WORLD OF DILEMMAS

Increasingly, we are moving from a world of problems—which demand speed, analysis and elimination of uncertainty to solve—to a world of dilemmas—which demand patience, sense-making and an engagement with uncertainty. Dilemmas span disciplines and frustrate attempts to craft elegant and final solutions. Dilemmas require a different orientation, decision process and set of skills.

Characteristics of modern strategic dilemmas

- Unsolvable
- Complex and often messy
- Threatening
- Enigmatic and confusing
- Two or more puzzling choices—and decisions are still required

One of the purposes of this map is to help you identify your dilemmas. Some of the signals may seem incongruous, even contradictory, but that is because dilemmas often seem like complex, no-win situations.

As you tell your stories from the map, use the signals and focal points to draw out dilemmas. What signals seem to conflict with each other? What combinations present multiple and competing options?

Dilemmas will challenge and frustrate leaders, but they will also present opportunities for deep inspiration, creative innovation and win-win strategies.

Characteristics of effective dilemma management

- Strategic sense making beyond operational problem solving
- Engagement with complexity
- Uncoupling "winning" from the need for a solution
- Learning through immersive experiences, scenarios and rapid prototyping
- Flexible, decentralized, empowered networks within a structure of strategic intent
- Acceptance of uncertainty with intuition as a valid contributor to clarity

PEOPLE

Sustainability defines a new citizenry

As personal health becomes increasingly linked to community health, a new "sustainable citizen" will replace the so-called green consumer. Eco-friendly, low-impact, local and organic will be seen as part of a healthy lifestyle. Sustainable citizens will participate in community-improvement efforts to secure their own health and make their values heard through their purchases, daily behavior, online activity and involvement in local community issues. Tools and practices will emerge to support sustainability lifestyles—carbon footprint calculators, sustainability coaches, personal carbon credits and online forums for personal sustainability strategies. Real-time monitoring of environmental goods and services flows at the household, community and regional level is anticipated within the decade.

Extreme longevity shifts perceptions of risk and opportunity

Breakthrough bioscience holds out the possibility of much longer lifespans in the next few decades. In the meantime, many cultural analysts note that populations are effectively growing younger, as social and economic aspects of midlife are extended and even childhood lasts longer: young adults are getting married later, having children later and adopting the material symbols of adulthood, such as purchasing homes, later. While the social and political effects of engineered longevity may not show up for decades, the expectation of longer lifespans may fundamentally change the way people view the future and, in particular, risk.

Links between environment and health grow

Public views of health are moving away from the disease-centered symptom of model toward a more ecological view. This evolving perspective is supported by scientific evidence that where and how people live their lives can have as great an impact on health as genetics, health maintenance and medical interventions. A language of eco-health literacy will emerge over the next decade to frame health concerns in these new terms.

Polarizing extremes

Though many will rally around common causes and decide to collaborate, anxieties about pollution, climate change and health will solidify strongly-advocated opinions. In both the developed and developing world, communities will use economic, social and political arsenals to protect their positions and resources. Potential results range from obstructionism, to counter-activism to out-and-out violence.

Self-interest is aligned with collective good

A fundamental principle of cooperative strategy is to link personal self-interest to the good of the larger community. As new technologies and a new sociability make this link more obvious across many domains from health and environment to wealth generation, security and even entertainment, expect a proliferation of new commons experiments and innovative solutions to old commons problems. As understanding of these resources matures, people will realize that different kinds of resources will require different management and protection strategies. In "Capitalism 3.0: A Guide to Reclaiming the Commons," economist Peter Barnes argues for the creation of a commons sector of the economy to make up for the limits of the private and government (public) sector when it comes to preserving natural capital and the rights of future generations. His proposed twin engines of growth-corporate profit maximization and commons wealth creation-would allow for a more prosperous, secure and sustainable future.

REGIONS

Decentralized authorities compete for voice and influence

A maelstrom of voices will vie for influence, control and power, under conditions where knowledge and technologies are constantly changing. Surveillance and detection tools can force transparency and accountability but can also enable fabricated 'evidence' and spread misinformation. Communities and consumers will challenge the notion of 'externalities' and companies will need to rethink their relationships with their stakeholders. Many will look to state authorities to adjudicate these issues—whether through command-and-control legislation, new market and tax incentives or overseeing natural resource damage claims—even as the state struggles to find its role in this volatile climate.

Geo-politics adopts eco-politics

Anxieties about climate change, vulnerable natural resources, and protected private resources will carve out a new landscape of geo-eco-politics. Environmental impacts ignore national borders, which will encourage collaborative approaches but will also fuel tensions. Perpetrators of environmental abuse do not necessarily feel the effects of their actions, as sentiments carry air pollution miles away, disrupted eco-systems cripple neighboring eco-systems and IP theft and non-cooperation undermine certain strategies. Environmental justice will acquire a global character, and international diplomacy will be forced to manage reparations and environmental damage lawsuits. It is possible that some countries will feel threatened enough to protect resources and enforce measures violently.

Eco-tools build on bottom-up context awareness

New scientific and social practices—using sensor networks, bottom-up environmental monitoring, collaborative pollution mapping and nested environmental models—will create a rapidly growing awareness of our environment. This "green panopticon" may lead to a kind of "planetary mark-up language" not unlike the Web's XML, which will facilitate global communication about the state of the planet. Scrutiny of products, chemicals and corporate behavior will come from the top down and the bottom up, as centralized and distributed parties take advantage of surveillance tools.

Think local, act global

The interconnections between global climate change and local ecological instability, between overall economic sustainability and community economic health will spur increased localism. Some communities will bear the brunt of economic and environmental fluctuations—pollution hot-zones created by cap-and-trade markets, disrupted agricultural seasons, non-potable water—and these communities will protect themselves in surprising ways. Meanwhile, efforts to secure the stability of local and regional ecologies and to integrate these systems with each other and with macro-climates, will be increasingly important.

Higher (by)product standards

Augmented detection capabilities and pressure for monitoring and regulation will combine to intensify restrictions on production, manufacturing and servicing. As the links between environment and DNA are discovered, chemicals will receive greater institutional scrutiny and higher individual expectations. The entire life-cycle of products will be examined, from inception to eventual degradation—from cradle to grave). However, outputs that cannot be used or reused—i.e. those in the "graveyard"—will incur penalties, and companies will be asked by regulators and consumers alike to find valuable uses for all products and by-products. Cradle-to-cradle will be a commonplace demand.

BUILT ENVIRONMENTS

Rise of the eco-driven city-states

As urban and regional political leaders seek decentralized approaches to sustainability, look for mega-cities and collections of leading-edge eco-cities populated by the creative class to join climate change abatement efforts as semi-autonomous units. Their size and complexity may demand customized and locally-overseen strategies. Some will distinguish themselves as leading eco-cities, pioneering green strategies, boasting cleaner water and air and accumulating the social and intellectual capital that sustainability innovations attract.

Extreme urbanization

For the first time in history, the majority of the population will be urban, not rural, and most of these urban environments will be in developing countries. Slums and squatter communities will grow in number and size. Lacking traditional resource-and care-delivery infrastructures, these urban wildernesses will foster innovation. Mobile phones will enable new forms of collaboration. Distributed urban users will pioneer sustainable-out-of-necessity business, development and living strategies. Look for new market opportunities in marginalized and bottom-of-the-pyramid populations.

Increasing vulnerability will drive climate refugees and reshape migration

Close to 40% of the human population lives near coasts, and rises in sea levels could devastate local and global economies. Natural disasters could cause mass migrations, disrupting neighboring countries, who could respond aggressively and violently. Many of the vulnerable areas have disadvantaged communities, which lack the resources to properly safeguard against these hazards.

Digital natives define the next generation of civic engagement

As youth media literacy emerges, watch for young people to apply media skills to social, political and environmental issues. They will podcast, blog, tag, rate and review companies, share information and connect online to collaborate. Their evolving literacy could catalyze new forms of civic action as networked publics, consumer-based property regimes and emergent self-organization bypass traditional government with ad-hoc interventions and distributed solutions.

Open-source practices help diffuse sustainable building

The energy required to maintain commercial and residential buildings accounts for more greenhouse gas output than the global transportation network. Building and urban development practices are set to experience innovation around energy efficiency, water use, information transparency and health effects. Biomimicry, micro-energy production and "zero footprint" designs will become watchwords. Watch for do-it-yourself (DIY) home improvement mobs and architectural design knowledge commons to change home building.

Built environments get smart

RFID, tags, embedded sensors and ubiquitous communication computing will help animate and empower built environments. Products and places will bear user-generated information, which will be accessible through sensing devices and be capable of gathering information. Embedded micro- and nano-electronics make it possible for previously "dumb" materials to sense usage and activity patterns, and communicate this information to other systems. The environmental uses are significant, ranging from finer control of energy consumption to measurement and potential mitigation of "sick building syndrome."

NATURE

Eco-markets face challenges

Using the marketplace to manage ecosystem disturbances, many states, regions and countries will experiment with eco-trading exchanges for carbon, water pollution and air pollution. These exchanges will be plagued by uncertainties in how to value ecosystem services—how much is one acre of carbon-sequestering forest really worth?—as well as back-lash from emerging economies who question the exchange rates and the limits on their own development. The result? Eco-markets may be a short-lived phenomenon. Nonetheless, valuation efforts will exert pressure on companies and commerce to acknowledge environmental services, and insurance and reinsurance industries may force the issue.

Eco-management practices and regulations proliferate

As the effects of climate change mount, both communities and corporations will step up efforts to manage the ecosystem more effectively, focusing on ecosystem services such as carbon sequestration and water quality management to more intangible services, such as the value of view-scapes. They will look to science to provide precise measures and targets, but they will also conform to top-down regulation as states set standards for everything from renewable fuels to personal carbon emission limits.

Fragmented state practices

As climate change continues to alter ecosystems and spur changes in economic and political practices, some states will find resistance more profitable and attractive. Some might benefit from climate change: growing seasons may lengthen, conditions may enable more productive practices and formerly inaccessible regions may open. Some, especially in the developing world, will simply disregard pressure for green development, preferring rapid industrialization in the race to strengthen economies and infrastructure, even engaging in "greenmail"—offering to trade compliance for massive subsidies or economic favors. Meanwhile, many states will also pilot green development tools and practices. Some may display a disregard for international IP rights, pitting them against major companies and other countries, while others find themselves used as testing grounds for new treatment and clean-up processes.

Collaborative science and open-source environmentalism

Participatory digital media tools and connectivity will enable bottom-up mapping, monitoring and sharing of data, activities and conditions related to the environment. The emergence of universal protocols for field research will facilitate and accelerate these efforts. These networks will integrate local knowledge and expertise with professional insight, creating webs of population-based science and innovation and informed activism. As local self-interests align with broader issues, these efforts will contribute to open-source environmental strategies and policy making.

Nature becomes the guide to design

Nature-based models are becoming important in the design of products and control systems. Biomimetic practices allow designers to take advantage of millions of years of evolution towards optimized structures, and will appear with greater frequency in the shapes of cars, buildings, even infrastructure. Biological models will take on increased importance in the management of resources, ecosystems and traffic flow. The changing global climate may also force construction and oversight of designer ecosystems in order to maintain important services despite a changing environment.

MARKETS

The intersection of economics and ecoscience creates chaos before clarity

The intersection of ecoscience and economics manifests in the growing market presence of environmental products and services, but also as a new way of understanding value. Ecosystem valuation describes the importance of the natural world using the language of costs and benefits, forcing governments and businesses to look at the broader ecological picture. These valuations are controversial: they are often ambiguous, with conflicting metrics, and environmentalists and economists alike have raised important questions about their ethics and efficacy. For example, critics of cap-and-trade schemes charge that these 'carbon indulgences' create pollution hotzones and invite market corruption. Moreover, this is a field in flux—new scientific discoveries could rapidly change the rules for up-and-coming services like carbon offsets and sequestration.

Eco-brands and offerings expand markets

As consumers express eco-friendly preferences through their purchases, companies will find increasing opportunities to create eco-brands, identify market niches and build their eco-friendly reputations. Some companies already label their products with the environmental impact of their production. Consumers, to maintain freedom to manage their own environmental footprints, will value information over promises. However, companies will face the dilemma of identifying the most relevant information (carbon footprint, local-community impact, equitable practices), calculating this information (using what methods?) and finding palatable ways to present it. Meanwhile, the sustainability and 'zero-impact' craze may fuel a backlash, as some people see environmentally damaging products and practices as elite, luxurious or just downright more comfortable.

Smart networking enables new activism

Smart networking practices, personal empowerment and abundant connectivity will stir a whirlwind of new activism, often challenging traditional roles, responsibilities and realms of influence. Increasing lightweight venture funding and social entrepreneurship will produce creative synergies, especially in urban slums. Some shareholders will pressure companies to incorporate sustainable practices, and some parties will become shareholders for the precise purpose of doing so. Amplified by social networking technologies, the voices of stakeholders will louden and, connected together, they'll be able to champion their own causes. Among these evolving efforts lies regenerative commerce, which sits at the intersection of intangibles and cooperative strategies. Coined by Jon Ramer, the term regenerative commerce refers to value-based commerce that integrates social networks and their values with transactional networks to retain and grow local wealth. In this mix, expect labor to enter the forefront of sustainability debates.

Design-based manufacturing foments a factory revolution

As rapid fabrication technologies like 3D inkjet printers and laser sintering move from prototyping to production, they will likely trigger a transformation in manufacturing. They will make factories more flexible, short-run and responsive to rapidly shifting markets. More important, they may well unleash a vast wave of design innovation and ultimately move some forms of manufacturing to the desktop, where peer-to-peer exchanges of design are as common as music swapping is today. New production technologies and processes may drive demand for various wastes as base production material, which will open new markets and change the rules of waste regulation.

BUSINESS

Financial reform will tackle intangibles

The next decade is likely to see a host of financial reforms in response to natural and social crises that will create volatility in the financial community. Some will be innovations that extend existing financial practice such as microfinance or Islamic finance, but more will use multiple capitals—intellectual, social and natural—to reduce the risk associated with uncertainty in the environment. These will be linked to growing corporate social responsibility requirements and increasing demands for transparency across both corporations and communities.

A score of scorecards

External scrutiny and evaluation will take diverse forms and functions, but one thing most methods will do is become public. The field of corporate responsibility ratings will range from self-organized, bottom-up ratings by networks of consumers and small business (such as the World Index for Social and Environmental Responsibility and BuyBlue.org) to top-down, designed evaluation schemes by formal institutions like GEMI, Dow Jones and the Financial Times. Metrics for intangibles and alternative indicators like employee wellness, civic participation and carbon footprint per worker will find their way into rating schemes.

Green is green, toward value-creation

As companies navigate the storm of pressure from various voices—consumers, regulators, partner and rival companies, empowered communities, employees, advocacy groups—they must balance their responsibility to their shareholders and pursue profits. Successful companies will discover points of synergy, where sustainable, eco-friendly and equitable practices create tangible value. Simple revisions in operations to improve energy efficiency can yield immense energy savings in the long run. Protecting and investing in employees can increase productivity and reduce turnover rate. These strategies will become more sophisticated, measurable and mainstream. Companies take initiative to adopt and innovate these reforms will earn respect and quiet criticism—as long as companies remain honest and transparent.

Employees as a driver of corporate sustainability

As health care continues to be a major cost to employers, it will be treated as a commons—a shared resource that is susceptible to depletion. While health and wellness become more directly linked to physical environment, work and the physical workplace will become a focus for sustainable systems, conditions and practices. Watch for business services based on FairSource practices and European models of work-shaping those in the United States.

Consumer collectives organize around low-impact commerce

Collective purchasing by groups of Chinese consumers online provides lessons for establishing new relationships between consumers, retailers and manufacturers. Collectives will include community- and neighborhood-based buying groups, as well as formally organized corporate employee buying clubs. As personal sustainability practices and values permeate households and the workplace, look for these groups to drive market growth for low-impact, green products and services.

Natural systems redesign business interactions

In addition to serving as inspiration for designing new products and functional services, natural systems offer important lessons in organizational processes ranging from team process to collective intelligence and collaborative problem solving. Beginning with experiments in bioteaming, companies will use natural models, from cellular communication to swarms and flocking, to understand more emergent forms of collaboration.

ENERGY

Reinsurers as regulators

Reinsurance companies, which provide insurance to traditional insurance companies, pay extremely close attention to emerging risks that might end up causing catastrophic events. The top two global reinsurance companies—Munich Re and Swiss Re—started taking climate change seriously over a decade ago, and have begun to charge higher rates to insurance companies that cover areas most at risk of global warming-related disasters, such as coastal developments in hurricane-prone regions. These higher rates get passed along to consumers, or sometimes even force insurance companies to leave certain areas.

Do-it-yourself infrastructures create opportunities and gaps

As lightweight infrastructure components for communications, water, power and transportation diffuse in the developing world, a variety of strategies will emerge for local, small-scale implementation—from regenerative commerce strategies that emphasize new commons, to private investment that looks more like traditional chambers of commerce. Both will create opportunities for local and global entrepreneurs, but will also leave gaps that will not only deny access to some but also require adaptable strategies by those who want to use the infrastructures for their own enterprises.

Energy infrastructure (in)security

Energy will be reframed in a variety of ways, as different parties recognize their inevitable dependence (and interdependence) on the functioning of numerous overlaid energy systems—fuel pipelines, electric grids, etc. Some states will see energy as an economic and political weapon of coercion, domestically and internationally. However, insurgent groups and other non-state actors—called "global guerillas" in John Robb's book "Brave New War"—will see energy disruption as an effective strategy for crippling states. Using technologies, innovations in weaponry, IEDs, online networks, crime and eco-terrorism, they will target centralized energy grids, which, when they fail, fail catastrophically. Many will find that maintaining energy as a commons—sourced from the top down, monitored from the bottom up and distributed in a network fashion—will render systems more resilient to these shocks. The strength of these networks as opposed to hierarchies may inspire other restructuring of crucial economic, social, environmental and business resources.

Immersive media helps reframe of energy strategies

Understanding the long-term impacts and day-to-day realities of energy choices will play a key role in developing successful strategies. Immersive experiences can provide consumers and business decision-makers with concrete experiences in living the future consequences of present day energy decisions.

Alternative energy up, demand down

Renewable, non-fossil fuel energy sources are beginning to see a renaissance, and are likely to become a much greater part of the global energy footprint in the near future. Familiar power technologies like wind and solar will see increased cost benefits from material and manufacturing technology advances, such as lightweight composites and organic-polymer electronics. Less-well-known alternative technologies, such as hydrokinetic energy and solar-thermal energy, will also attract increasing attention from investors and governments looking for wild-card breakthroughs. Meanwhile, ongoing innovation in energy efficiency has radical benefits over time. With small annual boosts in efficiency, by 2100 ten billion can live as well as the top billion today, while using less power.

Map of Future Forces Affecting Sustainability

Welcome to the 2007-2017 Map of Future Forces Affecting Sustainability prepared for the Senior Advisory Council (SAC) of the Global Environmental Management Initiative (GEMI) by the Institute for the Future (IFTF).

This custom map of the future is based on the latest *Ten-Year Forecast* by IFTF, an independent nonprofit think tank in Silicon Valley. IFTF has a 39-year track record of successful forecasting and is one of the few research organizations ever to outlive its own forecasts. Twenty years ago, the term "sustainability" was virtually unknown in business circles; "environmentalism" was synonymous with government regulations and pollution; and, "health" was another term for occupational safety. Today, all three of these concepts have evolved broader and more complex definitions and they have moved from the margins to the center of business activity.

Making sense of "sustainability", as various stakeholders define it, and incorporating it as a source of long-term business value is a critical challenge for the next generation of business and specifically for business leaders in environment, health and safety (EHS). However, it is not always clear as to how companies can go about integrating sustainability into their strategic thinking. Will today's cutting-edge environmental measures be seen as greenwashing in five years? How do you account for sustainability projects that have no immediate payoff, but will yield significant benefits decades from now? Do sustainable companies tend to be more successful, or does sustainability change the very notion of success?

This map is a strategic tool that will help organizations navigate the complexity of sustainability. Our goal is to elevate the strategic conversation around EHS issues and develop more organizational adaptability to respond to emerging challenges.

2007-2017

KEY DRIVING FORCES

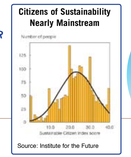
PEOPLE | REGIONS | BUILT ENVIRONMENTS | NATURE | MARKETS | BUSINESS | ENERGY

AN IMPERATIVE FOR LOOKING LONG

The 21st century will test our ability to grasp the future impacts of present choices, but even as we struggle to incorporate future knowledge into our day-to-day decisions, we're tuning up our bodies and minds and even our cultural frameworks for a much longer view.

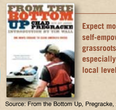
POPULATION GETS YOUNGER

Increasing life expectency in developed world and parts of developing world shifts life stage, behaviors and views of future



CITIZENS OF SUSTAINABILITY

Green consumers will become "sustainable citizens," as smart-networking skills, do-it-yourself attitudes and a focus on personal and community health converge.



Source: From the Bottom Up, Pregracke, 2007.

Expect more self-empowered grassroots activism, especially at the local level

SUSTAINABLE CITY-STATES

Cities sign Kyoto-type agreements

MEGA-CITY PLANET

More people live in cities than rural communities, globally—nearly all the largest cities in the world are in developing countries.

BRIGHT GREEN

Eco-cities attract "creative class" citizens, forming leading-edge centers of innovation in urban form, governance, employment and industry

Preserving vulnerable resources requires creative collaboration

Source: www.gemi.org

RE-ENGINEERING NATURE

- Conservation to restoration to optimization
- Designer ecosystems
- Re-sourcing natural resources

THE ENVIRONMENTAL DILEMMA

Effective green strategies need to identify:

- Fences: short-term costs with long-term benefits
- Traps: short-term benefits with long-term costs

CAP AND TRADE: A STORMY START

Pollution trading strategies seem promising but still must overcome skepticism and controversy. Debates will likely follow other strategies:

- Carbon tax
- Carbon offsets
- Carbon sequestration

ECONOMICS AND ECOSCIENCE: A CHAOTIC INTERSECTION

Climate change drives development of economic measures and markets for ecosystem services. However, non-linear behaviors and fragile ecosystems create a chaotic and complex arena of responsibilities.

INTANGIBLE WEALTH GENERATION

Investors get serious about

- Intellectual capital
- Social capital
- Natural capital


Source: www.gemi.org

Metric Navigator helps companies find place in metrics jungle

SUSTAINABILITY SCORECARD(S)

- Carbon footprint per worker
- Employee health/wellness
- Turnover rate
- Employee civic engagement

EFFICIENCY AS CATALYST

- Energy efficiency as engine for radical innovation
- Clean fossil fuel solutions?

GLOBAL REINSURANCE

Reinsurance firms force insurance companies to account for climate change in their policies

A PLANET AT RISK

As climate change, deterioration of the global food chain, uncertain energy supplies, natural resource vulnerability and environmental health issues loom, ecological indicators will become key measures that organizations—and society as a whole—need in order to steer a strategic course.

ECO-HEALTH LITERACY

- More holistic models of health
- New DNA links to the environment discovered
- Global education reframed

VOLATILE FEEDBACK

As climate change debates intensify, extreme positions and actions grow:

- Children become a 'protected population'
- Fundamentalism, on all sides, grows
- Eco-terrorism risk rises

ENVIRONMENTAL DEFENSE FORCES

- Could armed forces protect the planet?
- Could the U.N. enforce compliance?

THE STATE IS BACK

New assertiveness in standards setting, monitoring, adjudication and enforcement

DECENTRALIZED AUTHORITIES

Competing tools, interests and voices of authority:

- New scientific discoveries
- Corporate regulators
- Tools for monitoring
- Empowered communities
- New legislation

CLIMATE REFUGEES

- Natural disasters create mass migrations
- Marginalized economies most vulnerable

ENVIRONMENTAL SERVICES

Markets for environmental services grow:

- 15-30% of food production depends on pollinators
- Trees store carbon and reduce stormwater runoff

Source: www.foreskre.com

ForestRe Limited helps insurers account for financial risk associated with ecosystem services

ROGUE ECO-STATES

Some nation states benefit from the status quo and resist sustainable development

GEO-ECO-POLITICS

- Environmental impacts between countries and companies
- Transforming carbon footprint via outsourcing

THE NGO NEXT DOOR

A potent watchdog for community sustainability

SLUMS AS CENTERS OF INNOVATION

- Pioneers for efficient low-impact living
- New cooperative strategies
- Bottom-of-the-pyramid market opportunities

CONTROVERSIAL TESTING GROUNDS

Developing and undeveloped countries pilot green tools, fueling debates about:

- Environmental justice, self-governance and development
- Innovation, hacking, competition and exploitation

INFORMED REFORMS?

New institutions and instruments to manage ecologies of risk, but they will need to be deeply informed by science to be effective

ENVIRONMENTAL MARKETING

- Eco-labeling
- Brand differentiation
- Carbon information labels

Source: http://openthefuture.com

Products will display environmental impact of production and travel

THE BOTTOM LINE IS BACK

Deep self-interest, not altruism, drives adoption of energy efficiency and "green" strategies as sensible business practice.

MEGA-RETAILER REGULATORS

SUPPLY WEB COMPLEXITIES

Increasing interdependencies = more opportunities (and need) for collaboration, but also more vulnerability to disruption and inertia.

A PUR water sachet can purify up to ten liters of non-potable water

Source: P&G

SMALL SCALE SOLUTIONS

- Micro-power (wind and hydro)
- Solar walls and roofs
- Water capture and purification

MARGINAL POPULATIONS REDEFINE THE MAINSTREAM

Marginalized populations—whether they are slum dwellers, citizens of economically disadvantaged countries or people with disabilities—will grow in number and influence over the next ten years, remaking mainstream culture.

POWERFUL PERIPHERY

Coping strategies and resilience for an eco-challenged world come from challenged populations: the aged, chronically ill and those with disabilities

BLACKENED MARKETS

Demand for non-sustainables fueled by nouveau riche tech and petro economies

Tools to identify, utilize, and create untapped business value


Source: www.gemi.org

BEYOND COMPLIANCE

Companies must create value while navigating among diverse voices, all of whom may have different conceptions of sustainability

DATA FILTERS

Tension between transparency, ubiquity of data, and need for accessibility

DISTRIBUTED ENERGY

Innovative strategies to generate and manage energy through lightweight infrastructures as viable alternative to centralized grids.

GRAMEEN SHAKTI

Renewable energy microentrepreneurs

BAREFOOT SOLAR ENGINEERING

Rural women in South Asia trained to install and maintain solar power systems

PARTICIPATORY CULTURE DRIVES CHANGE

Taking advantage of lightweight infrastructures—for everything from media to energy to fabrication—many more people will participate in the creation of the cultural fabric that defines who we are and how we will manage the dilemmas that face the world in the coming decade.

PERSONAL SUSTAINABILITY

Practices and tools to tune, tweak and transform "green" behavior:

- Eco-footprint calculators
- Carbon offsets
- Online eco-accounting

Source: www.terrapass.com

Terrapass lets individuals purchase carbon offsets for travel footprints

PARTICIPATORY GREEN PANOPTICON

Enabled by portable connected media, top-down surveillance and distributed bottom-up 'souveillance' will redefine privacy and secrecy and drive forms of participatory governance

Source: http://openthefuture.com

Context-specific information becomes visible in place


Source: Institute for the Future

SMART URBAN ENVIRONMENTS

- Cameras, sensors and RFID recognize and inform
- Tagging shares digital knowledge about places

COLLABORATIVE ECO-MAPPING

- Bottom-up pollution mapping and environmental monitoring
- Flickr-based field data
- Earth Transparency Project

PARTICIPATORY PHILANTHROPY

- Social entrepreneurship
- Stakeholder, shareholder activism

SMART NETWORKING

Online lifestyles, mobile communication and collective behavior take networking to the next level

BOTTOM-UP CSR RATING

- Buyblue.org
- World Index for Social Environmental Responsibility
- Online eco-tagging

IMMERSIVE STRATEGY

Simulations, pervasive media and open modeling take off as standard learning tools

In the alternate-reality game World Without Oil, participants document and post their responses to a fictional oil crisis

Source: http://www.worldwithoutoil.org/

IN THIS TOGETHER...

Citizens share strategies for eco-friendly, energy-efficient lifestyles, often in innovative ways

NEW COMMONS CREATE NEW VALUE

Even as the Earth's natural commons are increasingly at risk, humans are creating new kinds of commons around shared resources that can generate and sustain new wealth, health and well-being in the face of these risks. From the Internet to bio-commons, these will provide new lessons in human social organization.

LITERACY OF THE COMMONS

New ways of building identities and communities allow for better group management and accountability for shared vulnerable resources of all kinds

Source: Capitalism 3.0, Barnes, 2006

The commons as a tool for sustainability

DEEP LOCALISM

Citizens of sustainability will focus efforts on local communities and commerce: local commons for the global good.

CHAMBER OF COMMONS

Cross-boundary governance responsible for identifying and managing local commons

DIGITAL NATIVES, CIVIC SPACES

Youth media literacy and practices—tagging, commenting, participating—transforms relationship to physical spaces and creates new sense of civic responsibility.

GREEN ARCHITECTURE OPENS UP

Open-source building design and engineering catalyzes innovations in balancing low impact, affordability and aesthetics:

- Energy producing, ultra-efficient homes
- Urban roof gardens
- Design mimics nature

OPEN-SOURCE ENVIRONMENTALISM

Sharing environmental practices and IP to create an environmental knowledge commons

PML: PLANETARY MARKUP LANGUAGE

Universal data protocols for field research

PARTICIPATORY ECOSCIENCE

Empowered by new media and connectivity, distributed networks of professionals and amateurs exchange knowledge, gather data, share analysis and collaborate for research and new eco-solutions.

WORK THE PLANET

Labor issues become a key force in sustainability debates

ECO-CONSUMER COLLECTIVES

Online buying groups redraw relationships between consumers and companies

HUMAN RESOURCES

- Employee health as new commons
- Programs to support employees' eco-friendly lifestyles

CARBON COMMONS

Emissions as commons reframes decisions and choices

ENERGY: NEW COMMONS OR WEAPON?

States vary in their strategic approach to energy resources depending on geopolitics and presence of activism

Organizations emerge that promote architectural and design solutions to global, social and humanitarian crises


Source: www.architectureforhumanity.org

architecture for humanity

A NEW SOCIALITY: FUELS COMMONS-BASED STRATEGIES

Social network development and social identity creation drives values-based markets:

- Regenerative Commerce
- Viva Favela
- BioPlaneta

Source: www.bioplaneta.com

Bioplaneta is a network of sustainable companies and cooperatives in Mexico

A NEW MATERIAL WORLD

The human ability to engineer at the molecular level, whether through biological, chemical or electromechanical means, will grow over the next decade, changing not only the way we manage the world but actually transforming it to create new kinds of built environments—and new ways of living in them.

BIOCOMMONS

Open-source biology, biotech and biological design


Source: http://nanoarchitecture.net/article/?c=synthetic-biology

Organizations—like BioBricks, a dynamic protected commons of enabling technologies in the life sciences—encourage open improvement and innovation

ENGINEERED LONGEVITY

- Cell therapy
- Somatic gene therapy
- Caloric restriction drugs

CHEMICAL TRESPASS

As scale of detection and investigation grows smaller, chemical and product scrutiny increases and intensifies

NO MORE GRAVEYARD

- Cradle-to-cradle manufacturing standards
- Product waste taxes

SMART WALLS

Micro- and nano-engineered sensors and processors make building materials responsive to users and environment

London's Plantation Place has a ventilation system inspired by human lungs


Source: http://www.arup.com/facadeengineering/project.cfm?pageid=1794.

WASTE AS RESOURCE

New design and productions methods create demand for waste as raw material

RAPID, FLEXIBLE MANUFACTURING

3D printers + computerized design trigger transformation of factories and manufacturing, and enable rapid prototyping of eco-friendly products

BIOTEAMING

Beyond project management: bio processes as guidelines, models

BIOHACKING

DIY molecular biology for health, performance, fashion and fun

BIOLOGICAL RESOURCE MANAGEMENT

- Bioengineered fuel cells
- Cellulose converting synthetic termites
- Beetle-inspired fog collectors for desert water

LABS ON A CHIP

Support *in situ* environmental sampling and analysis

POWER AND ENERGY INNOVATION

Options for alternative energy increase:

- **Biofuels:** saw grass, cellulose ethanol algae fuels cells
- **Solar:** organic polymer solar goods
- **Nuclear:** molten salt thorium nuclear power
- **Nano:** nano-boosted photovoltaics

HOW TO USE THIS MAP

FORESIGHT TO INSIGHT TO ACTION

The 2007–2017 Map of Future Forces Affecting Sustainability is a key step in a process of using foresight to reveal insights that can lead to more effective action in the present. You can use it as a simple road map, pointing to signposts in a sustainability landscape that you can not afford to overlook. But you can also tap much more deeply into it, using group processes to discover how your own organization—your strategies and your goals—will be shaped by the passage of the next ten years.

TAKE A FORESIGHT TOUR

The visual side of this map organizes IFTF's research in technology, environment, health and sustainability in a matrix format. Six rows, representing key external DRIVING FORCES shaping the future context for EHS, cross with seven columns—or IMPACT AREAS. The impact areas are different interpretations of, or perspectives on, sustainability that will register the various effects of the driving forces. The impact areas are not discrete silos but rather a framework for making sense of the sustainability landscape. On the other side of the map, you will find a text summary of the forecast structured around the seven impact areas. You can use the text as a narrative partner to the map.

SIGNALS

Located across the map are HOTSPOTS circled in blue. These are the big ideas of the forecast and make a good starting point for exploring the map.

Waving across the map are dozens of SIGNAL BANNERS: the indicators, innovations and examples that, when woven together, tell the stories from the forecast. Track several of them across the map to see what kind of story they tell together.

BUILD YOUR OWN FORESIGHT

No map is ever complete. So add to it. In a group or individually, use the columns and forecasts to organize your own intelligence about the future. Where do your most important internal forecasts fit in this bigger picture? What signals do they amplify?

CAPTURE INSIGHTS

Insight often emerges from juxtaposition. Circle signals (or forecasts) on the map that are most important to your organization. What makes them important—especially when you put them together? What dilemmas emerge and how can you creatively manage them?

LINK TO ACTION

Ultimately you want to link your foresight and insight to action. What are the next steps? The next step may simply to be to collect more foresight. Or it may be to link specific signals to key indicators you need to track. Or it may be to translate an insight into an initiative. Try not to leave the map without jotting down at least one action step.

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