



CARBON FINANCE'S ROLE IN MUNICIPAL FINANCE

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Global Warming



- Temperature increase by human induced emissions, greenhouse gases (GHG), primarily carbon dioxide
- Non-CO₂ GHGs (anthropogenic): 23% of total

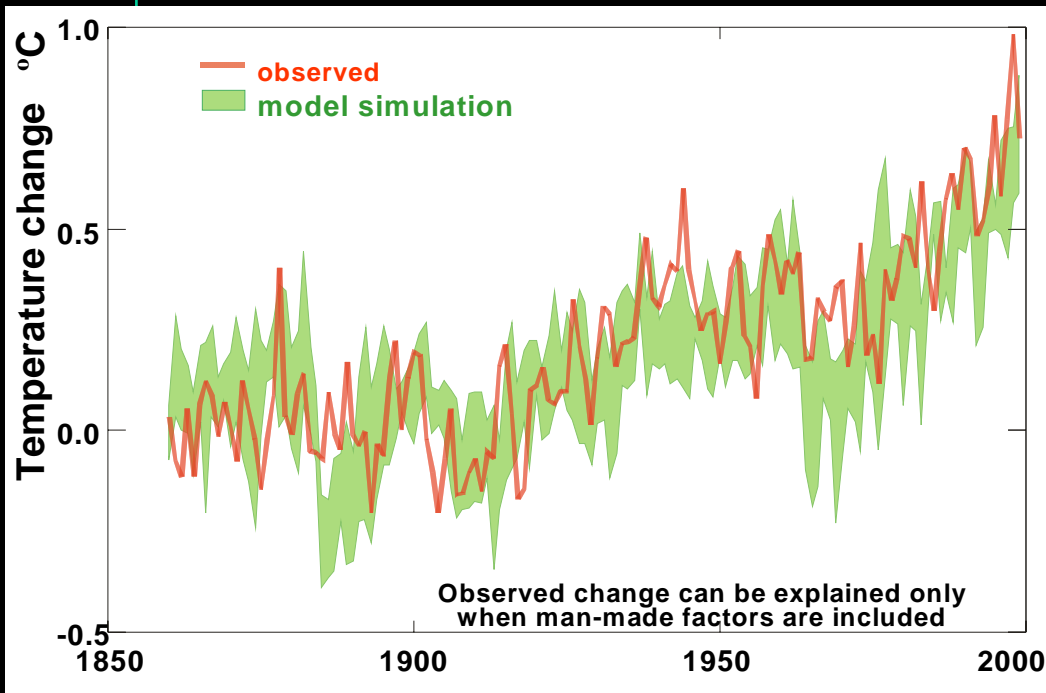
GHG	GWP (tCO₂e)
Methane (CH ₄)	21
Nitrous oxide (N ₂ O)	310
Hydrofluorocarbons (HFCs)	140 - 11,700
Perfluorocarbons (PFCs)	3,200 - 50,000
Sulfur hexafluoride (SF ₆)	23,900



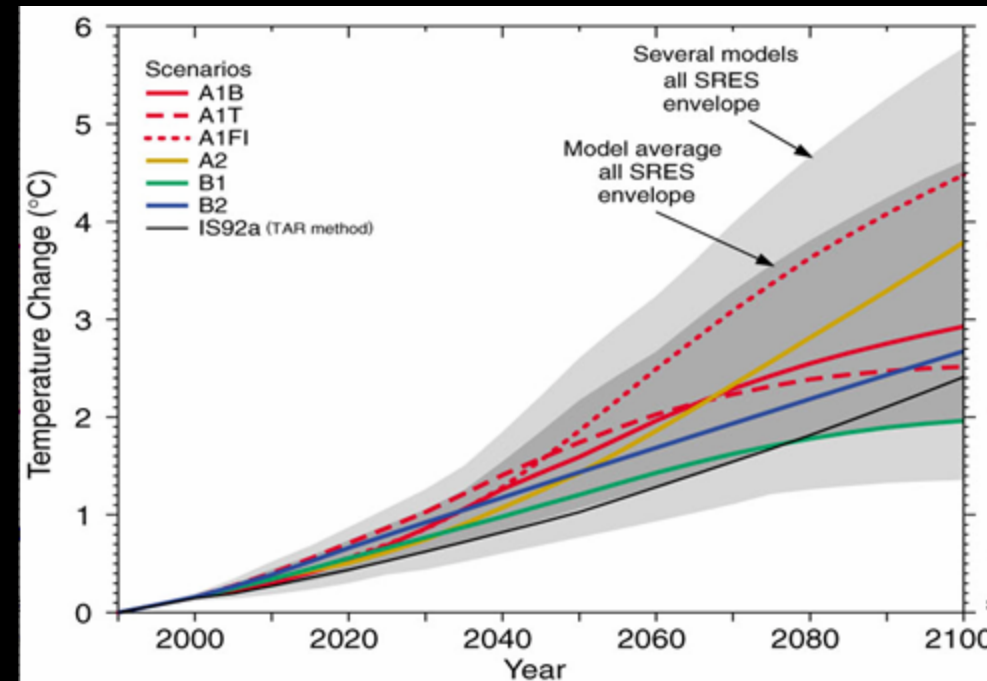
Global Warming

Observed temps increased by 0.7°C from 1900 - 2000,
with another $1\text{-}2^{\circ}\text{C}$ projected by 2050

Past Temp Change



Projected Temp Change



Global Warming Entities



- Intergovernmental Panel on Climate Change (IPCC)
- UN Framework Convention on Climate Change (UNFCCC), voluntary program (1994)
- Kyoto Protocol, legally binding program (effective Feb. 2005)
 - Sale of emission reductions to developed countries
Clean Development Mechanism (CDM), developing
Joint Implementation (JI), EIT

Clean Development Mechanism



- Methodology conditions
 - Baseline, GHG emissions in absence of action
 - Additionality, GHG emissions in addition to Baseline
- Applicable methodologies
 - ACM001, landfill gas recovery plus CO₂ from displaced energy (fossil fuel)
 - AM0025, composting – emission reduction based on first order decay model (baseline – landfill)

Carbon Finance Project Cycle



- Project Idea Note (PIN)
- Carbon Finance Document (CFD)
- Letter of Intent (LOI)
- Project Design Document (PDD)
- Validation
- Registration
- Emission Reduction Purchase Agreement (ERPA)
- Verification / Certification

UNFCCC



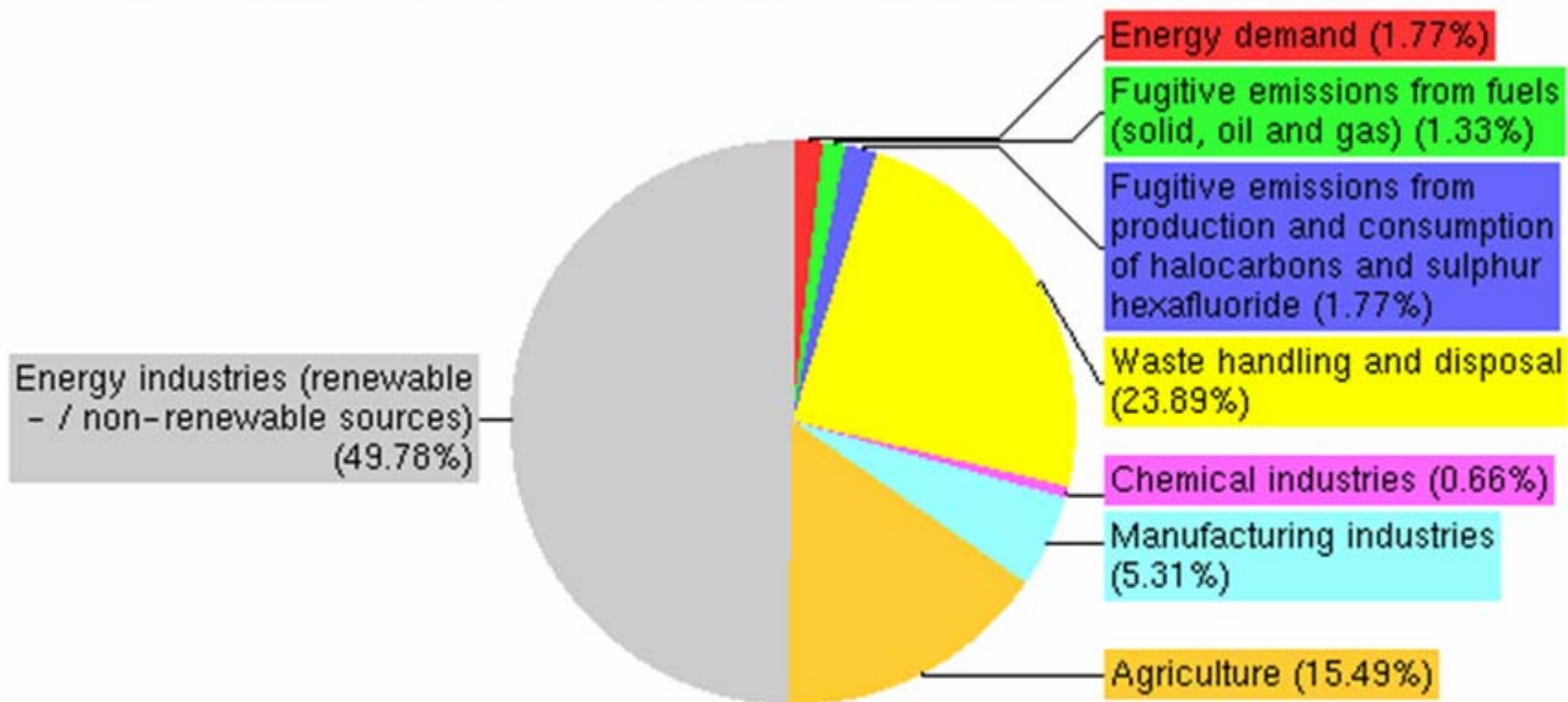
<u>Status</u>	<u>Number</u>	<u>CERs to 2012</u>
Registered Projects ¹	349	590 million
Requesting Registration	83	90 million
Pipeline	1,200+	1,400 million

1. Waste management: 108 registered projects.

UNFCCC



Distribution of registered project activities by scope





Methane Emissions

- Methane – 15% of GHG
- Landfills
 - GHG emissions 730 million tCO₂e / year
 - 12%+ global anthropogenic methane emissions
 - 4th largest contributor of non-CO₂ GHG emissions

Municipal Carbon Finance Opportunities



- Non-waste Municipal Project Opportunities
 - Bus rapid transit system, Bogotá.
 - Energy efficient buildings, Bundled project.
 - Parks, Afforestation and reforestation.
 - Street lighting.

World Bank, Carbon Finance Projects Municipal Orientation



<u>Status</u>	<u>ERPA</u>	<u>CFD</u>	<u>PIN</u>	<u>On-Hold</u>	<u>Total</u>
District Heating	3	-	1	-	4
Energy Efficiency ¹	-	1	-	-	1
Waste Mgt ²	<u>10</u>	<u>7</u>	<u>36</u>	<u>10</u>	<u>63</u>
TOTAL	13	8	37	10	68

1. Water pumping improvements.

2. Waste mgt – biodigesters, composting, LFG, recycling, waste water.

World Bank, Carbon Finance

Solid Waste Projects – Reg. Distribution



<u>Region</u>	<u>Projects</u>
Africa	11
E. Asia / Pacific	15
Europe / Central Asia	9
Latin America	21
Middle East / N. Africa	7
South Asia	<u>5</u>
TOTAL	68

World Bank, Carbon Finance



- Bank initiated carbon finance program 1999 to stimulate market
- Administers 10 Funds, supported by 13 governments and 56 firms
- Bank administered Funds: \$1.8 billion (July 2006)
- Unlike other Bank programs, Carbon Finance Unit contracts to purchase emission reductions
- Verified by third party
- CF contributes to sustainable development and reduces climate change



Impact of Carbon Finance

- Increased cash flow boosts IRRs (26% or more)
- High quality cash flow reduces risk
 - OECD - sourced in hard currency (\$/€/Yen)
 - Investment grade payer
 - Eliminate currency convertibility or transfer risk
- Projects can borrow against ERPA cash flows OR
- Municipal Bond issues can be made with carbon payments as security
 - Well-suited to countries with high liquidity in local currency
 - Financing for complete overhaul of waste management