Indicators

energy

The following indicators were derived from the Research Roundtable Workshop discussions and previous indicator research undertaken by the Design Centre for Sustainability and its partner research groups.*

The proposed Energy Indicators are:

Density and Adaptability

Renewable Energy Proximity

Recovery of Waste Energy

Ron Kellett, Sara Fryer & Isabel Budke. 2009 Specification of Indicators and Selection Methodology for a Potential Community Demonstration Project. Report for CMHC/NRCan.

Density and Adaptability

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INDICATOR

Density: optimization of existing energy infrastructure through densification. Adaptability: some building types are easier to adapt to new uses or technology than others and, therefore, have longer life spans.

Increased density and buildings adaptable to new uses, in areas serviced by existing infrastructure, reduce demand for new energy infrastructure, shares maintenance costs among more consumers, reduces transmission losses, and enables energy efficient behaviors.

DESIGN METRICS

- % of new developments served by existing energy infrastructure
- Population per hectare
- Jobs per hectare
- % of existing buildings in new developments retrofitted for new uses or higher density

SUPPORTING STRATEGIES & ACTIONS

- Reuse existing buildings
- Focus on energy conservation efforts to minimize need for additional energy production
- Employ green building rating certification
- A % of building energy requirements are met using microgeneration technologies
- Reallocate density from areas at risk from natural hazards to reduce energy required for protection (i.e. pumps, dikes, and slope stabilization)
- Implement a 7 to 10 story maximum height in dense nodes and 4 to 8 stories along corridors for optimum balance between energy efficiency and building turnover to accommodate new technologies.
- Develop neighbourhood waste-to-energy plants
- Include consultations on energy efficiency as part of of building permit process

Renewable Energy Proximity

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INDICATOR

Renewable Energy Proximity reveals the proportion of development serviced by renewable energy systems. A close proximity reduces transmission losses and allows for localized energy generation and synchronicity of uses. Additionally, compact, mixed use enables synergies in energy use patterns and energy production.

DESIGN METRICS

- % of development serviced by renewable energy systems
- % of development area energy demand to be met with on-site energy sources (i.e. renewable energy generation, waste heat recovery, or waste-to-energy generation)

SUPPORTING STRATEGIES & ACTIONS

- Increase residential and employment density
- Shift density away from areas prone to natural hazards
- Use low grade energy sources for low grade uses (i.e. heating using geothermal or sewer heat recovery)
- Build neighbourhood waste-to-energy plants
- Mandate passive solar building design
- Use "smart grid" technology (i.e. smart meters and switches) to manage energy demands and enable decentralized energy production
- Focus on energy conservation before implementing renewable sources
- Use renewable energy generation for base demand and supplement with combustion sources for peaks (with appropriate pricing scheme)
- Invest in creating green energy jobs
- Enable the use of micro generation technologies (i.e. small wind turbines, roof-mounted solar energy systems)
- Employ low carbon landscaping (using low-carbon materials and low maintenance landscape design)
- Incorporate green infrastructure solutions (i.e. swales and infiltration basins to treat and locally infiltrate rainwater)
- Encourage each municipality to create and implement an energy plan

Recovery of Waste Energy

energy

INDICATOR

Reveals the degree of energy recovery from waste sources. Recycling energy from waste sources reduces the load on conventional energy sources and landfill pressures. For example, heat can be captured by clustering complementary heating/cooling requirements (i.e. a library next to an ice rink, or heating residential units with heat generated by a bakery) or exchanging heat with outgoing sewer or wastewater.

DESIGN METRICS

- % of buildings connected to a sewage/surface water heat exchange
- % of wastewater treatment facilities capturing energy content of wastewater
- % of people and businesses able to capitalise on waste energy
- % of agricultural or municipal organic waste utilized for energy production
- % of municipal solid waste and/or wastewater utilized for energy production

SUPPORTING STRATEGIES & ACTIONS

- Monitor the % capacity of district energy systems derived from waste energy
- Use smart growth patterns to mix heat sinks and sources
- Create disincentives to use electric heat and promote waste energy capture
- Mandate passive solar architectural design to minimize energy waste
- Use low grade energy sources (waste energy) for low grade uses (heating and cooling)
- Cluster land uses that have complimentary heating and cooling requirements
- Employ neighbourhood biomass collection sites to encourage the reuse of yard waste