

*“Sustainable Community Design
& Development for the 21st Century”*
21世纪可持续社区设计与发展

Presented by
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演讲：道格 纽曼

美国全球能源中心社区持续部执行主席



Presentation Content

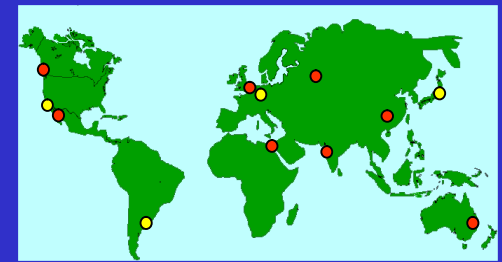
International Competition for Sustainable Urban System Design



Challenges & Solutions for Urban Sustainability



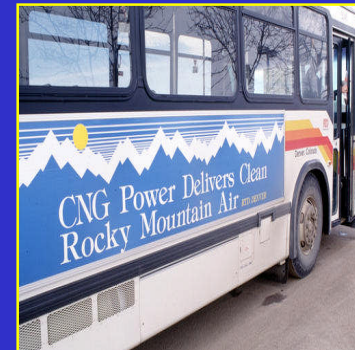
Global Energy Network for Sustainable Communities



Gas Technology Institute

www.gastechnology.org

- Nonprofit research organization developing sustainable energy & environmental technology solutions
- Funded by government & energy industry
- 320+ Scientists, Engineers, Analysts, Planners & Contract Managers
 - Hydrogen systems research & development
 - Renewable energy systems development
 - Cleaner combustion technologies
 - Energy efficient technologies & systems
 - Performance testing & optimization
 - Sustainable energy planning



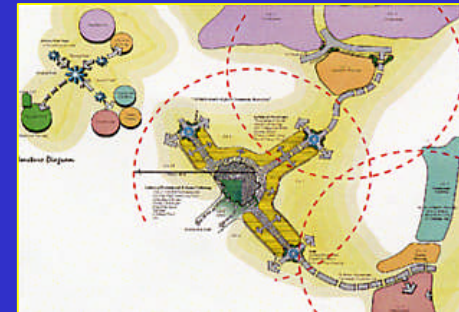
International Competition for Sustainable Urban System Design



*Generate new approaches to
urban design & development to accommodate
future economic growth & social progress
without degrading the local or global environment*

IC-SUSD Expectations

- A design for an existing city that by 2103, would result in the sustainable use of all resources & the practical elimination of global greenhouse gases
- Description of a “*Total Energy System*”, in which all aspects of production, consumption and waste disposition are environmentally compatible
- A roadmap defining the institutional, economic, technological and social developments necessary to reach sustainability by 2103



IC-SUSD Competitors

- Argentina - Buenos Aires
- Canada - Vancouver
- China - Changshu
- Germany - Berlin
- India - Goa
- Japan #1 - Tokyo
- Japan #2 - Mishima
- Russia - Vologda
- United States - San Diego
- Mexico - Tijuana



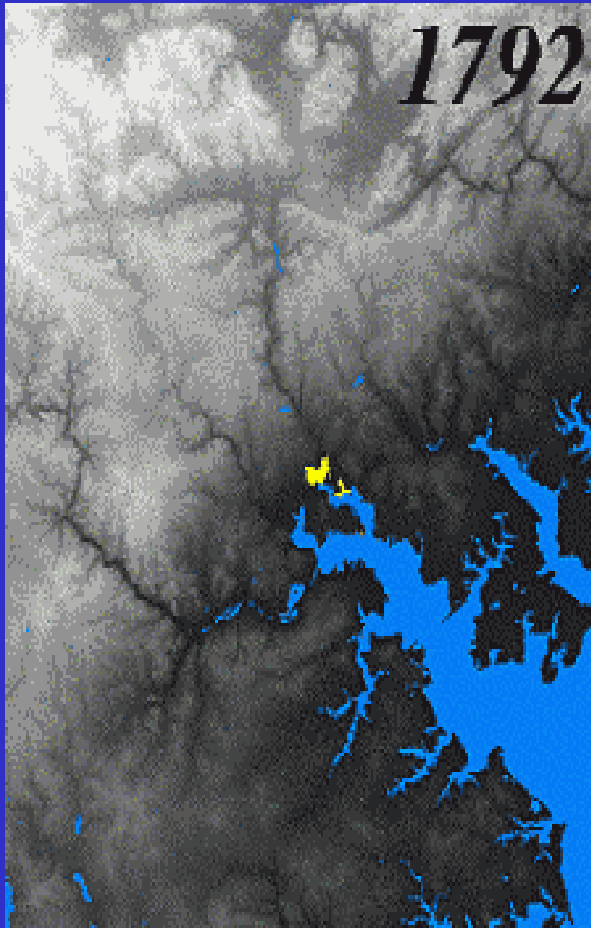
IC-SUSD Jury



& Specialties

- Dr. Shigeru Ito, Professor Emeritus, University of Tokyo, Japan
 - Urban Planning
- Dr. Ismail Serageldin, World Bank & Curator, Alexandria Museum, Egypt
 - Sustainable Development
- Dr. Ernst U. von Weizsacker, Member of the German Parliament, Germany
 - Global Environment
- Dr. Stephen Graham, Newcastle University, United Kingdom
 - Information Technology
- Mr. Casio Taniguchi, Mayor Curitiba City, Brazil
 - City Management
- Ms. Haikyung Shin, Correspondent, Joong-Ang Ilbo, Korea
 - Culture & Lifestyle
- Mr. Gary Neale, Chairman, President, CEO, Nisource, Inc., United States
 - Energy

Common Challenges

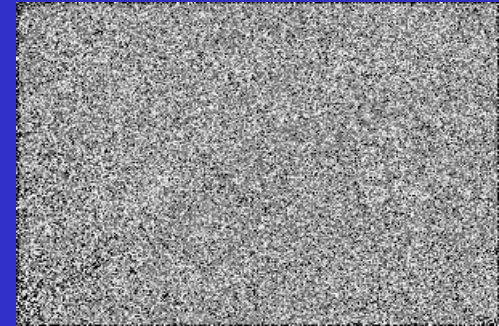


- Urban Sprawl
- Energy Consumption Impacts
- Material Resource Depletion
- Transportation Congestion & Air Quality Impacts
- Water Quality Degradation
- Affordable Housing Scarcity
- Government Fragmentation
- Marketplace Dysfunction
- Public Ignorance

Urban Sprawl

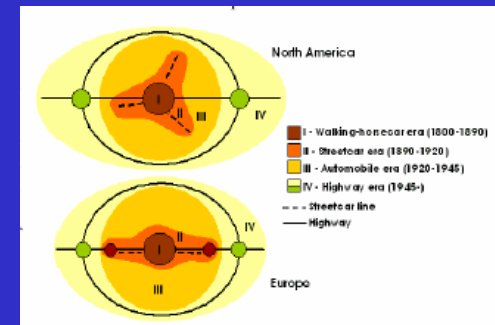
Challenge

- Environmentally insensitive development practices and uncontrolled/unregulated growth that consumes prime agricultural, forests and wetlands, stresses natural resources & threatens biodiversity



Potential Solutions

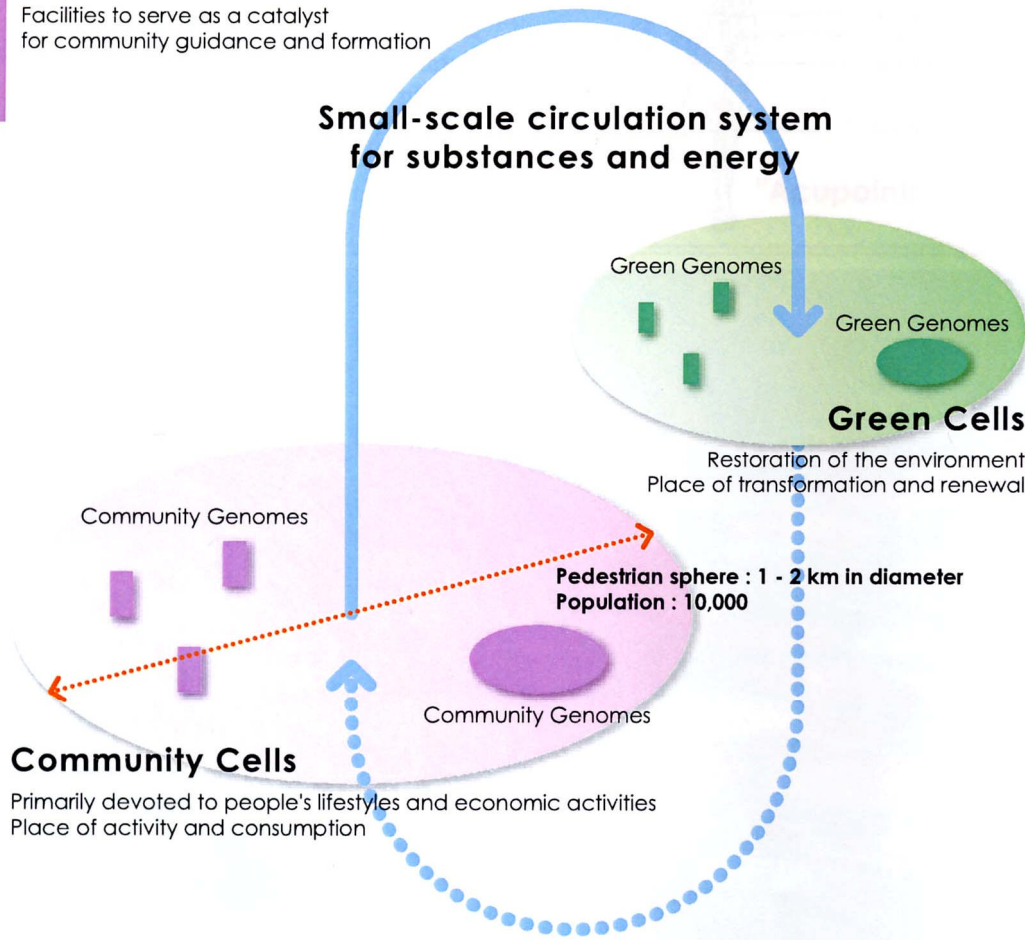
- Urban containment or growth boundaries
- Mixed-use, transit oriented development & optimization of existing urban footprint
- Concentration of growth in self-sufficient urban cells/clusters or villages



Japanese Team - Cellular Dynamic

Community Genomes

Facilities to serve as a catalyst for community guidance and formation



Cell operation

These genomes guide the formation and operation of Green Cell while they organize the agricultural and factory operations that are the mainstay of the economy.

Utility

These factory type facilities support small-scale circulation between cells. They include waste water treatment plants and power generation facilities.

Environmental preservation and restoration

These genomes play a role in preserving and restoring the natural environment while they plant trees and beautify the environment by volunteer activities.

Recreation

These facilities are provided for outdoor recreation. They include campgrounds and sports facilities.

Diversity promotion

These genomes guide to bring out the unique attributes of each cell, creating diversity in the city. They include existing and cultural facilities and festivals.

Energy Consumption Impacts

Challenge

- Over-reliance on fossil fuels & associated local & global environmental degradation
- Lack of public awareness & concern for energy efficiency & conservation



Potential Solutions

- Renewables (solar, wind, hydro., biogas, geothermal, waste-energy systems, etc.)
- Net-zero energy buildings, combined cooling-heat-power systems & distributed generation
- Community-based resources management



U.S. Team – Resource Management Center



Material Resource Depletion

Challenge

- Growing solid waste disposal dilemma
- Single-purpose use of materials in transportation, buildings & commodities
- High embedded energy cost of materials



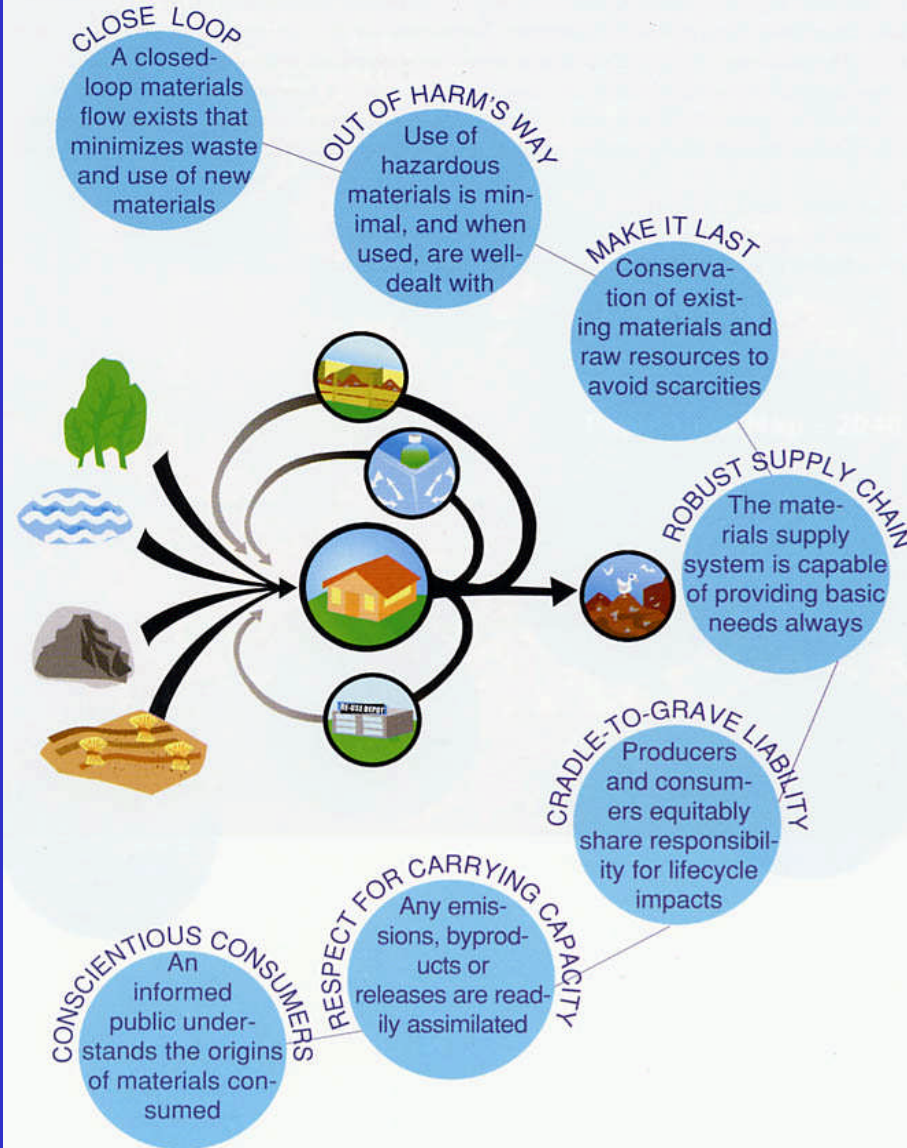
Potential Solutions

- Waste minimization via “Cradle-to-Cradle” design, manufacturing & commodity leasing
- Adaptive reuse of existing structures using green building guidelines & controls
- Utilization of alternative recyclable materials



Canadian Team - Material Resource Scheme

Working Example of End-State Goals for Materials Component of Urban System



Transportation Congestion & Air Quality

Challenge

- Congestion across the metropolitan region, particularly along city-suburban thoroughfares
- Air emissions (ground-level ozone) & noise
- Limited availability of appealing public transit

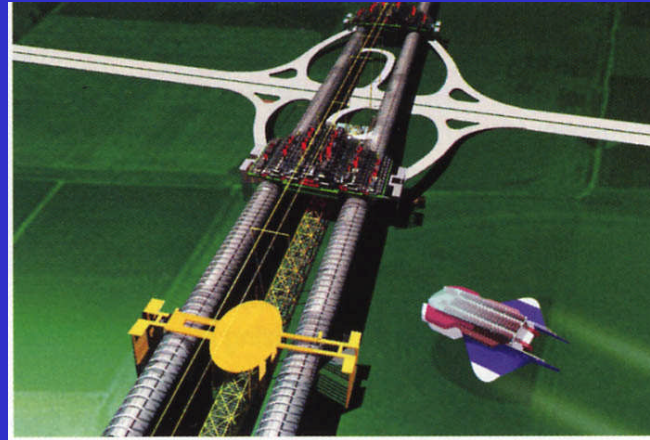


Potential Solutions

- Efficient transit & transit-oriented development
- Surface light rail, trolley, flexi-bus and mono-rail
- Alternative fuels & propulsion systems (compressed & liquid natural gas, ethanol, hydrogen fuel cells & electric motor engines)



Russian Team - Sibstream/TOD Scheme



Indian Team

Smart Material Transport System

Containerised goods movement: on common rapid transport network using micro to full size containers with wireless tagging, automated mode transfer and door-to-door routing

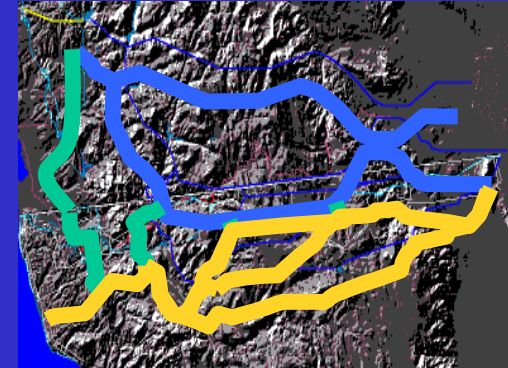
Fluid transfer: Metal hydride, water and heat transfer: on intelligent co-axial pipeline systems within the community



Water Quality Degradation

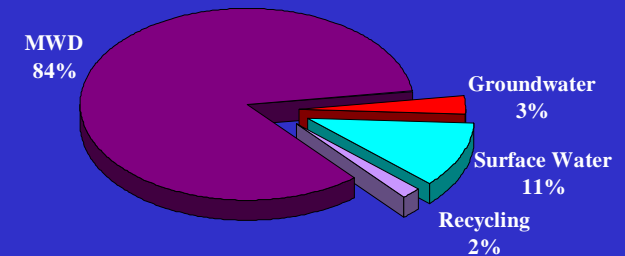
Challenge

- Inadequate drinking water supplies
- Urban & agricultural non-point source pollution & wetlands losses
- Inadequate control of municipal effluents

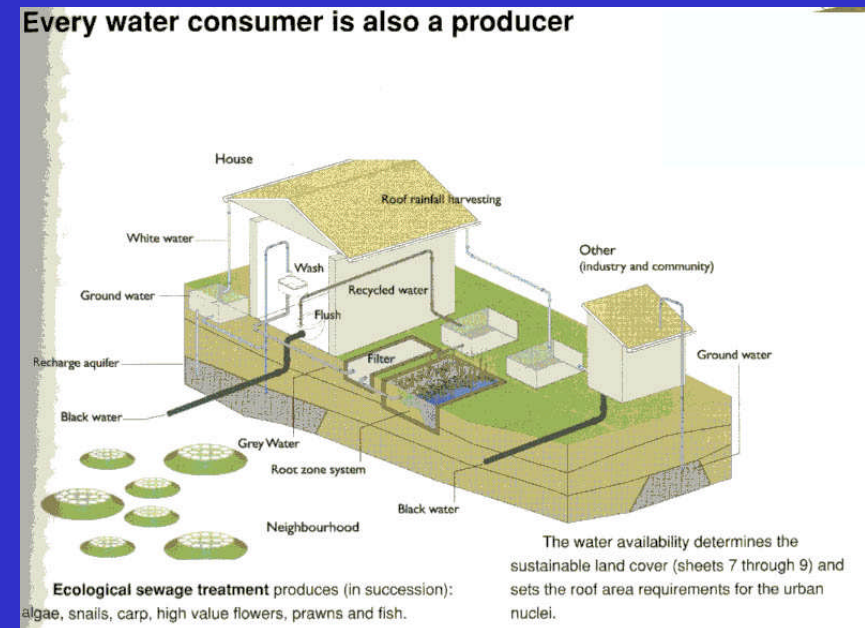


Potential Solutions

- Comprehensive watershed protection controls & stewardship programs
- Natural wastewater filtration utilizing wetlands & sanitary solids recycling
- Water reclamation and reuse



Chinese Team - WEI System



Indian Team - Residential WQM System

Affordable Housing Scarcity

Challenge

- Cost of home ownership & “fuel poverty”
- Substandard housing w/ inadequate sanitation



Potential Solutions

- Adaptive reuse of the existing building stock to satisfy demand
- Building energy efficiency a priority
- Targeted mortgage qualification programs for reconstructed housing projects



U.S. Team Sustainable Single Family Residence



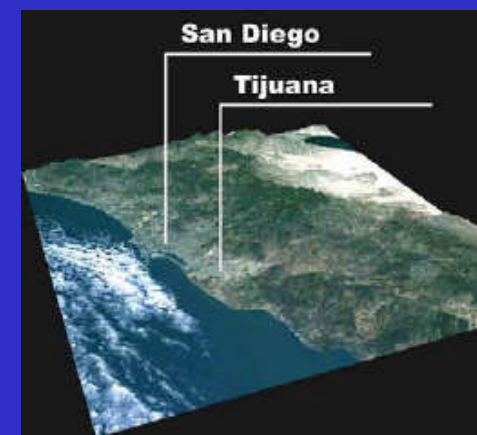
Government Fragmentation

Challenge

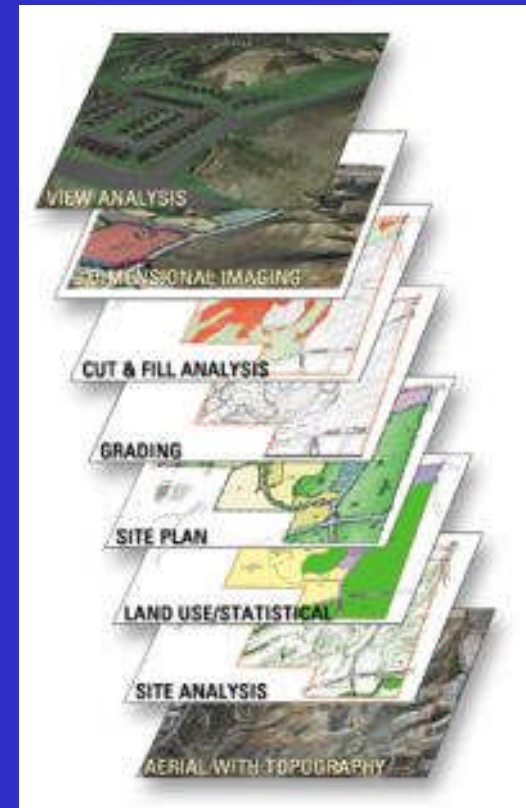
- No existing institutional arrangements for ecosystem-wide sustainable development
- Lack of local control over local issues

Potential Solutions

- Regional form of governance for regional resources & functions
- Region-wide resources management & development strategy
- Neighborhood/village management councils & local autonomy to reach regional goals



All Team's Propose a Regional/ Eco-Systems Approach to Community Governance & Development



Marketplace Dysfunction

Challenge

- Cost of environmental & social externalities excluded from commodity pricing & markets
- Government subsidies for unsustainable practices continue



Potential Solutions

- Integration of an ecological footprint approach to urban design & development
- Introduction of full-cost accounting & pricing within commercial market segments
- Consumer education & empowerment initiatives to build sustainable markets



Public Ignorance

Challenge

- Most individuals are simply unaware of the impact their lifestyle choices have on the sustainability of local and global resources
- Belief that science & technology will save the day, no matter the hour



Potential Solutions

- Awareness building & educational initiatives
- Product sustainability certification & labeling
- Citizen engagement in resources management



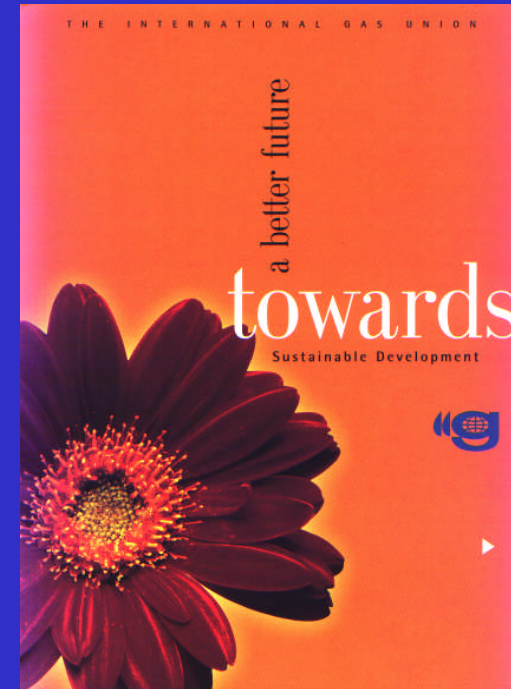
U.S. Design Entry



18 - Minute DVD Presentation

Jury's Challenge to the Global Energy Industry

Accept Responsibility for Creating More Sustainable Communities



GEC
gti

Consider Energy Impacts Across All Community End-Uses
Develop Cleaner Energy Technologies & Consumer Market Demand
Lead the Effort to Build Healthier Communities, Worldwide!

Global Energy Center for Community Sustainability



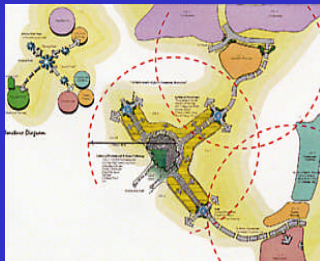
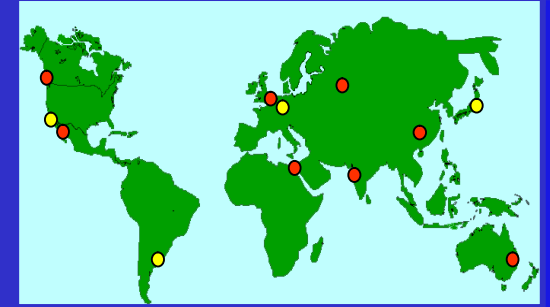
Strategically Targeted Technology Transfer Initiatives

Community-Wide “Systems Approach” to Energy Efficiency

Public-Private-NGO Sector Cooperation & Market Incentives

Global Energy Network for Community Sustainability

- Collection of organizations collaborating on the development & dissemination of resources that enable local elected officials, planners, builders, architects & engineers to integrate clean energy technologies & practices into community planning, development & management

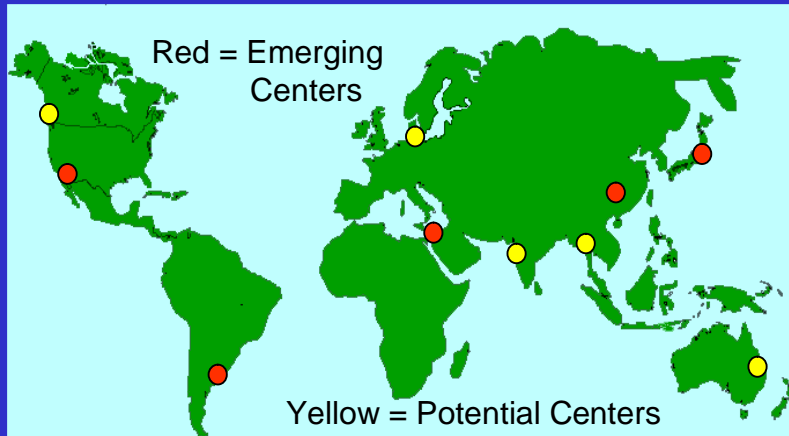


- End Uses: municipal infrastructure & services, transit systems & operations, industrial processes & commercial & residential end-uses
- Resources: information on clean energy technologies, energy-smart development models & practices, guidance on energy project financing & good governance
- Technology Integration: the integration of cleaner & more efficient energy sources & technologies into the design, development & management of all urban systems

Current Initiatives

- Conducting a renewable & recoverable energy technology demonstration & showcase project on the island of Oahu, Hawaii
- Coordinating the integrated U.S. technical assistance offer to assist Beijing in the design and construction of the Olympic Village for the 2008 Games
- Formulating a training program for the Beijing Sustainable Development Center on energy-efficient community development
- Providing technical assistance to the government of Thailand in the formulation of energy-efficient redevelopment models for Tsunami-stricken communities
- Developing a comprehensive 3-day energy training module for the Mayor's Asia Pacific Environmental Summit - Melbourne, Australia May of 2006
- Developing a community-scale technology demonstration/showcase in the City of Chula Vista, California & planning for a permanent sustainable energy research, education & training facility to serve the Global Energy Network affiliates

Global Energy Network



Currently, there are 5 emerging Global Energy Network affiliates & 5 potential affiliates

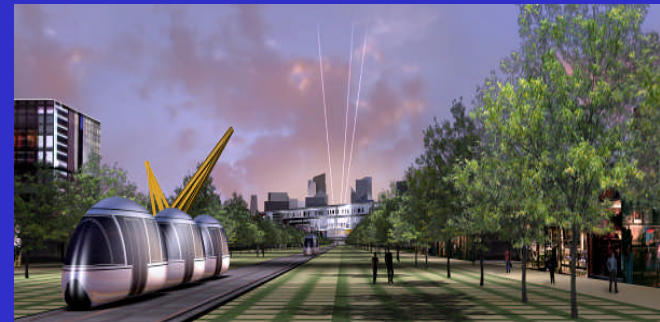
Emerging affiliate centers include:
Argentina, China, Israel, Japan & the U.S.

Potential affiliates include: Australia, Canada, India, the Netherlands & Thailand

U.S. Global Energy Center will be located in Chula Vista California, south of San Diego

Plans to construct a 40,000 sq. foot international education, training & conference facility & technology demonstration park

Facility & park will be located within a new 6,000 acre sustainable community development





Global Energy Center for Community Sustainability

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