

Ecological Design for the Toronto Region

TRCA / The Design Exchange
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Eco-Density



By understanding the “structure of wholeness” of a region and overlaying the existing cultural and economic context, it is possible to design products, buildings, infrastructures, towns, cities, landscapes, and economies that are consistent with a post-carbon future.

Bioregional Restoration & Development



- *INTEGRATED* urban, rural, and wildlands spatial, economic, and resource planning and development
- *LONG-TERM* (100 year+) adaptive planning for resiliency and sustainability
- *Preserve BIOCULTURAL DIVERSITY*
- *ZERO* (Fossil Fuel) *ENERGY* Development
- *ZERO WASTE* (Closed Loop) Development

Bioregional Restoration & Development



- *Focus on HUMAN DEVELOPMENT rather than old models of economic development*
- *LOCALIZATION: meet local needs locally*
- *SENSE of PLACE*
- *JUST TRANSITION to Sustainability*
- *SOCIAL EQUITY*
- *RESTORATIVE COMMERCE*

Autopoiesis, LLC

Autopoiesis, LLC is an international company that provides design, development, finance, and project management services for bioregional restoration & development.

Autopoiesis, LLC uses innovative design, financial, and analytical tools to speed the transition to a world that works for all species.

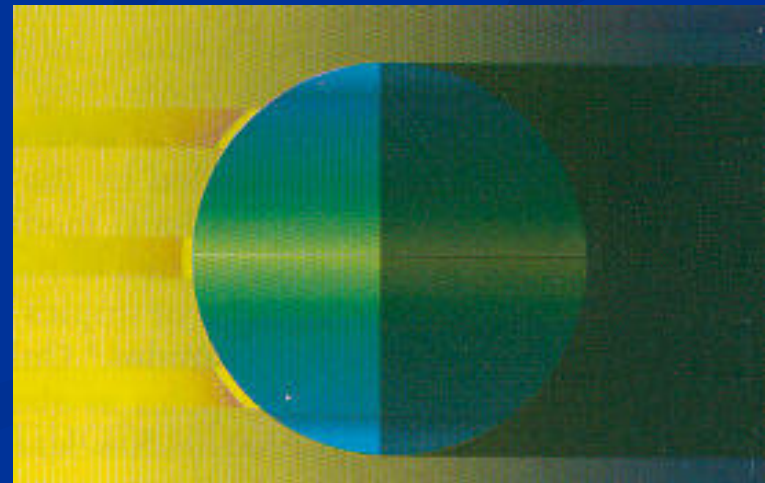
A Sense of Place

The organizing units of biocultural diversity include biomes, bioregions, ecoregions, and watersheds.

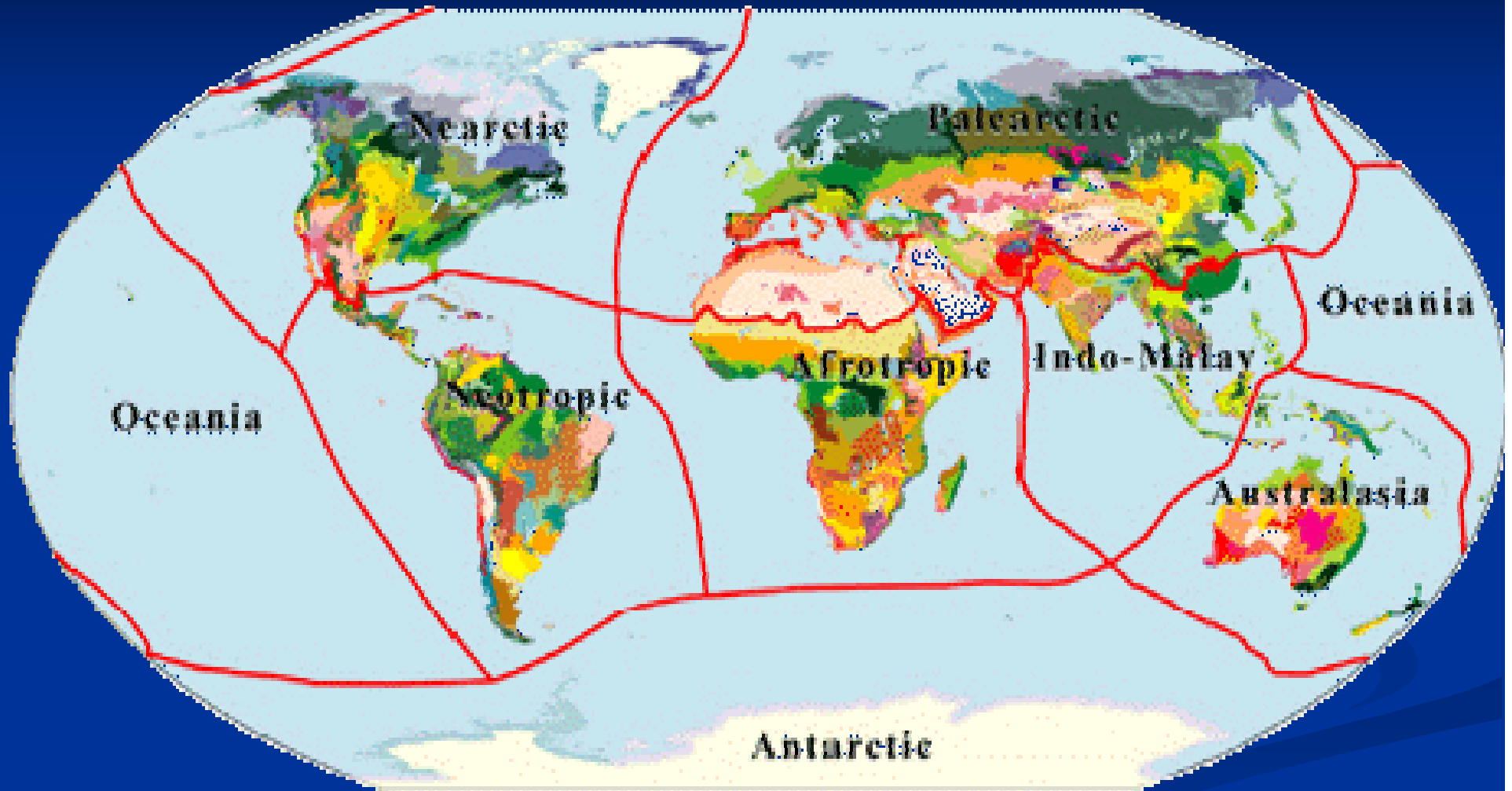
Ecoregion: “a large area of similar climate where similar ecosystems occur on similar sites” (Bailey 2002, Ecoregion-Based Design for Sustainability)

Ecoregions are determined by three main factors:

- Latitude (overall solar flux)
- Marine-Terrestrial Interface
- Topography



Ecoregional Mapping



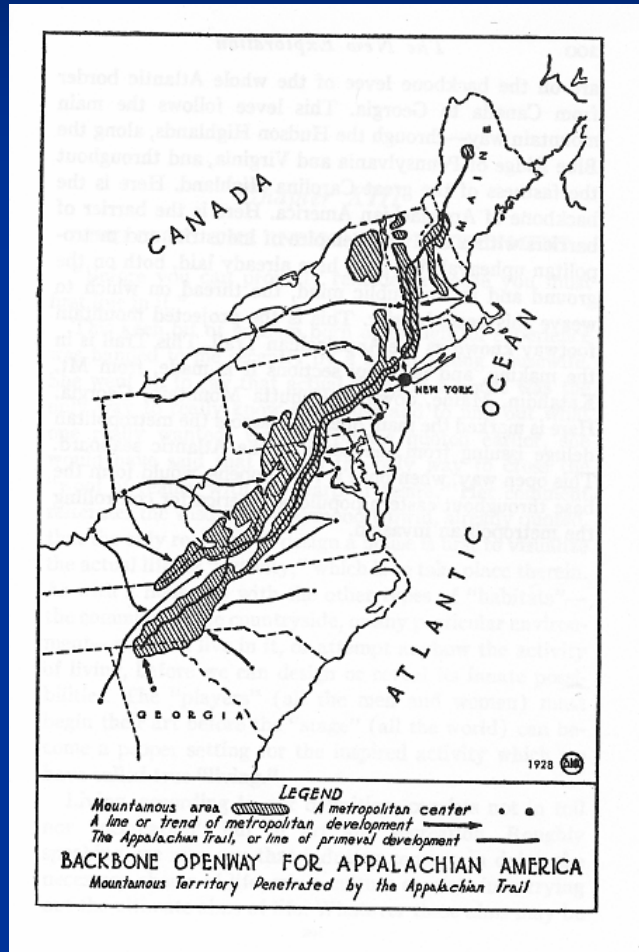
Map developed by World Wildlife Fund

Ecological Design



- Climate
- Soil
- Vegetation
- Topography
- Hydrology
- Geology
- Guide architecture, land-use planning, natural resources, commerce, etc.

Bioregional Planning



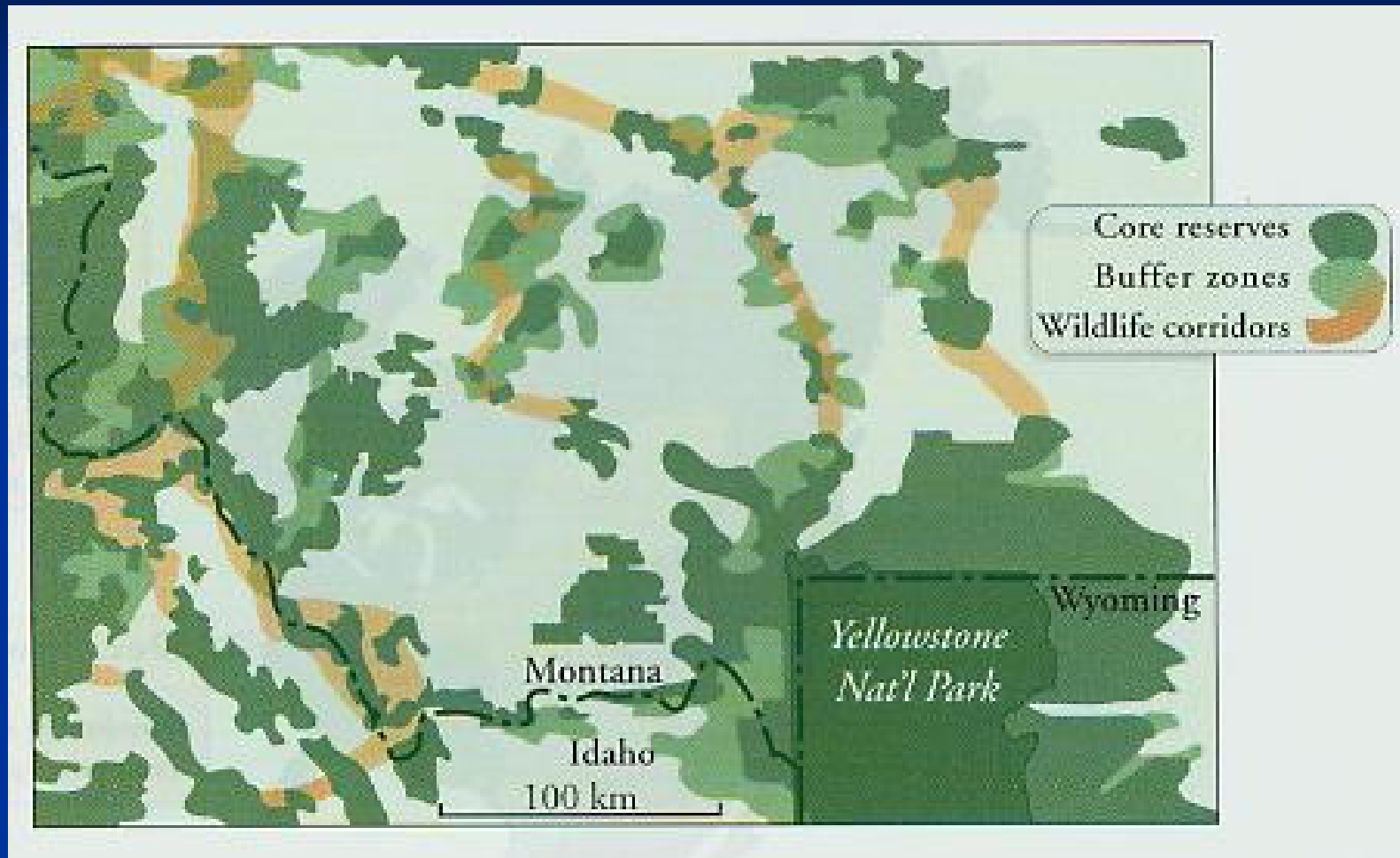
- There is a long tradition of bioregional planning integrating culture and history with ecology as a blueprint for a new sort of prosperity
- Benton MacKaye 1920s (landscape flows)
- Lewis Mumford 1930s (regional survey)
- Ian McHarg 1960s (ecological overlays)
- Robert Bailey 2000s (ecoregions)

Landscape Ecology

The emerging science of landscape ecology provides quantitative and qualitative methods for describing the ecological functionality of landscape features. It holds promise as the scientific foundation for preserving biocultural diversity.

- Patches
- Edges & Boundaries
- Corridors & Connectivity
- Mosaics
- Flows: wind, water, animal movements, fire, pollinators, etc.

Core · Buffer · Corridor

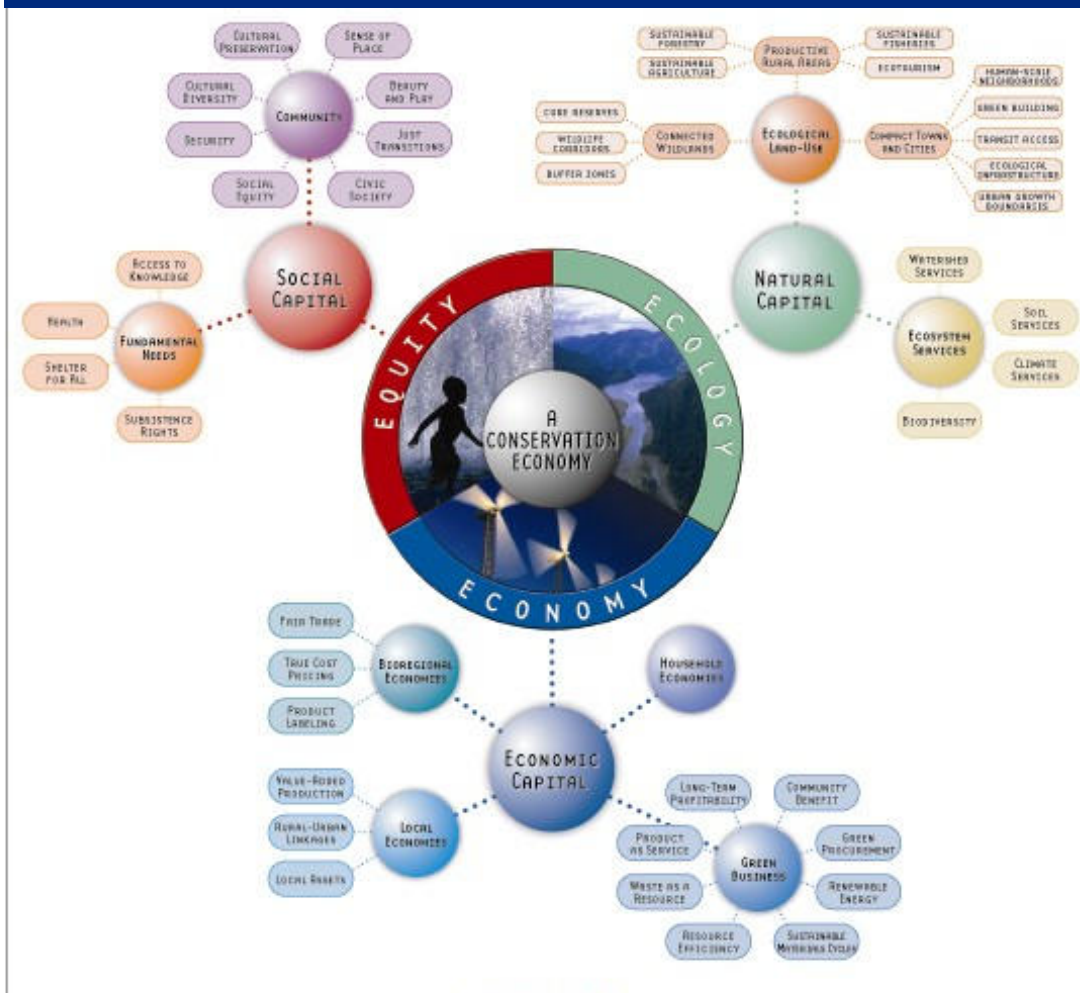


System of core reserves, buffer zones, and wildlife corridors proposed by the Northern Rockies Ecosystem Protection Act

Pattern Languages

- Developed by Christopher Alexander and colleagues at U.C. Berkeley starting 1960s
- Key References: *A Pattern Language*, *Timeless Way of Building*, *The Nature of Order*
- Each pattern resolves a set of forces that occurs again and again, providing a flexible template
- Patterns form a shared record of a community's highest aspirations: the world they are trying to create together
- Patterns are connected through deep structural linkages into a “pattern language”

Conservation Economy: What Does a Living Economy Look Like?



- Developed at Ecotrust 1999-2002
- Currently integrates 57 patterns across social capital, natural capital, economic capital
- Open Source framework with international audience
- Website includes descriptive essays, photos, case studies, links to organizations

www.conservationeconomy.net

- Originally developed for the coastal temperate rainforest bioregion
- Tries to understand the structure of wholeness of a region
- Has been used for strategic planning, sustainability training, community planning software, town planning, etc.

Conservation Economy: Natural Capital



- Ecological Land-Use
 - Connected Wildlands
 - Core Reserves
 - Wildlife Corridors
 - Buffer Zones
 - Productive Rural Areas
 - Sustainable Forestry
 - Sustainable Agriculture
 - Sustainable Fisheries
 - Ecotourism
 - Compact Towns and Cities
 - Human-Scale Neighborhoods
 - Green Building
 - Transit Access
 - Ecological Infrastructure
 - Urban Growth Boundaries
- Ecosystem Services
 - Watershed Services
 - Soil Services
 - Climate Services
 - Biodiversity

Ecosystem Services

- Purification of air and water
- Mitigation of floods and droughts
- Detoxification and decomposition of wastes
- Generation of soil fertility
- Pollination of crops and natural vegetation
- Control of agricultural pests
- Dispersal of seeds
- Movement of nutrients (e.g. C, S, N, P, K)
- Protection and generation of biodiversity
- Provide microclimatic and global climatic stability
- Moderation of temperature extremes and the force of winds and waves
- Supports diverse human cultures
- Provision of beauty, intellectual stimulation, and spiritual sustenance



Community-Based Ecosystem Services Trust (CBEST)

- Ecosystem services are currently valued at zero, creating perverse incentives to destroy ecosystems.
- How can we capture the economic value of ecosystem services without enclosing the commons?
- A CBEST operating at the regional scale can channel reinvestment for restoration and conservation while equitably sharing costs and returns.

Conservation Economy: Economic Capital

- Household Economies
- Green Business
 - Community Benefit
 - Green Procurement
 - Renewable Energy
 - Sustainable Materials Cycles
 - Resource Efficiency
 - Waste as a Resource
 - Product as Service
 - Long-Term Profitability
- Local Economies
 - Value-Added Production
 - Rural-Urban Linkages
 - Local Assets
- Bioregional Economies
 - Fair Trade
 - True Cost Pricing
 - Product Labeling



Conservation
Economy:
Social Capital



- Community
 - Cultural Preservation
 - Sense of Place
 - Beauty and Play
 - Just Transitions
 - Civic Society
 - Social Equity
 - Security
 - Cultural Diversity
- Fundamental Needs
 - Access to Knowledge
 - Health
 - Shelter for All
 - Subsistence Rights

Cities^{PLUS}: Cities Planning for Long-Term Urban Sustainability



Our region is one system, comprised of the place, the people, the infrastructure and the governance.

- Vancouver, BC won 1st Place in the International Urban Systems Design Competition in Tokyo in 2003
- The Competition called for a 100 year strategic plan for urban sustainability

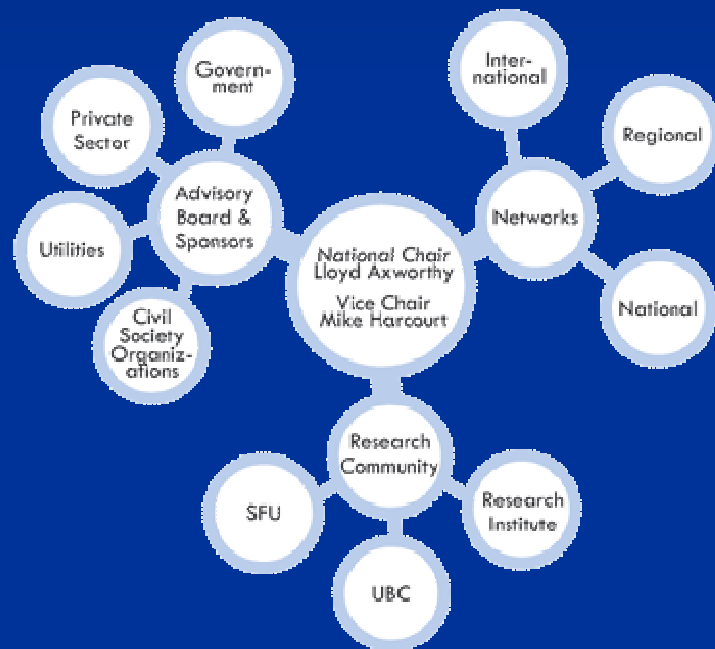
Cities^{PLUS}: Vancouver, BC



PHASE 1: Envisioning Our Future

- Sustainability, Resilience, Livability
- Assessed 18 components of the urban system and developed visions and end-state goals for each

Cities^{PLUS}: Vancouver, BC



The cities^{PLUS} collaborative.
Click on image
to see indepth involvement

PHASE 2: Exploring the Options

- Defined 100 Year Critical Path
- Evaluated magnitude of needed changes
- Looked for best practices

Cities^{PLUS}: Vancouver, BC

PHASE 3: Implementing the Plan

Greater Vancouver Regional District (GVRD) is
Creating Integrated Strategies to Guide Implementation





GOA 2100

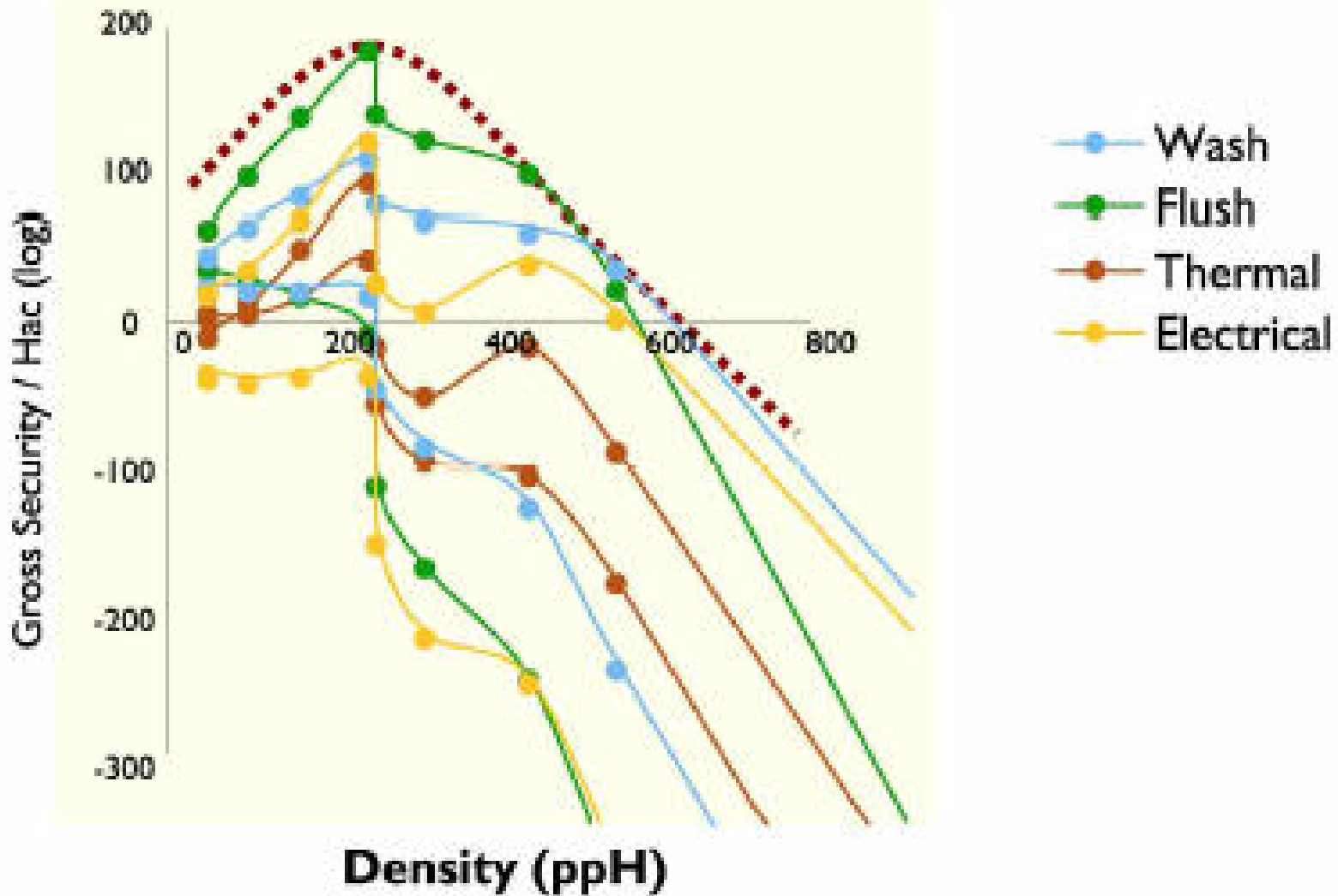
Sustainable Cities
International Urban Design Competition

India Team
World Gas Conference, June 2003
Tokyo, Japan



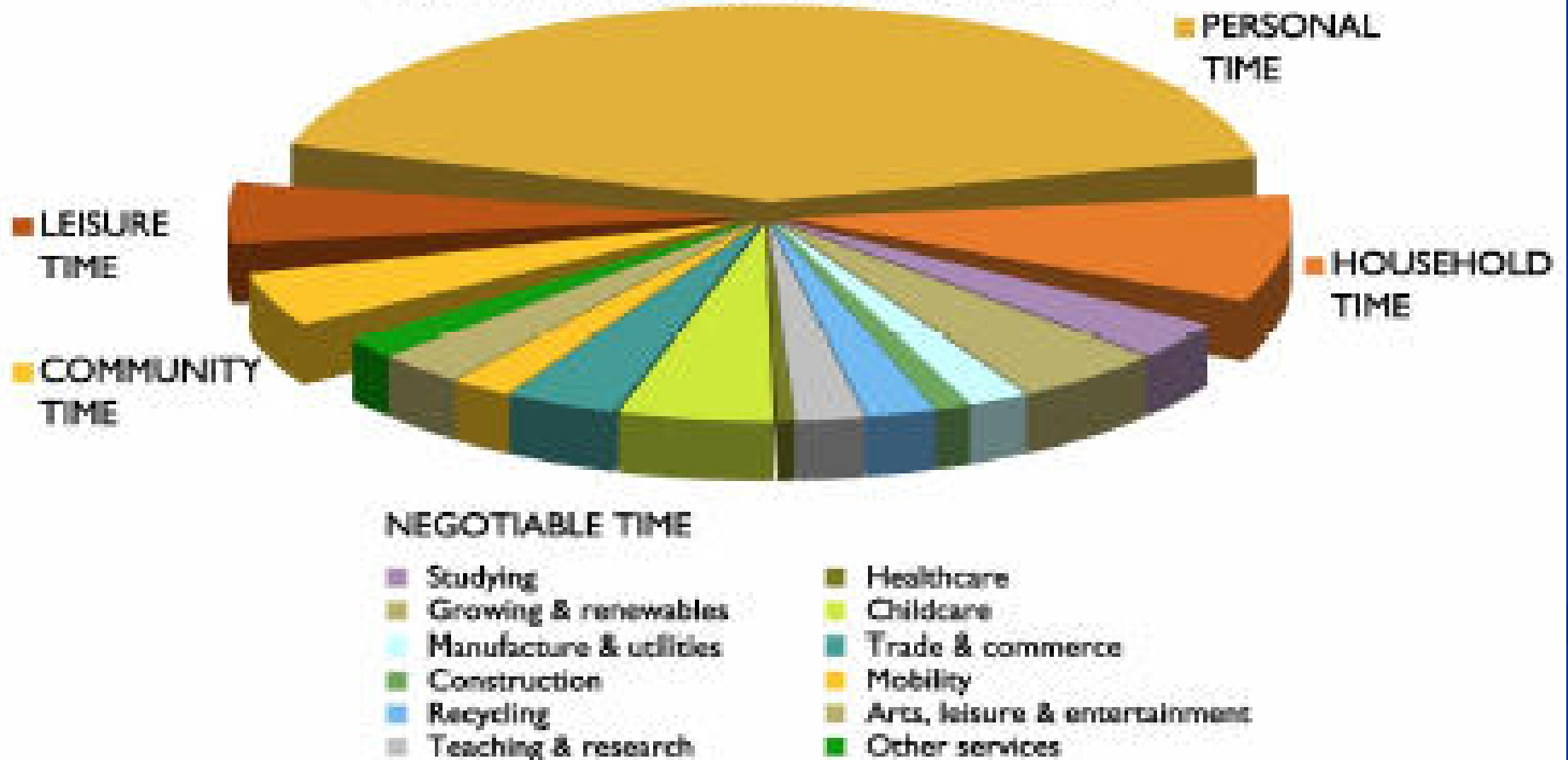
GOA
2000

Goa 2100 Project: International Competition for 100 Year Sustainability Strategic Plan

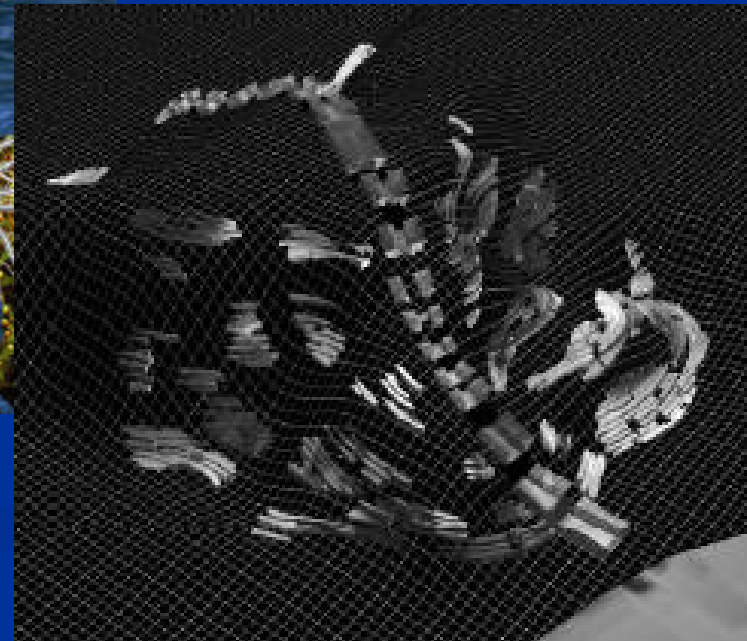
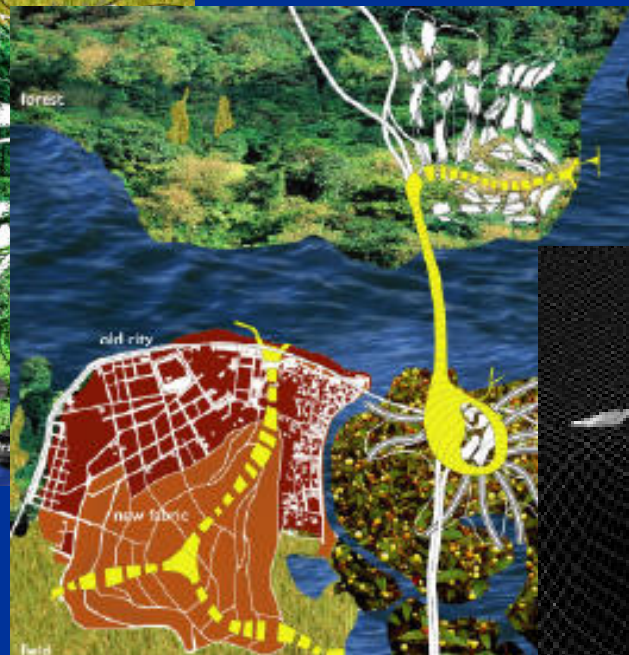
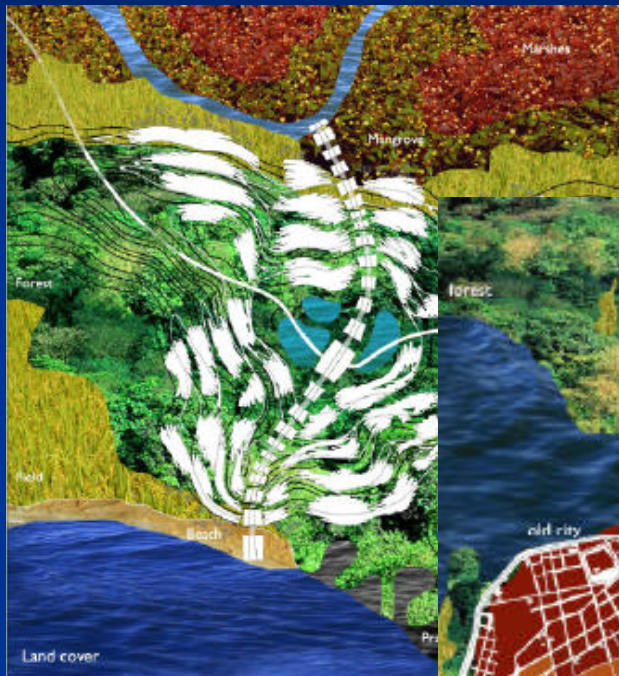


Goa 2100 Project

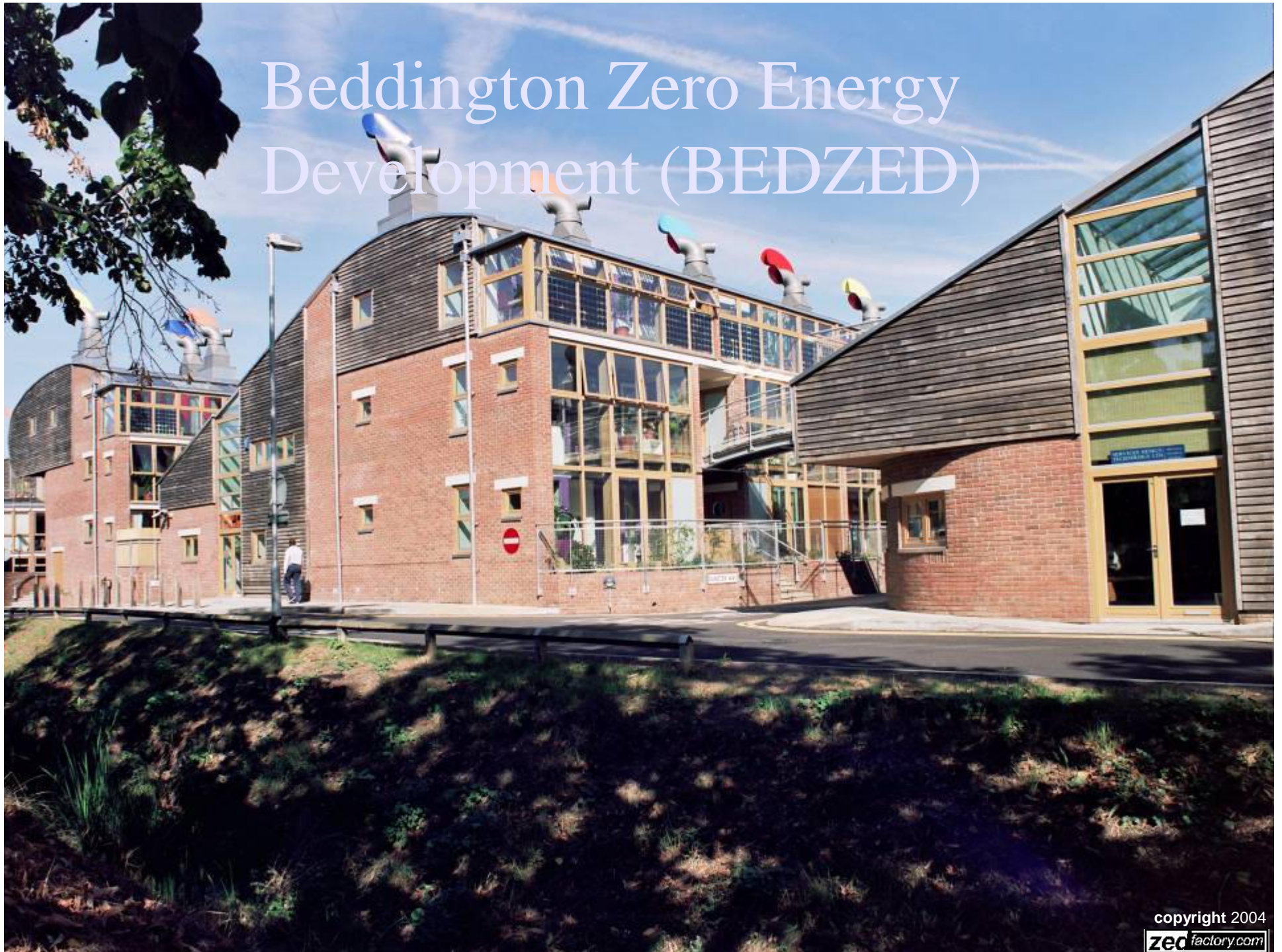
Greater Panjim Time-use Budget (2100)
(2.7 billion person hours per year)



Goa 2100 Project



Beddington Zero Energy Development (BEDZED)



copyright 2004

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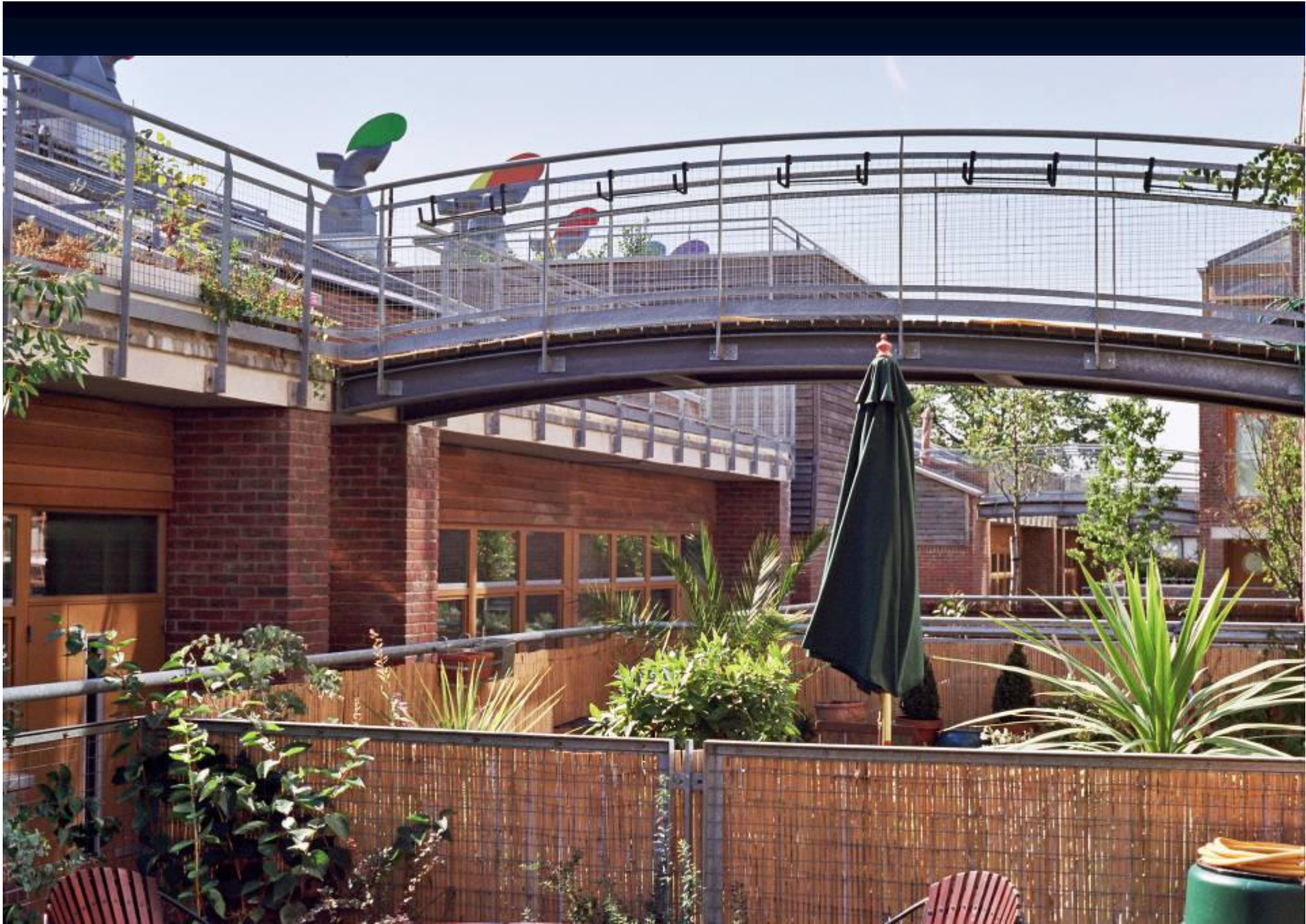
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An aerial photograph of a modern building with a green roof. The roof is covered in various plants and features several colorful, abstract sculptures. The building has a mix of brick and wood siding. The background shows a clear blue sky and distant trees.

World Wildlife Fund: One Planet Living Principles

Zero Carbon

Zero Waste

Sustainable Transport

Local and Sustainable Materials

Local and Sustainable Food

Sustainable Water

Natural Habitats and Wildlife

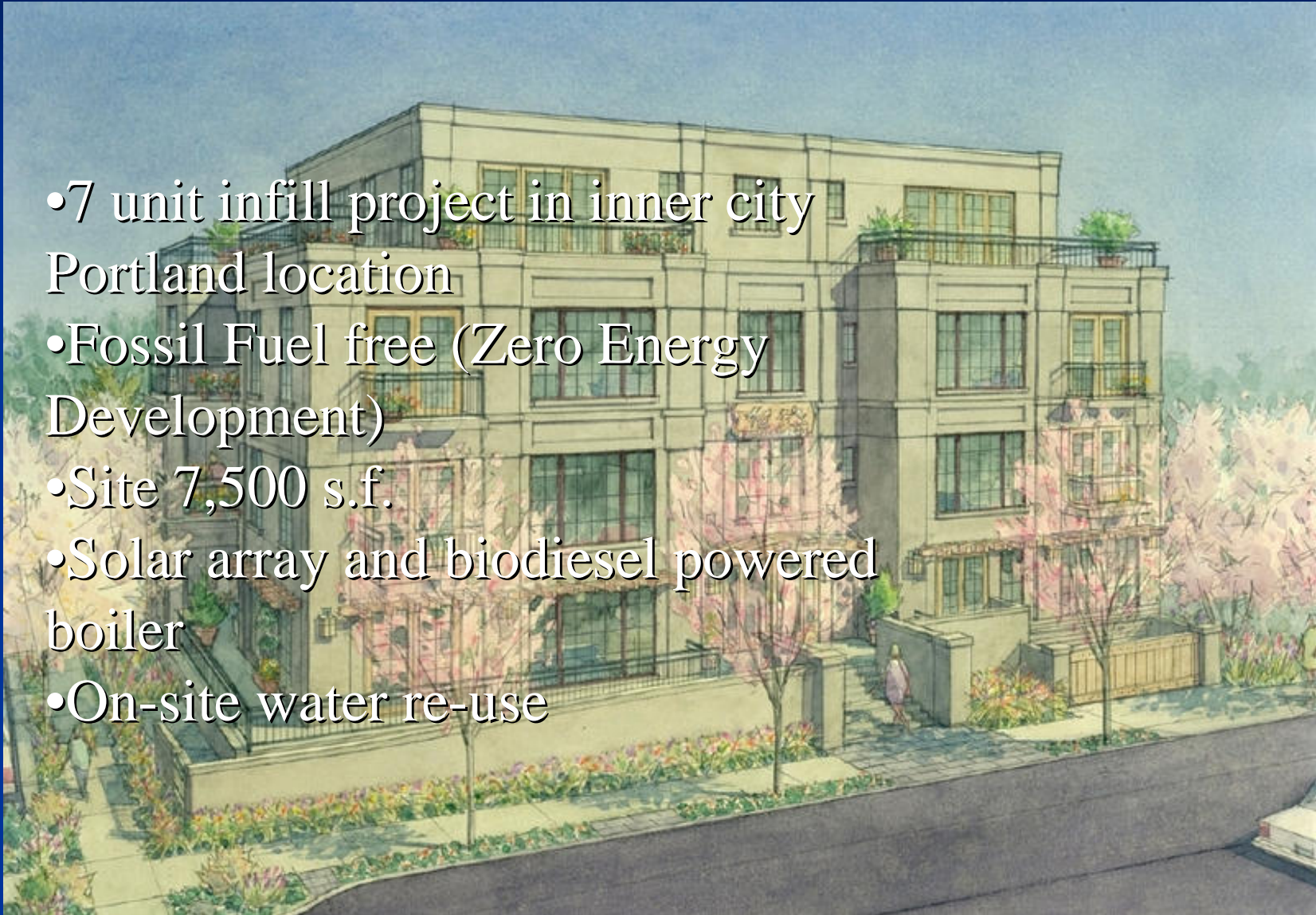
Culture and Heritage

Equity and Fair Trade

Health and Happiness

Shizen

- 7 unit infill project in inner city Portland location
- Fossil Fuel free (Zero Energy Development)
- Site 7,500 s.f.
- Solar array and biodiesel powered boiler
- On-site water re-use



Redeploy Capital: Solving for The Sustainability Gap

- There is a perceived (and often actual) additional cost to sustainable approaches
- This results from a tax, subsidy, and regulatory structure that does not promote sustainability
- Systems approaches, sustainability frameworks, and a disciplined approach to the business case rather than “mission” can be tremendously effective

Redeploy Capital: Blended Value

“all organizations, whether for-profit or not, create value that consists of economic, social and environmental value components—

and investors (whether market-rate, charitable or some mix of the two) simultaneously generate all three forms of value through providing capital to organizations”

– Jed Emerson, www.blendedvalue.org

Investing in a Post-Carbon Toronto Region

- Regions have the opportunity to establish tax, subsidy, and regulatory structures that support the rapid transition to an equitable, convivial, restorative, post-carbon world
- Regions also have the opportunity to invest in this vision through integrated strategies linking government, business, non-profits, and civic society that offer economic, environmental, and social returns
- This afternoon you will be able to design with this vision in mind

Key Objective Today

- Build momentum for a comprehensive, long-term sustainability vision for the Toronto region that INTEGRATES spatial, economic, and natural resource planning and development
- Identify key partners in the process who can provide technical expertise, personnel, and funding



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