

2 CLIMATE VULNERABILITY MONITOR

A GUIDE TO THE COLD CALCULUS OF A HOT PLANET

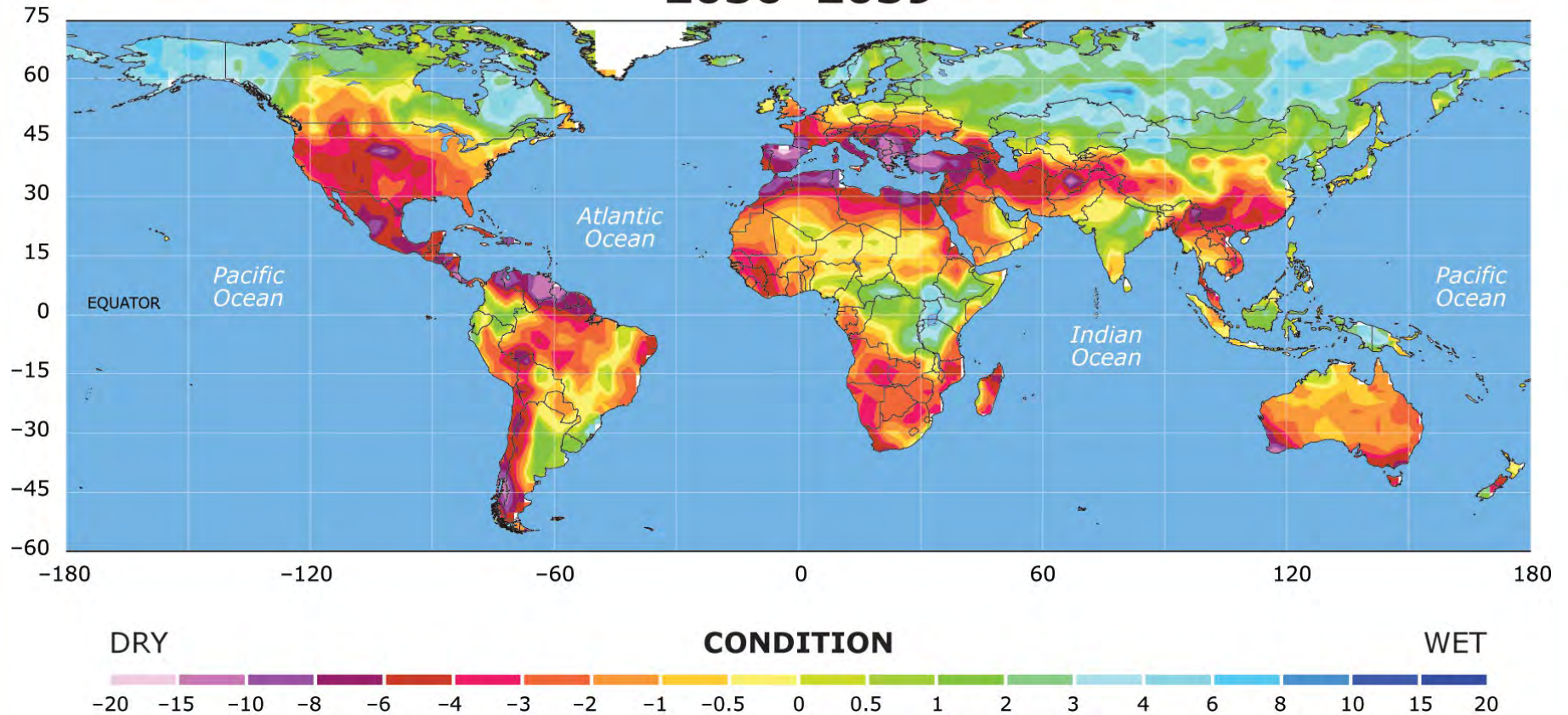


NUMBER OF DEATHS

	2010	2030	
Climate	Diarrheal Infections	85,000	150,000
	Heat & Cold Injuries	35,000	35,000
	Hunger	225,000	380,000
	Malaria & Vector Borne Diseases	30,000	30,000
	Measles	30,000	40,000
	Environmental Disasters	5,000	7,000

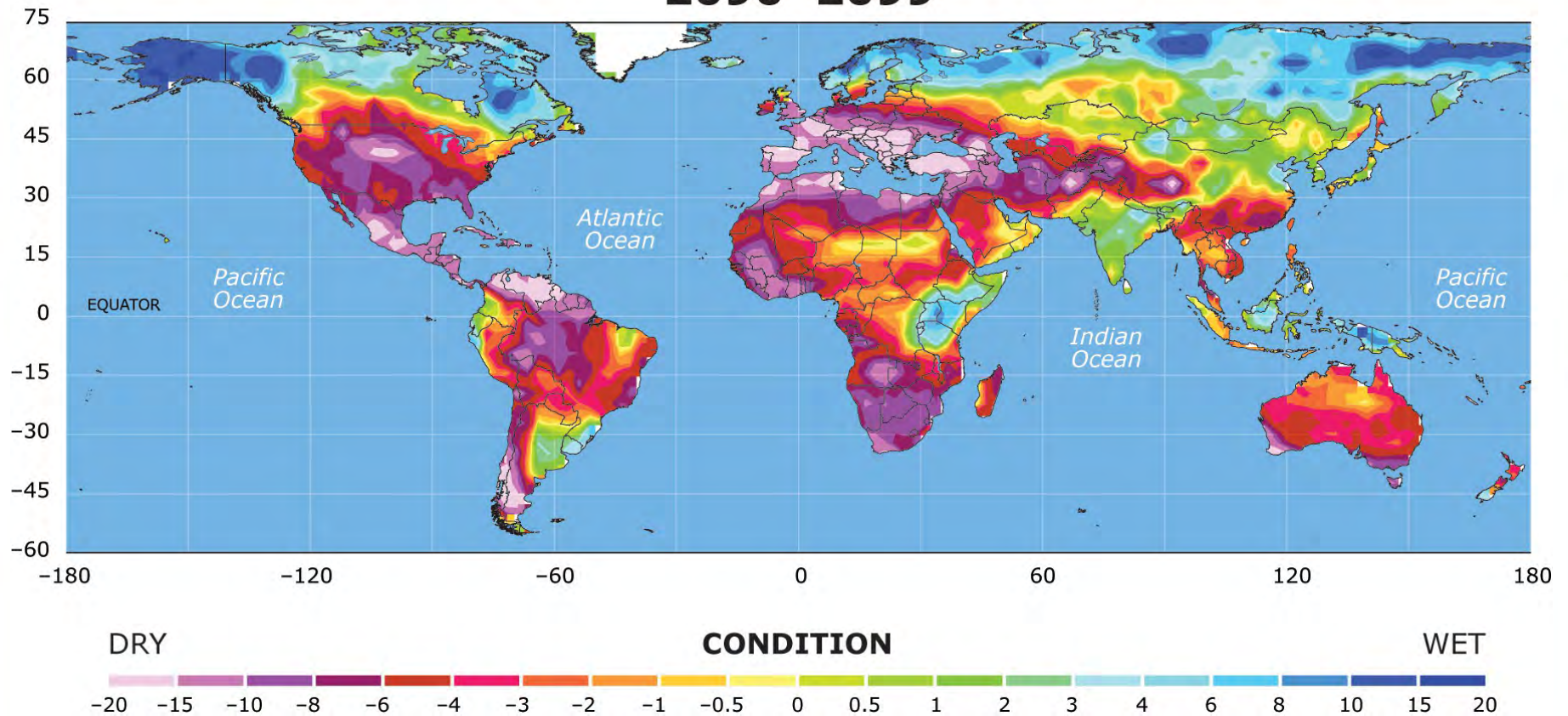
additional deaths from climate change (DARA 2012)

2030–2039



Aiguo Dai (2011), Drought under global warming: a review, *Wiley Interdisciplinary Reviews: Climate change*, 2 (1), pp 45-65. Reproduced courtesy of University Cooperation for Atmospheric Research.

2090–2099



Aiguo Dai (2011), Drought under global warming: a review, *Wiley Interdisciplinary Reviews: Climate change*, 2 (1), pp 45-65. Reproduced courtesy of University Cooperation for Atmospheric Research.

Copenhagen accord, 2009

“...we shall, recognizing the scientific view that the increase in global temperature should be below 2 degrees Celsius, on the basis of equity and in the context of sustainable development, enhance our long-term cooperative action to combat climate change.”

Cancún, 2010

“[The conference of the Parties] further recognizes that deep cuts in global greenhouse gas emissions are required according to science, and as documented in the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, with a view to reducing global greenhouse gas emissions so as to hold the increase in global average temperature below 2°C above pre-industrial levels, and that Parties should take urgent action to meet this long-term goal, consistent with science and on the basis of equity...”

Durban, 2011

“Canada believes that the Cancún Agreements, adopted at COP 16 and flowing from the Copenhagen Accord, do provide a sound conceptual and practical framework to advance our collective engagement to address climate change. Again, Canada supports the blueprint put forward at Cancún.”

- environment minister Peter Kent

consistent with science...

- H Damon Matthews & Ken Caldeira (2008), Stabilizing climate requires near-zero emissions, *Geophysical Research Letters*, vol 35, L04705
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- H Damon Matthews, Nathan P Gillett, Peter A Stott & Kirsten Zickfeld (2009:Jul:11), The proportionality of global warming to cumulative carbon emissions, *Nature*, vol 459, pp829-832
- Kirsten Zickfeld, Michael Eby, H Damon Matthews & Andrew J Weaver (2009:Sep:22), Setting cumulative emissions targets to reduce the risk of dangerous climate change, *Proc Nat Acad Sci USA*, vol 106, pp 16129-16134
- Kevin Anderson & Alice Bows (2011), Beyond "dangerous" climate change: emission scenarios for a new world, *Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences*, vol 369, pp 20-44
- United Nations Environment Programme (2010:Nov), *The Emissions Gap Report: Are the Copenhagen Accord pledges sufficient to limit global warming to 2°C or 1.5°C? - a preliminary assessment*. Available at www.unep.org/publications/ebooks/emissionsgapreport
- Dan Bernie, Laila K Gohar & Jason A Lowe (2012:Aug:15), Development of emissions pathways meeting a range of long-term temperature targets, *AVOID: avoiding dangerous climate change*
- Joeri Rogelj, David L McCullom, Brian C O'Neill & Keywan Riahi (2013), 2020 emissions levels required to limit warming to below 2°C, *Nature Climate Change* 3 pp 405-412
- Michel G J van Elzen, Andriew R Hof & Mark Roelfsema (2013:May), Analysing the greenhouse gas emission reductions of the mitigation action plans by non-Annex I countries by 2020, *Energy Policy*, vol 56, pp 633-643

consistent with science...

**THE LAWS OF PHYSICS AND
CHEMISTRY DETERMINE OUR
CARBON BUDGET, AND WE MUST
STAY WITHIN IT.**

consistent with science...

Total world emissions need to peak during this decade, and return to 2005 levels or lower (<45 Gte CO₂e per year) by 2020.

BUT newly industrializing countries are still increasing their emissions as they pull out of poverty...

...and on the basis of equity

“... the largest share of historical global emissions of greenhouse gases originated in developed countries and that, owing to this historical responsibility, developed country Parties must take the lead in combating climate change and the adverse effects thereof,...”

- Cancún 2010 text

the absolute minimum needed

*AT LEAST a 25% reduction by 2020
compared to 1990 by industrialized
countries*

(Anderson & Bows 2011)

*assuming the most favourable terms
possible for industrialized countries -
which means more rapid reductions for
low-income countries*

Canada's emissions

1990: 591 Mte CO₂e

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2011: 702 Mte CO₂e

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2020: 442 Mte CO₂e (science)

Canada's emissions

1990: 591 Mte CO₂e

2011: 702 Mte CO₂e

2020: 442 Mte CO₂e (science)

2020: 607 Mte CO₂e (current target)

Canada's Copenhagen promise

Committed to 17% cut compared to 2005 (3% RISE compared to 1990).

EU27+others: committed to 20% cut compared to 1990, but 30% if other developed countries improved their targets.

They didn't.

Canada's emissions

1990: 591 Mte CO₂e

2011: 702 Mte CO₂e

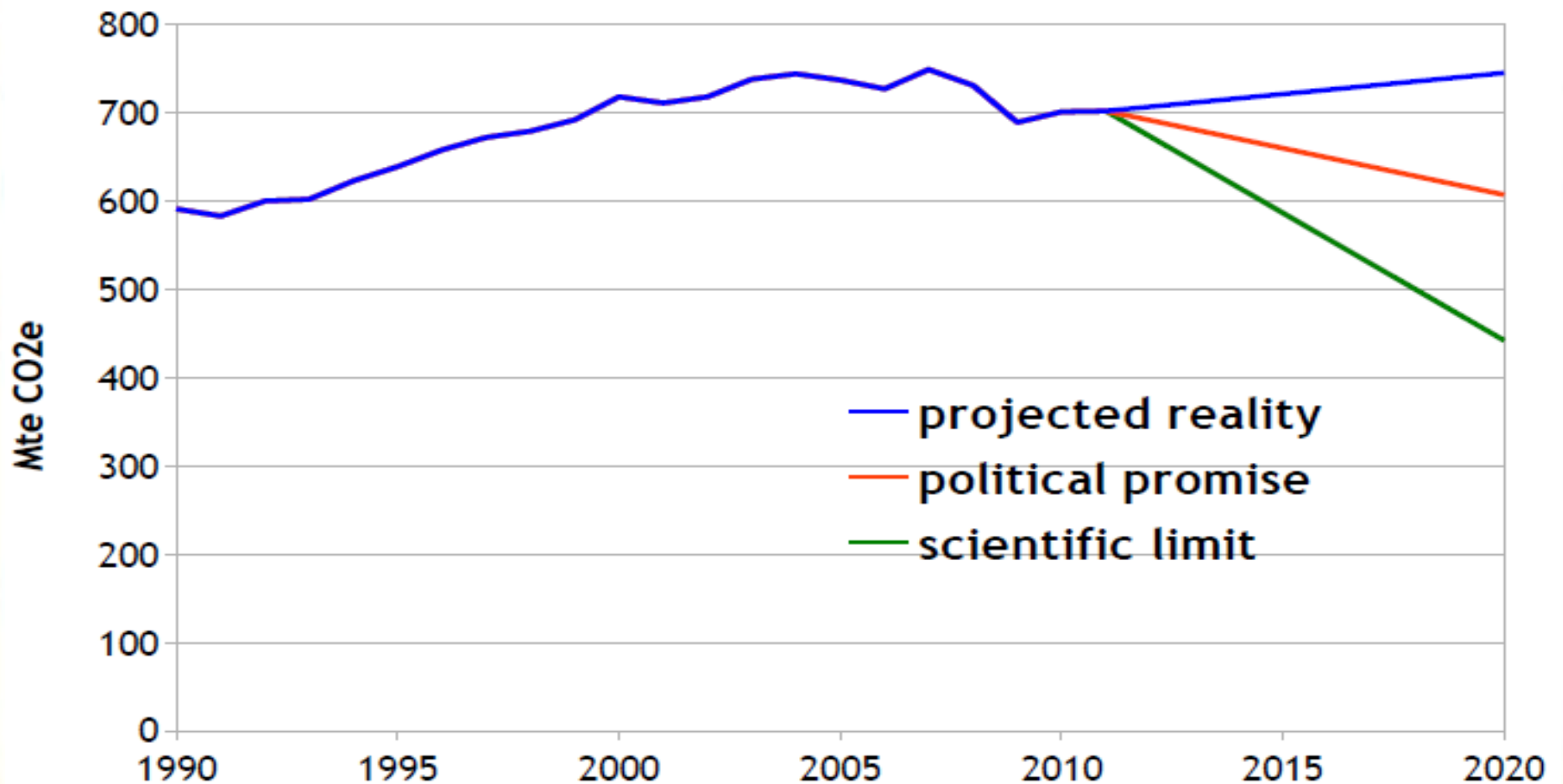
2020: 442 Mte CO₂e (science)

2020: 607 Mte CO₂e (current target)

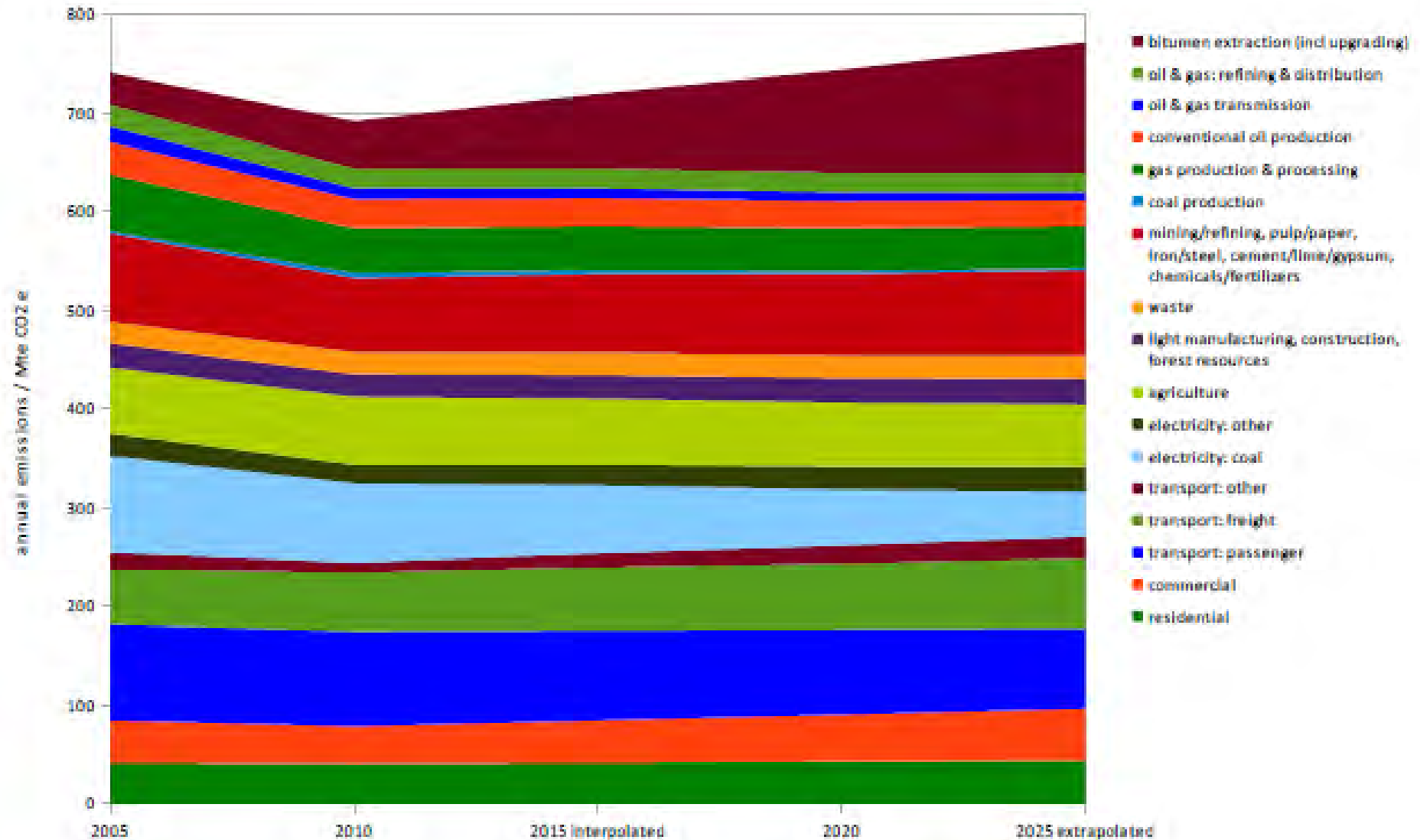
2020: 745 Mte CO₂e (predicted)

Canada's emissions

Canada: GHG emissions 1990-2020



Canada's emissions

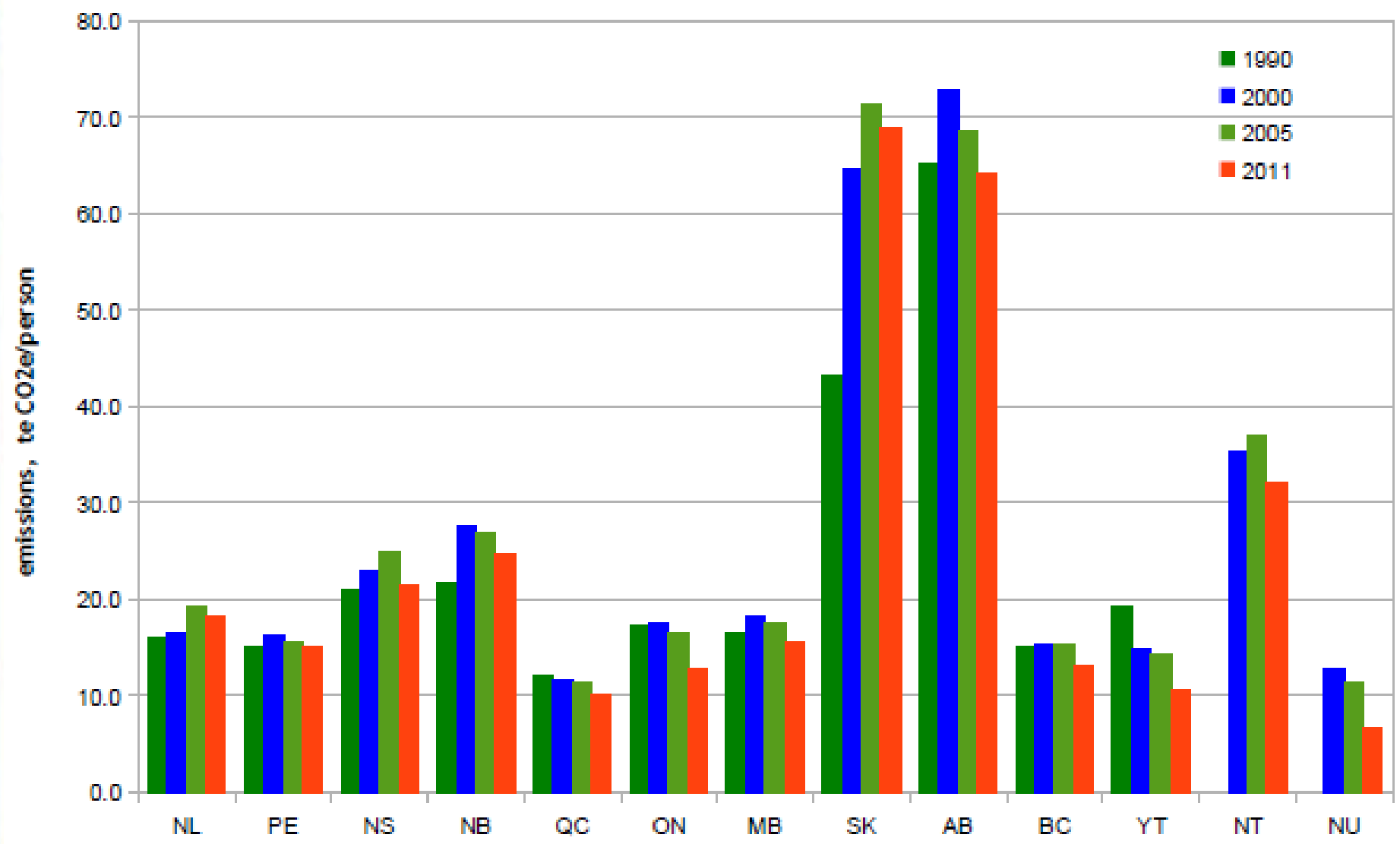


Breakdown of Canada's GHG emissions, 2011

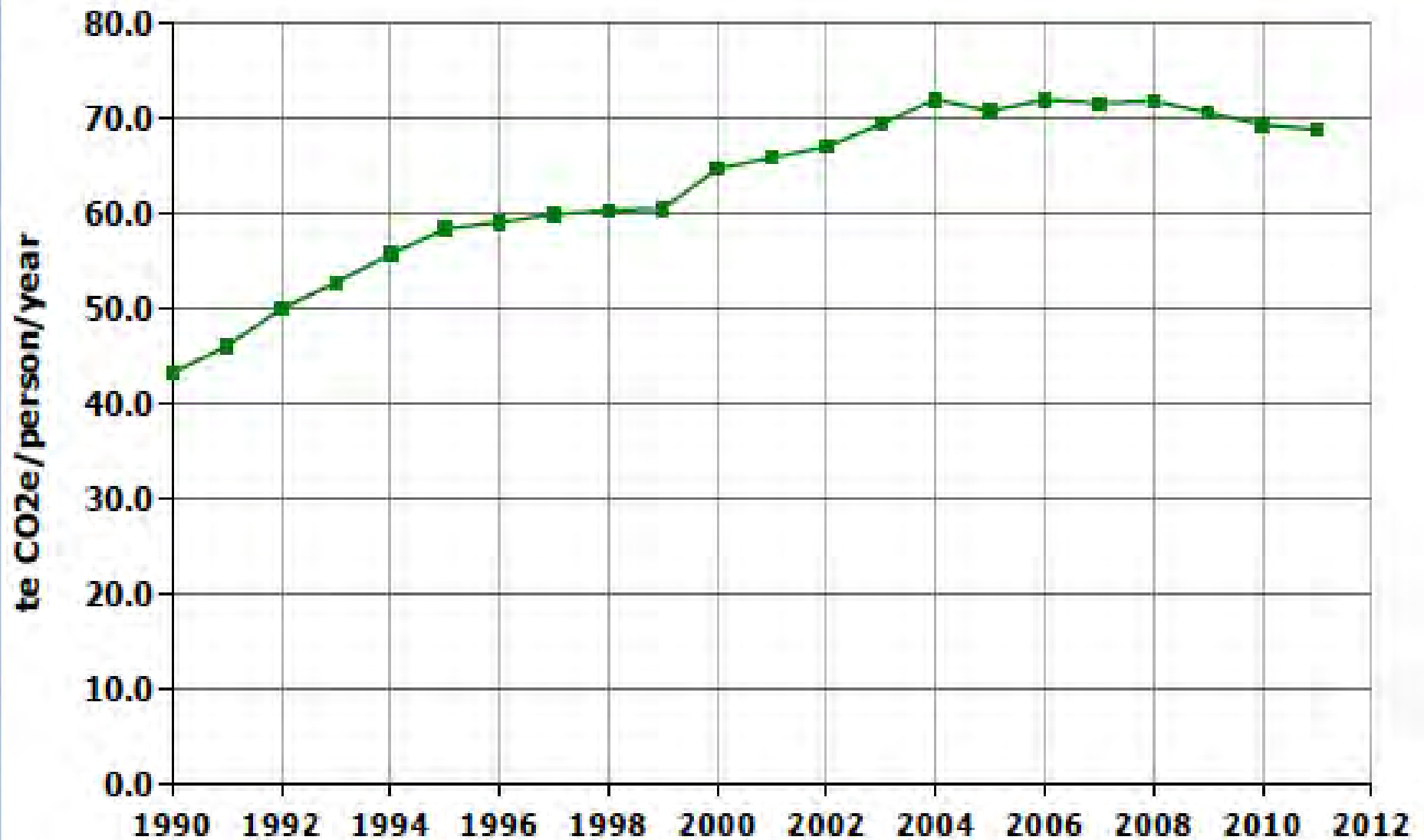


- electricity
- fossil fuel refining/production
- mining / oil & gas extraction
- manufacturing + construction
- buildings: commercial/institutional
- buildings: residential
- agriculture & forestry
- transport
- fugitive sources
- industrial processes (non-energy)
- agriculture/landuse (non-energy)
- waste; solvents; other (non-energy)

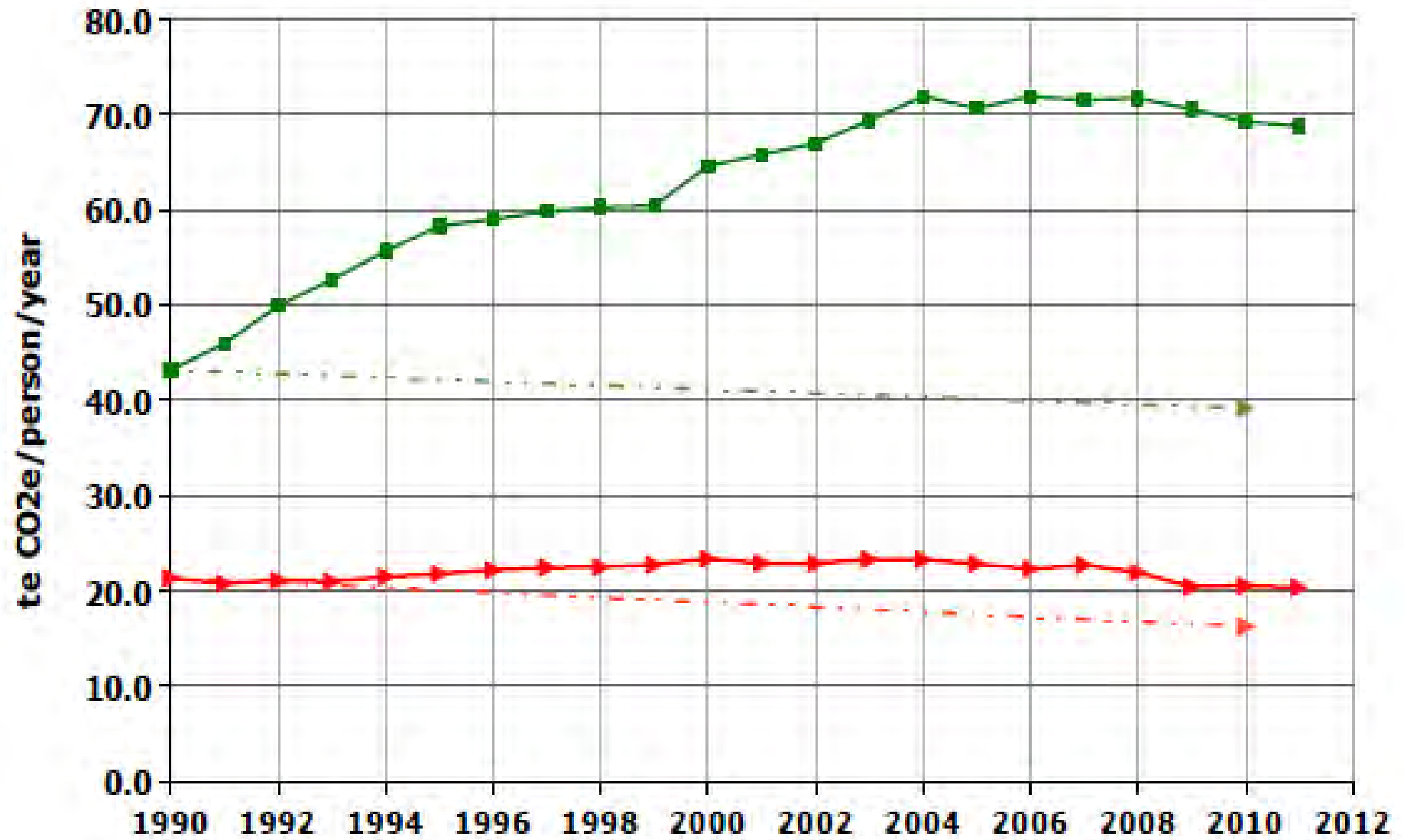
Provincial GHG emissions per person: 1990, 2000, 2005, 2011



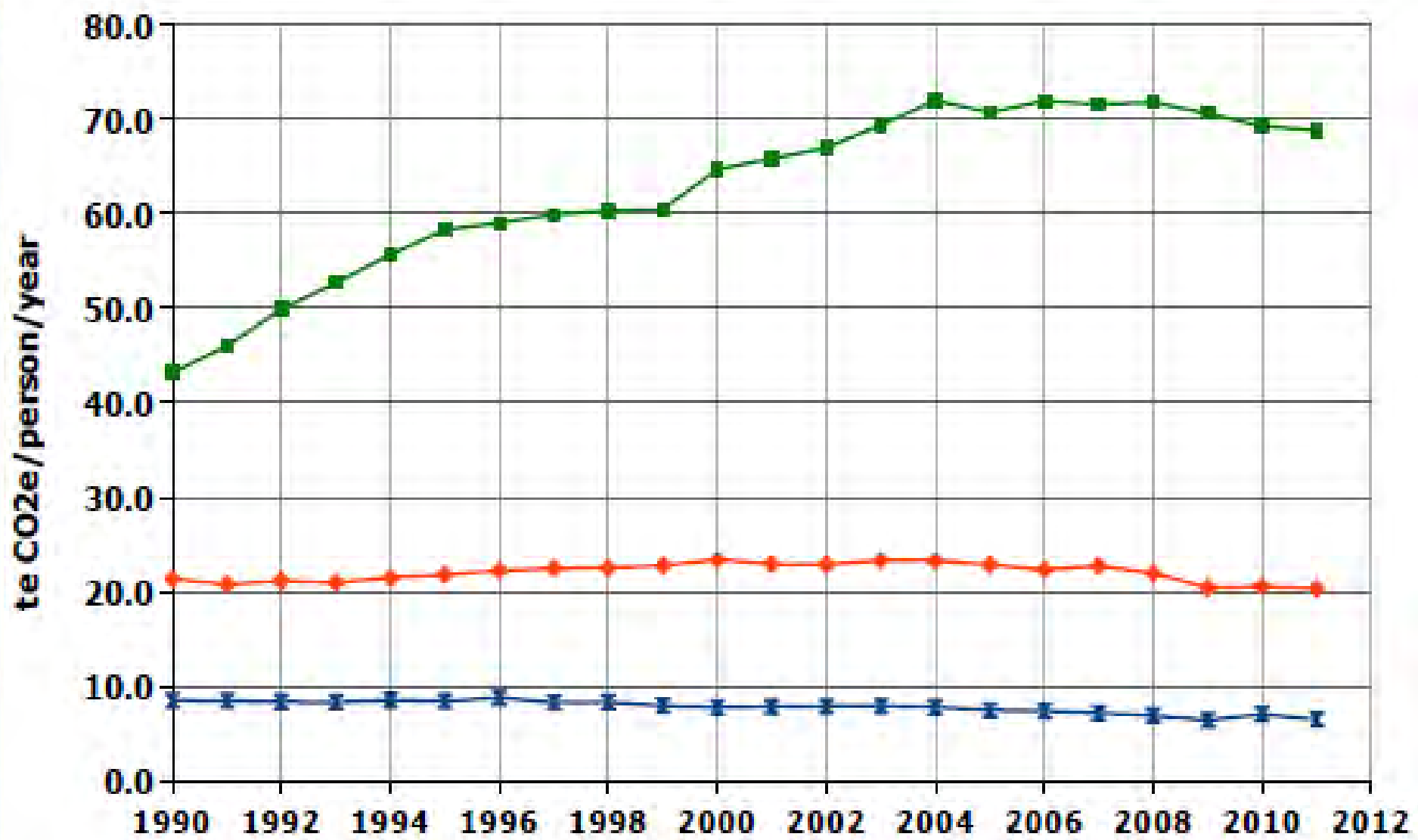
Per capita annual GHG emissions: Saskatchewan



Per capita annual GHG emissions: Saskatchewan; Canada

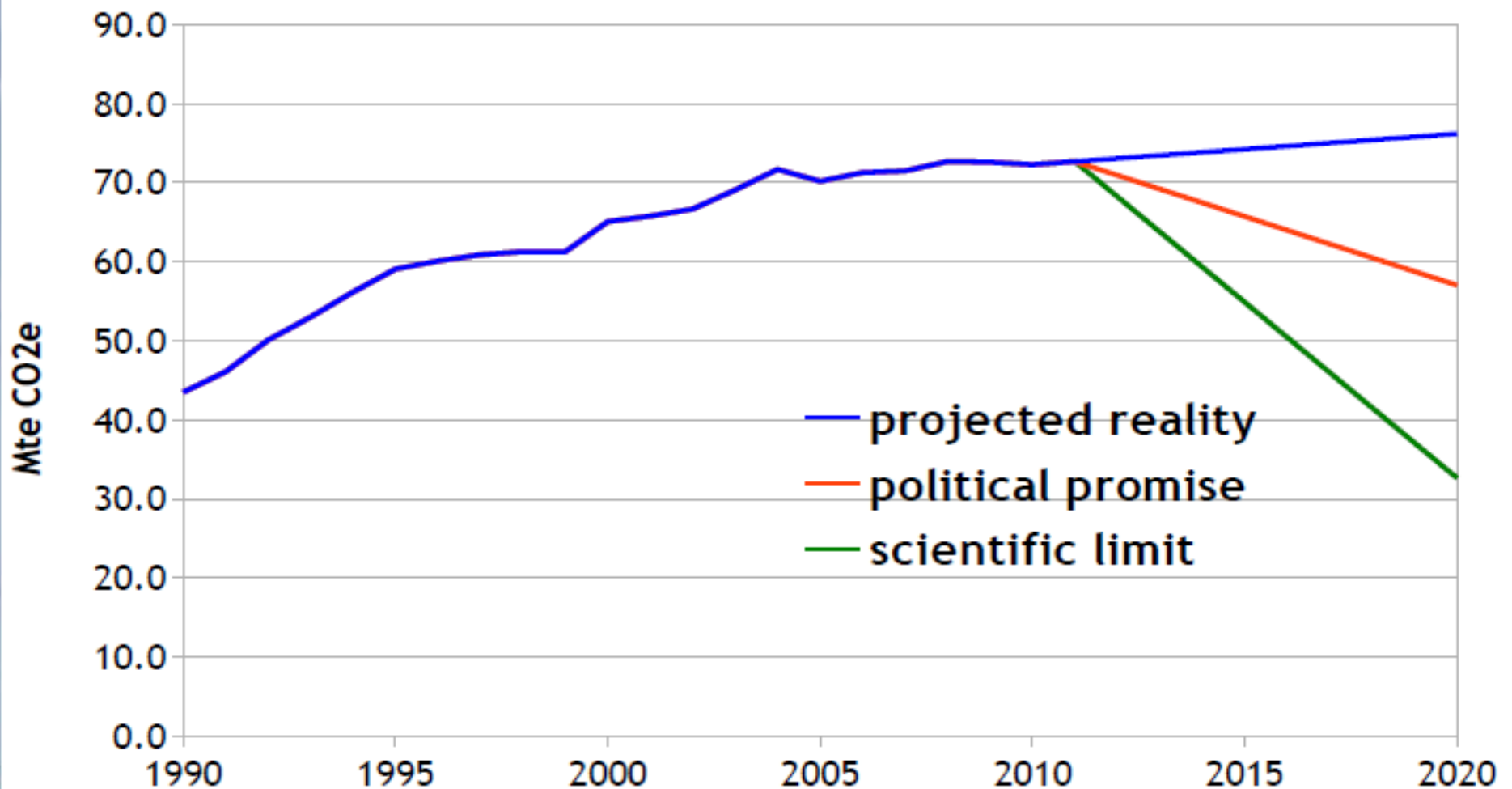


Per capita annual GHG emissions: Saskatchewan; Canada; Sweden

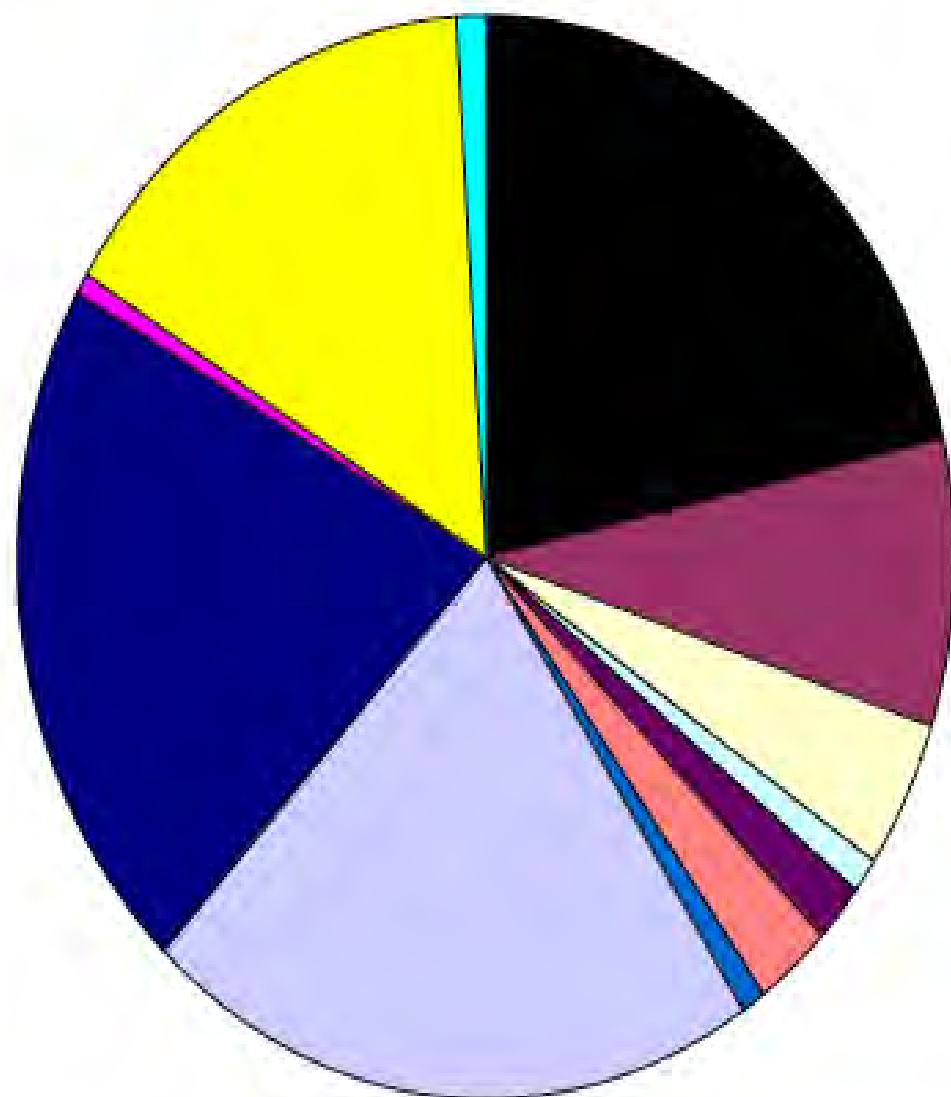


Saskatchewan's emissions

Saskatchewan: GHG emissions 1990-2020



Breakdown of Saskatchewan GHG emissions, 2011



- electricity
- fossil fuel refining/production
- mining / oil & gas extraction
- manufacturing + construction
- buildings: commercial/institutional
- buildings: residential
- agriculture & forestry
- transport
- fugitive sources
- industrial processes (non-energy)
- agriculture/landuse (non-energy)
- waste; solvents; other (non-energy)

GHG EMISSIONS SOURCES: SASKATCHEWAN 2010	megatonnes CO2 equivalent	percent of total SK emissions	tonnes CO2 eqvt per person
electricity generation	15.5	21.5%	14.9
energy use: transport (incl. farm vehicles and pipelines)	15.4	21.3%	14.8
fugitive sources (methane leaks & vents: oil/gas industry)	15.2	21.0%	14.6
agriculture/landuse (non-energy: methane & nitrous oxide)	11.0	15.2%	10.5
energy use: fossil fuel refining/production	6.2	8.6%	5.9
energy use: mining / oil & gas extraction	3.2	4.4%	3.1
energy use: heating homes	1.9	2.6%	1.8
energy use: heating offices etc	1.3	1.8%	1.2
energy use: manufacturing + construction	0.8	1.0%	0.7
non-energy-related emissions: waste; solvents; misc.	0.7	1.0%	0.7
direct energy use: agriculture & forestry	0.6	0.8%	0.6
non-energy related emissions: industrial processes	0.4	0.6%	0.4

Some priorities: federal

1. *Eliminate fossil fuel subsidies*

IISD (2010): \$1.4 billion federal

IMF (2013): \$26 billion (including externalities)

Some priorities: federal

2. *Limit tarsands extraction*

(refuse permits to new pipelines)

IEA 450 scenario: 3.3 Mbbl/day

current production: 2.3 Mbbl/day

ADD under construction: 3.0 Mbbl/day

ADD fully approved: 5.2 Mbbl/day

ADD under review / announced: 9.4 Mbbl

Some priorities: federal

- 3. Eliminate coal-fired power FAST***
ON will have done so by end 2013
leaving AB, SK, NS, (NB)

Some priorities: federal

4. *Vehicle efficiency:*

laws + incentives

Some priorities: federal

**5. PUT A PRICE ON CARBON:
*tax emissions***

Some priorities: federal

- 1. *Eliminate fossil fuel subsidies***
- 2. *Limit tarsands extraction***
- 3. *Eliminate coal-fired electricity***
- 4. *Vehicle efficiency***
- 5. *Carbon pricing + taxation***
- 6. *Don't forget the other sources***

Some priorities: provincial

- 1. Eliminate fossil fuel subsidies
(\$327M: IISD 2010)*
- 2. Eliminate coal-fired electricity;
pursue efficiency seriously; shift
rapidly and deliberately to renewables*
- 3. Legislate to outlaw venting &
flaring*
- 4. Price and tax carbon*

Some priorities: municipal

1. *Move to a stricter building energy code*
2. *Transport plans: put pedestrians, cyclists and public transit before cars & trucks, and limit necessary travel distances*
3. *Local wind and solar cooperatives!*