Introduction to Sustainable Urban Development Planning

LECTURE 8

Sustainable Economy
- Sustainable Economic Development
- Green Economy
- Sustainable Economic Development Statistics, Indicators & Decision Making
- Quality of Life
Sustainable Economic Development
Sustainable Economic Development

The Goal of Sustainable Economic Development

Sustainable economic development helps cities and regions build an economic base that simultaneously creates new jobs and businesses; improves local standards of living; reduces income inequities; and improves the environmental performance of the local economy.

For cities/regions to be successful in the 21st Century, their economic development strategies need to reorient to the sustainability revolution and address the financial, social, and environmental performance of businesses and of the economy.
**Sustainable Economic Development**

**Targeted Sustainable Economy Outcomes**

- **IMPROVED BUSINESS SUSTAINABILITY PERFORMANCE.** All businesses in a region become greener and, at the same time, more economically productive.

- **SUSTAINABLE BUSINESS CLUSTERS.** Businesses that specialize in environmental products and services (the clean tech business cluster) are enabled to start-up, locate, and grow in the region.

- **IMPROVED LOCAL DEMAND.** Households are mobilized as educated green consumers, and local institutions drive demand for new products and services through their policies and buying practices.

- **SUSTAINABLE BUILT ENVIRONMENT.** Sustainable real estate development takes place – development that is mixed-use, mixed income, walkable, energy and resource efficient, and transit-oriented.

- **BUSINESS SUPPORT.** The regional financial, workforce, and educational infrastructure understands sustainable enterprises and prepares people to participate effectively as workers, consumers, and investors.

- **SUSTAINABLE INFRASTRUCTURE.** The regional physical infrastructure provides energy, water, materials, buildings, and mobility in a way that is both ecologically and economically efficient.

- **MARKET IMAGE.** The region is recognized as a place that is in the forefront of the sustainability revolution, becoming an economically, socially, and environmentally better place to live, work, and locate a business.
Sustainable Economic Development

Some Differences to Acknowledge

**Economic Development Field**

- Well established field with many parts of the professional infrastructure well in place (standards; tools; certifications; etc.)
- Well established public acceptance for rationale and outcomes.
- Significant resources committed for company subsidies – especially on the attraction side.
- Often short-term transaction oriented (“doing deals”) – economic development staff that have a strategic sector orientation and knowledge are not the norm.
- Success typically measured in company investment and jobs created/retained.
- Significant changes happening in the field in terms of thinking about innovation; entrepreneurship; and the role of regional economies.
- Staff come from backgrounds in the public sector and business/marketing.

**Sustainability and Climate Field**

- New field in early stages of professional development.
- Still building public understanding of the benefits, as well as the nature of the work.
- Heavily driven by scientific analysis and understanding.
- Resource base for the work has not yet been standardized.
- Typically oriented towards long-term thought horizons (“ice age to ice age”).
- Success measured in greenhouse gas reductions and increased adaptation.
- Staff come from a wide variety of backgrounds, including law; engineering; environmental policy; planning; etc.
Three Forms of Capital in a Business

Any business-person knows that, over the long run, a successful business needs to invest wisely to generate more income than expenses and to grow its capital. If a business lives off its capital, it will eventually go bankrupt. This is just as true for natural and social/human capital as it is for economic capital.

By holding themselves accountable for superior performance in each of these three areas, the companies adopt what has been referred to as a “multiple bottom line” or an “integrated bottom line” business strategy, seeking performance outcomes beyond simple financial ones.

The key premise to this approach is that these domains of business performance reinforce each other – that instead of requiring trade-offs (i.e. I have to sacrifice profits to achieve higher environmental performance), an integrated approach improves overall competitiveness (e.g. better environmental performance spurs innovation and creates new efficiencies that improve profits).

“Sustainable development is living on nature’s income rather than its capital.”

(Bjorn Stigson, President, World Business Council for Sustainable Development)

Defining the Three Forms of Capital in a Business Context

**Economic Capital:** Company assets that can be readily converted into some form of money (stock; cash; property; equipment; licenses; etc.). Economic capital is developed through the process of customer value creation.

**Social & Human Capital:** The physical, mental, emotional and spiritual capabilities of employees, and their relationships with each other. Human and social capital is created through the processes of learning and trust building.

**Natural Capital:** The natural resources and ecologies that a company depends on for its raw material inputs, as well as the environment in which it and its employees live. Natural capital is created through the natural processes of water, mineral, energy and biotic cycles.
## Sustainable Economic Development

### Multiple Performance Outcomes

A multiple bottom line or integrated bottom line business model requires that there be clear performance outcomes that reflect the business approach – the various bottom lines need to be defined in ways that are measurable and that create accountability.

<table>
<thead>
<tr>
<th>CAPITAL</th>
<th>WHAT SUCCESS LOOKS LIKE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Natural Capital</td>
<td>The enterprise radically reduces consumption of minerals, biological products, energy and water in an effort to eventually become part of a “closed loop” industrial ecology. Long-term, the enterprise contributes to the “re-weaving” of the natural ecology that has already been destroyed (restoration).</td>
</tr>
<tr>
<td>Social &amp; Human Capital</td>
<td>The enterprise nurtures the intellectual, physical, psychological and spiritual growth of its employees and contributes to the economic, social and environmental well-being of the communities that it is located in.</td>
</tr>
<tr>
<td>Economic Capital</td>
<td>The enterprise creates sufficient economic value added to:</td>
</tr>
<tr>
<td></td>
<td>• Generate competitive rates of return for its investors</td>
</tr>
<tr>
<td></td>
<td>• Pay acceptable compensation to its employees that exceeds “livable wage” standards</td>
</tr>
<tr>
<td></td>
<td>• Accumulate adequate financial reserves</td>
</tr>
<tr>
<td></td>
<td>• Maintain robust infrastructure (offices, IT, plant, equipment, etc.)</td>
</tr>
</tbody>
</table>
## Sustainable Economic Development

### Connecting The Three Capitals to Core Business Processes

There are opportunities to contribute to “multiple bottom line” capital formation across many different enterprise functions. Serious sustainable enterprises develop differentiated strategies across their key business functions.

<table>
<thead>
<tr>
<th>Enterprise Function</th>
<th>Ways It Can Help Build the Three Capitals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mission</td>
<td>What its purpose is; what its long term vision is; how it communicates to stakeholders</td>
</tr>
<tr>
<td>Leadership</td>
<td>What it values; who it recruits; how it develops leadership</td>
</tr>
<tr>
<td>Marketing and Product Development</td>
<td>Who it sells to; what it sells; how it designs products and services; where it sells</td>
</tr>
<tr>
<td>Production</td>
<td>How it produces; how much waste it creates; technology it uses</td>
</tr>
<tr>
<td>Human Resources</td>
<td>Who it hires; how many; how diverse; how it develops them; where they are located</td>
</tr>
<tr>
<td>Supply Chain Management</td>
<td>What it buys; where it buys it; who it buys from; how it develops its supply base</td>
</tr>
<tr>
<td>Facilities</td>
<td>Where it locates; how it constructs its facilities</td>
</tr>
<tr>
<td>Finance</td>
<td>Where it borrows money; where it invests funds; how it distributes profits/surplus</td>
</tr>
<tr>
<td>Community Relations</td>
<td>Who it gives money to; how it contributes to the community; who they lobby/influence and on what issues</td>
</tr>
</tbody>
</table>
## Sustainable Economic Development

### Different Kinds of “Sustainable” Business

Encouragement of sustainable business is at the heart of any Sustainable Economic Development Strategy. There is a lot of debate about what is and is not a “sustainable” business. The terms “sustainable”; “green”; “clean technology”; and “low carbon” tend to be used interchangeably without much differentiation.

In a very general way, businesses can be divided by whether they are a sustainable “producer” or whether they are a sustainable “user.”* “Producers” develop, create and sell sustainable products and services – i.e. products and services that reduce non-sustainable resource consumption. “Users” seek to embody sustainable business practices in the way they carry out their operations. We refer to “producers” as “clean tech” companies, and we refer to “users” as “green” companies. “Sustainable” businesses are green or clean tech business that also seek to build social/human capital.

### Sustainable Businesses

Businesses that “live off of nature’s income” and seek to simultaneously build natural, social/human and economic capital.

### Sustainable “Producers”

(aka “Clean Tech” companies)

Develop and market products and services that reduce non-sustainable resource consumption

### Sustainable “Users”

(aka “Green” companies)

Manage their business enterprises in ways that reduce non-sustainable resource consumption

---

*The Brookings Institution and Battelle are currently developing a more rigorous approach to defining and quantifying these two approaches to ‘green’ industry.*
Creating your sustainable economic development initiatives
Initiatives to Support Your Strategy

Each of the opportunity areas translates into a potential sustainable economic development initiative. Within each initiative, there are multiple kinds of actions that cities and regions can take to structure and implement that initiative.
Build Local and Regional Demand
(Green Savings)
Sustainable Economic Development

Build local and Regional Demand (Green Savings)

Use policies, incentives, investments and behavior changes to build demand for sustainable practices, products and services.

One of the ways in which sustainable economic development differs from traditional economic development is that cities and regions can play an important role in stimulating demand for sustainable products and services that serve the multiple purposes of:

- Attracting producers to the region.
- Encouraging innovation and new business development
- Supporting and advancing national policy

In essence, it means that in order to be a business and market leader in these niches, the local community needs to itself be a “lead user” and implement policies and incentives that show it is serious about “walking the talk.”

It is important to be realistic in this area, however. Business enterprises and clusters cannot be built on local demand alone. That demand must be aligned with larger market trends outside of the local area in order to have a real impact on business development. Local demand can help companies move into the market and refine their business strategies, but they rarely can serve as a platform for robust growth and expansion. That requires producing for markets outside of the local geography and engaging with regional, national and international competitors.

Possible Initiatives

1. **Sustainable Business Practices.** Improve the sustainability performance of existing businesses.
2. **Green Building Retrofits.** Improve the environmental performance of existing buildings and drive demand for green building products and practices.
3. **Sustainable Real Estate Investment.** Increase the supply of walkable, mixed-use, mixed-income, energy efficient, and transit-oriented real estate developments.
4. **Sustainable Infrastructure Investment.** Coordinate investments in municipal and private infrastructure and services (transportation, power, water, waste, communications) in ways that support the development of a sustainable economy.
5. **Large Scale Behavior Change.** Mobilize citizens to make sustainable consumer choices.
Purpose: To improve the sustainability performance of existing businesses.

Description: Sustainable business practice initiatives work to establish a regional system to assist all companies in improving their performance in all three capitals—financial; natural and human/social. This in turn drives demand for sustainable products and services and organizes the business community around the sustainable economic development agenda.

Actions:

- **Sustainability Reporting and Certification.** Communities can support companies in meeting sustainability reporting requirements, or achieving third party certifications. These can include ISO 14000; the Global Reporting Initiative; and the B-Corp, among others.

- **Local Green Business Certification.** Many communities have developed their own green business certification systems.

- **Green/Sustainable Business Forums.** These are networks of companies that share best practices in sustainability and environmental performance. They will often evolve to take on joint initiatives and projects as well as information sharing.

- **Sustainable Business User Groups.** User groups are small networks of firms that collaborate on the implementation of specific practices. They usually involve 6-8 businesses and are facilitated by someone with expertise in the practice area.

- **Industrial Ecology Analysis.** Also known as “regional resource metabolism assessments”, these projects seek to understand the regional flow of materials to reduce imports; increase exports; and turn waste into resources.

- **Sustainable Supply Chain Management.** This strategy helps companies green their supply chains.

- **Sustainable Extension Services.** Utilizing resources like the Manufacturing Extension Partnership, these strategies provide general technical consulting to companies about how to improve the sustainability of their businesses.
Sustainable Economic Development

Green Building Retrofits

**Purpose:** To improve the environmental performance of existing buildings and drive demand for green building products and practices.

**Description:** Green building retrofit initiatives work to establish a regional market for building retrofitting that improves the environmental performance of the buildings. This strategy both produces "green savings" in the form of reduced occupancy costs; and it stimulates economic development in the building sector.

**Actions:**
- **Retrofit Intermediaries.** These are separate organizations with the mission of designing and driving a regional retrofit strategy.
- **Customer Interface.** Simplified processes for auditing; contractor management; and performance measurement can reduce transaction costs for consumers.
- **Marketing and Education.** Communities are experimenting with outreach and marketing strategies that increase awareness and acceptance of retrofits as a “product.”
- **Financing.** Customized financing tools can be developed to help owners afford the costs of retrofits. These can include traditional financing; on-bill financing; Clean Energy Assessment Districts; and ESCO financing, among others.
- **Policy Support.** Retrofit strategies can be supported with policies such as energy codes; building energy efficiency labeling; and green requirements for city construction.
- **Workforce Systems.** Retrofit strategies need to be supported with workforce development and career pathways initiatives to build a labour supply that will match demand.
Sustainable Real Estate Investment

Purpose: To increase the supply of walkable, mixed-use, mixed-income, energy efficient, and transit-oriented real estate developments—both infill and new communities—that feature clean tech and green products, services and business enterprises.

Description: Sustainable Real Estate Development provides a foundation for Sustainable Economic Development. Mixed-use developments provide the spaces within which clean tech and green businesses can operate. The energy and cost efficiencies of green new construction and retrofits of existing buildings can be important sources of savings for green businesses and markets for clean tech businesses. Mixed-use, human-scale, walkable neighborhoods are more attractive to the entrepreneurial talent and workforce needed by clean tech and green businesses.

Actions:
- **Modifications to Planning Code and Zoning.** In many cases, cities need to reform their planning and zoning regulations to permit and encourage sustainable real estate development projects.
- **Urban Land Institute Sustainable Development Panels.** ULI Sustainable Development Panels are an accelerated way to develop recommendations that advance sustainable real estate strategies.
- **Sustainable Opportunity Scans.** Quick scans of the region for sustainable real estate development opportunities can develop a “portfolio” for the city and investors to focus on.
- **Eco-Smart Developments.** Eco-Smart Development aspires to create Eco-Smart Communities that exemplify intensive best practices. They typically utilize environmental preservation zones, energy efficient buildings and transportation, and renewable energy generation to achieve carbon neutrality and even be carbon-negative (taking more carbon out of the atmosphere than they release).
Sustainable Economic Development

Sustainable Infrastructure Investment

**Purpose:** To coordinate investments in municipal and private infrastructure and services (transportation, power, water, waste, communications) in ways that model and support the development of a sustainable economy.

**Description:** Municipal infrastructure has two potential impacts on business development. First, the quality and cost of services are key to attracting and retaining businesses. Second, these systems are potential sources of sustainable business demand and technology innovation. Regions that are ‘walking the talk’ on sustainable infrastructure will increase their capacity to be home to business innovators.

**Actions:**

- **Sustainable Transportation.** There are multiple approaches cities and regions can take to making their transportation systems more efficient and sustainable, including mass transit; car sharing; bus rapid transit; bike sharing; street cars; high speed rail; mobility on demand; and cargo-oriented development.

- **Green Infrastructure.** In many cases, green infrastructure provides a sustainable and cheaper alternative to “gray” infrastructure, especially for management of storm water.

- **Waste Systems.** Municipal solid waste systems provide many opportunities for combining resource efficiency with economic development, including resource recovery business parks that divert landfill wastes as feedstocks for targeted businesses.

- **Renewable Energy.** It is difficult to attract and retain renewable energy companies if the region is not implementing policies to advance those technologies, including Renewable Portfolio Standards; Renewable Energy Certificates; Net Metering; etc.

- **High Speed Broadband.** High speed broadband and energy conservation are highly synergistic. Broadband is increasingly required by state of the art companies for communications and data management, and allows the creation of “smart communities” that reduce travel and transportation.
Large Scale Behavior Change

**Purpose:** Mobilize citizens to make sustainable consumer choices.

**Description:** The emergence of new markets for sustainable products and services ultimately depend on consumers making different choices about what products and services they purchase and how they manage their own resource use. New practices are emerging that hold the potential of large scale change in citizen behavior linked to community sustainability strategies.

**Actions:**
- **Citizen Empowerment and Voluntary Action.** More communities are experimenting with strategies that use household teams and peer support systems to engage households in largescale voluntary actions to reduce carbon emissions at the household level.
- **Employee Engagement.** Large employers can engage their employees in reducing their carbon emissions. These strategies can accomplish the multiple objectives of improving corporate environmental performance; teambuilding; and reducing household emissions.
- **Social Marketing for Sustainability.** Largescale public information campaigns have proven successful in building awareness motivating behavior change for public health issues like smoking and cholesterol. Similar approaches can be used for climate change using the tools of social marketing.
Strengthen Local and Regional Supply
(Green Opportunities)
Sustainable Economic Development

Strengthen Local and Regional Supply (Green Opportunities)

Support the creation, development, and attraction of sustainable businesses and business clusters.

Possible Initiatives.
1. **Clean Tech Cluster Development.** Encourage the emergence and growth of clean tech business clusters.
2. **Clean Tech Technology Transfer.** Accelerate the commercialization of innovative intellectual property in your local clean tech cluster.
3. **Clean and Green Tech Business Support.** Promote the city, community, or region as an optimal place for clean tech and green businesses to locate, expand, and grow over the long term.
4. **Sustainable Finance.** Increase the availability of specialized investment capital that is targeted to sustainable and clean tech businesses and business opportunities.
5. **Sustainable Branding and Marketing.** Brand your region as an emerging sustainable economy with a coherent sustainable development agenda and distinctive competence.

The core work of sustainable economic development is building the base of sustainable businesses and business clusters in your region. This involves many of the traditional economic development tools of business attraction, retention, and expansion, but also means focusing and refining those tools to target specific kinds of companies — high performing "producers" (clean tech) and high performing "users", as well as companies that are intentional and deliberate about the building of social and human capital within their enterprises and within the community.

Significant investments of time, effort, and money can occur before results become apparent. While marketing “sizzle” can work in the short run, the development of a genuine “sustainability brand” will only happen over the long run, as strategic focus and investment survives the test of time.

This long-term focus means it is critical that the support infrastructure for the strategy for a sustainable economic development strategy be in large part insulated from changes in political leadership. This only happens with a strong private and independent sector commitment and ongoing investment.
Clean Tech Cluster Development

Purpose: To encourage the emergence and growth of Clean Tech business clusters.

Description: A Clean Tech Cluster strategy uses the approach of business cluster development to encourage the emergence of and/or the strengthening of a clean tech business cluster in a city, community, or region.

Actions:

- **Clean Tech Cluster Study.** This analysis forms the basis for growth of clean tech any cluster strategies. It identifies the businesses in the cluster; their relationships with each other; the required business Cluster specialized inputs and support mechanisms; and opportunities for cluster development.

- **Clean Tech Networks.** Clean Tech networks bring together the key players in the clean tech cluster (business owners; entrepreneurs; utilities; investors; service providers; A Clean Tech Cluster academic and R&D institutions; and government agencies) to share best practices with each other; contribute to the Strategy uses the approach design of clean tech initiatives; and develop joint projects.

- **Clean Tech Business Acceleration.** A business development to encourage acceleration program helps companies grow “faster and the emergence of and/or smarter”—increasing income while increasing positive environmental and social benefits. It involves a “networked incubator” structure to assess business plans; provide tech business cluster In a consulting support; link to markets and customers; and link to investors.

- **Clean Tech Business Recruitment.** Business attraction resources are tightly targeted to firms that bring complementary technologies and markets to existing cluster players and fill out “gaps” in the cluster.
Clean and Green Tech Business Support

**Purpose:** To promote the city, community, or region as an optimal place for clean tech and green businesses to locate, expand, and grow over the long term.

**Description:** A sustainable business development strategy focuses the traditional tools of business attraction, retention, and development on targeted sustainable business sectors.

**Actions:**
- **Sustainable Business Recruitment.** Business recruitments need to be refined and focused on those sectors that the region believes it has a competitive advantage in. This requires as much more strategic approach to identifying and recruiting companies than is often pursued by local expand economic development organizations.
- **International Recruitment.** It is often necessary to reach out to foreign markets to identify leading candidates for attraction, particularly in renewable energy and other efficiency areas where China, the EU and other markets have an edge over the US. This kind of strategy is best executed in cooperation with State and Federal partners.
- **Sustainable Business Assistance Centers.** Sustainable Business Assistance Centers customize business services to the practice of sustainable business. This will often require specialized expertise that cities and regions don’t have.
Sustainable Finance

**Purpose:** To increase the availability of specialized investment capital that is targeted to sustainable and clean tech businesses and business opportunities.

**Description:**
A Sustainable Business Finance strategy assures that there are specialized investment sources across the full spectrum of finance—angel; seed; venture capital; mezzanine; growth capital; and traditional debt financing.

**Actions:**
- **Green Finance Network.** A Green Finance Network is a regional investment network made up of banks, venture funds, real estate funds, angel investors, banks, insurance intermediaries, pension funds and other investors interested in green equity or debt investment.
- **Green Investment Fund.** Many communities have developed their own private equity and loan funds specifically targeted at sustainable real estate development or clean tech and green businesses. To be successful, these funds require adequate geographic scope to support deal flow; multiple national and regional investors; and professional fund management.
- **Green Bond Mechanisms.** A Green Bond Mechanism can take either the form of a tax-exempt bond or a taxable bond. Green Bonds can be used to finance retrofit programs for residential, commercial, industrial, and public buildings and construction of facilities for green and clean tech businesses.
Sustainable Economic Development

Sustainable Branding and Marketing

Purpose: To brand your city/region as an emerging sustainable economy with a coherent sustainable development agenda and distinctive competence.

Description: A Sustainable Branding and Marketing campaign develops messages; communication channels; and media to raise its visibility as a leading sustainable economy player.

Actions:

- **Identity Development.** The city/region needs to develop a distinctive identity that goes beyond the “we’re green” or “we're sustainable” message. It needs to have a compelling story about the place and how it is unique.

- **Message Development.** Focused messages about the city/region need to be developed and adopted across multiple organizations.

- **Audience Targeting.** The city/region needs to identify the key audiences it wants to influence, and what kinds of messages they listen to and communications channels they participate in.

- **Communication Channels.** A wide variety of communications channels — news services; Internet blogs; television; radio; and print media — are used to send a consistent message to key audiences.

- **Event-Based Marketing.** Specific events, such as sustainable economy conferences, trade shows, and expositions, can be used to advance the city/region’s image as “a place to be” in the sustainable economy market.
Engage People in the Sustainable Economy

(Green Talent)
A sustainable development strategy will require a long-term approach to building new career pathways and related skills to support sustainable business sectors.

The sustainable economy affects skill demand in several ways:

- Many existing jobs will require new skill sets.
- New occupations and related skill certifications will be created.
- New career pathways (linking sequential occupations) will emerge.

It is important to pace new skill development with actual demand — if demand exceeds supply, it will negatively affect the competitiveness of enterprises. Equally, if supply is prematurely developed without effective demand, it will waste resources and discourage people from seeking careers in this niche.

Possible Initiatives
1. **Green Talent Systems.** Stimulate the creation of the trained and job-ready green workforce and the well-educated green entrepreneurial and managerial capacity needed to power the transformation to a sustainable economy.

2. **Sustainable Community Development.** Connect the benefits of resource conservation and sustainable economic development to local communities and disadvantaged populations.

3. **Sustainable Community Engagement.** Engage the residents of a city, community, or region in understanding sustainability, participating in the process of building a sustainable economy, and making green purchasing decisions.
Green Talent Systems

Purpose: To stimulate the creation of the trained and job-ready green workforce and the well-educated green entrepreneurial and managerial capacity needed to power the transformation to a sustainable economy.

Description: A Green Talent System aligns the skill needs of the marketplace with talent suppliers through well-defined career pathways.

Actions:
- **Green Jobs Analysis.** This analysis does a comprehensive review of the current and forecasted green jobs; market segments that will drive demand, and the occupational categories and career pathways that are associated with them. (This includes analysis of the job impacts of local sustainability and/or climate mitigation plans and strategies.)
- **Green Career Pathways.** This action defines the “career pathways” for highest demand green jobs — skill standards; required certifications; and skill development progressions.credit and non-credit). It includes creation of career advising strategies for green careers.
- **Capacity Analysis.** This assessment measures the capacity of regional education and workforce development providers to meet the career pathway demand — both qualitatively and quantitatively. It includes an inventory of all existing programs.
- **Sustainable Business Education.** Sustainable business education programs can be created at local higher education institutions, including green entrepreneur programs.
- **Overall Green Jobs Strategy.** Development and implementation of the strategy is best done with a city/regional leadership team and will require a funding strategy and selection of workforce intermediaries.
**Sustainable Community Development**

**Purpose:** To connect the benefits of resource conservation and sustainable economic development to local communities and disadvantaged populations.

**Description:** A Sustainable Community Development initiative takes a proactive approach to localizing the benefits and connecting them to minorities, women, and underserved communities. It also engages low- and moderate-income employees and residents in saving money through ecological efficiency.

**Actions:**

- **Economic Localization.** Localization strategies seek to strengthen and diversify local economies by developing localized networks for economic exchange and increase the total number and market share of locally owned, socio-culturally diverse and neighborhood- and community-based businesses.

- **Neighborhood and Community-Based Economic Development.** The sustainable development strategy can be used to spur community and neighborhood-level economic development and redevelopment in ways that bring employment and income benefits to residents on an inclusive basis.

- **Green Capital Connections Program.** This action seeks to develop the ability of minority and women-owned businesses to participate in sustainable market supply chains.

- **Equity Express Program.** Equity Express helps low-income households reduce their cost of living by systematically applying principles of ecological efficiency to their household practices and consumption patterns around energy, water, transportation, food, telecommunications, and information technology.
Sustainable Economic Development

Sustainable Community Engagement

**Purpose:** To engage the residents of a city, community, or region in understanding sustainability, participating in the process of building a sustainable economy, and making green purchasing decisions.

**Description:** Through a Sustainability Community Engagement Initiative, a place can define itself as a sustainable city, community, or region, and residents, businesses, community organizations, and government agencies can create an area-wide culture of sustainability that reduces costs, obtains financial benefits, and contributes to a prosperous economy, while contributing to the environmental and social health of the city, community, or region.

**Actions:**

- **Green One-Stop Center.** A One-Stop center creates a centralized source of information for citizens to obtain information about the region’s sustainability strategies and how they can participate in them. (In some cases One-Stop Centers are created for specific initiatives, such as building retrofits).
- **Sustainability Education.** Education initiatives seek to integrate knowledge about sustainability and the sustainable economy in K-12 schools, adult education, and community colleges.
- **Sustainable Economy Dashboard.** Many communities already have sustainable indicator initiatives, and these can be customized to reflect the sustainable economic development outcomes.
- **Sustainability Communications.** A communications strategy will build off of the region’s marketing and branding platform, and will incorporate multiple ways of sharing information, including web sites and an annual Sustainability Report.
- **Sustainable Economy Conference and Exposition.** An annual Building a Sustainable Economy conference and exposition provides an opportunity to bring together regional leaders and citizens to discuss trends and challenges, showcase progress, and enable area enterprises to exhibit their products, services, and programs.
Summary of Graphics of Initiatives and Actions
Summary

Sustainable Economic Development

**Build Local/Regional Demand**
Use policies, incentives, investments and behavior changes to build demand for sustainable products and services.

**Strengthen Local/Regional Supply**
Support the creation, development, and attraction of sustainable businesses and business clusters.

**Engage People in the Sustainable Economy**
Build skills for the green economy and enroll communities in the process.

- **Sustainable Business Practices**
  - Sustainability Reporting & Certification
  - Local Green Business Certification
  - Sustainable Business Forums
  - Sustainable Business User Groups
  - Industrial Ecology Analysis
  - Sustainable Supply Chain Management
  - Sustainable Extension Services

- **Green Building Retrofits**
  - Retrofit Intermediaries
  - Customer Interface
  - Marketing and Education
  - Retrofit Financing
  - Retrofit Policy Support
  - Workforce Systems

- **Sustainable Real Estate Development**
  - Planning Code and Zoning Modifications
  - ULI Panels
  - Sustainable Opportunity Scans
  - Eco-Smart Developments

- **Sustainable Infrastructure Investment**
  - Sustainable Transportation
  - Green Infrastructure
  - Waste Systems
  - Renewable Energy
  - High Speed Broadband

- **Large Scale Behavior Change**
  - Citizen Empowerment and Voluntary Action
  - Employee Engagement
  - Social Marketing for Sustainability

- **Clean Tech Cluster Development**
  - Clean Tech Cluster Study
  - Clean Tech Networks
  - Clean Tech Business Acceleration
  - Clean Tech Business Recruitment

- **Clean Tech Technology Transfer**
  - Intellectual Property Mining
  - Industry R&D Consortia
  - IP Networks
  - Vertical Inventor Networks
  - Research Institutes

- **Clean And Green Tech Business Support**
  - Sustainable Business Recruitment
  - International Recruitment
  - Sustainable Business Assistance Centers

- **Sustainable Finance**
  - Green Investment Funds
  - Green Bond Mechanisms
  - Green Finance Networks

- **Sustainable Branding and Marketing**
  - Identify Development
  - Message Development
  - Audience Targeting
  - Communication Channels
  - Event-Based Marketing

- **Green Talent Systems**
  - Green Jobs Analysis
  - Green Career Pathways
  - Capacity Analysis
  - Sustainable Business Education
  - Green Jobs Strategy

- **Sustainable Community Development**
  - Economic Localization
  - Neighborhood and Community-Based Economic Development
  - Green Capital Connections Program
  - Equity Express Program

- **Sustainable Community Engagement**
  - Green One-Stop Centers
  - Sustainability Education
  - Sustainable Economy Dashboard
  - Sustainability Communications
  - Sustainable Economy Conference and Exhibition
References


Green Economy
Green Economy

What is a Green Economy?

Blueprint for a Green Economy

Making economies more sustainable requires three key policies:

I. Valuing the environment
II. Accounting for the environment
III. Incentives for environmental improvement.


Blueprint for a Green Economy, 1989 David Pearce, Anil Markandya, Edward Barbier
Green Economy

A Global Crisis with Multiple Dimensions and Implications
Green Economy

Why Green Economy?

- Failure of past international efforts in sustainable development

Financial crisis - threatening jobs worldwide & poverty reduction gains

Current Economic Model

- Worsen quality of lives
- Social Disparity resulted from rapid urbanization
- Ecological scarcity
- Resource exhaustion
- Climate Disaster
- Fuel & Food crisis

The world needs to transition to a sustainable green economy
Green Economy

Why Green Economy?

CAUSES

- Market failures
  - Intragenerational and Intergenerational Externalities
  - Especially, Intergenerational Externalities are highly ignored
  - Causes misallocation of capitals and resources among generations
  - Unsustainability

- Institutional inertia and governance failure
  - Vested interests
  - Agency problem
The Causes of Innovation Slowdown

Two different technological limits

- Physical and Biological Limits
  - due to the laws of physics and biology
    - such as the impossibility of building a perpetual motion machine

- Economic Limit:
  - Increasing marginal cost vs. diminishing marginal benefit of R&D
Opportunity Amidst Crisis

Opportunity as governments jump start economies

Potential for substantial investments in a green economy
**Rethinking The Economic Recovery: A Global Green New Deal**

1. Revive the world economy, create new and decent jobs, and protect the vulnerable

2. Reduce carbon dependency, ecosystem degradation, and water scarcity

3. Eliminate persistent poverty by 2015…. achieve the MDG’s

Global Green New Deal Rationale

• Fiscal stimulus agreed as the way forward, but how *sustainable* is the recovery?

• “Green Investment” beats a “Shopping Spree”

• “Win-Win-Win” solutions exist: Decent Jobs, Lower Risks, Higher Returns

• Globalization is a fact: success lies in globally coordinated action..

• “A crisis is a terrible thing to waste”: Seeding the “Green Economy”
Green Economy

Global Green New Deal Components

• International Policy Architecture
  • International Trade
  • International Aid
  • Global Carbon Market
  • Global Markets for Ecosystems Services
  • Development and Transfer of Technology
  • GGND International Coordination

• Domestic Policy Initiatives
  • Perverse Subsidies
  • Incentives & Taxes
  • Land Use and Urban Policy
  • Integrated Management of Freshwater
  • Environmental Legislation
  • Monitoring and Accountability

Fiscal Stimulus in 2009-2010

• Energy Efficient Buildings
• Sustainable Transport
• Sustainable Energy
• Agriculture and Freshwater
How Big is the “Green” Economy?

A recent (April 2010) report by the US Department of Commerce Economics and Statistics Administration (ESA) conducted a detailed assessment of the size of the green economy. The Measuring the Green Economy report looked at 732 detailed product codes for green products and services. Based on this analysis, they came to the following conclusions:

• Green products and services comprised only 1% to 2% of the total private business economy in 2007.

• The number of green jobs ranged from 1.8 million to 2.4 million.

The services sector accounted for 75% of green business activity; manufacturing for 13%.

• Energy conservation, resource conservation and pollution control accounted for 80% to 90% of green business activity.

• Between 2002 and 2007, the share of green shipments and green jobs in manufacturing remained fairly constant.

• The green economy is in a position to grow quickly, but the relatively small size of the green economy suggests that a majority of the new growth during the recovery will come from products and services outside of the green economy.

• The process for measuring the green economy is far from exact; better definitions and alignment of data sources are needed.

Definition of Green Products and Services

The ESA report defines green products and services as those whose predominant function serves one or both of these goals:

• Conserving energy or other natural resources

• Reducing pollution

These basically are the “sustainable producers.” The report does not cover “sustainable production practices” – companies who produce “non-green” products and services in ways that conserve resources.

Out of a total universe of 22,000 product codes, the ESA “conservative” definition covers 497 product and service codes; the “broad” definition covers 732 products and service codes.
Green Economy: Living well within ecological limits

- **Ecosystem services**
- **Withdrawals from the ecosystems**
- **Ecosystems**
- **Policy**
- **Values**
- **Technology**
- **Market**
- **Energy system**
- **Food system**
- **Mobility system**
- **Technology**
- **Science**
- **Deposits**
- **Pollution**
- **Environmental externalities**
- **Sustainability**

**ECOSYSTEMS**

**SOCIO-TECHNICAL SYSTEMS**

Providing science, values, and technology.
Green growth is economic growth that is environmentally sustainable (WB, 2012)

- Enhances the quality of growth
- End goal is to operationalize sustainable development

Figure from Poverty-Environment Partnership 2012.

An inclusive green economy that can reduce poverty and inequality and sustain inclusive growth
Green Economy

**Segments of the Green Economy**

There are several ways in which people are beginning to segment the sub-sectors of sustainable producers and users. The following several slides integrate several of these approaches into a taxonomy of increasing levels of detail.

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Segments</th>
</tr>
</thead>
</table>
| Clean Energy Sources            | The production, storage and distribution of renewable or low carbon energy sources. | • Clean energy generation  
• Energy storage  
• Energy infrastructure |
| Energy Efficiency                | Technologies and services that reduce the amount of energy consumed by different sectors of the economy. | • Building energy efficiency  
• Appliances and controls  
• Energy management |
| Green Production Practices      | Enterprises that produce products and services or use production practices that reduce the consumption of natural resources. | • Transportation and logistics  
• Manufacturing and industrial  
• Materials and nano-technologies  
• Green construction  
• Agriculture |
| Pollution Mitigation, Conservation, and Restoration | Enterprises and technologies focused on reducing pollution or conserving and restoring natural ecologies. | • Water and wastewater  
• Air and environment  
• Materials recovery and recycling |
| Support Services                | Consulting and other services that help enterprises develop and implement green and clean technologies. | • Advocacy and policy  
• Green business consulting  
• Green finance  
• Research and development  
• Education |
<table>
<thead>
<tr>
<th>Category</th>
<th>Segment</th>
<th>Sub-segments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Clean Energy Sources</strong></td>
<td><strong>Clean Energy Generation</strong></td>
<td>Distributed &amp; renewable energy, Equipment, controls, software, services</td>
</tr>
<tr>
<td></td>
<td><strong>Energy Storage</strong></td>
<td>Fuel cells, Advanced batteries, Hybrid systems</td>
</tr>
<tr>
<td></td>
<td><strong>Energy Infrastructure</strong></td>
<td>Transmission, Demand Mgt., Smart grids, Power monitoring</td>
</tr>
<tr>
<td><strong>Energy Efficiency</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Green Production Practices</strong></td>
<td><strong>Transportation and Logistics</strong></td>
<td>Alt. Fuels, Alt. Vehicles, Fuel Efficiency, Logistics, Transit systems</td>
</tr>
<tr>
<td></td>
<td><strong>Manufacturing and Industrial</strong></td>
<td>Life cycle design, Packaging, Smart production, Industrial ecology</td>
</tr>
<tr>
<td></td>
<td><strong>Materials and Nano-Technology</strong></td>
<td>Nano, bio, chemical and other new, more efficient materials</td>
</tr>
<tr>
<td></td>
<td><strong>Green Construction</strong></td>
<td>Design &amp; construction, Building materials, Site management, Green Real Estate Dev.</td>
</tr>
<tr>
<td></td>
<td><strong>Agriculture</strong></td>
<td>Organic farming, Sustainable Forestry, Sustainable Aquaculture, Sust. Food Processing, Local food syst.</td>
</tr>
<tr>
<td><strong>Pollution Mitigation and Conservation</strong></td>
<td><strong>Water and Wastewater</strong></td>
<td>Filtration, Conservation, Wastewater, Pumping/Metering</td>
</tr>
<tr>
<td></td>
<td><strong>Air and Environment</strong></td>
<td>Purification, Emission control, Land conservation, Eco-system regeneration</td>
</tr>
<tr>
<td></td>
<td><strong>Materials Recovery &amp; Recycling</strong></td>
<td>Recycling, Waste Mgt. &amp; Treatment, Recycling machinery</td>
</tr>
<tr>
<td><strong>Support Services</strong></td>
<td><strong>Advocacy and Policy</strong></td>
<td>National climate &amp; env. member organizations, Community-based environmental org., Policy think tanks</td>
</tr>
<tr>
<td></td>
<td><strong>Green Business Consulting</strong></td>
<td>Env. Law services, Sustainable business consulting, Product branding and marketing</td>
</tr>
<tr>
<td></td>
<td><strong>Green Finance</strong></td>
<td>Emissions trading &amp; offsets, Green investment funds</td>
</tr>
<tr>
<td></td>
<td><strong>Research &amp; Development</strong></td>
<td>Federal R&amp;D Institutes, IP commercialization, Private R&amp;D labs</td>
</tr>
<tr>
<td></td>
<td><strong>Education</strong></td>
<td>Sustainable business certificates &amp; degrees, Green career pathways, certifications</td>
</tr>
</tbody>
</table>
Green Economy

Why Green Economy?

- ROOT CAUSES
  - Selfishness of human beings
  - The more two individuals are genetically unrelated, the more sense it makes for them to behave selfishly with each other.
Green Economy

New challenges: Slowdown of Technological Breakthroughs

Rate of innovation since the end of the Dark Ages (Huebner, 2005)

Green Economy

The Efforts on Promoting Green Economy

The Green Economy Initiative in UN

2009

- Fiscal stimulus
- Domestic policy reforms
- International coordination

2011

- Enabling conditions for a green economy
- 11 sectors

2012

THE FUTURE WE WANT

- A green economy
- Sustainable development
- Institutional framework

- Reviving the world economy
- Developing sustainable environment, economy and the society
- Achieving the MDGs,

Green Economy

Improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities
Green Economy

The Efforts on Promoting Green Economy

International Organizations

1. UNEP (2011)
2. World Bank (2012)
3. OECD (2011)
Green Economy

UNEP (2011)
Towards a Green Economy: Pathways to Sustainable Development and Poverty Reduction

- Agriculture
- Fisheries
- Forests
- Water

Sectors from Natural Capital
Enabling Conditions
Key policy tools + Supporting actions

- Renewable Energy
- Transport
- Manufacturing
- Tourism
- Waste
- Cities
- Buildings

Finance

Governance

Market

Infrastructure

Information
Green Economy

World Bank (2012)
Inclusive Green Growth: The Pathway to Sustainable Development

To build non-regret physical capital

Physical Capital

Green Innovation and Industrial Policies

Sustainable Development

Human Capital

Market and Nonmarket mechanism

Natural Capital

Sustainable management of natural capital

To help minimize the risks posed by green growth policies and maximize co-benefits
Green Economy

3

OECD (2011)
Towards Green Growth

Green Growth Indicators

- Pricing pollution and natural resource use
- Removing perverse subsidies
- Emission Trading

Transition toward Green Growth

To fully reflect the value of the natural resource base of the economy

To address the roles of innovation, infrastructure & institutions in enabling change

- Green Innovation
- Infrastructure investment programs
- Institutional and governance capacity
## Green Economy

### Green Economy/ Growth Policies of Several Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Policy</th>
<th>Targets (for example)</th>
</tr>
</thead>
<tbody>
<tr>
<td>German</td>
<td>National Strategy for Sustainable development (2012)</td>
<td>Share of renewable energy sources in final energy consumption to be increased to 18% by 2020 and 60% by 2050</td>
</tr>
<tr>
<td>China</td>
<td>China’s 12th Five-Year Plan</td>
<td>Develop 7 priority industries: energy saving and environmental protection, new energy, clean energy vehicles, biotechnology, new material, new IT, high-end manufacturing.</td>
</tr>
</tbody>
</table>

Source: HSCB 2009, CIA factbook
EU Policy tools that can help achieve 2020 targets in line with 2050 visions

- Regulation
- Fiscal reform
- Financing tools
1. Well-designed legislation stimulates innovation

- Policy analysis and research demonstrate that well-designed regulations can stimulate innovation.
Legislation supports the global ‘race to the top’

- Legislation ‘export’ gives European businesses a head start in global markets.
- Environmental policy is regarded in some quarters as Europe’s most successful foreign policy.
- The EURO emission standards and REACH legislation are examples of European regulation ‘export’. This spreads higher environmental standards around the world.
Green Economy

EU emissions standards are adopted across Asia, giving European exporters access to huge markets

Adoption of the EU’s Euro emissions standards for road vehicles in Asian countries, 1995–2025

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>E1</td>
<td>Euro 2</td>
<td>Euro 3</td>
<td>Euro 4</td>
<td>Euro 5</td>
<td>Euro 6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HK (⁺), China</td>
<td>Euro 1</td>
<td>Euro 2</td>
<td>Euro 3</td>
<td>Euro 4</td>
<td>Euro 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td>Euro 4</td>
<td>Euro 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China (⁻)</td>
<td>Euro 1</td>
<td>Euro 2</td>
<td>Euro 3</td>
<td>Euro 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China (⁺⁺⁺)</td>
<td>Euro 1</td>
<td>Euro 2</td>
<td>Euro 3</td>
<td>Euro 4</td>
<td>Euro 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singapore (⁺⁺⁺)</td>
<td>Euro 1</td>
<td>Euro 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Singapore (⁺⁺⁺)</td>
<td>Euro 1</td>
<td>Euro 2</td>
<td>Euro 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>India (⁺⁺⁺)</td>
<td>Euro 1</td>
<td>Euro 2</td>
<td>Euro 3</td>
<td>Euro 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>India (⁺⁺⁺)</td>
<td>E1</td>
<td>Euro 2</td>
<td>Euro 3</td>
<td>Euro 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>Euro 1</td>
<td>Euro 2</td>
<td>Euro 3</td>
<td>Euro 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>Euro 1</td>
<td>Euro 2</td>
<td>Euro 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td>Euro 1</td>
<td>Euro 2</td>
<td>Euro 4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vietnam</td>
<td>Euro 2</td>
<td>Euro 4</td>
<td>Euro 5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>Euro 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangladesh (⁺⁺⁺)</td>
<td>Euro 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangladesh (⁺⁺⁺)</td>
<td>Euro 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td>E2 (⁺⁺⁺)</td>
<td>Euro 2 (⁺⁺⁺)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>Euro 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nepal</td>
<td>Euro 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: CAI, 2011
2. Environmental Fiscal Reform

- Shifting taxes from societal goods – employment, investment – to societal bads – pollution and over-consumption

- Taxation shift puts a price on environmental externalities, thereby reducing pressures on human and ecosystem health while also supporting economic efficiency and jobs.

- Removing harmful subsidies
But environmental taxes are an under-used tool in the EU

Environmental taxation as a percentage of GDP (distinguished between energy, transport and pollution/resource) in the EU-27

Eco-innovation and competitiveness are compatible

- Finland, Germany and Sweden are highly competitive, and leaders in eco-innovation
3. Several sources of financing the green economy shift

- Estimates for the financing needs of the green economy range from between US$70bn and several trillion dollars per year.

- Public funding: European Commission, European Investment Bank, the Green Climate Fund.

- Private funding: pension funds and insurance companies.

The Global Green Bond Market In 2011

Source: Della Croce et al., 2011
To build up solid foundations for a green economy

- APEC, WTO
- UN-NGO

**International cooperation**
- Green consumption & marketing

**Investment & Spending**
- Green label

**Finance**
- Subsidy reform
- Investment in natural assets
- Public Procurement

**Human capacity & Administrative capacity**
- Training, education
- License
- Assessment, monitoring and enforcement ability

**Market mechanism**
- Full cost pricing
- Fees-in-tariffs
- Peak pricing

**Green Science and Technology**
- Foster innovation with R&D
- Experimental model plans

**Enabling Conditions**
- Information and public awareness
- Green label
- Green Investment Bank
- Green Fund
- Green PPPs
- Training, education
- License
- Assessment, monitoring and enforcement ability
- Foster innovation with R&D
- Experimental model plans
What is the potential for environmental industries to become drivers of future economic growth?

What financial, policy and institutional barriers currently inhibit a shift towards a green economy?

What national experiences currently exist?
Sustainable Economic Development Statistics, Indicators & Decision Making
Sustainable Economic Development Statistics, Indicators & Decision Making

Uses of statistics and indicators

- Planning
- Formulating laws, policies and regulations
- Designing market instruments
- Research and education
- Media
- Public participation
Sustainable Development - Decision-making and Action

- Recognition of problem (depends on some overview data)
- Formulation of policy (implies further data needs)
- Identification of solution (followed-up by more detailed data)
- Implementation of control (supported by continued detailed data for monitoring)
Sustainable Economic Development Statistics, Indicators & Decision Making

Using statistics and indicators in decision-making for sustainable development

- What are the priority issues?
- Which statistics/indicators are needed to measure the issues?
- Do the statistics/indicators exist?
- Are the data readily available?
- What are the data sources?
- How are the data collected?
- What is the data coverage?
- What is the periodicity of data collection?
- What is the quality of the data?
Sustainable Economic Development Statistics, Indicators & Decision Making

Information Pyramid

- Indices
- Indicators
- Statistics
- Raw data
Purposes of indicators

- Defining objectives
- Assessing present and future direction with respect to goals and values
- Evaluating specific programmes
- Demonstrating progress
- Measuring changes in a specific condition or situation over time
- Determining impact of programmes and conveying messages
Criteria for Indicator Selection

- Policy-relevant
- Specific
- Valid
- Reliable
- Sensitive
- Measurable
- User-friendly
- Cost-effective
Assessment of Data Quality

- Relevance
- Timeliness
- Accessibility
- Clarity
- Metadata
- Accuracy

- Completeness
- Comparability
- Methodological soundness
- Efficiency
- Coherence
Sustainable Development - Frameworks and Indicators

- Frameworks and approaches
- Lists of indicators
- Focus of this presentation is on the Commission on Sustainable Development (CSD) list of indicators and the Millennium Development Indicators
CSD Indicators of Sustainable Development Guidelines and Methodologies

- Core set of 58 indicators with flexible adaptation at the national level
- Description of themes and sub-themes
- Methodology sheet for each indicator by lead agency
- Guidelines for national implementation

(http://www.un.org/esa/sustdev/natlinfo/indicators/isd.htm)
Indicators of Sustainable Development: Guidelines and Methodologies

September 2001
Second Edition

Indicators of Sustainable Development

Sustainable Economic Development Statistics, Indicators & Decision Making
### Indicators of Sustainable Development

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Theme</th>
<th>Sub-Theme</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Economic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institutional</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Sustainable Economic Development Indicators

<table>
<thead>
<tr>
<th>Theme</th>
<th>Sub-theme</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Structure (2)</td>
<td>Economic Performance</td>
<td>GDP per Capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Investment Share in GDP</td>
</tr>
<tr>
<td></td>
<td>Trade</td>
<td>Balance of Trade in Goods and Services</td>
</tr>
<tr>
<td></td>
<td>Financial Status (33)</td>
<td>Debt to GNP Ratio</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total ODA Given or Received as a Percent of GNP</td>
</tr>
<tr>
<td>Consumption and Production Patterns (4)</td>
<td>Material Consumption</td>
<td>Intensity of Material Use</td>
</tr>
<tr>
<td></td>
<td>Energy Use</td>
<td>Annual Energy Consumption per Capita</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Share of Consumption of Renewable Energy Resources</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intensity of Energy Use</td>
</tr>
<tr>
<td></td>
<td>Waste Generation and Management (19-22)</td>
<td>Generation of Industrial and Municipal Solid Waste</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Generation of Hazardous Waste</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Generation of Radioactive Waste</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Waste Recycling and Reuse</td>
</tr>
<tr>
<td></td>
<td>Transportation</td>
<td>Distance Traveled per Capita by Mode of Transport</td>
</tr>
</tbody>
</table>
Particular issues in the compilation of environmental statistics and indicators

- Indicator is not always relevant
- Lack of coordination at the national level
- Politically sensitive data
- Lack of resources
- Different definitions and/or classifications
- Lack of adequate time series
- Duplicate data sources and/or conflicting values
- Some examples from the CARICOM region
References

A guidebook to the Green Economy Issue 1: Green Economy, Green Growth, and Low-Carbon Development – history, definitions and a guide to recent publications Division for Sustainable Development, UNDESA

A guidebook to the Green Economy Issue 3: exploring green economy policies and international experience with national strategies Division for Sustainable Development, UNDESA

Green Economy and Sustainability A Societal Transformation Process: Summary for Decision-Makers
http://www.ihdp.unu.edu/docs/Publications/Secretariat/Reports/SDMs/IHDP-Green%20Economy%20SDM.pdf

Report on definitions of the Green Economy and progress towards it Deliverable 2.1
http://netgreen-project.eu/sites/default/files/NETGREEN%20Deliverable%202.1%20Annexes.pdf

Cities, Climate Change and the Green Economy: A Thematic Literature Survey

Defining the Green Economy LABOUR MARKET RESEARCH STUDY 2010

Green Growth (for China): A Literature Review

State of Green: The Definition and Measurement of Green Jobs

A New Paradigm for Caribbean Development: Transitioning to a Green Economy.

Towards A Green Economy -- Exploring the Political Feasibility of Carbon Tax Policy in Ireland
http://lup.lub.lu.se/luur/download?func=downloadFile&recordOId=1785081&fileOId=1786922
References


Shorrocks Anthony, 2007. Human Well-Being: Concept and
Quality of Life
Luca D’Acco
Some definitions of quality of life

“The general well-being of a person or society, defined in terms of health and happiness, rather than wealth”. (Collins Dictionary).

“The standard of health, comfort, and happiness experienced by an individual or group”. (Oxford Dictionaries).

“The state of social well-being of individual or groups, either as they perceive it or as it is identified by ‘observable indicators’”. (The dictionary of Human Geography).
Some definitions of well-being

“The condition of being contented, healthy, or successful”. (Collins Dictionary).

“The standard of health, comfort, and happiness experienced by an individual or group”. (Oxford Dictionaries).

“The state of being comfortable, healthy, or happy”. (The Oxford Pocket Dictionary).
The importance of quality of life

Quality of life/well-being are concepts which are more and more involved in any world development consideration.

A large amount of work is being carried out to study measurements of quality of life, including a more holistic vision on the development and welfare of a country.

This lecture is based on an idea of quality of life that is distant from the two extreme positions: “poor but happy, and rich then happy; too romantic the first, and reductive the second” (D’Acci 2011).
Objective well-being

Objective well-being is based on observable factors such as richness, health, tangible goods, etc.
Subjective well-being

Subjective well-being is referring to well-being which is psychologically experienced.
Well-being

An equilibrate idea of well-being “is far from the two extreme positions: poor but happy, and rich then happy; the first being too romantic, and the second being reductive” (D’Acci 2011).

An overall assessment of well-being should take into account both: objective well-being and subjective well-being. Or respectively the material well-being (material utility) and the psychological well-being (psychological utility).
Cities play a crucial role in both our **objective** and **subjective** wellbeing
Objective wellbeing in Cities

Cities can provide **objective** wellbeing in the form of housing, infrastructure, healthy system, wages, services, shops, educations, healthy environment, …
Subjective wellbeing in Cities

Cities can provide subjective wellbeing in the form of pleasant urban environment to aesthetically enjoy, and of opportunity that the city offers to satisfy recreational desires.
The urban quality of life “is a hierarchical multi-attribute concept characterized by several underlying attributes that, in turn, are defined by more specific underlying attributes. These attributes are:

Environmental quality, 
air quality, 
green, 
jobs, 
social condition, 
urban quality, 
arquitecture quality, 
accessibility, 
etc…”

(D’Acci 2014).
Two methodologies can be distinguished for structuring attributes:

1. top-down method
2. bottom-up method

The top-down approach is also called analytic method, and creates a list of semi-specified relevant attributes that characterize the object. If the object of our interest is the ‘urban quality of life’, the ‘object’ is a ‘concept’.

For example, if the semi-specified attribute is ‘environmental quality’, it is split up into more specified attributes such as ‘soil quality’, ‘water quality’, ‘air quality’, ....

This process of specification of the attributes carries on until we reach a certain level of attribute concreteness that can be properly measured (i.e. concentration of atmospheric poisonous substance in micro-Mole per cubic metre; or noise level in deci-Bells; or square metre of green per capita...).

The above final well specified attributes are called the end-level attributes.
The bottom-up approach is the other way round but nothing change: concrete and well-specified attributes are assembled into more and more abstract, less well-specified attributes. This process continues until only one attribute remains: the top-level attribute.

In both cases, we have a top-level attribute that divides and grows into more and more detailed and concrete measurable attributes, until the end-level attributes and this process forms a ‘value tree’.
Attributes Weights

The weight of an attribute is its influence on the global object.

In our case it estimates how much each attribute (green, pedestrian area, pollution...) influences the urban quality life.

The assessment of the weights may be done in two ways:

1. preference aggregation - **constructive modelling**;
2. preference disaggregation - **reconstructive modelling**.
Constructive approach

The concept of urban quality of life is built up as a weighted sum of its underlying attributes.

The weight of each underlying attribute is measured by **ranking** or **rating** methods.

The ranking method

asks to set the list of attributes in order of importance: 1st, 2nd, 3rd, etcetera.

Several variants have been proposed for this purpose; some examples are:

The pair-wise comparisons, which is the basis of the Analytical Hierarchy Process (AHP):

the Multi-attribute Value Theory, when we are in decisions under certainty;

the Multiattribute Utility Theory, when are in decisions under risk.

The **pair-wise comparison** of the AHP estimates the importance of each attribute in relation to the others. For example, if we have three attributes: air pollution, parks, pedestrian areas, the respondent would say how much more or less important ‘air pollution’ is relation with ‘parks’ for the point of view of urban quality of life; then in relation with ‘pedestrian areas’, and then ‘parks’ in relation with ‘pedestrian areas’. Mathematical passages will automatically give the relative weights.

In the rating method the respondent rates the list of attributes independently of one another.
Reconstructive approach

The global assessment (value, preference, utility…) about the object, is broken down to yield the relative weight of the underlying attributes included.

The typical most used statistical tool which allows this is the Multiple Regression Analysis.

It is also the basis for analysis like the Hedonic Pricing Method or the Conjoint Analysis.
Some indicators

The Human Development Index (HDI)

combines the following three factors with the same weight:

1. Life expectancy at birth
2. Knowledge and education (adult literacy rate [2/3 weighting], and the combined primary, secondary, and tertiary gross enrollment ratio [1/3 weighting])
3. Natural logarithm (to moderate the impact beyond a level) of gross domestic product per capita at purchasing power parity (GDP ppp).
The Genuine Progress Indicator (GPI)

It complements the GDP by adding the cost of negative effects to economic activity (i.e. cost of crime, cost of ozone reduction, cost of resource exhaustion, etc.).

The Gross National Happiness (GNH)

It involves measures about psychological well-being, ecology, health, education, culture, living standards, time use, community vitality, and good governance.
The Quality of Life Index

It includes material well-being (GDP per capita), health (life expectancy at birth), political stability and security, family life (divorce rate), community life, climate and geography (latitude), job security (unemployment rate), political freedom, and gender equality (ratio of average male and female earnings)

The Life-Quality Index (LQI)

$LQI = EKG$ where $E$ is the expectancy of healthy life at birth, $G$ is the gross domestic product (GDP) per capita, and $K$ is a constant related to time budget studies available for many countries ($K$ is around 5.0 for developed nations)
The Your Better Life Index

It includes 11 measures: community, education, environment, governance, health, housing, income, jobs, life satisfaction, safety, and work-life balance.

The Well-Being and Progress Index (WIP)

It includes measures of life expectancy at birth, richness and equality, subjective well-being, education, research, political rights, civil liberties, women’s equality, intentional homicides, quality of the urban environment and ecological behaviors.
An example of indicators’ comparison

(source: D’Acci 2010)
Some References