



Sustainability Criteria for Biomass

German Federal Minister for the Environment, Nature and Nuclear Safety

Jose Roberto Moreira
**National Reference Center on
Biomass – CENBIO**

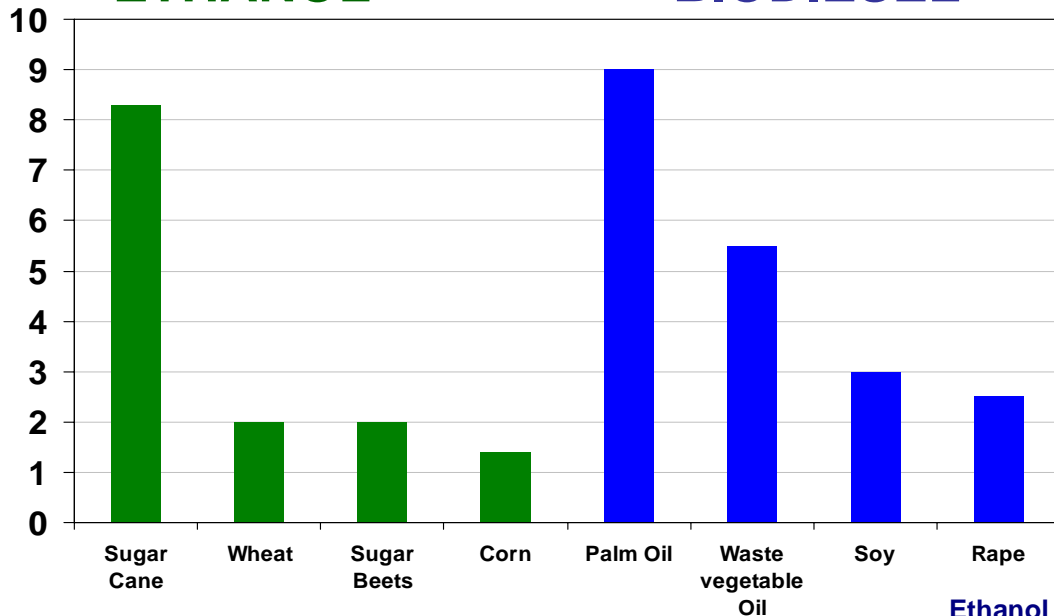
Washington D.C., 4 March 2008

FOSSIL ENERGY AND GHGs BALANCE

Data represent the amount of energy contained in the listed fuel per unit of fossil fuel input

ETHANOL

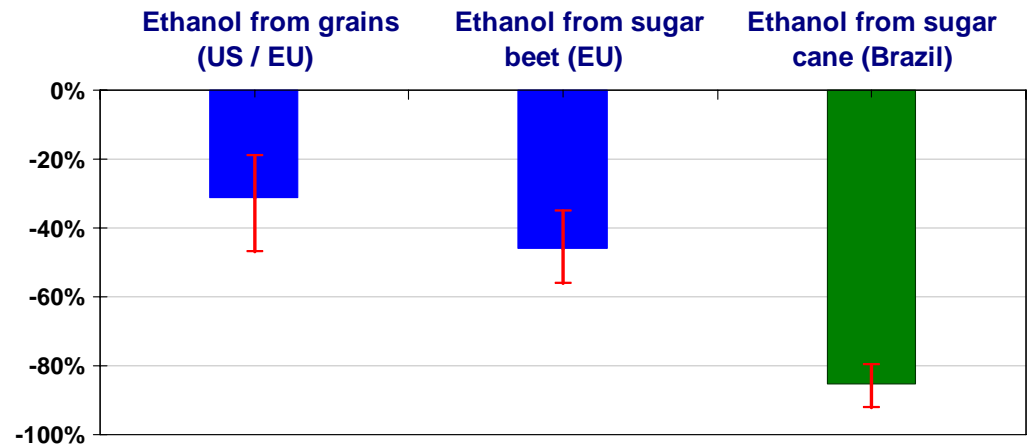
BIODIESEL



Source: Various, compiled by World Watch Institute.

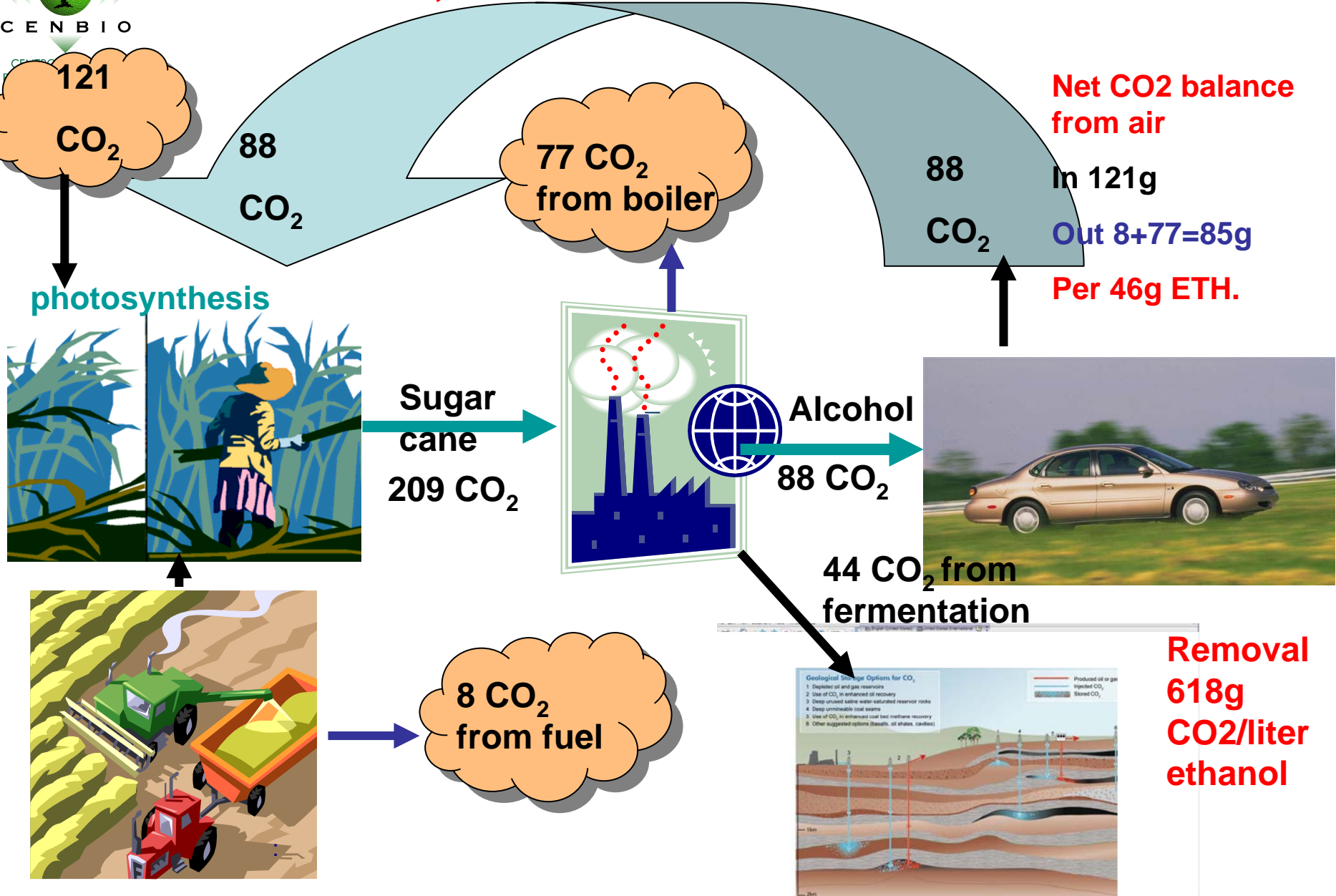
Emissions avoided with ethanol replacing gasoline

Note: Reductions in well-to-wheel CO₂-equivalent GHG emissions per km, from bioethanol compared to gasoline, calculated on a life-cycle basis.
Source: IEA – International Energy Agency (May, 2004), based on a review of recent articles.



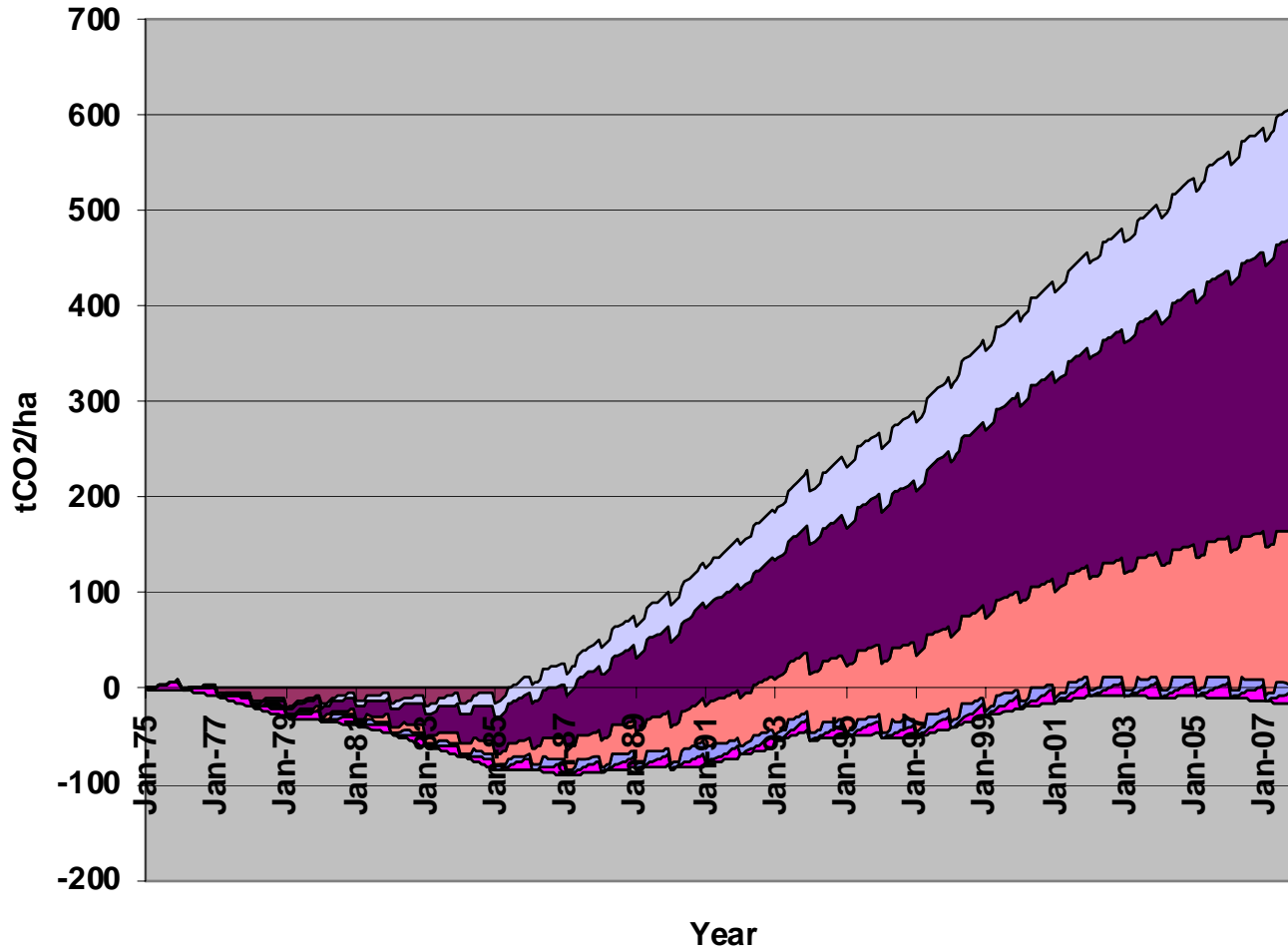


SUGAR CANE, ETHANOL AND THE GHG EFFECT

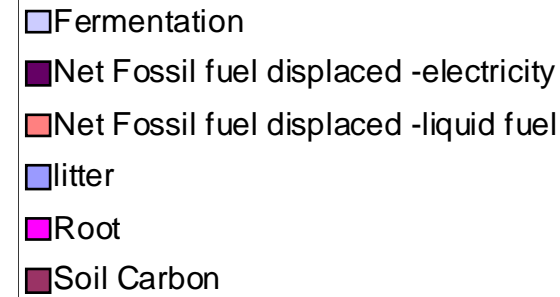


Source; Moreira, 2003, IPCC, 2005

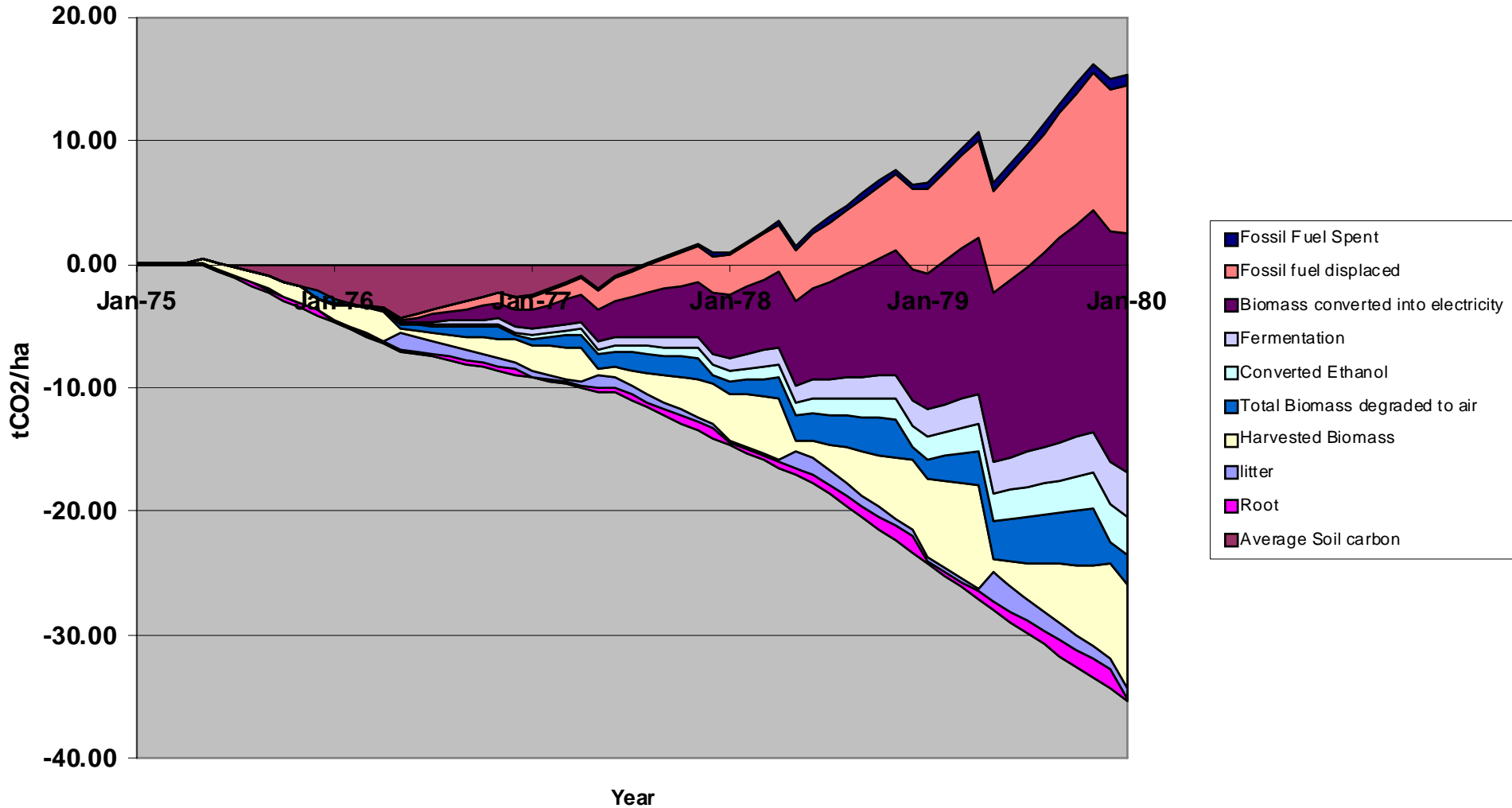
Sugar cane biomass and its potential CO₂ offsets - Proalcool Program in Brazil From 1975 to 2007 (32 years)



Assuming C soil reduction as being due conversion of Tropical Forest in Sugar cane crop. The result is the same if we assume tropical forest is in equilibrium and cutted wood will not be burned



Sugar cane biomass and CO₂ generation - 5 first years of the Proalcool Program in Brazil



Source; Moreira, 2008 to be published

Technical Certification

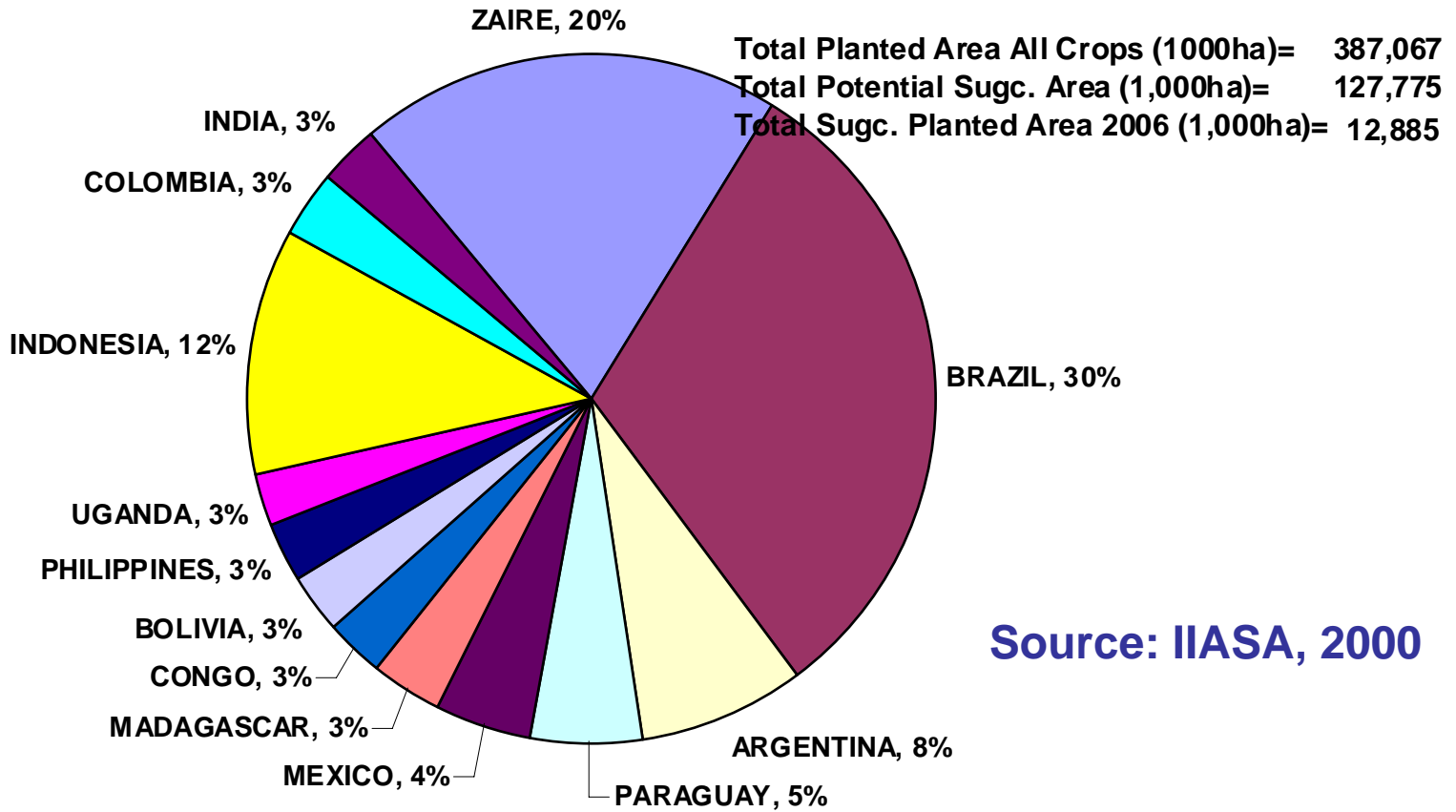
Setting up technical biomass standards on bioenergy trade

- For biomass to become a large-scale commodity, which can be traded on an exchange, technical standards are needed. **It is recommended that the various standards that are applied today are developed into internationally accepted quality standards for specific biomass streams (e.g. CEN biofuel standards).**

FOOD VERSUS FUEL



Very Suitable and Suitable Area in Major Potential Producer Countries for Sugar Cane Plantation Using High Technology Input and Preserving Forests by Year 2000



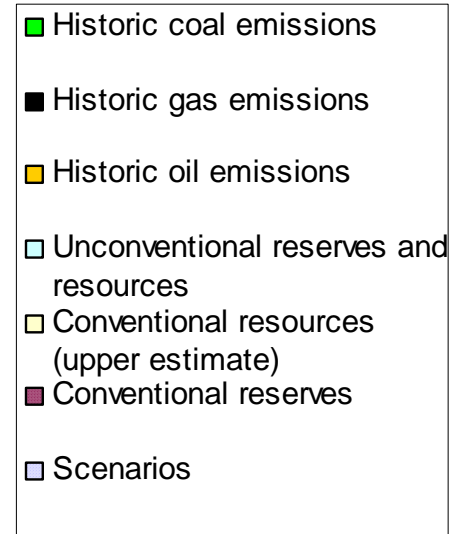
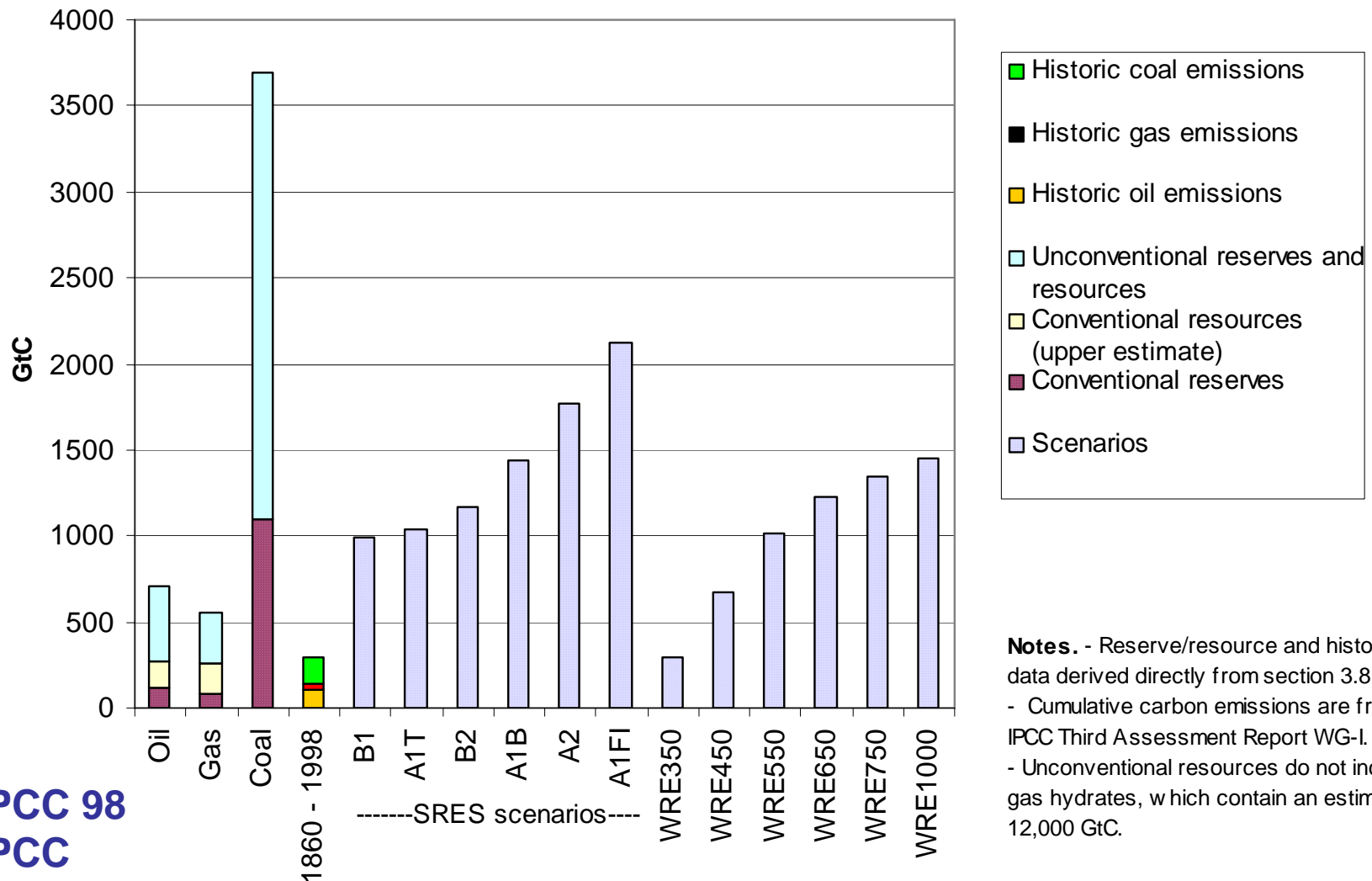
Source: IIASA, 2000

Rain Feed Agriculture

Ecological Certification

- 1) Life cycle analysis, labelling and “certification of origin” of biofuels should be applied in the global energy market to ensure that “sustainable bioenergy” production is not affecting biodiversity and food security.**
- 2) Classification of “sustainable bioenergy” should be introduced in the WTO rules in order to reduce or, as appropriate, eliminate tariff and non tariff barriers according to the Doha Development Agenda, paragraph 31 (iii)**

There is enough fossil fuel to fill the greenhouse much further than we want



Notes. - Reserve/resource and historic use data derived directly from section 3.8.1.
 - Cumulative carbon emissions are from the IPCC Third Assessment Report WG-I.
 - Unconventional resources do not include gas hydrates, which contain an estimated 12,000 GtC.

CONCLUSION - Create a *stable demand-side*

- Institutional Regulation is a must for implementation of renewable energy markets
- On the longer-term, market support policies in the various countries, etc. should be designed to promote and stimulate international trade when and where trade would be the logical option. Some task member advocate a harmonization of e.g. EU policies but recognize that this will be hard to achieve.
- Policy incentives could also include requirements for energy and/or CO2 balances.
- In order to create long-term incentives, policy makers in countries with biomass targets are advised to formulate sound long-term biomass policies, including new targets with a time horizon of at least 10 years or longer in order to create clarity and security for the industry for long-term investments.

Source: **Opportunities and barriers for sustainable international bioenergy trade and strategies to overcome them, IEA Task 40**

THANK YOU VERY MUCH

Jose R. Moreira

**National Reference Center on
Biomass/University of São Paulo**

Brazil

bun2@tsp.com.br