



# BC Government Initiatives to Support Energy Efficiency and Climate Action for Buildings

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# Overview

- Targets & Vision
- Approach
- Tools
- Benefits



# Aggressive Targets: Emissions

- Provincial greenhouse gas emission reduction targets (legislated):
  - 33% by 2020
  - 80% by 2050
- 2007 Energy Plan:
  - Net zero emission electricity by 2016
  - Electricity self sufficiency by 2016
- Clean Energy Act:
  - 93% of electricity must be clean
  - ‘objectives’: support fuel switching to electricity and renewable energy; use of waste heat, biomass, biogas



# Aggressive Targets: Energy Efficiency

- 2008 Energy Efficient Buildings Strategy energy reduction targets for 2020:
  - Residential: 20% reduction per home
  - Commercial: 9% per floor area
- BC Hydro: Meet 66% of demand increase through conservation
  - Note: electricity conservation is good for rates, land & water impacts, but minimal emission impact. Conservation ethic.
  - Conservation of natural gas produces incremental emission reductions

# Ambitious Vision

- Net Zero Emission new buildings by 2020?

All buildings by 2050?

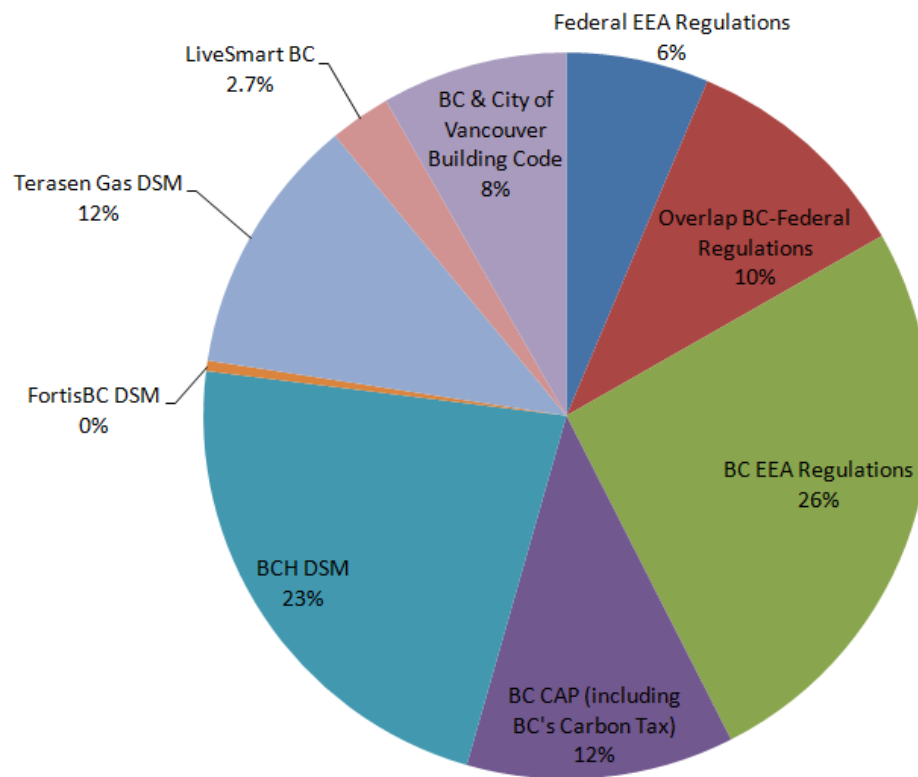
- California targeting NZ Energy in residential by 2020 and commercial in 2030
- European Union targeting ‘nearly zero’ energy by 2020



# Estimated Energy Savings

- 2012: 21 PJ, equivalent to 236,000 households
- 2016: 39 PJ, equivalent to 431,000 households
- 2020: 55 PJ, equivalent to 608,000 households

2020 Cumulative Energy Savings per Policy





# Reducing Energy Use

- Conservation (*“use less”*)
  - Turn off the lights
  - Turn down the thermostat
- Building and system design (*“need less”*)
  - Daylighting
  - Windows, insulation and draftproofing
- Efficient equipment (*“use it efficiently”*)
  - Compact fluorescent light bulb
  - ENERGY STAR furnace
- Load management (*“use it at the right time”*)
  - Run dishwasher to avoid peak



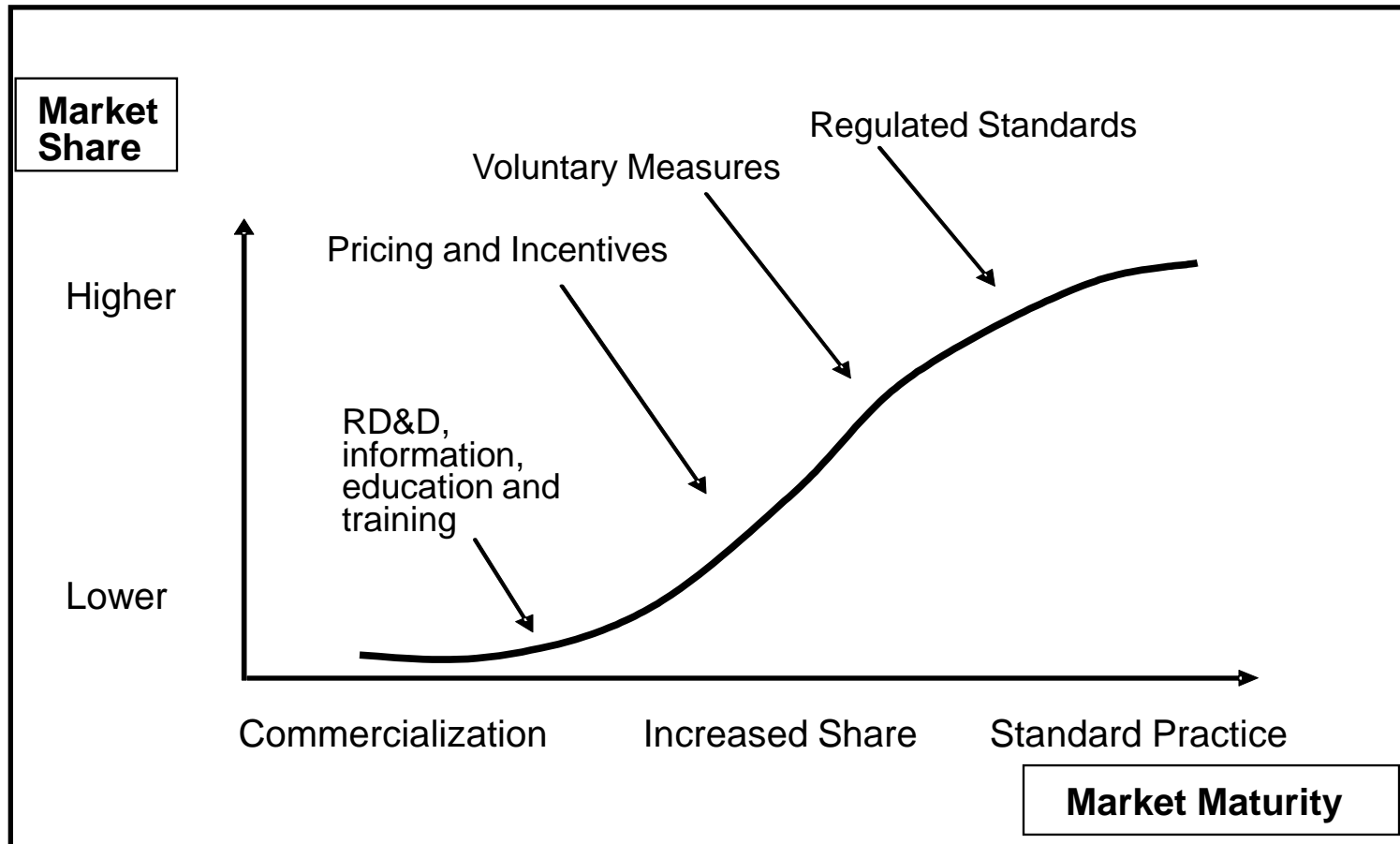
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# Market Transformation

- 5 A's – Indicators of Success
  - Awareness
  - Availability
  - Accessibility
  - Affordability
  - Acceptance

# Market Transformation





# 'Soft' Tools

- Building labelling – consumer information (pilots)
- Electricity conservation rates (BC Hydro and FortisBC electric)
- Carbon tax (\$30/tonne in 2012)
- Public sector leadership
  - Carbon neutral government
  - PSECA
- Financing (Pay As You Save / On-bill financing)
- Programs
  - Utilities: BC Hydro, FortisBC
    - Governed by Utilities Commission Act, Clean Energy Act, DSM Regulation
  - LiveSmart BC: Efficiency Incentive Program
  - LiveSmart for Small Business Program



# LiveSmart BC - Residential

- Whole-house energy assessments (Certified Energy Advisors) and EnerGuide label
  - \$110 M over 5 years (2008-2013)
- Rebates for energy efficiency upgrades – building envelope, space and water heating, ventilation, renewable energy
  - 78,000 participants to date
- Promotes heat pumps (fuel switching)
- One-stop-shop for incentives from multiple parties
- Promotion of trades training and certification



# LiveSmart for Small Business



- **Business Energy Advisor (BEA)** service for 5 sectors and 7 regions, including free walk-through Energy Assessment for businesses that use less than \$50,000 of electricity per year
- **Direct Installation** of energy efficient products for businesses < \$20,000 elec.
- **Increased incentives** offered by utility partners (BC Hydro & FortisBC Energy)
- **LiveSmart Champion** Program

# Regulatory Tools

- BC Building Code (Minister Responsible for Housing)
  - Applies to new construction, major renovations and change of occupancy
  - Update currently in progress (EnerGuide 80 and ASHRAE 90.1-2010/MNECB)
  - Continual improvement
  - Focus on performance
- *Energy Efficiency Act* standards for manufactured building components and equipment (Ministry of Energy)
  - Applies to manufacturers, importers, distributors, builders
  - Third party tested
  - Examples: windows, glazing, doors, large boilers, small furnaces, small water heaters, large motors, line-voltage thermostats, ballasts



# Constraints

- Stock turnover rates
- Positive net present value
  - Challenge: low energy costs in BC
- Upfront cost vs energy savings
- Manufacturer & industry capacity – BC is small

# Other Benefits

- Jobs: ~ 30 person-years per \$million, many local
- Improved competitiveness
- Increased comfort in buildings
- Improved healthfulness of buildings
- Occupant productivity and education outcomes
- Slowing utility rate increases (DSM is cheaper than many new supply options)



# Closing Thoughts

- Energy efficiency initiatives help to achieve both energy and emissions targets
- The BC Ministry of Energy and Mines is actively facilitating market transformation
- Both programs and regulations have an important role to play



# Questions or Comments?

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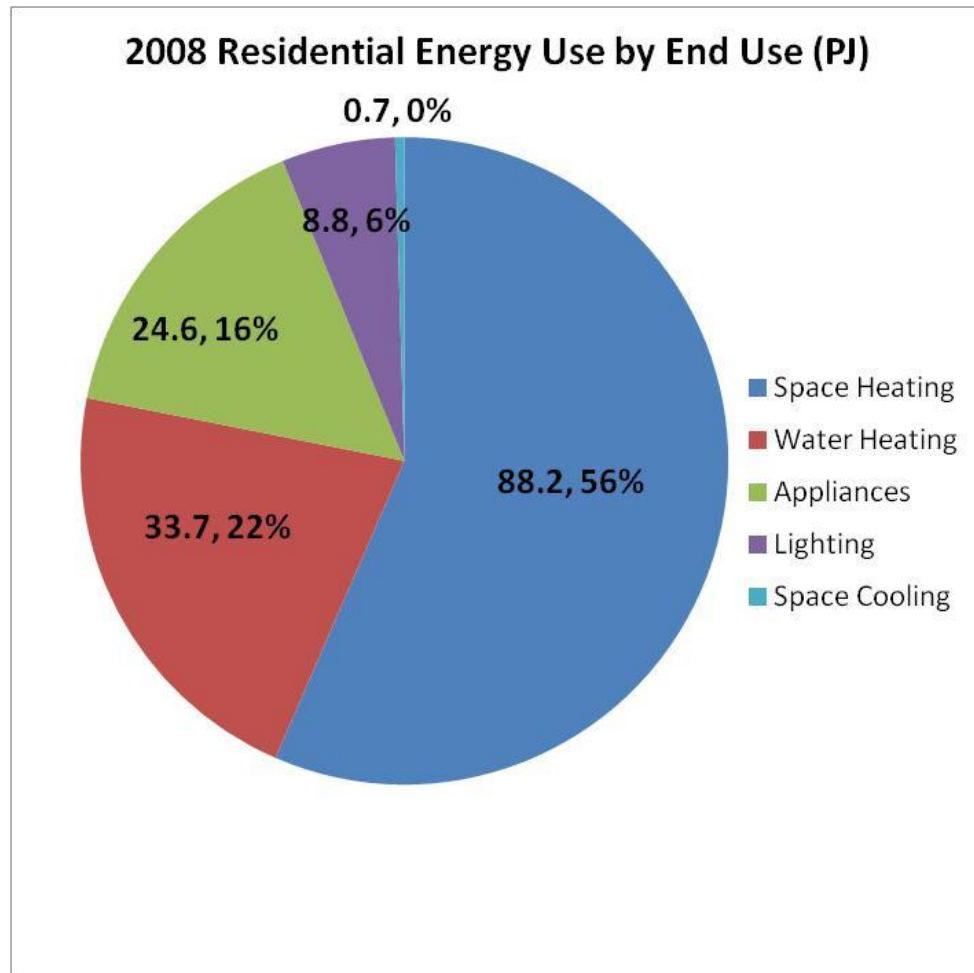


# EXTRA SLIDES



# Options for Homes

- Efficient building envelope
- Walls, windows and doors
- Air leakage and ventilation
- Space heating
- Water heating
- Lighting
- Appliances
- LiveSmart BC home energy evaluation
- Billing analysis





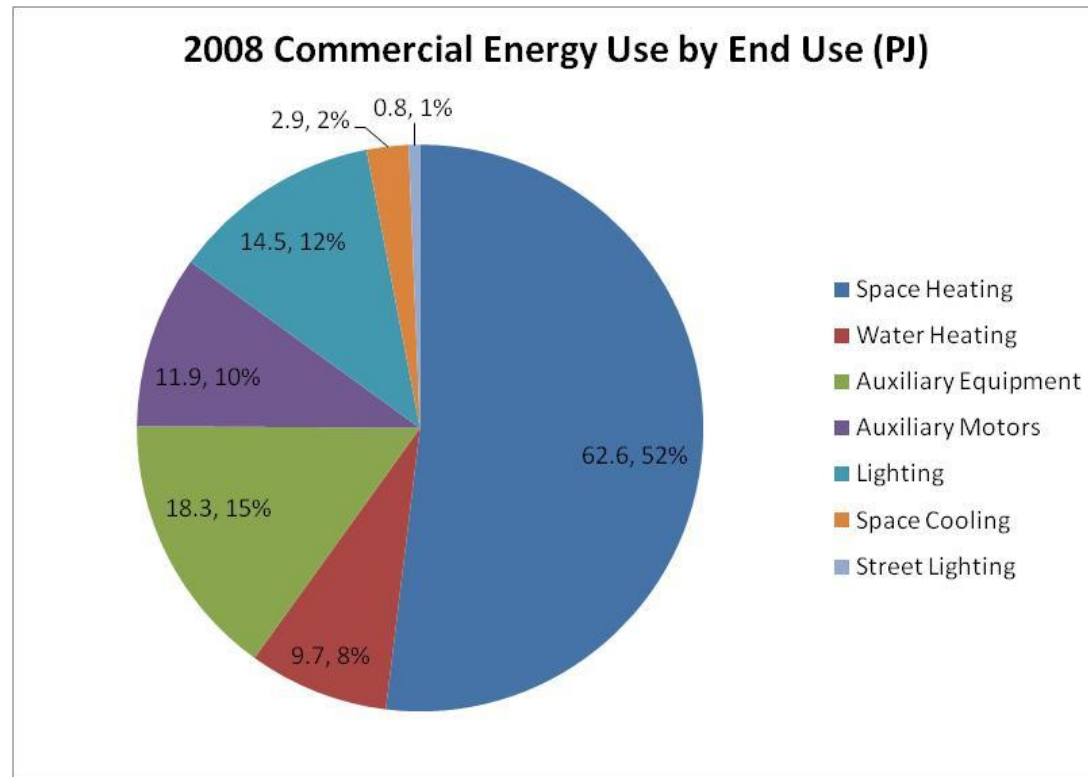
# Options for New Construction

- Building Envelope
  - High-efficiency (low-E) glazing
  - Reduced thermal bridges (balconies)
  - Detailing to reduce air leakage
- Heating, ventilation, air-conditioning (HVAC)
  - Variable air volume (VAV)
  - Hydronic distribution with heat pumps
  - Thermal metering
  - Heat recovery
  - Compartmentalization
- Lighting power density
- Commissioning (controls)
- ASHRAE standards 90.1, 189.1



# Options for the Office

- Conservation
  - Social marketing
- Heating
  - Heat pumps
  - Condensing boiler
- Lighting
  - T8 energy saver bulbs
  - Electronic ballasts
- Building Envelope
  - Air tightness
- Retro-Commissioning
  - Controls, operating schedules
  - Maintenance of equipment



# Options for Communities

- Community buildings
  - Conservation – user engagement
  - Energy efficiency retrofits
  - Retro-commissioning
- Community Energy Systems
  - District energy
  - Geoexchange
  - Waste heat (e.g., arenas)
- Water/Wastewater infrastructure
  - Mini-hydro from pressure drops
  - Heat recovery from sewage
  - Efficient motors/pumps
- Landfill gas capture – heat and power

