



# Policy and Regulatory Instruments to Advance Building Energy Efficiency in BC

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# Overview

Background

Codes & Standards

Purchasing Policies

Municipal Building Policies

Break

Community-wide Building Policies

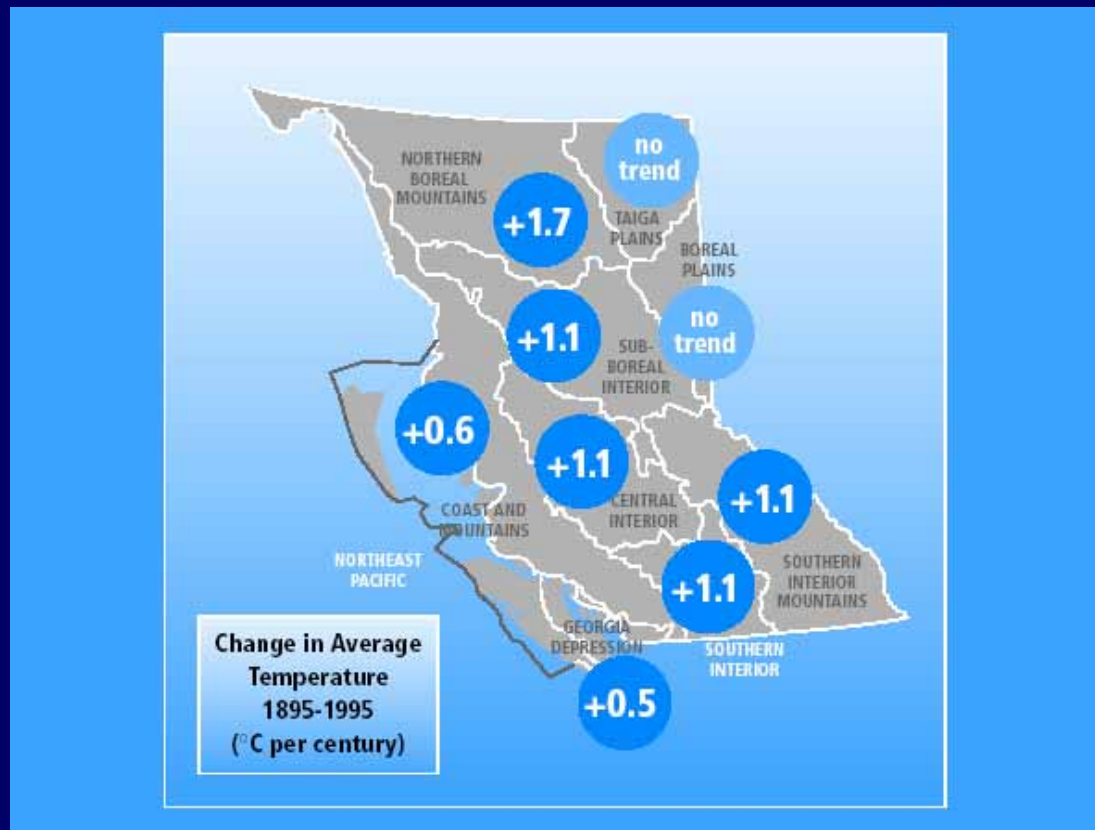
# Background



# Climate Change

- Stern report, Oct 2006
  - 20% reduction in global GDP
- IPCC report, Feb 2007
  - Global warming is occurring
  - Mostly due to human activity
  - Global temperature rise of 1.1 - 6.4°C over next 100 years
- BC Throne Speech, Feb 2007
  - 33% below current levels by 2020

# Climate Change Is Happening in BC



# Climate Change Impacts in BC

- Pest infestations: e.g. mountain pine beetle
- Increased forest fires
- Increased severity of droughts
- Declining water flows, impacting irrigation, fisheries, and hydro-electricity
- Warmer stream flows harming salmon and other fish species
- Flooding
- Lack of snow at ski resorts

# South Cascade Glacier

1928

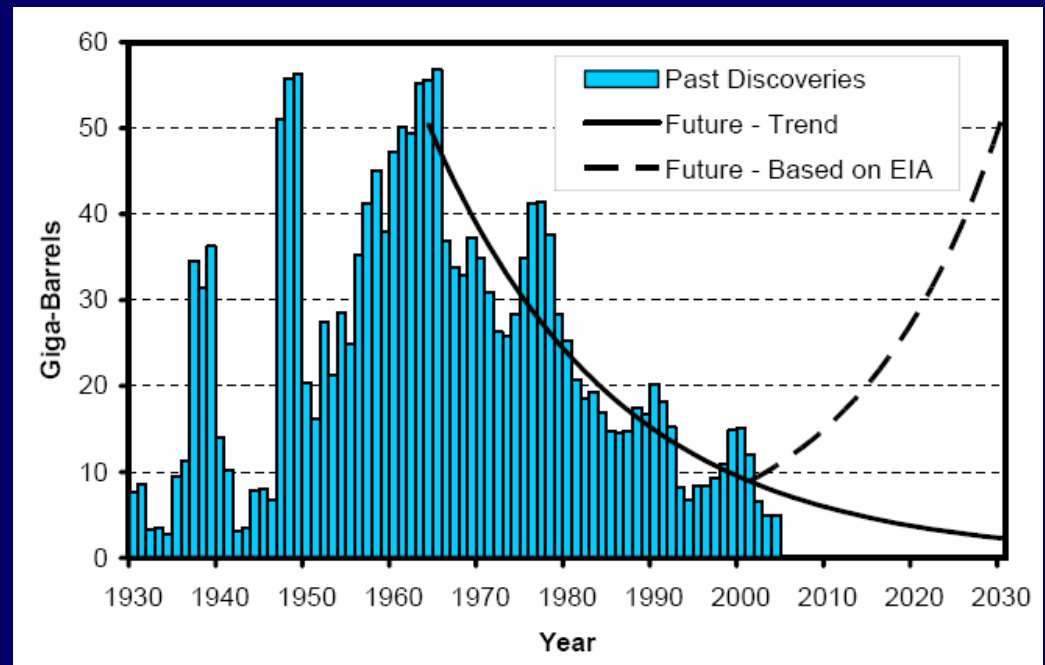


2000



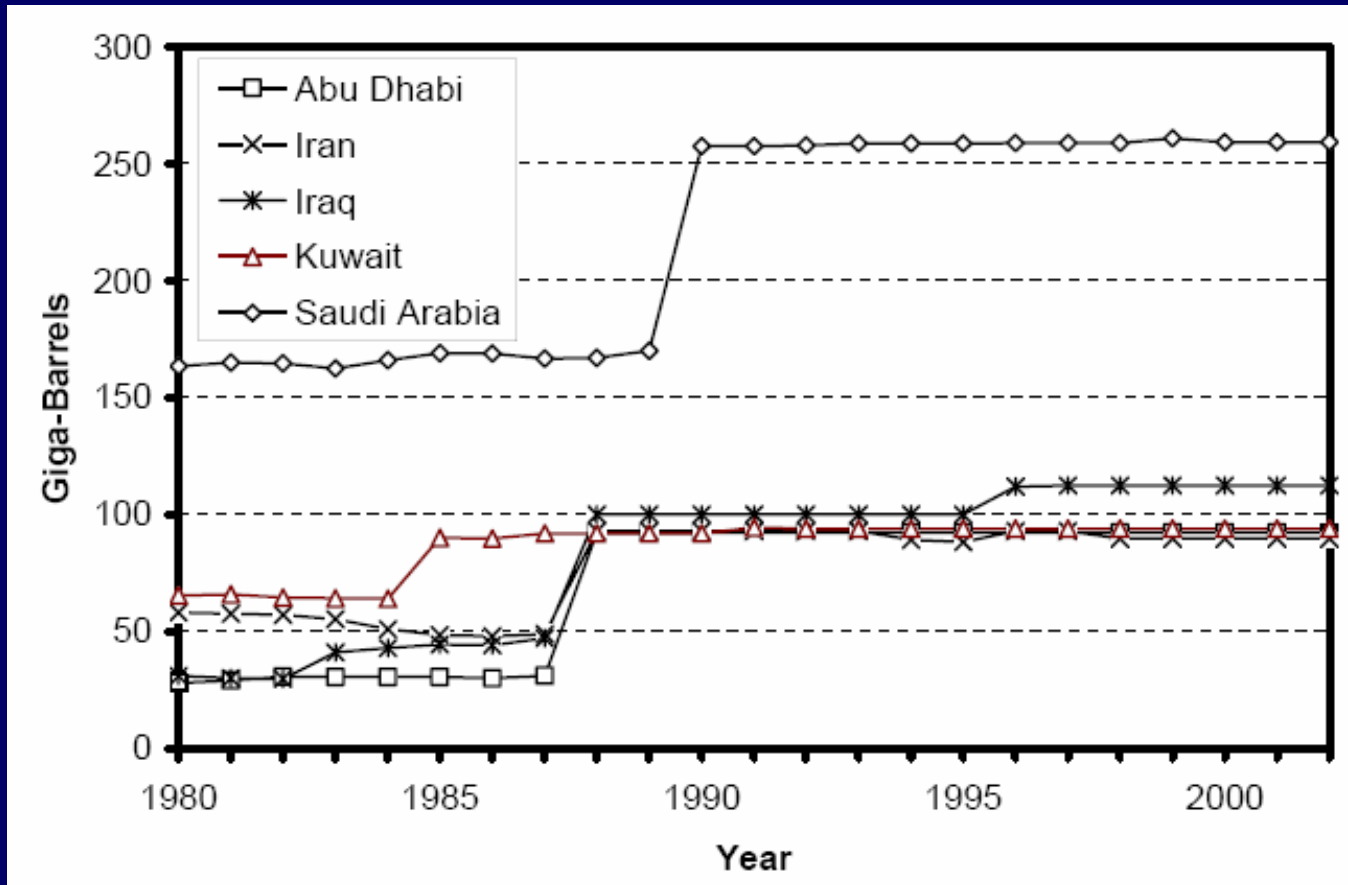
# Peak Oil/Gas

- Conventional oil peak – 2037 or 2005?
- North American natural gas production peaked in in 2000
- Non-conventional supplies are available, but at a much higher cost



Past & Future Oil Discoveries

# Reported Oil Reserves – OPEC countries



# Impacts of Peak Oil/Gas

- Increasing costs
- Uncertainty of supply
- Impact on the economy
- Increased environmental degradation



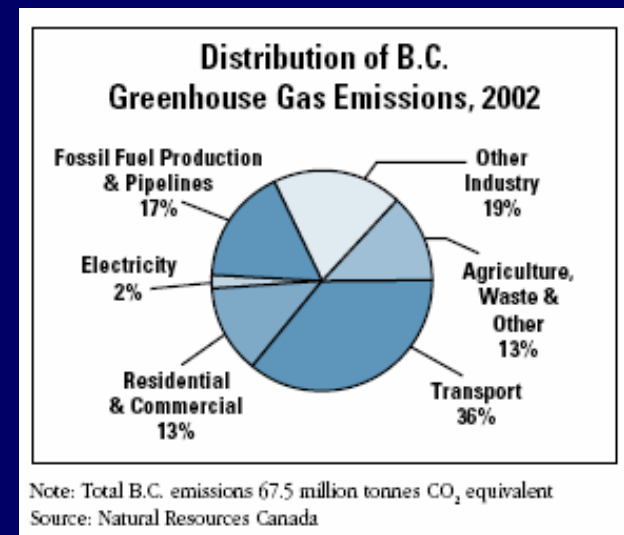
# Municipalities and Energy

- Canadians are the 4th highest per capita energy users in the world
- ~ \$4,300/person/year on energy
- Municipalities directly account for 7% of GHG emissions, indirectly > 50%



# Buildings and Energy

- Residential & commercial buildings account for about 27% of energy use in Canada, and about 13% of GHG emissions in BC



# Provincial Building Targets

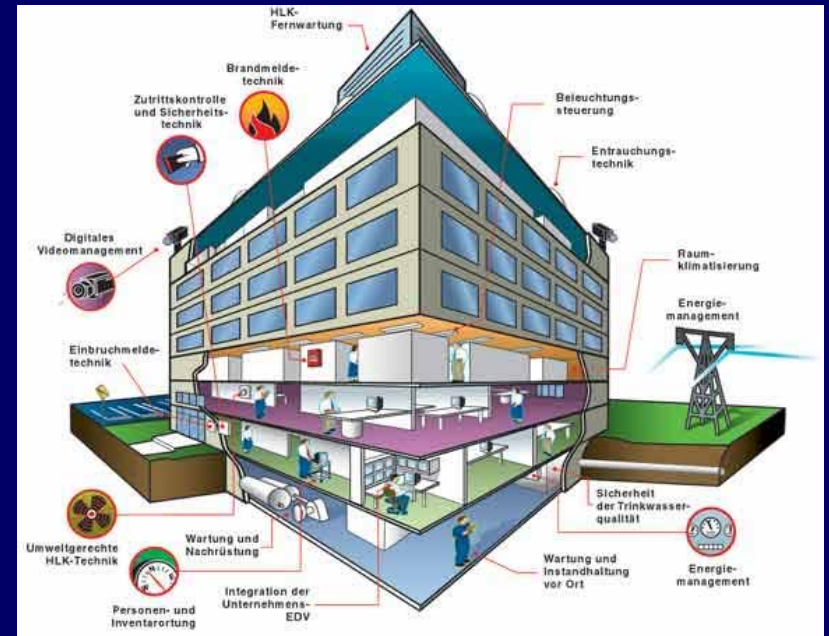
- Energy Efficient Buildings: A Plan For BC, 2005
- Targets by 2010
  - Energuide 80 for new houses
  - 25% better than MNECB (CBIP) for new commercial
  - 17% reduction in 12% of existing houses
  - 14% reduction in 20% of existing commercial
- Community Action on Energy Efficiency
  - 29 participating local governments
  - Emphasis on policy



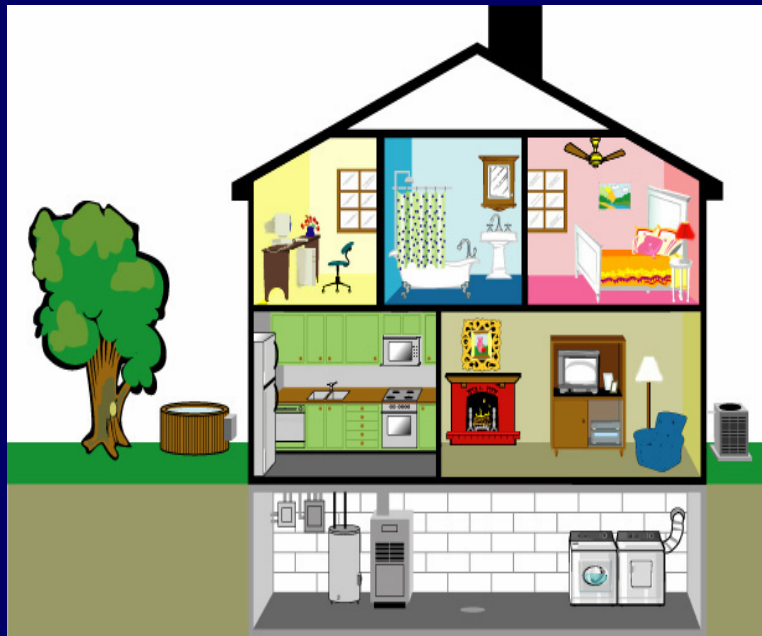
# Where does the energy go?



?



# Where does the energy go?



Roof	3.6 %
Walls	7.6 %
Windows / doors	9.0 %
Basement / floor	10.1 %
Infiltration / ventilation	5.8 %
<u>Furnace efficiency loss</u>	<u>10.3 %</u>
Heating sub-total	46.4 %
<u>DHW</u>	<u>25.6 %</u>
<b>Total Gas</b>	<b>72.0 %</b>
Lights	5.0 %
Fridge	4.8 %
<u>Other</u>	<u>18.2 %</u>
<b>Total Electrical</b>	<b>28.0 %</b>



# Codes & Standards

- Existing codes
- Other available codes & standards



# Existing Codes

- Federal Energy Efficiency Act
  - Regulates efficiency of equipment imported or shipped across provincial borders
  - Furnaces, air conditioners, appliances
  - New amendments will increase standards and add lamps, boilers



# Existing Codes (cont'd)

- BC Energy Efficiency Act
  - Regulates equipment efficiency, similar to federal act with some additions
  - Updated July 2006
  - Condensing gas furnaces Jan 1, 2008
  - Low-e windows Jan 1, 2009



# Existing Codes (cont'd)

- BC Building Code
  - Part 9 residential buildings have insulation requirements for walls and roofs
  - Varies by heating degree days
  - Special exemption for gas heated homes in lower mainland
  - No requirements for Part 3 buildings or non-residential buildings



# Existing Codes (cont'd)

- Vancouver Energy Utilization Bylaw
  - Introduced in 1991, ASHRAE 90.1-1989
  - Updated in 2004 to ASHRAE 90.1-2001
  - Applies to Part 3 buildings



# Other Codes & Standards



- ASHRAE 90.1
  - Applies to all buildings except residential 3 stories or less
  - Regulates building envelope, lighting, hvac
  - Mandatory, prescriptive requirements
  - Energy Cost Budget
  - 90.1-1999 about 1% below current practise
  - 90.1-2001 about 5% better than current practise
  - 90.1-2004 about 25% better in lighting, minimal change HVAC and envelope

# Other Codes & Standards (cont'd)

- Model National Energy Code for Buildings (MNECB)
  - Introduced in 1997, not updated since
  - Similar in format to 90.1
  - About 8% below current practise
  - Not used by any jurisdictions

# Other Codes & Standards (cont'd)

- ASHRAE 90.2 / MNECH / IECC
  - Codes for houses
  - Similar in format to 90.1 and MNECB
  - Lighting not included
  - IECC predominant residential code in US
  - None are used in Canada



# Other Codes & Standards (cont'd)

- Commercial Building Improvement Program (CBIP)
  - NRCan program to encourage efficient building design. Expires Mar 31, 2007.
  - Incentives for buildings 25% better than MNECB
  - Has become a de facto standard for various programs
  - Only works for performance compliance (energy modeling)

# Other Codes & Standards (cont'd)

- LEED

- Developed by USGBC, run in Canada by CaGBC
- Includes site selection, water, materials, and IAQ, as well as energy
- Minimum energy standard CBIP or 18% better than 90.1-1999



Certified  
Silver  
Gold  
Platinum

# Other Codes & Standards (cont'd)

- Energuide
  - Home rating system developed by NRCan
  - 1 – 100 rating, scale not linear
  - Typical existing homes range from 58 to 68
  - Typical new homes range from 71 – 76
- R2000
  - Equivalent to Energuide 80



# Other Codes & Standards (cont'd)

- Built Green
  - Industry driven program for new homes by CHBA
  - Energy focused, but includes water, waste, materials, IAQ, and business practices
  - Includes both points and an Energuide rating
    - Bronze – Energuide 72
    - Silver – Energuide 75
    - Gold – Energuide 77

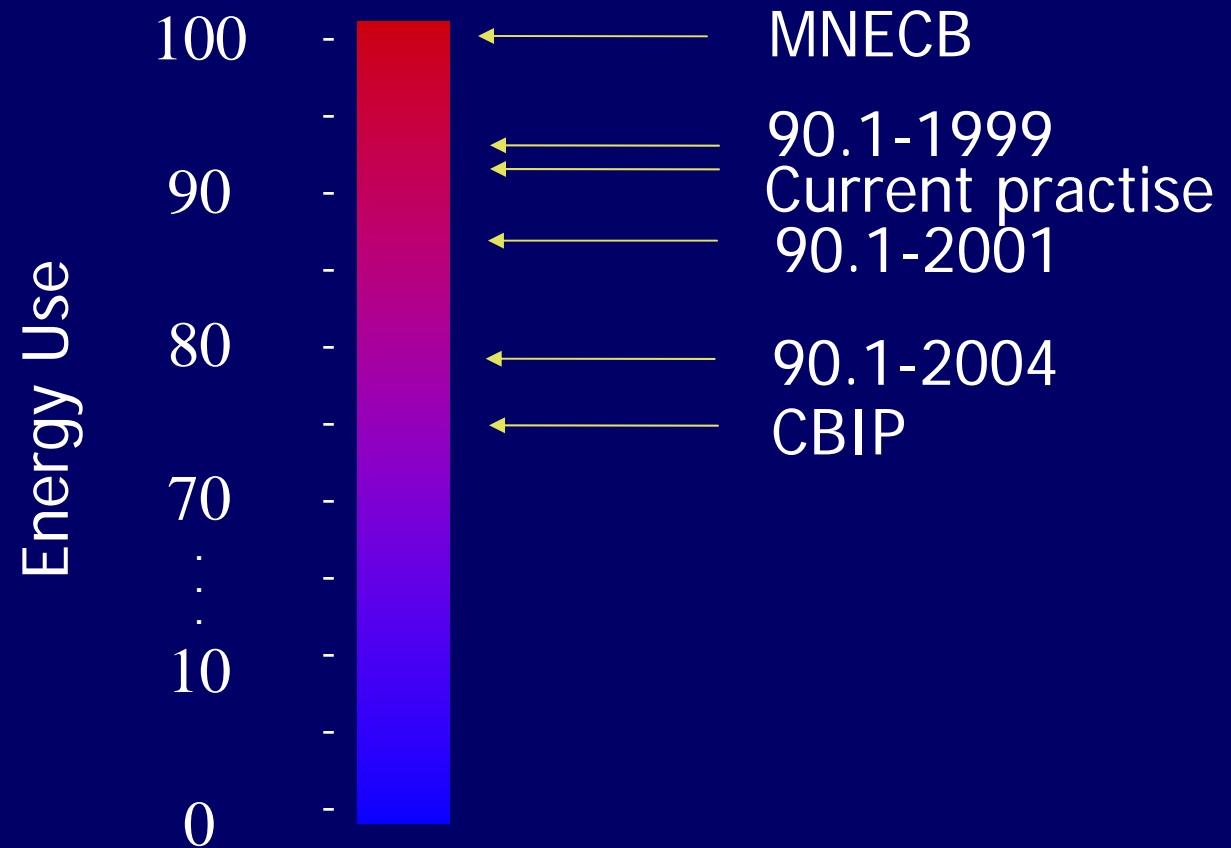


# Other Codes & Standards (cont'd)

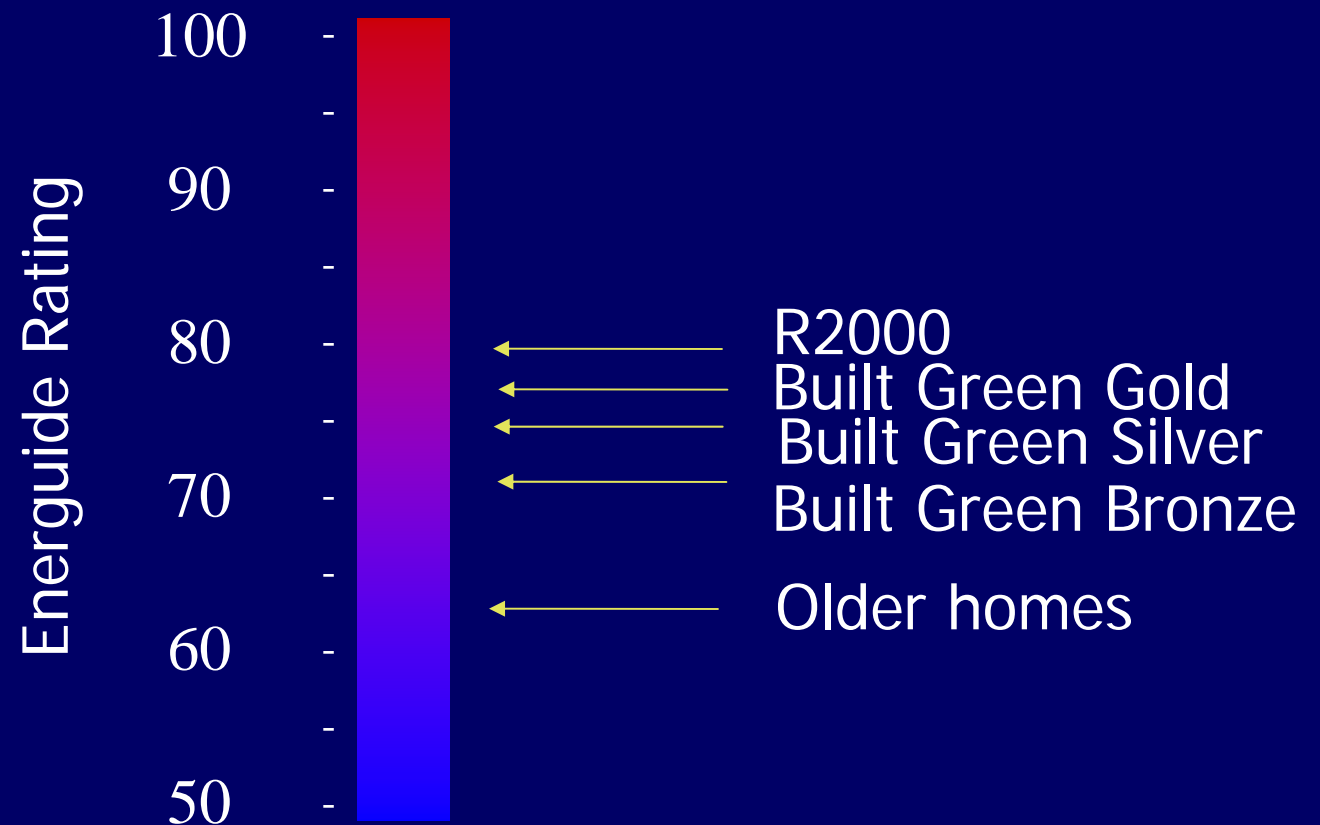
- Energy Star
  - International rating system for equipment
  - Identifies the top tier of equipment
  - Anywhere from 10 – 50% better than average



# Commercial Standards



# Residential Standards



# Purchasing Policies

- Commitment to buy products that meet a certain standard, eg. Energy Star
- City of Vancouver, Energy Efficiency Purchasing Policy AF-013-01
  - City must purchase energy efficient supplies and appliances wherever possible. This requires that product specifications be compliant with 1) Energy Star and 2) NRCan OEE guidelines.
  - Applies to HVAC, appliances, motors, office eqpt, lighting, signage, transformers, electronics.
  - Criteria must be included in all specifications.

# Local Government Building Policies

- Commitment to meet standards for new buildings, or targets for existing buildings
  - For new buildings would typically be ASHRAE 90.1, MNECB, or LEED
  - For existing facilities would typically be a % savings
- City of Richmond, Sustainable High Performance Building Policy #2004
  - Projects will be evaluated based on life cycle costing
  - LEED Gold standard for buildings >2000 m<sup>2</sup>
  - LEED Silver for buildings < 2000 m<sup>2</sup>

Break

# Community Energy Management – Decision-making Hierarchy

Infrastructure and land use  
(Density, mixed use, energy supply  
infrastructure, transportation  
network)

Building and site design, industrial  
processes, transportation modes

Energy using equipment (boilers,  
vehicles, industrial equipment)

Adapted from Jaccard et al, 1997.

# The Three Dimensions of Energy-related Decisions

Energy related decision	Time	Space	Private/public land use
Land use and infrastructure	Years to decades	A lot	Public
Building and site design	One to three years	Moderate	Public/private
Energy using equipment	Less than one year	Little	Private

# Private Sector Policies

- Energy management objectives in the OCP
- Comprehensive Development Zoning w/ Green Buildings
- Development Permit Area Guidelines
- Building Energy Performance Standards via Rezoning
- Heat Loss Calculation

## Energy Management Objectives in the OCP

- OCP provides guidance to the community, staff and council when making future decisions
- Staff will usually couch their requests to council in the OCP language
- When negotiating with developers, OCP can lend guidance
- Helpful to have energy-related language (ideally an energy management section)
- Language should be enabling rather than limiting (consider future unknowns)

# Energy Management Objectives in the OCP

At minimum, effective OCP energy-related language will:

- Establish the importance of energy to all aspects of the community's well-being (social, economic and environmental);
- Establish the importance of demonstrating leadership in sustainable energy;
- Emphasize the community's global citizenship (this ties local efforts to national and international energy and emissions policy, whatever it may be at a given point in time);
- Articulate the relevance of energy management to land use planning and development controls

# Energy Management Objectives in the OCP

- Direct future development to existing village/urban centres
- Enable staff to explore energy options, both on the supply side (e.g. district heating system) and the demand side (e.g. neighborhood and site design)
- Address the importance of EE municipal purchasing policies
- Require consulting engineers to assess full life cycle costs for all municipal building energy-related equipment
- Encourage collaboration with higher orders of government (e.g. CRD, province, federal) and utilities to advance energy sustainability
- Establish and support an ongoing Energy Management committee to advise Council and the community on energy-related issues and work with other jurisdictions on exploring options

# Green Buildings for Comprehensive Development Zoning

- Rezoning
- Amend OCP + zoning bylaw
- Municipality and developer negotiate
- Development agreement + s.219 covenant (Land Title Act)

# Green Buildings for Comprehensive Development Zoning

## Example – City of Burnaby

- Part 9 multi-family buildings on city owned lands.
- Drawing on UBC's Residential Environmental Assessment Program (REAP) guidelines and SFU UniverCity's Green Building Guidelines



# Green Buildings for Comprehensive Development Zoning

## Example – City of Victoria

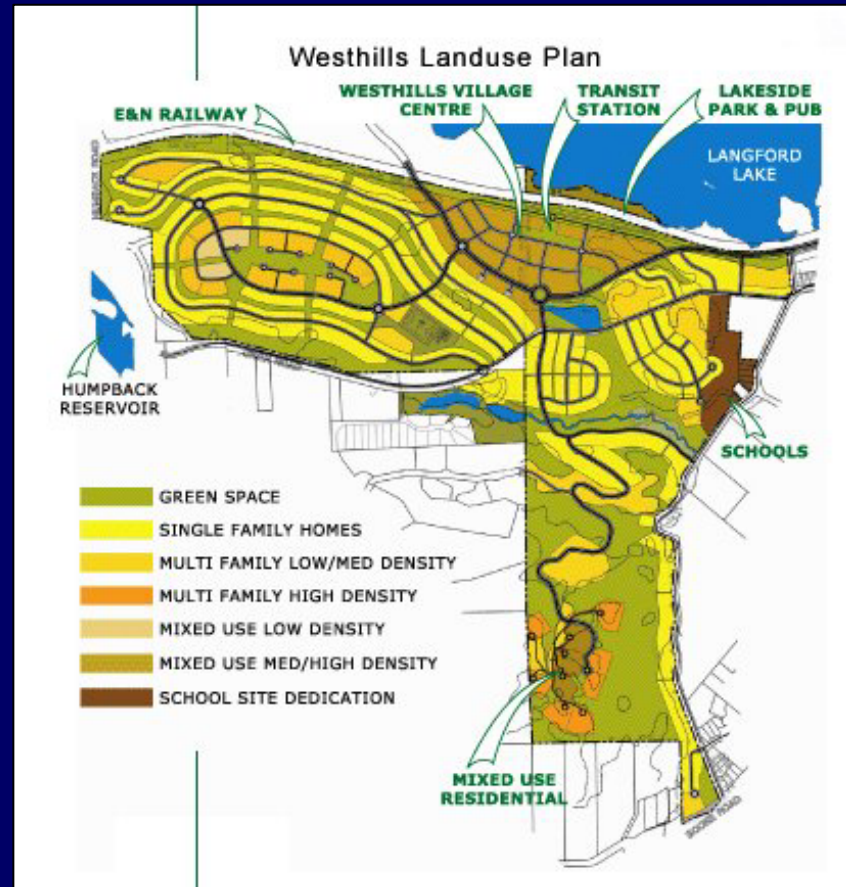


- Dockside Green
- All buildings LEED standard
- On site sewage treatment & waste-wood cogeneration utilities
- 100% of the site sewage treatment and heating services for the entire development

# Green Buildings for Comprehensive Development Zoning

## Example – City of Langford

- Westhills Development
- Mixed use neighborhood (5,000 residential units, commercial, civic)
- All commercial and residential buildings LEED certified
- Will achieve LEED for Neighborhood Development



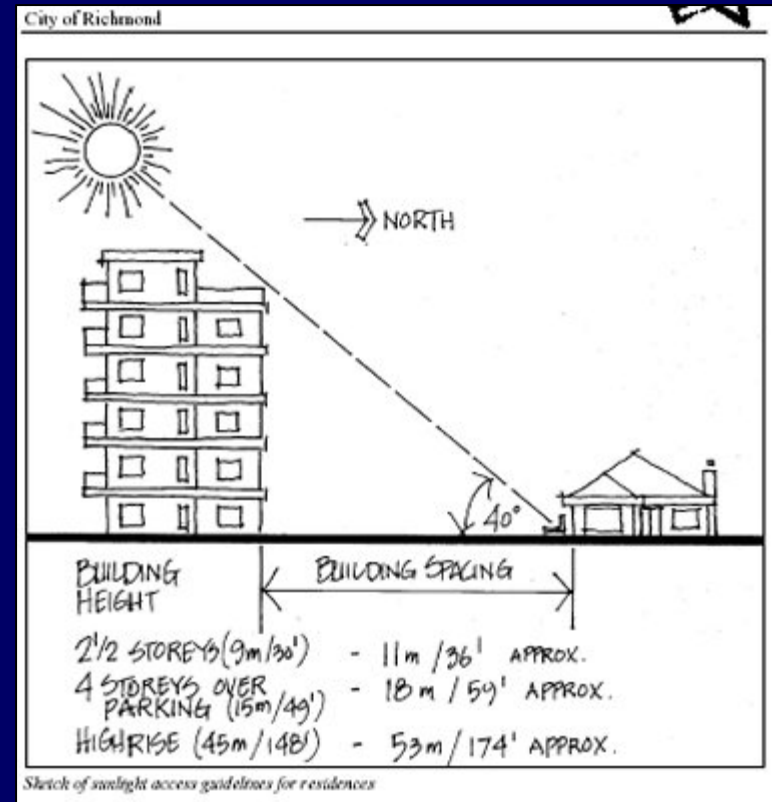
# Development Permit Area Guidelines

- S. 919 and 920 of the Local Government Act authorizes the establishment of Development Permit Areas
- Permit required for subdivision or development
- Proponent must meet DPA guidelines to proceed
- Guidelines outlined in OCP bylaw
- Authority to establish guidelines for ‘character and form’
- Passive solar and natural ventilation

# Development Permit Area Guidelines

## Example – City of Richmond

- Sunlight access – minimum 75% of dwellings & open spaces receive direct sunlight every day of the year
- Minimum north-south spacing
- Orient windows to the south in order to maximize solar gain
- Operable windows



# Building Energy Performance Standards via Rezoning

- A municipality can stipulate additional requirements in exchange for rezoning (e.g. energy efficient building features)
- Staff requires the proponent to prepare a development plan & provide s. 219 covenant (Land Title Act)
- Secure staff's favorable recommendation to Council
- Staff cannot enter into binding agreement with proponent, cannot 'fetter' council's delegated authority to exercise discretion

# Building Energy Performance Standards via Rezoning

## Example – Municipality of Bowen Island

- Developing a Council rezoning policy
- Rezoning applicants are expected to achieve Built Green™ “Gold”, and EnerGuide for New Houses 80 for new residential development
- Extensive developer consultation and committee referrals
- Strong support



# Heat Loss Calculation

- Municipalities deliver and enforce the BC Building Code
- Can amend building bylaw to require heat loss calculation for all heating or building permits, as per the 2006 BC Building Code Section 9.33.5.1 (1)

# Heat Loss Calculation

## Example – City of Burnaby



- 2004 Building Bylaw
- Permit applicant must submit a heat load worksheet, an appliance selection worksheet, manufacturer's furnace specifications and blower performance data
- Ensures heating equipment meets the heating requirements of the structure and avoids installation of "oversized" furnace or hydronic equipment

## Other Policies

- Energy Efficiency Development Permit/Rezoning Checklist – Port Moody, Kelowna, New Westminister, Port Coquitlam
- Density bonusing for energy efficiency
- Discount building permit fees for energy efficiency – District of Saanich
- Local Improvement Charges (still in infancy – see Pembina Report) – potential pilot Central Saanich, Smithers
- Service Area Bylaw for DH systems – City of North Vancouver
- Local energy efficiency building code – Dawson Creek (requires Ministerial authority)

## Policy Exercise - Negawattville

- You are the lead planning team for a small (15,000) community
- Over the next 5 years significant expansion of brownfield waterfront development lands
- Older downtown, deteriorating
- New big box sprawl occurring at the urban fringe
- Several new civic buildings sprinkled throughout the municipality
- Receive a lot of rezoning appl's for SFD and MF low rise

# Your Planning Team's Task

1. Based on what you've learned today, design the best energy efficiency policy, or suite of policies, for the community
2. Implementation plan (potential barriers, how you will overcome those barriers)
3. Report back to the other teams



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