Ontario Cap and Trade: Overview and Scope of the Challenge

2016 Spring Seminar Program
Natural Gas Markets And A Carbon Constrained Future

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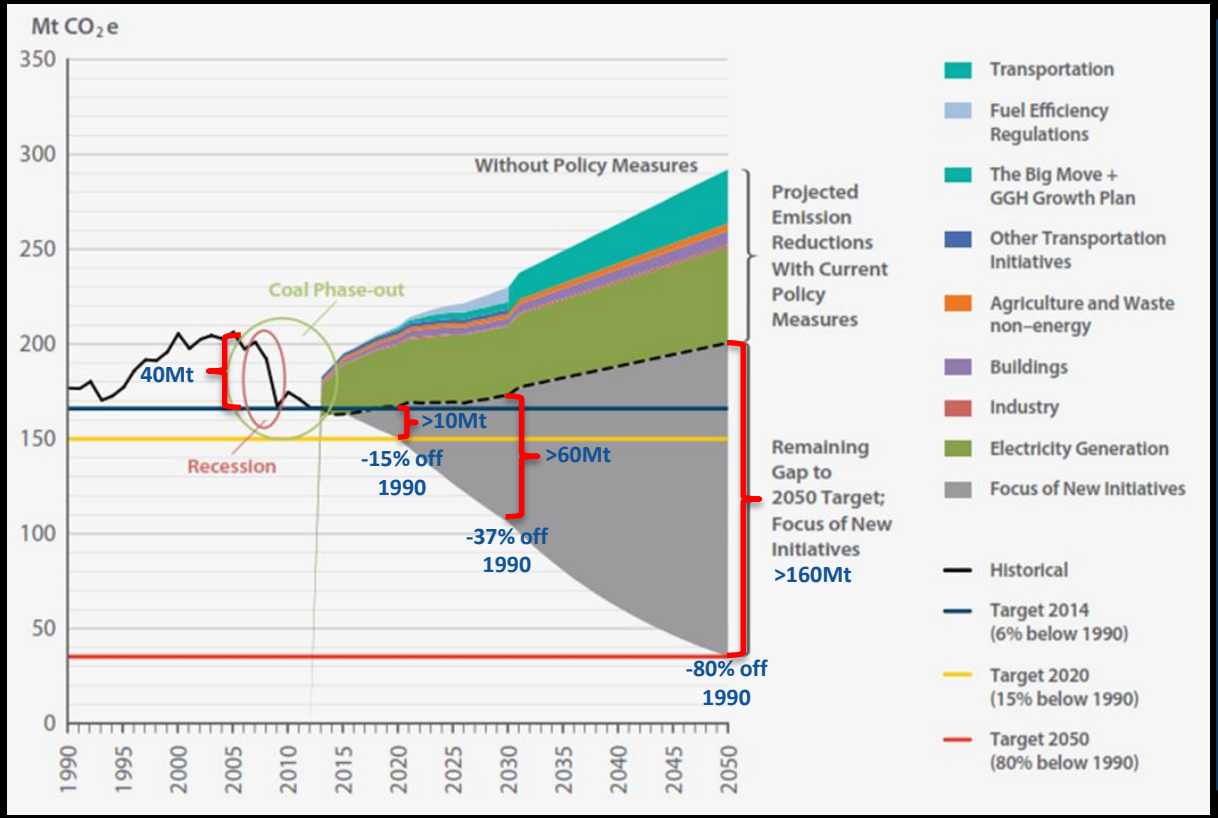
Ontario has defined 2020 and 2030 targets and a linear path to de-carbonization by 2050



>40 $MtCO_2$ (-20%) reductions achieved from 2005 to 2010.

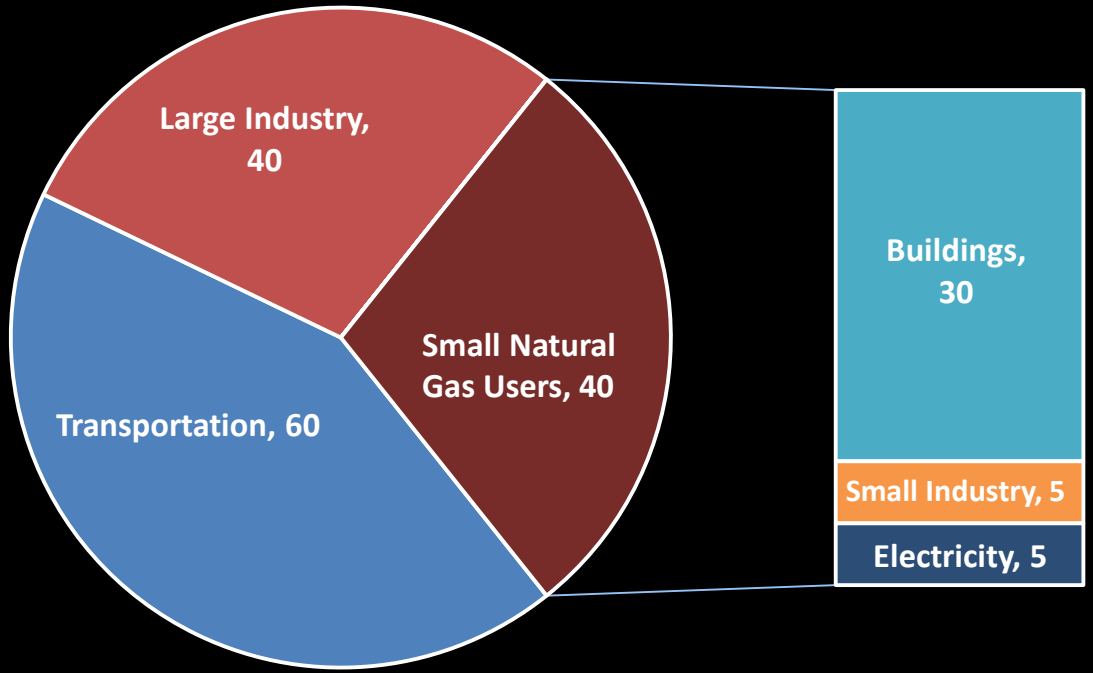
Coal retirement, CDM/DSM, industrial output decline (recession), vehicle fuel efficiency standards,…

Current measures identified for transportation and energy efficiency.

Future reductions required to fill 2020, 2030 and 2050 gaps...

Source: Ontario's Climate Change Discussion Paper, 2015, Ministry of the Environment and Climate Change

Based on Ontario's emissions profile reductions needed from NG and transport fuel use



Ontario Forecast 2017 GHG emissions for sectors / sources covered under proposed cap and trade ($MtCO_2e$)

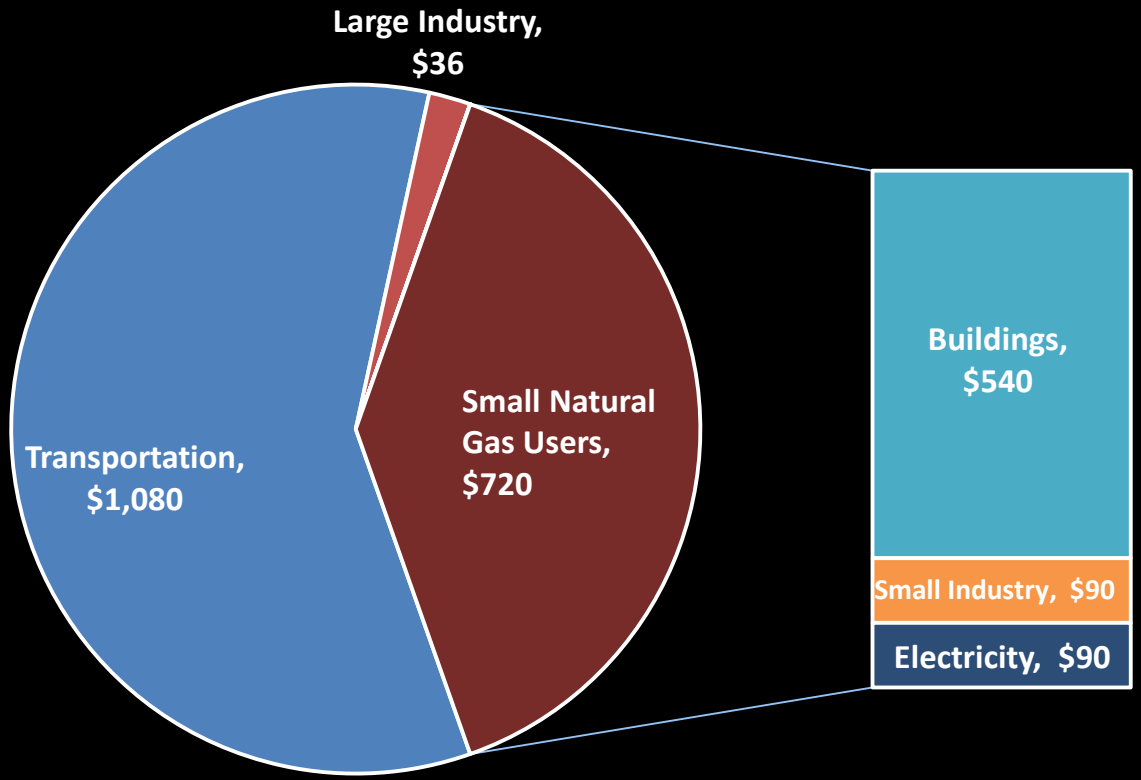
NG share of energy demand expected to grow over next 15 years (LTEP, community expansion).

ON proposed cap: 142M (2017) to 124M (2020) = 532M (avg 133M/yr).

$18MtCO_2$/yr (12.6%) reduction from 2017-2020 or 36Mt total over 2017-20.

$18MtCO_2$ = 4.5M (of 8M) personal vehicles or 10B m^3 NG (of 27B m^3).

In Year 1: >1.8B in revenue from sale of allowance via auction. Mostly from the small energy user.



Ontario Forecast Year 1 (2017/18) proceeds of sale of allowance (Million $s) – assuming $18/tCO$_2$e (WCI = $14US@0.77)

142M total allowances in Year 1

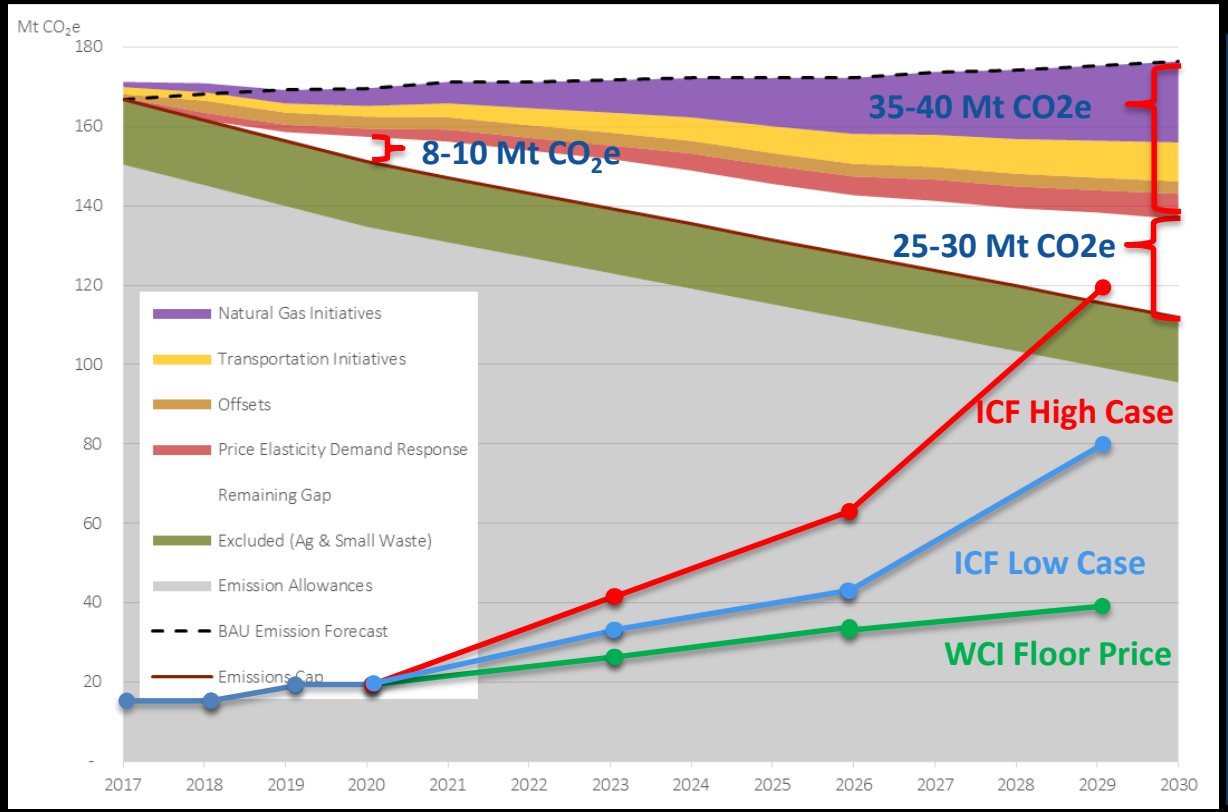
~38M free allocated to large industry (95% of 40M) = $0

~104M allowances auctioned.

- ~$1.1B for transport fuels (6-12 buyers).
- >$700M for NG small end users and NG generators (2 buyers).
- <40$M acquired by 100 large industrials (for portion not free allocated).

Less than 10 Ontario buyers dominating the allowance auctions.

Ontario will be unable to meet 2030 reduction targets domestically



Under aggressive abatement scenarios + effective complementary policy we can meet ~50% of the reduction target.

Price ($/t$CO_2$) suppressed out to 2025 due to California surplus.

Ontario joining WCI "short" moves price off floor earlier (vs no ON).

If Ontario 15Mt "short" of its 2017-2020 cap = transfer of >$300M from to California.

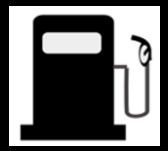
Impact on the price of energy?

Carbon price alone won't drive behaviour change by 2030

Households (10.6tCO$_2$/yr)

2017 = $85/yr

2030 = $450/yr



2017 = $106/yr

2030 = $560/yr

Small Industry (5M m^3 NG/yr 9,500tCO$_2$/yr)

2017/18 = $170,000/yr

2030 = $900,000/yr

Assumptions:

- 2017/18 allowance price $18, 2030 carbon price $95
- No free allocation to the Small Industrial

76%
of ON homes use NG as primary heating fuel
(Quebec = 3%)

85,000MW
ON peak day NG demand vs. peak electricity system demand of
25,000MW

15%
of the electricity generated within Ontario is NG fired
(California = 59%)

HIGH COST MAY NOT = EMISSION REDUCTIONS

- Low consumer behavioural response to energy price
- Very low cost fossil fuels = very high price of CO_2

NEW POLICY REQUIRED…

- Need a made in Ontario plan to drive reductions in short, mid, and long-term
- EE, EV, fuel switch

NEW INFRASTRUCTURE REQUIRED…

- Mass transit and electric distribution system to enable EVs
- CNG / RNG systems to enable long haul