with new rules
Efforts begin to develop frameworks that decouple economic growth from resource consumption and ecosystem degradation. How to measure success and progress is reconsidered. Markets move toward true-value pricing and long-term value creation. Tax strategies shift towards incentivizing job creation and healthier products and discouraging negative external factors like pollution and environmental damage. The case for long-term investments and opportunities in areas such as renewables, energy efficiency and capacity building, particularly in poorer countries, becomes more valid. Born of environmental and economic crises and spread by education and the media, these initiatives encourage “One World – People and Planet” behavior in society and individuals.

Business works to make sustainability an easier choice

Business plays a key role in informing the development of frameworks, policies and innovations. Companies, policy-makers and customers experiment with ways to make sustainable living easier while improving human well-being. Products and services that translate aspirations and values into sustainable lifestyles and behaviors are increasingly co-created by enterprises and consumers.

Transformation Time (2020-2050): Success builds confidence and momentum

Actions begun in the previous decade gain momentum: it is a time

“The radical changes highlighted in Vision 2050 demand a different perspective from business leaders, requiring them to rethink how they operate to stay on-track for a sustainable future.”

Samuel A. DiPiazza, PricewaterhouseCoopers

of more-efficient homes, farms, buildings and vehicles, low-carbon and renewable energy systems and smarter electricity grids and water management. There are continuing shifts in the “software” of society: governance systems, markets and business models. Governments, cities, civil society and business find themselves collaborating in new ways to deal with the challenges of the times.

Innovation, renewal and systems change

The new value-based economic architecture catalyzes an era of innovation in solutions and social change. Newly competitive, cleaner and more decentralized energy technologies are developed and disseminated to complement centralized systems. A greater focus on food efficiency, security and footprint allows societies to meet rising demand for food, including meat and fish. More recycled water is used for agriculture and energy

and the concept of virtual water spreads further. Forestry and farming are better organized and more land-efficient. Other natural systems – reefs, wetlands, watersheds and open seas – are also better managed.

New business models flourish on networks, institutional renewal and systems change. Closed-loop systems create business opportunities. Co-creation, open source and other types of intellectual property regimes exist alongside more traditional licensing and patenting.

People are healthier and wealthier

Basic needs are increasingly met. Former least-developed countries begin to thrive in new trade regimes that benefit all. Education, healthy living and inclusion accelerate. There are sufficient jobs, and high levels of labor productivity through technological advances and skilled labor. Lifestyles that support “living well within the limits of one planet” are more popular.

A dynamic path for business

Successful businesses adapt to changing market realities and regulatory environments. They have learned when to lead and when to follow. And they have reached out to new resources, both natural and human, in order to transform themselves and their products to serve a new world.

Experimentation and creativity have been the most renewable and sustainable resources for this transformation. Creativity has been sought and found in product development, as always. It has also been sought from customers, governments, suppliers, neighbors, critics and other stakeholders. Where companies have succeeded in tapping new sources of creativity, success has come from these new directions, and it has happened because the business culture has been open to new ideas.

Box 2: Tough questions and dilemmas

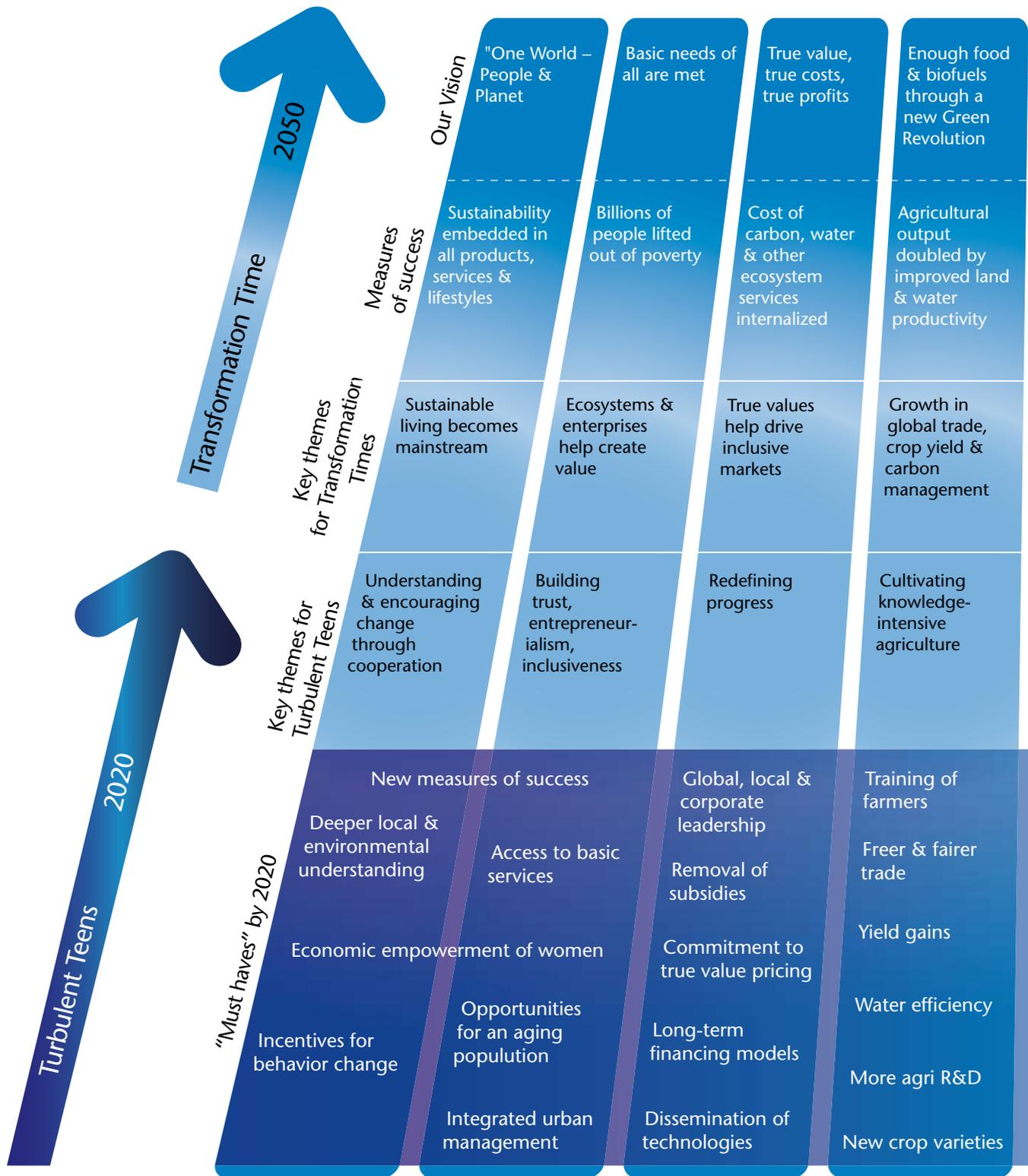
Over the next four decades societies will grapple with difficult questions and tradeoffs, for which answers will need to be found through collaboration. Tough questions include:

- Who will (or should) be the first mover – people, governments or business? Or as we suggest in this project, do all need to move at once? Where is business ready to move forward with other stakeholders?
- How can business, governments and society work together to encourage the desired value shifts and behavior changes?
- Who will define the incentives and mechanisms?
- Who finances the transition?

Trust and long-term thinking are “must have” ingredients for addressing such issues and building inclusive decision-making processes. These requirements raise some important questions:

- How can we achieve this level of trust?
- How can we give/create the right incentives for leaders of companies and countries to prioritize long-term stability and progress over short-term success?
- How can policy-makers and business carry out the economic restructuring needed both quickly and without incurring job losses and economic insecurity?

To a sustainable



People's values

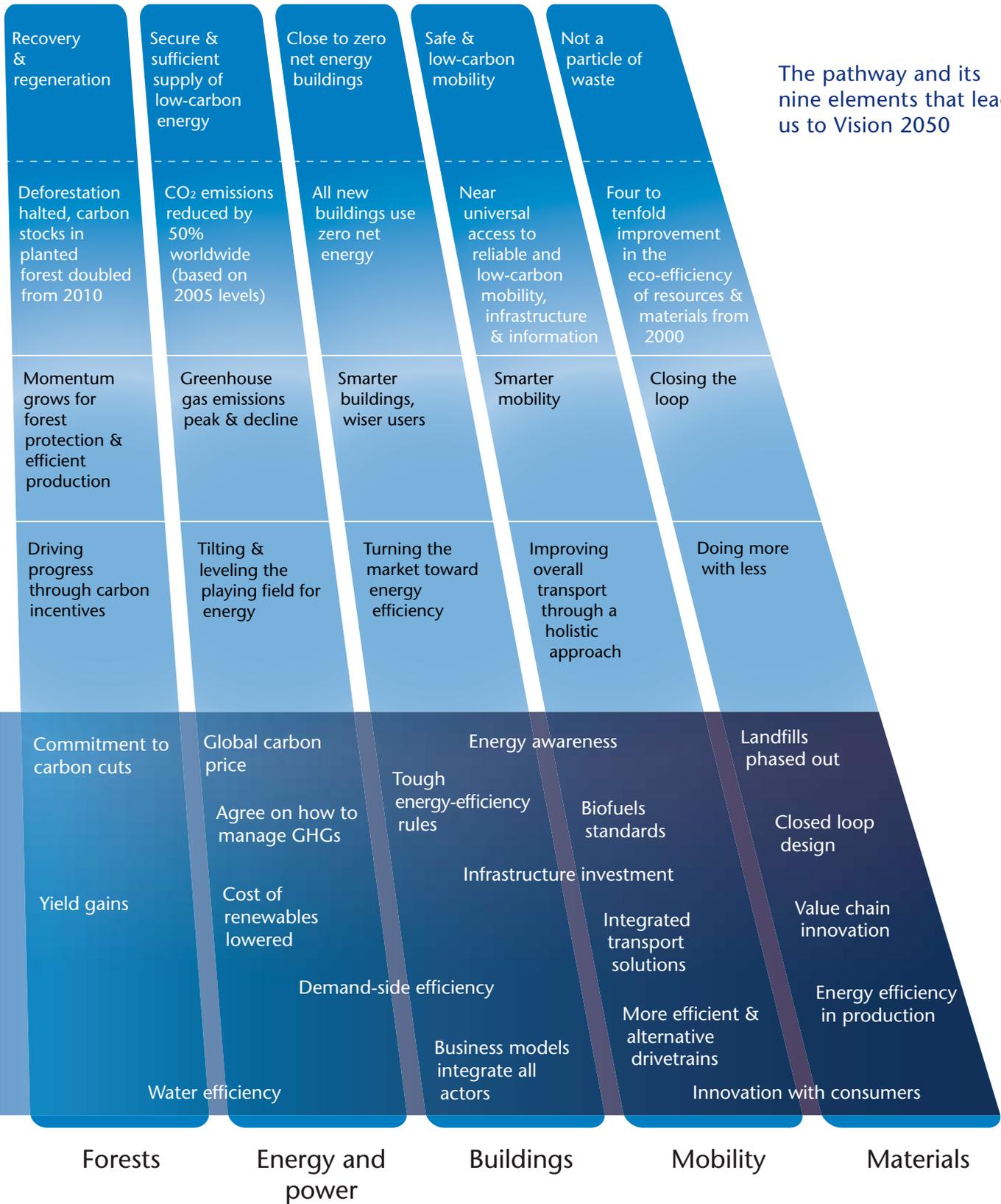
Human development

Economy

Agriculture

From business

world in 2050



The pathway and its nine elements that lead us to Vision 2050

as usual

ECONOMIC ESTIMATES

The potential magnitude of the global business opportunities that could arise from realizing a sustainable future is considerable. This section looks at estimating the global order of magnitude of potential sustainability related business opportunities in key sectors in 2050.

PricewaterhouseCoopers (PwC) has, as part of their contribution to the *Vision 2050* project, prepared an illustrative analysis of the order of magnitude of some of the global business opportunities that might arise if the vision of a sustainable future in 2050 is realized. They adopted a top-down macroeconomic approach, making use of existing bottom-up analysis by the International Energy Agency (IEA) in the climate change area. The analysis focuses on required additional investment or spending in two key areas highlighted in the *Vision 2050* study: natural resources, and health

and education. Other sectors were not included due to the absence of any clear basis for producing quantified estimates, but they would be expected to add further to the scale of business opportunities.

Illustrative estimates (see table 1) suggest that the sustainability related global business opportunities in natural resources (including energy, forestry, agriculture and food, water and metals) and health and education (in terms of social sustainability) could build up steadily to around US\$ 3-10 trillion annually in 2050 at constant 2008 prices, or around 1.5-4.5% of world GDP at that time. By 2020 the figure could be around US\$ 0.5-1.5 trillion per annum at constant 2008 prices (assuming a broadly linear build-up of these opportunities over time as a share of GDP).

Approach

Natural resources: *Estimates of required additional investments in the energy sector related to reducing carbon emissions are based on projections in the IEA's 2008 Energy Technology Perspectives report; estimates for other natural resource sectors are benchmarked against these energy estimates, taking into account the relative size of different sectors and a broad judgmental assessment of the required scale of the transformation in each sector to achieve desired Vision 2050 outcomes.*

Health and education: *Estimates are based on raising emerging economy health and education GDP shares to 2005 G7 (Canada, France, Germany, Italy, Japan, the UK and the US) levels by 2050 (bearing in mind that G7 education and health spending shares of GDP will probably have increased further by then), then making a broad judgmental assumption on the proportion of the increased health and education spending in emerging economies that will translate into increased spending on private sector goods and services.*

Table 1: Illustrative estimates of the global order of magnitude of potential additional sustainability related business opportunities in key sectors in 2050

Sectors	Annual value in 2050 (US\$ trillion at constant 2008 prices: mid-points with ranges shown in brackets)	% of projected world GDP in 2050
Energy	2.0 (1.0-3.0)	1.0 (0.5-1.5)
Forestry	0.2 (0.1-0.3)	0.1 (0.05-0.15)
Agriculture and food	1.2 (0.6-1.8)	0.6 (0.3-0.9)
Water	0.2 (0.1-0.3)	0.1 (0.05-0.15)
Metals	0.5 (0.2-0.7)	0.2 (0.1-0.3)
Total: Natural resources	4.1 (2.0-6.1)	2.0 (1.0-3.0)
Health and education	2.1 (0.8-3.5)	1.0 (0.5-1.5)
Total	6.2 (2.8-9.6)	3.0 (1.5-4.5)

Source: PwC estimates drawing on data from IEA, OECD and the World Bank

ECOLOGICAL ESTIMATES

In collaboration with the Global Footprint Network, we calculated the *Vision 2050* ecological footprint against business-as-usual. We found that by 2050, despite increases in population, humanity will be using the equivalent of just over one planet, based on the changes we embrace in *Vision 2050*, as opposed to the 2.3 planets we would be using if we continued on the business-as-usual path we are on today (see figure 3). The world will be in a much better position if we maintain the course implied in the pathway and its elements, with the possibility of getting to one planet by around the end of the 2050s, early 2060s.

Vision 2050 assumptions suggest a reversal of the growing consumption and ecological degradation paradigm. We would see a significantly lower ecological

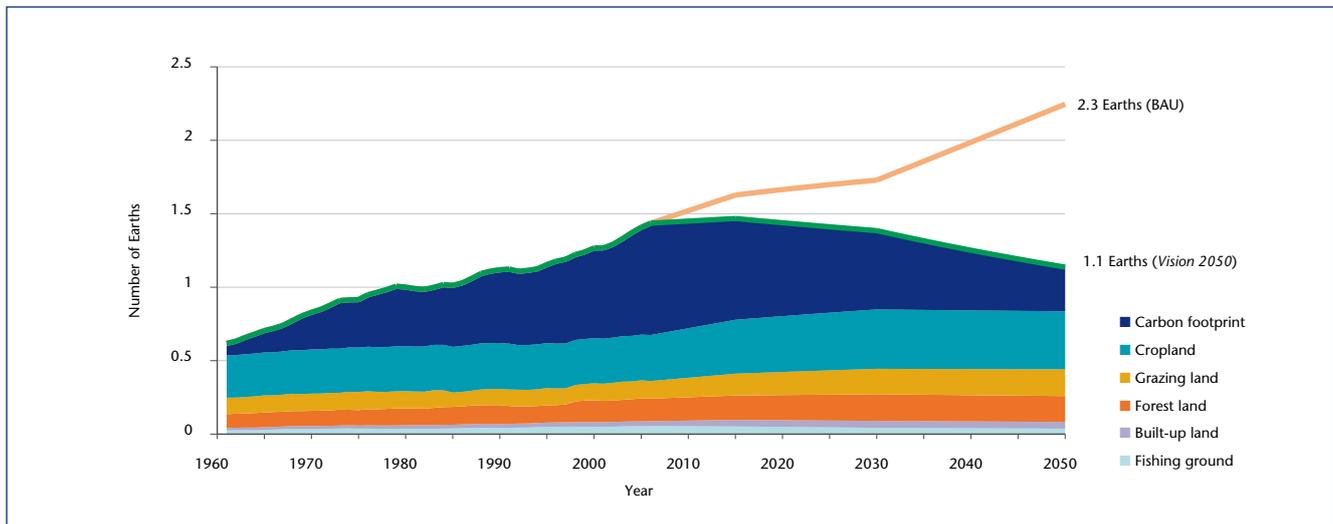
footprint in 2050 and indeed steady improvements in biocapacity after around 2015.

Approach

The *Vision 2050* ecological footprint assumptions are compatible with the measures detailed in the pathway developed by the project. They are based on median population projections for 2050 of 9.2 billion (United Nations – UN), a 50% reduction from 2005 levels of carbon emissions by 2050 (International Energy Agency Energy Technology Perspectives, IEA ETP – 2008, Blue Map Scenario), improvements in forest yields through managed forests and an increase in forest areas after 2030 (*Vision 2050* project assumptions), an increase in average global crop yields of 2% a year or more above recent historical levels as a result of the dissemination of best practice and high levels of innovation (*Vision 2050* project assumptions). Global average food consumption is similar to current Costa Rican food consumption levels

(Food and Agriculture Organization – FAO). The assumptions for the business-as-usual path are the same for population and food consumption, while those for carbon emissions, forests and crop yields differ. Carbon emissions increase with increased population and economic growth (IEA, ETP 2008, Business-as-Usual Baseline Scenario); forest areas continue to follow the 1950-2005 linear trends while forest plantation and crop yields remain constant. Carbon emissions are shown in the ecological footprint through the carbon footprint component. This translates the amount of carbon dioxide emissions into the amount of productive land and sea area required to sequester said carbon dioxide. The date by which we hit one planet is calculated based on a linear extrapolation of trends between 2040 and 2050.

Figure 3: *Vision 2050* ecological footprint against business-as-usual – How many Earths do we use?



Source: Global Footprint Network and WBCSD *Vision 2050*, 2010

Opportunities

Efforts toward sustainability in the coming decade could create many large business opportunities in three general categories: building and transforming where and how we live, improving and managing biocapacity and ecosystems, and developing new financial and collaboration structures to help enable the changes required in the first categories.

Building and transforming cities

More people live in cities than in rural areas, and this trend will continue. Urban expansion will accentuate the effects of energy, land and resource shortages in and around cities as developing countries change from farm-based economies to product and service economies. Some estimates suggest that by 2030 US\$ 40 trillion will need to be invested in urban infrastructure worldwide. Cities must be designed and retrofitted to minimize waste in all forms, to help biodiversity and ecosystems to

flourish and to provide inhabitants with the basic elements of human well-being in a resource- and energy-efficient manner. However, cities vary, and one size does not fit all. Re-envisioning the design and management of buildings, spaces and infrastructure systems will be central to this urban evolution.

Different types of cities with varying attributes and prospects present different types of challenges and opportunities (see table 2). In the coming decade sustainable **urban planning and design** will flourish as new “green”, planned cities, such as Masdar in the United Arab Emirates or Dongtang in China, with aspirations for zero waste, are built from scratch. “Brown” (London, UK and Seoul, Korea) and “blue” (Dhaka, Bangladesh and New Orleans, USA) cities will not only reintroduce nature into their plans, but also retrofit old buildings with improved recyclable

materials and information exchange systems. “Red” cities, like Mumbai, India and Soweto, South Africa, with booming populations but inadequate resources, present opportunities to develop affordable, scalable and eco-efficient solutions that improve quality of everyday life.

Efficiency standards for heating, cooling and electric appliances will be continuously improved while smart meters that monitor energy use and send price signals indicating best operating times will increase energy conservation. How citizens live and commute will continue to be critical to **building and space management** that reduces greenhouse gas emissions.

Urban mobility offers business opportunities as urban planning integrates mobility with the socio-economic environment, creating transport options while tempering

Table 2: Types of cities, their attributes and opportunities

		Brown	Red	Green	Blue
Example		London, Seoul	Mumbai, Soweto	Masdar, Dongtang	Dhaka, New Orleans
Development		Gradual: Aging infrastructure, slow to change	Ad-hoc: Highly populated, still growing, with inadequate infrastructure	Deliberate: Cities planned for optimal sustainability	At-risk locations: Low lying, at risk from rising sea levels
Opportunity	Buildings	New construction and retrofit	Affordable and low ecological impact housing	Holistic design	Adaptation
	Waste	Waste mining, recycling and collection			
	Water and Sewage	New construction and retrofit	Leapfrog	Closed loop design	Maintaining supply
	Energy	Cleaner energy	Access to reliable energy	“Smarter” systems	Maintaining supply
	Mobility	New construction and retrofit	Access to low-cost and low-carbon mobility and infrastructure	Smarter mobility	Maintaining infrastructure of private and public transport

“Sustainability will become a key driver for all our investment decisions.”
Idar Kreutzer, Storebrand

travel demand. More efficient vehicles are needed for expanding global markets. Adequate investments in **transport infrastructure** will create a diverse mix of options and efficient traffic flow, while intelligent transportation systems allow people to combine different means of transport that minimize waiting times. Options include light-duty vehicles, airplanes, shipping, trains, buses, motorcycles, bicycles, other two and three-wheeled vehicles, walking and information and communications technology-enabled connectivity. Consumers will need accurate information to make transportation decisions. Urban freight transport will continue to have special flexibility and load capacity requirements.

Building and transforming energy infrastructure

OECD/Global Insight estimates required infrastructure investments at US\$ 10.3 trillion until 2015. Just under a third (US\$ 3.2 trillion) of this will be for new capacity, while US\$ 7.1 trillion is needed for reinvestment.

Energy infrastructure will be made low carbon, and greater demand for energy will drive innovation and investment in its supply, transmission and distribution. The market for renewables is expected to more than double from around US\$ 115 billion in 2008 to just over US\$ 325 billion within a decade, according to Clean Edge Research. An estimated US\$ 13 trillion in investments will need to be made to upgrade transmission and distribution networks worldwide by 2030.

Demand will grow for solutions that help users manage energy consumption, including multi-way information exchange and telecommunications. Pricing signals, which form the basis of a dynamic energy pricing regime, will encourage time-shifting of energy use to spread electricity loads more evenly over a day.

Water will still be a billion-dollar business at the national level and a multi-million dollar business at the city level. New solutions will continue to be needed for treating, conserving and improving access to water, and an estimated US\$ 200 billion in annual investments will be required up to 2030. Meeting the UN Millennium Development Goals for drinking water and sanitation will require US\$ 11.3 billion per year.

Wastewater will be increasingly seen as a resource. **Circular water systems** will recycle water within city systems rather than releasing it into rivers and seas. Opportunity will lie in the design and management of these new, closed water systems.

On the demand side, many opportunities will arise in **reducing absolute water use** through efficiency and conservation. Globally, agriculture is currently responsible for 70% of freshwater use, but the water productivity of agriculture can be dramatically improved for all crops.

New green cities can construct **advanced sewage systems** that recycle nutrients, ensure rainfall

collection and secure water supplies. Urban wetlands can enhance city cooling and flood prevention while increasing urban biodiversity.

Mining waste can recapture materials and reduce the demand for raw resources. For example, aluminum product recycling rates are currently quite high, but only 10% of aluminum foil is recovered and recycled. With the global aluminum foil market at around 2.8 million tonnes, the opportunity to recover foil is worth US \$5.6 billion, at US\$ 2,000 per tonne. As new materials become increasingly scarce and environmentally costly, economics will encourage the recovery of landfill waste and by-products such as methane gas. As a zero-waste mindset replaces an “end of life” mentality, there will be many opportunities for recycling, including specialized systems for collecting the usable components of discarded waste and separating them according to demand for materials.

Building and transforming livelihoods and lifestyles

There are opportunities in helping people live more sustainably. Improving access to healthcare and education, as well as a more outcome-focused approach to such services, will improve livelihoods in both rich and poor countries.

The low-carbon, service-centric economy of the future will depend on scaled-up **education** programs that build skills among existing labor pools, empower new sources

of labor and entrepreneurialism, such as women and the elderly, and drive more informed choices among consumers. Governments and business will invest in education infrastructure and expand content to increase people's knowledge of natural systems (natural literacy) so they can improve their consumption patterns. This education growth will increase opportunities to develop and supply facilities, curricula, technology and other products and services.

Approaches to **health** will shift from treatment to care and prevention. Investments will be made to fight diseases, with affordable diagnosis, drugs and vaccines, and additional healthcare facilities, particularly in developing regions. This response will need to focus on prevention, which will require new products and services to help people avoid getting sick, and on controlling health system costs. Healthcare in most countries will change from hospital-centric to patient-centric preventive care.

Bridging **healthcare gaps** will require more primary, secondary and tertiary healthcare facilities, from simple medical facilities in rural areas to urban hospitals offering a full range of care. The number of private clinics will rise considerably, and improved health insurance systems will facilitate their development. Safe water, sanitation, clean air and housing will be priorities for emerging economies.

By 2020 people aged 65 and above will account for about 20% of the global population. Each month,

around 1.9 million people will join the ranks of the **over-65s**. These people will seek goods and services that help them maintain independent, integrated lives.

Safe financial products that give over-65s greater income security and suitable technology and communication tools that help them stay in touch with society, friends and family will be in high demand. Online **social networks** will be popular, providing access to different communities and offering the possibility to share experience with other cultures and younger people. The desire to continue to learn and develop skills after retirement will create demand for online content and for schools and universities to continue to teach the elderly.

The global middle class will grow from some 1.7 billion people today to 3.6 billion by 2030, with most of this growth in emerging economies. Unless consumers **choose the right products** and use them properly, it will be hard to achieve sustainability by 2050.

Consumers seeking products and services that let them reduce their carbon footprint in ways that are easy, desirable and seamless will demand more **product information**. New business models that provide consumers with desired experiences via sharing or leasing will thrive as consumers place less value on ownership. Multi-purpose devices and technologies will help consumers to make more informed choices.

Improving biocapacity and managing ecosystems

Agricultural productivity will need to grow 2% annually to feed, clothe and provide energy for the world's population by 2050. Net investments in agriculture must top US\$ 83 billion per year, up roughly 50% from current levels. Better seeds will be developed to **increase yields** per drop of water and nutrients, and resist pests and diseases. New farm and forestry techniques will improve the management of competing vegetation and application of nutrients. Best practice solutions will be spread via new knowledge platforms. Shared distribution networks among different companies and sectors of society will help bridge distribution gaps to ensure that remote farmers are able to use the best technology and know-how.

The degradation of ecosystems due to deforestation means that each year the world loses natural capital worth between US\$ 1.9 and 4.5 trillion. The **bioproductivity** of farmland will increase in ways that allow the return of spaces to wildlife and complement the productivity of natural systems. Planting trees, improving forest productivity, restoring degraded land, and avoided deforestation will help mitigate climate change, and, through conservation payments plus payments for ecosystem services, will contribute to economic development.

Some estimates suggest that **ecosystem markets** for products from certified forests could grow from an estimated US\$ 15 billion

in 2010 to around US\$ 50 billion in 2050. For certified agricultural products, estimates suggest ecosystems markets could grow from US\$ 42 million in 2005 to around US\$ 97 billion in 2012 (assuming an annual growth rate of 15%), potentially increasing by a factor of 10 to US\$ 900 billion in 2050.

Helping change happen

Sustainability requires some key enablers that present significant opportunities for businesses involved in financing, information and transparency, risk management and complex coalition building. While governance, including policies and regulation, is also critical, there are ways business can act directly.

Traditional **financing models** will not suffice, and more innovation is needed to create instruments that are robust enough to adapt quickly to conditions of need: scalable, practical, affordable, easy to implement and suitable for mass replication. For large infrastructure projects, **collaboration** could provide new sources of funding. For example, the life insurance and pension industry believes that with the appropriate regulatory and risk assessment frameworks, 2-5% of assets under management by the European life insurance industry could be allocated to infrastructure projects. This equates to billions of dollars. At the other end of the spectrum, **microfinancing** (loans of typically less than US\$ 250) will continue to grow in both developed and developing economies, targeting

women for higher returns, as their profits are returned to family and community. **Micro, small and medium enterprises** that create jobs will increasingly need dependable and affordable sources of capital to systemically and rapidly generate the jobs needed to realize *Vision 2050*.

More capital flowing among increasingly larger groups of collaborators and growing regulatory and compliance requirements will need increased **transparency**. This will generate a need for professional services related to reporting, accounting and assurance coupled with information technologies to facilitate global real time data collection and analysis. **Information and communication technologies**, particularly mobile ones, and access to faster, more reliable and convenient forms of Internet access will continue to drive innovation in business models and economic development in emerging economies and the developing world. Today, an extra 10 mobile phones per 100 people in a typical developing country, for example, boosts GDP growth by 0.8%, according to the World Bank.

New forms of risk sharing and transfer (beyond traditional insurance models) will emerge. At the base of the pyramid, the size of the potential market for **microinsurance** and other commercial opportunities in developing countries is estimated to be 1.5-3 billion policies. Annual

growth rates have been over 10%. The Microinsurance Centre estimates that over the next decade the microinsurance market could grow sevenfold, to one billion policyholders. Different types of partnerships involving a variety of actors from different geographical regions, industries, sectors of society and specialties will be pivotal in determining the most appropriate hedge to these types of big investments.

Demand will grow for those able to build and manage **complex coalitions**. Systems and structures including housing, mobility, energy, water and waste management do not and cannot operate in isolation. The interdependent nature of these elements will be increasingly important, informing the development and design of solutions. Similarly, the range of issues to be faced during the transition to a sustainable future will cross borders, sectors and industries. Information and communications technologies will continue to increase the speed and scale of information exchange and will play a significant part in efficiency improvements.

Sophisticated **early warning systems**, as well as ongoing risk monitoring and management at all levels, are likely to evolve. These systems will offer opportunities not only for the provider of the service, but also to the users who stand to gain substantially from increased monitoring and information-sharing capabilities.

Conclusion and way forward

Crisis. Opportunity. It is a business cliché, but there is truth in it. The perfect storm we face, of environment, population, resources and economy, will bring with it many opportunities.

In this report we've identified many of these, and ways in which to leverage them as the world addresses its challenges: infrastructure to build, medicine to discover, technology to develop, new strains of food to create and grow to feed a growing population.

What has driven this report, from its beginning, is one opportunity that trumps them all: our *Vision 2050* of 9 billion people living well, within the limits of one planet. While we have the world's attention, while the global focus is on environment and economics, we can act boldly to break the unsustainable model of growth-by-depletion. By 2050, we can replace it with a model of growth based on the balanced use of renewable resources and recycling those that are not.

The pathway to this sustainable world contains opportunities and risks, and will radically change the ways in which companies do business. Many companies will change and adapt, while others will be challenged to make the transition.

Moving toward *Vision 2050* will require business to engage more closely than ever before with both government and civil society. Key questions will need to be deliberated and sorted: Who defines the incentives and mechanisms? Who finances the

transition processes (especially research and development, and enhanced technology deployment)? Who will or should be the first mover in various activities? How will success be defined?

Complex systems will provide the foundation

Our findings suggest that there is no simple, single path, but rather the need to design, build and transform complex systems (e.g., energy, finance, food, forests, transport and cities) that will in turn provide the foundation for survival and human development throughout the 21st century and beyond.

History can teach us much. Revisiting the key concepts, assumptions and approaches that have underpinned past business and market success, and its role in enabling societal progress and human development over the past 50 years, will be important. As in the past, this will require external enabling conditions. It will also require enlightened leadership and imagination, because there will be much uncharted territory where history has less to offer us.

Business cannot do it alone

The window for action could be closing, and much will need to be done in the next decade. Progress must be secured across many different domains, sectors and regions. Business will be a key player in this endeavor, yet business by itself, or as we know it today, will not be enough. Government, civil society and the public at large must be equally committed. Delaying action will make the already ambitious targets that much harder to achieve.

In reaffirming the role of business in a society on track to a sustainable world, we have stressed that there will be significant opportunities that warrant further exploration, as well as risks to manage. These fall into three key areas:

1. New business opportunities derived from *Vision 2050* for the decade ahead. This learning helps set the new internal agenda for business: strategic priorities, skills and capacity building, new business development and possible portfolio priorities.
2. New external relations priorities, derived from a review of business opportunities and an analysis of what is required by government and other stakeholders to realize these business opportunities. This will help business define its new external agenda: stakeholder relations priorities, new topics to engage on and a new agenda for business associations.
3. New risks to monitor and address, based on the actions of other stakeholders and on critical and pertinent risks from the risks and wild card analysis.

The journey begins now

This report represents the first step in a 40-year journey. It is a call for further dialogue, and it is a call for action. Collaboration, conviction and courage will be required to visualize and implement the radical changes needed for long-term prosperity while succeeding in current conditions. Business leaders will want, and need, to lead toward sustainability, and we invite political and civil society leaders to join us in this challenging and exciting journey.

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To all contributors – named as well as unnamed – we express our sincere thanks.

About the WBCSD

The World Business Council for Sustainable Development (WBCSD) is a unique, CEO-led, global association of some 200 companies dealing exclusively with business and sustainable development. The Council provides a platform for companies to explore sustainable development, share knowledge, experiences and best practices, and to advocate business positions on these issues in a variety of forums, working with governments and non-governmental and intergovernmental organizations.

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For further information and resources on *Vision 2050*, please check our website at www.wbcsd.org/web/vision2050.htm

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This report is released in the name of the WBCSD. It is the result of an 18-month collaborative effort among representatives from 29 member companies and supported by the WBCSD secretariat. Like other WBCSD projects, *Vision 2050* has involved a broad range of stakeholders in locations around the world. Developed in close consultation with the project members and several other consultants/advisers, the report was reviewed by all project members to ensure broad agreement with its principal views and perspectives. However, this does not mean that every member company necessarily endorses or agrees with every statement in the report. Use of and reliance on the report shall be at the discretion of the readers.

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