Greenhouse Gas Subcommittee of the Agricultural Air Quality Task Force

1. Measuring, Monitoring, and Verifying Soil Carbon Stocks and Changes in Soil Carbon Stocks
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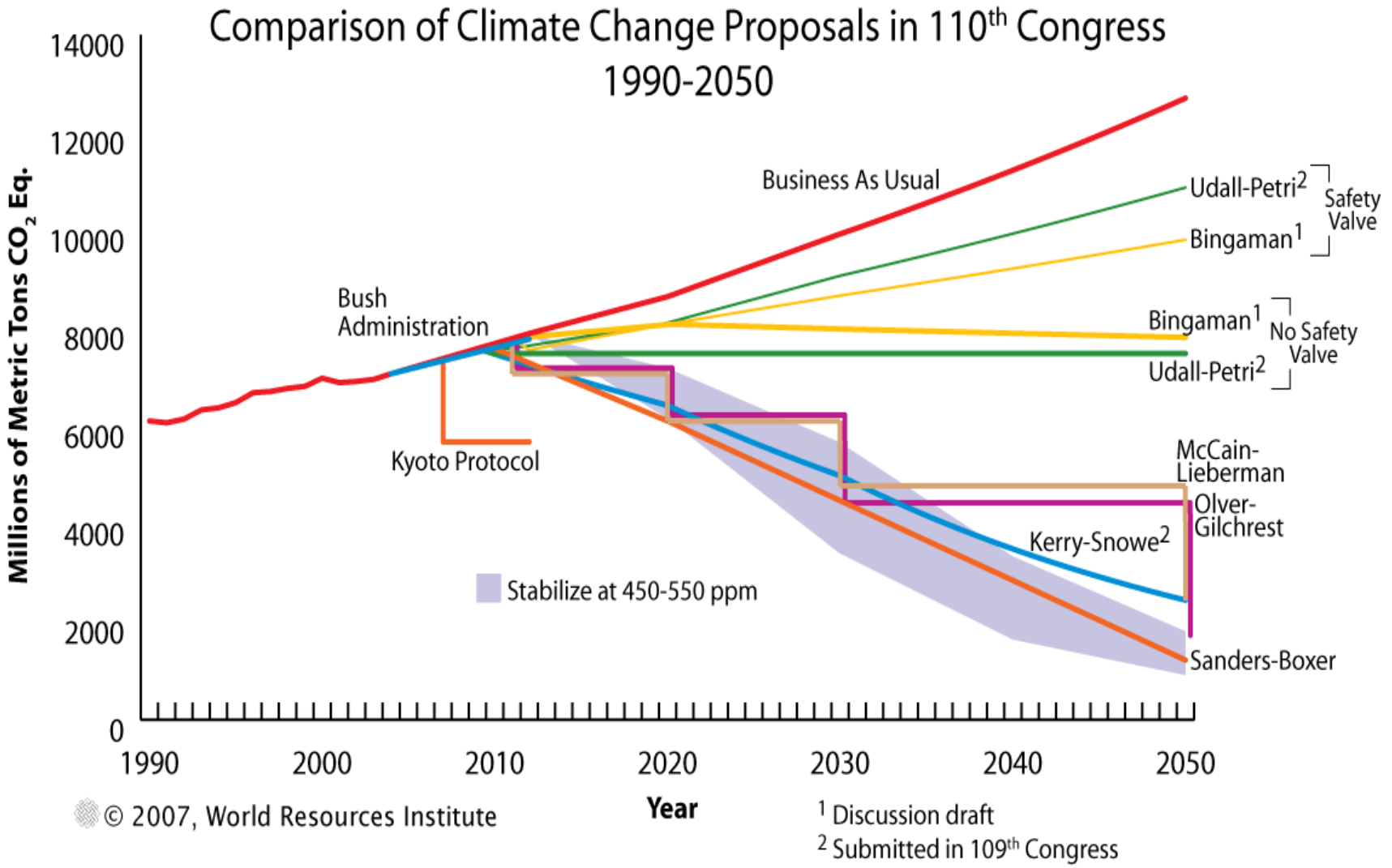
3. Biofuel Production
4. Spatial and Temporal Variation in GHG's
5. Volatile Organic Compounds


Comparison of Climate Change Proposals in 110th Congress
1990-2050
Millions of Metric Tons CO_2 Eq.
14000
12000
10000
8000
6000
4000
2000
0
1990
2000
2010
2020
2030
2040
2050
Year
Business As Usual
Udall-Petri[2]
Bingaman[1]
Safety Valve
Bush Administration
Bingaman[1]
No Safety Valve
Udall-Petri[2]
Kyoto Protocol
McCain-Lieberman
Olver-Gilchrest
Kerry-Snowe[2]
Stabilize at 450-550 ppm
Sanders-Boxer
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[1] Discussion draft
[2] Submitted in 109th Congress

Measurement, Monitoring and Verification

- Verifiable and transparent for reporting changes in soil carbon stocks
  - (i.e., withstand reasonable scrutiny by an independent third party as to completeness, consistency, and correctness)
- Cost efficient if soil C will be competitive with other C offsets
- Based on best science possible
- Meet requirements that are specified by international conventions
- Designed to work with data currently available but compatible with different types of data or new methods of data collection

Measurement, Monitoring and Verification

- Provide accounts and associated uncertainties for soil C measurements
- Flexible to accommodate new scientific developments (e.g., instrumentation, process or empirical models)
- Reporting structures that are flexible to meet the needs of different users

Measuring, Monitoring, and Verifying Soil Carbon Stocks and Changes in Soil Carbon Stocks

- ***Protocols needed for Agricultural Participation in GHG Markets***
  - A standardized, science-based protocol to measure, monitor, and verify soil carbon content and changes in content is necessary for emerging GHG markets. A standardized protocol, based on scientifically sound soil sampling techniques, modeling, and remote sensing technologies is needed to establish minimal parameters to verify increases in soil C and GHG emissions.
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- ***Nationwide Soil C Network (NSCN)***
  - A national network of on-farm soil measurements is needed to complement existing models and experimental data. The NSCN will link existing models and point data on soil C, and corroborate and link the data to allow scaling up (i.e, from farm or field levels up to regional or national levels) and scaling down (i.e., from national or regional levels down to farm or field levels). This will allow national inventory data to be linked and corroborated against actual point data at the field and farm level.

Agricultural Nitrous Oxide and Methane

- There is a serious lack of data available on agricultural emissions of these gases.
- Accurate emissions factors for agricultural sources and there are uncertainties regarding current methods to measuring their emission levels.

Agricultural Nitrous Oxide and Methane Research Needs

- Develop field measurements and models of N emissions from agricultural lands under different cropping systems, including renewable energy crop production;

- Determine ways to increase fertilizer N use efficiency, establish alternative management systems for N, and a protocol for N2O emissions reductions;

- Document the effect of different animal waste management systems on N2O emissions; and

- Develop total GHG accounting for agricultural lands and markets

Biofuel Production

- ***Changes in land use, and potential conversion of conservation lands to biomass production.***
  - If such changes are indicated, science-based recommendations on practices to avoid unintended environmental or ecological impacts are warranted. If biofuels production results in a loss of soil organic matter (carbon) the future capacity of the soil to produce food and fuel will be compromised.

- ***Changes in water needs, availability, and water quality impacts.***

- ***Lifecycle analyses and GHG/C accounting*** for biofuels production.
  - A low-carbon fuel standard will ensure the best total GHG outcomes.

- ***Assessing co-benefits of biofuel production***,
  - such as soil quality, reduced erosion from marginal crop lands, and enhanced wildlife benefits.

Spatial and Temporal Variation in GHG's

The research needs are:

- Develop guidelines to address uncertainty among samples induced by soil, topographic, and weather differences (precipitation and temperature) in the absence of soil or crop management practice differences.

- Evaluate the temporal variation in soil and canopy fluxes due to weather variations and interactions with soil and topography to develop guidelines on sampling frequency.

- Evaluate the interactions between different GHG's, e.g., CO2, N2O, and CH4 to determine if a common set of guidelines for sampling can be established. Evaluate the potential of extending information collected at limited spatial and temporal scale into larger scales and evaluate the appropriate methods to account for uncertainty.

Volatile Organic Compounds

- Agricultural emissions of volatile organic compounds (VOCs) are an emerging issue of major concern.
- Large ranges of estimated values reflect the serious limitations in our current knowledge of VOC emissions in agriculture.
- Because of the lack of sufficient information on emissions of volatile (VOCs) organic compounds and their fate research is needed on VOCs.