Achieving Sustainability

From the Energy Capital to the Energy Efficiency and Renewable Energy Capital

Rice University

POST/GLHT 411 - Integrated Approaches to Sustainable Development

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Outcome of Existing Initiatives

Expansion of City Services

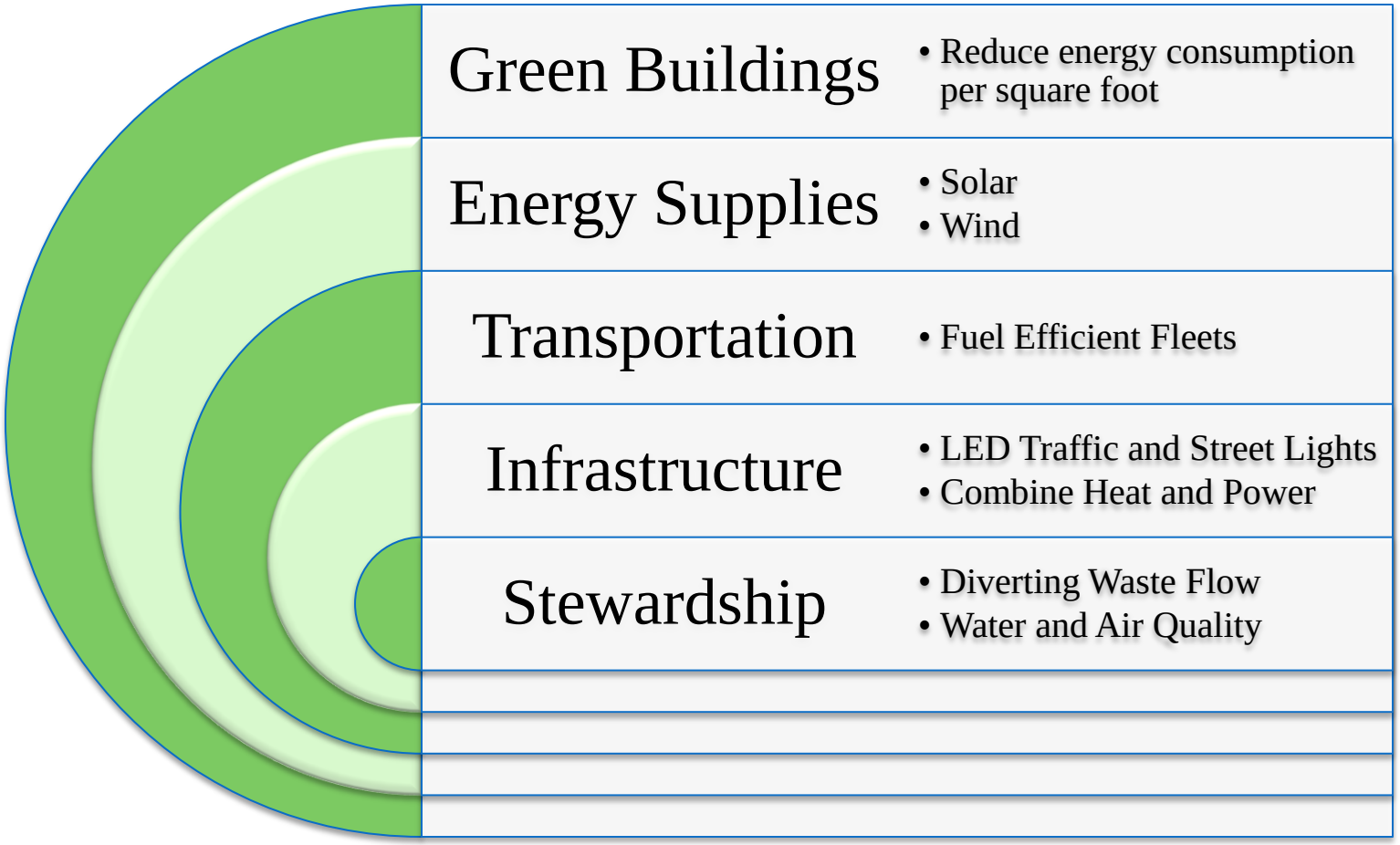
- Population growth at 1.9% per annum
- Regional GDP growth of 5.08% per year

Expansion of City Facilities

- 32 LEED Certified Buildings

Reduction of kWh use by 5.8% from 2004 through 2008

Framework for Sustainability



Green Building

Promoting Green Building by Example

LEED in the City

- **Leading by Example**
  - Mayor's Resolution, passed in June 2004, requiring all new City buildings and major renovation to be LEED certified (32 buildings, representing over 1 M sq ft LEED projects underway)
  - Mayor's Green Building Advisory Committee showcase LEED buildings in private sector
  - Houston Hope homes built to Energy Star standard. Building 150 near zero energy homes.
- **Result**
  - Over 70% of the new Class A commercial office buildings (over 50K sq ft in size) designing for LEED classification (6 M sq ft committed), nearly half of the residential new homes built are Energy Star.

Green Building

Increasing Energy Efficiency for New Construction and Major Renovations

Sustainable Building Codes

- **Commercial Construction**
  - •ASHRAE 90.1 2004 plus local amendments
  - •Increased energy efficiency amendments: cool roofs, efficient lighting
  - • Approved by City Council; code in effect August 1, 2008
  - • LEED Quick Start to expedite permitting and graduated fee rebates with LEED certification

- **•Residential Construction**
  - • IECC 2006 plus additional energy efficiency steps
  - • 15% increase in energy efficiency (Energy Star standard for homes)
  - • Approved by City Council; code to go into effect 10/09

- **Public Education**
  - •Enhancing City's Code enforcement to support code transformation
  - • Summer workshops on new code; increased staff and training
  - • Green building resource center to help educate builders and owners

Green Building

Reducing Energy Consumption by 20%-30%with No Upfront Capital

Energy Savings Performance Work

- City of Houston one of the first to contract large scale energy efficiency work:
  - 262 facilities, 7.1 million sq ft under consideration
  - Office buildings, libraries, multi-service centers, police stations, fire stations, health centers
  - Siemens and TAC selected as ESCOs
  - 5.3 million square feet under assessment
  - 4.5 million square feet receiving energy conservation measures
- Financing through utility savings
- Center Point energy efficiency incentives available

Renewable Energy

Large Scale Purchases on Long-Term Contracts

Wind Power

- Purchased 2 billion kWh (50 MW of power) as of July 1, 2009
  - Fixed wholesale price of 7.5 cents / kWh over the next 5 years.
  - Supply 32% of annual requirements for electrical load.
- The EPA ranks the City of Houston as the number one municipality in terms of the amount of renewable energy purchased.
- Retire RECs upon receipt

Renewable Energy

Deploying Solar Power in Houston

Solar Power

• Finalizing a long term power purchase agreement for a 10 MW solar plant with NRG; purchasing power at a blended cost of 8.2 cents per kilowatt-hour

• Total of 160 kW of solar power installed on City facilities

- •City code enforcement, City Hall Annex, SPARC Park at Tinsley Elementary school, Zoo and Discovery Green Park
- 100 kW solar system for the George R Brown Convention Center funded by Houston Endowment ($850K), BP ($100K), and CenterPoint ($50K)

• Developing PACE program for City with Energy Efficiency and Renewable Energy Financing Opportunities

Renewable Energy

DOE Solar America City Initiative

Solar Power

•Advisory Council with representatives from COH, academia, endowment, and private sector.

•Solar neighborhood program: Building 10 "near zero energy" homes in the Houston Hope neighborhoods that include 1-2 kw rooftop solar.

•Green Curriculum established at the HCC including solar and energy efficiency

• K-12 Programs: Demonstration site at SPARC Park (Tinsley Elementary School), working with HISD to integrate solar

• Public Outreach: Houston Solar web-site; City of Houston partnering with HREG to host Solar Home Tour on October 3, 2009. www.solarhoustontx.org

• Advanced Meter Deployment in region, enables peak shaving applications like solar.

Transportation

Greening the Fleet with Hybrids and Electric Vehicles

Fuel Efficient Clean Vehicles

- City's goal to have 50% of non-emergency, administrative fleet (2800 vehicles) by 2010. Currently have 683 hybrids in our fleet (mostly Prius, some Ford Escapes).
- The City has reduced fleet fuel consumption from 9.4 million gallons in 2005 to 8.8 million gallons in 2009.
- METRO is purchasing 100 hybrid buses a year through 2011 for a total of 449 hybrid buses. Currently 142 in fleet by end of 2008.
- Working with HAS and partners to migrate to clean fuel fleets at airport.
- Partnership with utility to retrofit City hybrids with Plug-In Hybrid Technology
- Developing City wide electric charging station infrastructure

Green Infrastructure

Retrofitting 2,400 intersections with LEDs

LED Traffic Lights

- 1,500 intersections completed at end of August 2009; with expectation of completing remaining intersections by end of fiscal year (June 30, 2010)

- 90% reduction in electricity use by new traffic light LEDs; last significantly longer (7 years versus 1 year)

- Saves the City $10K/day or $3.6M a year in electricity costs

- Upgrading heads from 8 inch to 12 inch as part of process

Green Infrastructure

Increasing Energy Utilization and Reducing kWh consumption

Combined Heat and Power Solutions

- Feasibility study carried out by HARC for 69th Street Waste Water treatment plant showed 14% return on investment with 7 year payback. Decision to focus effort at Almeda Sims which is in the process of major facility upgrade.
- Preliminary engineering development (including environmental permit analysis) kicked off at Almeda Sims Waste Water treatment plant for CHP solution. FY10 CIP includes a $10 million line item appropriations for project.
- Use a Design-Build development process for engineering and construction project.
- Applied for $12 million Department of Energy Grant to implement CHP technology at Almeda Sims and 69th Street Waste Water Treatment Plant

Environmental Stewardship

Promoting Energy Efficiency

Public Education and Outreach

- **CFL Campaign:**
  - •Door to door hand-out of 250,000 CFLs to Houston home owners via Mayor's Youth Summer Job Corp in partnership with Centerpoint

- **Million Trees Houston:**
  - •Significantly increase the number of trees planted and sustained across the region through a public – private partnership.

- "Power to People" web site to promote and educate public on energy efficiency concepts

Building on Sustainability

- **Infrastructure**
  - ESCO Work to Begin at Wastewater and Water Treatment Plants
  - Rolling out LED Street Light Initiative
- **Transportation**
  - Building Battery Electric Vehicle (BEV) Fleet
- **Renewable Energy**
  - Increasing Renewable Energy Financing Opportunities for Commercial and Residential Properties
  - Improving Natural Disaster Preparedness with Mobile Solar Powered Generators

Green Building

Weatherizing Low-Income Households to Reduce Energy Consumption

Residential Energy Efficiency Program

- Over 7,000 homes weatherized across the City
- Rolling out expanded $23 million weatherization program
- Participation rates approach 50%; home owner satisfaction high
- 12 – 18% “weather adjusted” kWh reduction; high as 20% over summer months
- Efficient implementation model; contractors go house to house
- City administered program funded by CenterPoint Energy, TIRZ funds and Affordable Housing funds
- Working with Clinton Climate Initiative and REPs to develop mass market program

Green Building

Why a Weatherization Program?

Residential Energy Efficiency Program

- Energy Burden
- Neighborhood Stability
- Demand Management
- Lack of Options for Low-Income

Green Building

Program Approach

Residential Energy Efficiency Program

- Identify and qualify low-income neighborhoods
- Implement neighborhood by neighborhood for maximum efficiency
  - Communicate and meet with community leaders to educate neighborhood about program and its benefits
  - Sign-up residents at community parties, events and walks
- Assign home to a weatherization contractor
- Contractor conducts:
  - Home energy efficiency assessment
  - Implements required energy measures
- Post-inspection and follow-up

Green Building

Mobilizing Applicants

Residential Energy Efficiency Program

- How to explain applicant participation across neighborhoods.
- Possible Factors
  - History of Previous Government Program Participation
  - Demographics
  - Approach