COMPLETE - UNEP

Sustainable Bioenergy Projects in Africa Barriers and Opportunities for Financing

"The US Voluntary Carbon Market and Sustainable Biofuels Standards – How these are evolving and relate to financing bio-energy projects"

David Walden, Winrock International

29 September to 1 October,

Dakar Senegal

Introducing Winrock International

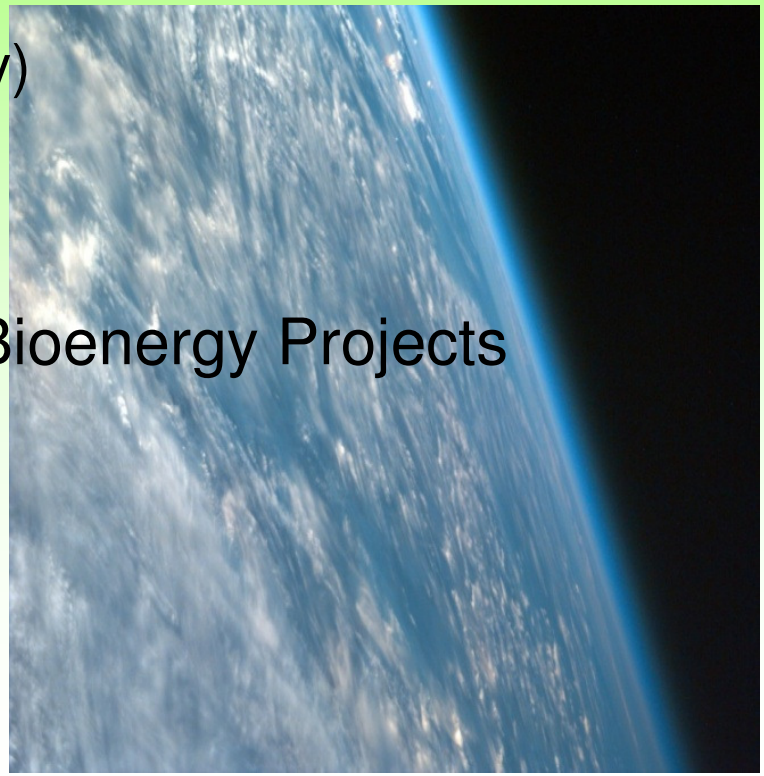
Winrock International is a non-profit agricultural and environmental NGO that works globally to empower the disadvantaged, increase economic opportunity, and sustain natural resources. www.winrock.org

The **American Carbon Registry**™ at Winrock International is a leading and trusted *non-profit* US carbon market registry that ensures quality offsets, establishes transparency, and access to the U.S. voluntary and pre-compliance carbon markets. www.americancarbonregistry.org

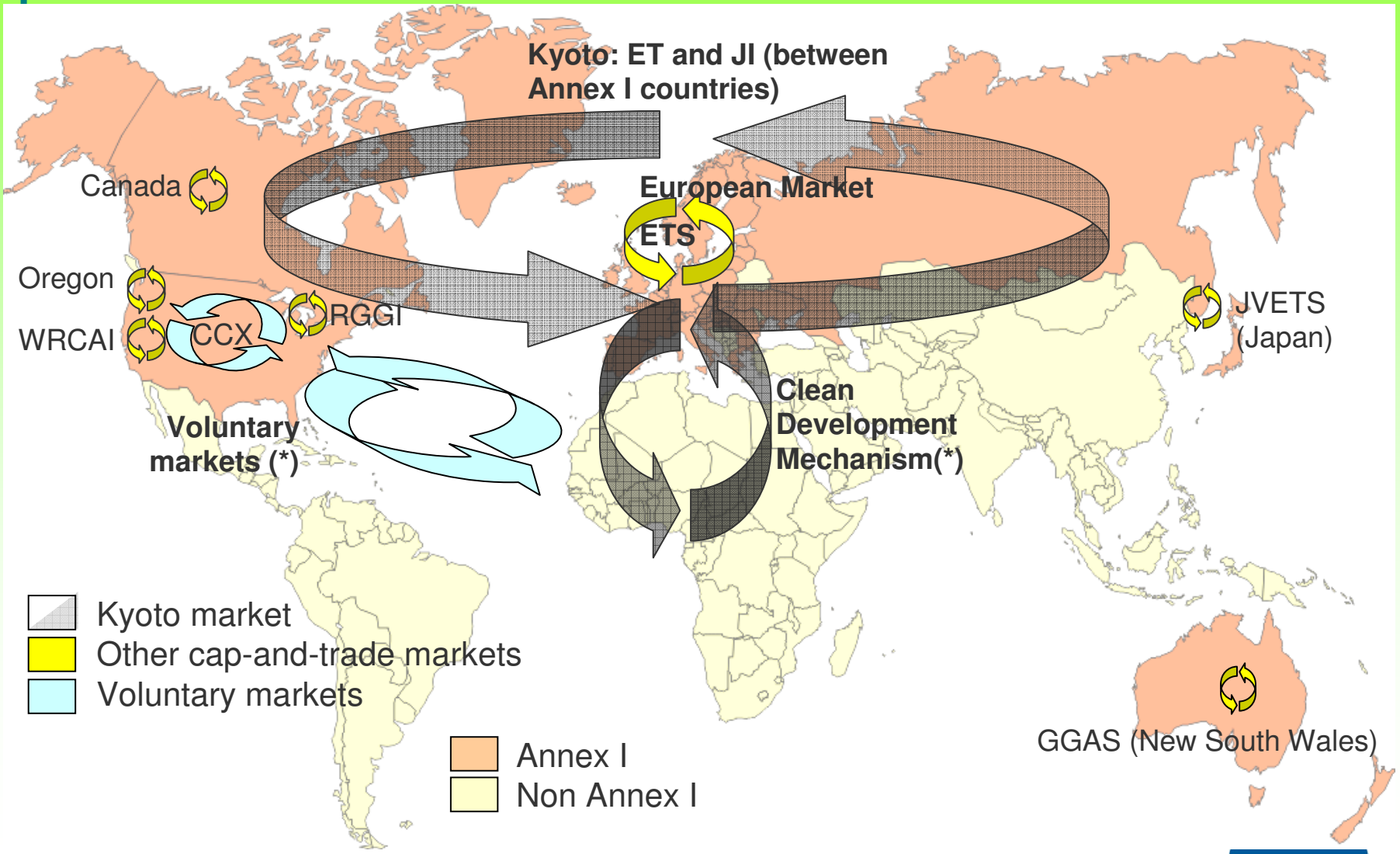
Working with People in Agriculuture, Forestry, Environmental Sciences, Renewable Energy, Education and Civic Empowerment

Key Discussion Areas

- Carbon Offset Markets
  - US Voluntary Market
  - US Congress (Waxman-Markey)
- Bio-fuel Sustainability
- Linkages in terms of Financing Bioenergy Projects
- Case Study – Palm Oil Effluent

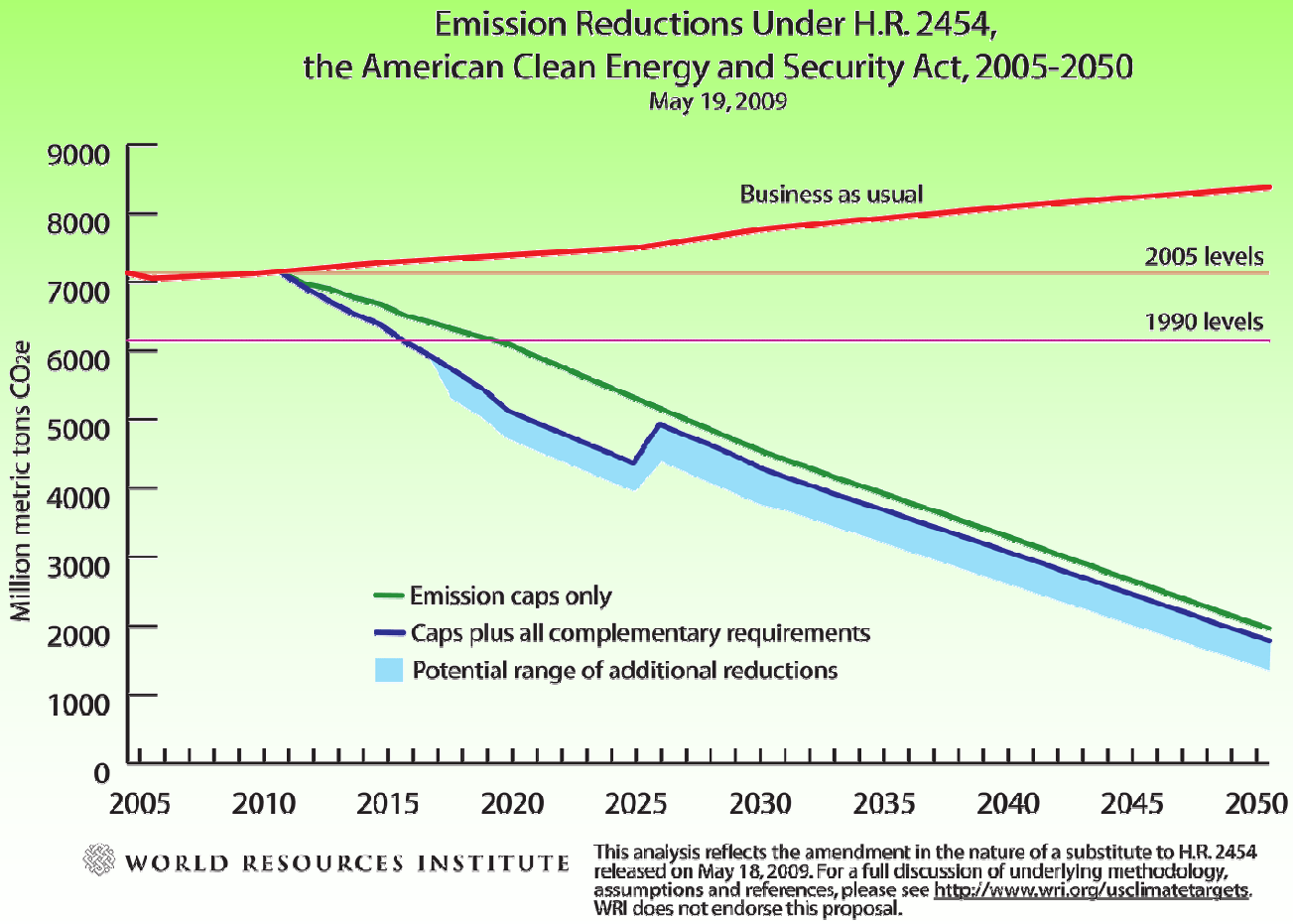


Diversity of carbon markets



Waxman-Markey Bill - Reduction Targets

(17% by 2020, 42% by 2030, 83% by 2050)

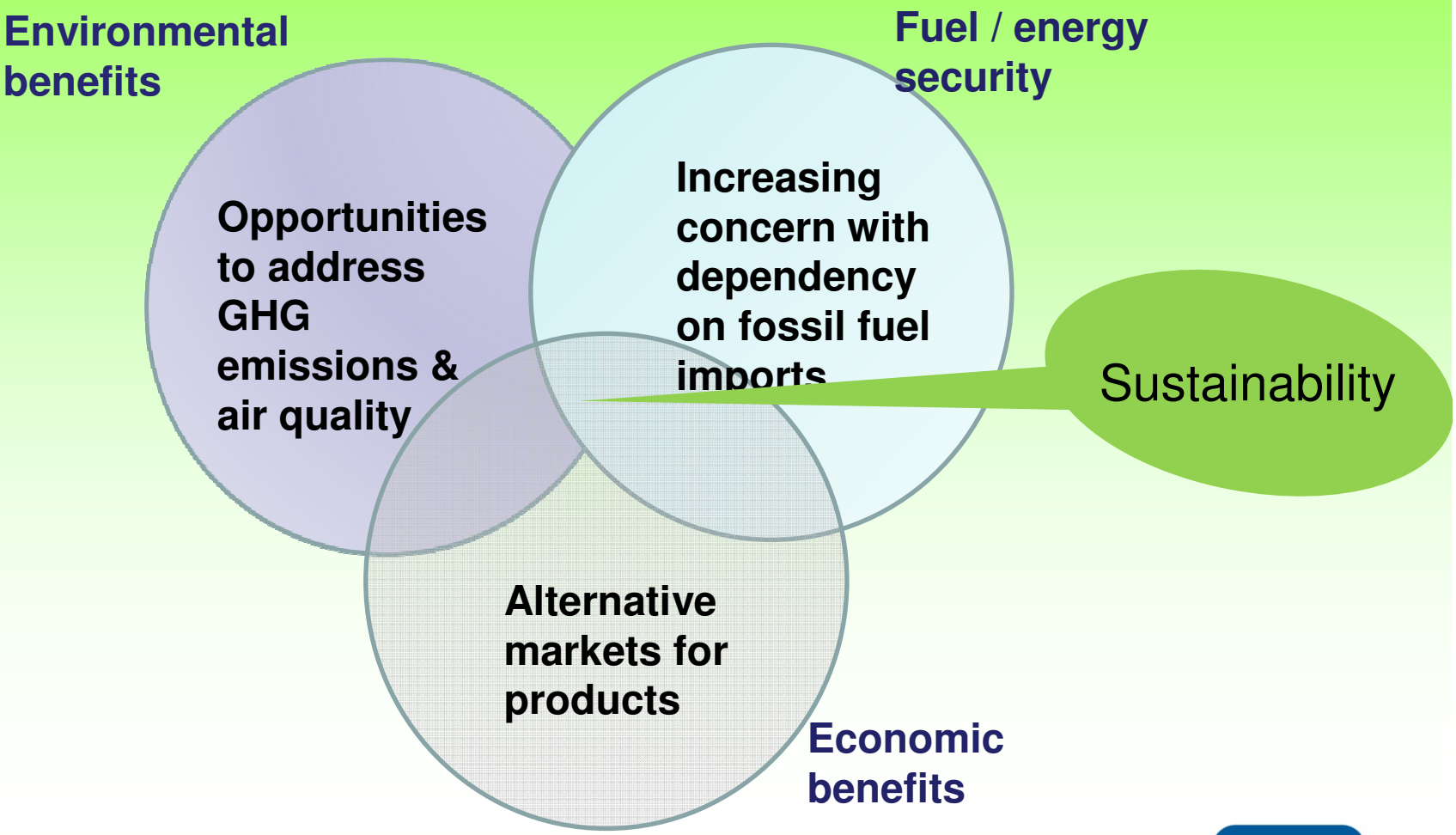


H.R. 2454 (Waxman-Markey Bill) allows for:

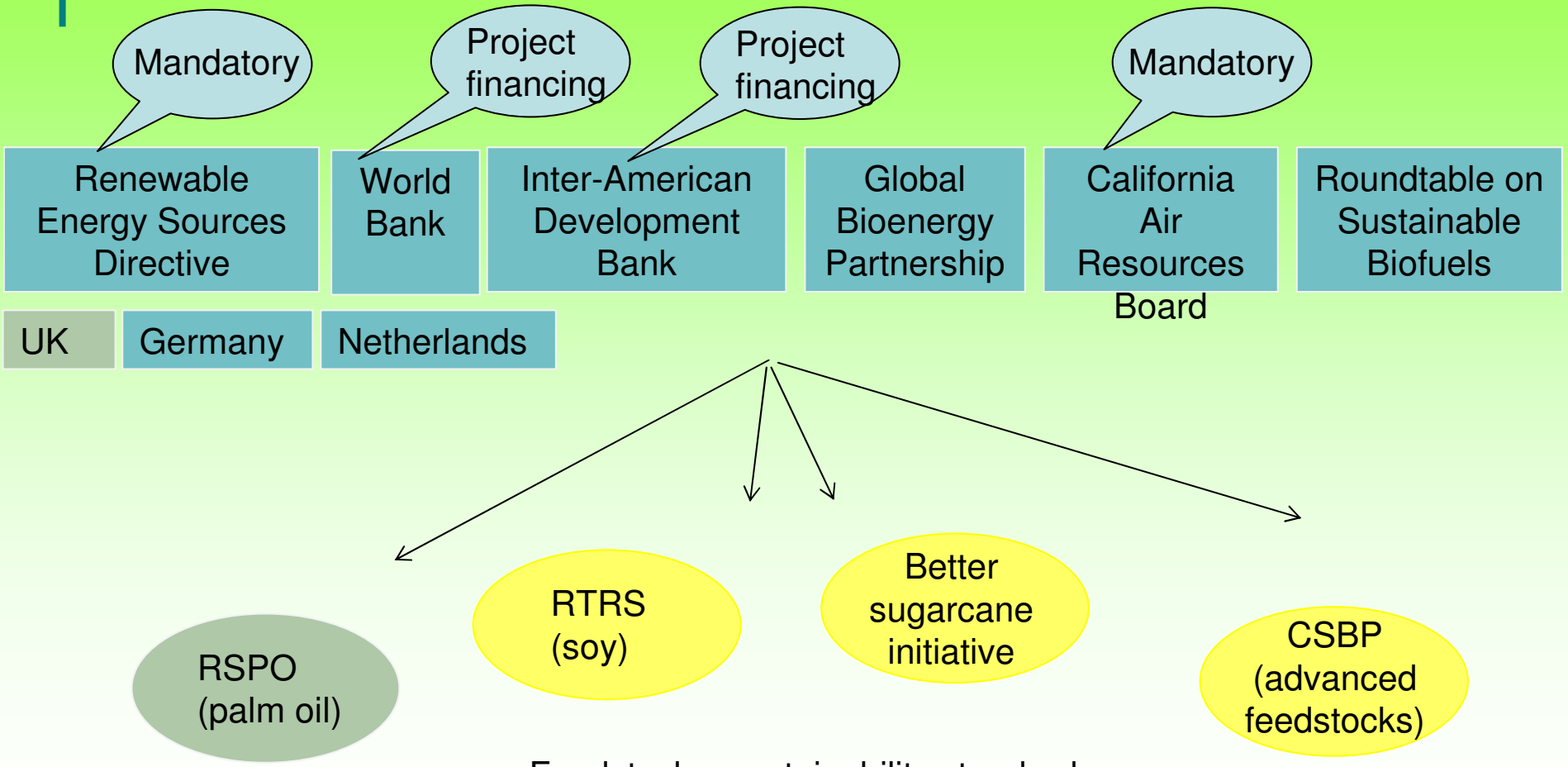
- one allowance credit per qualified offset
- 2 billion offset credits; up to 30% per entity
- 15% domestic offsets, 15% international

- 15% International means:
  - 1200 million tonne international offsets by 2020
  - $24 billion/year in carbon financing (assumes $20/tonne)
  - Increases at $3.1 billion/year thereafter until 2050

There are several different drivers for biofuel



Evolving bioenergy standards attempt to deliver sustainable products but have implications for market access and financing



Feedstocks: sustainability standards

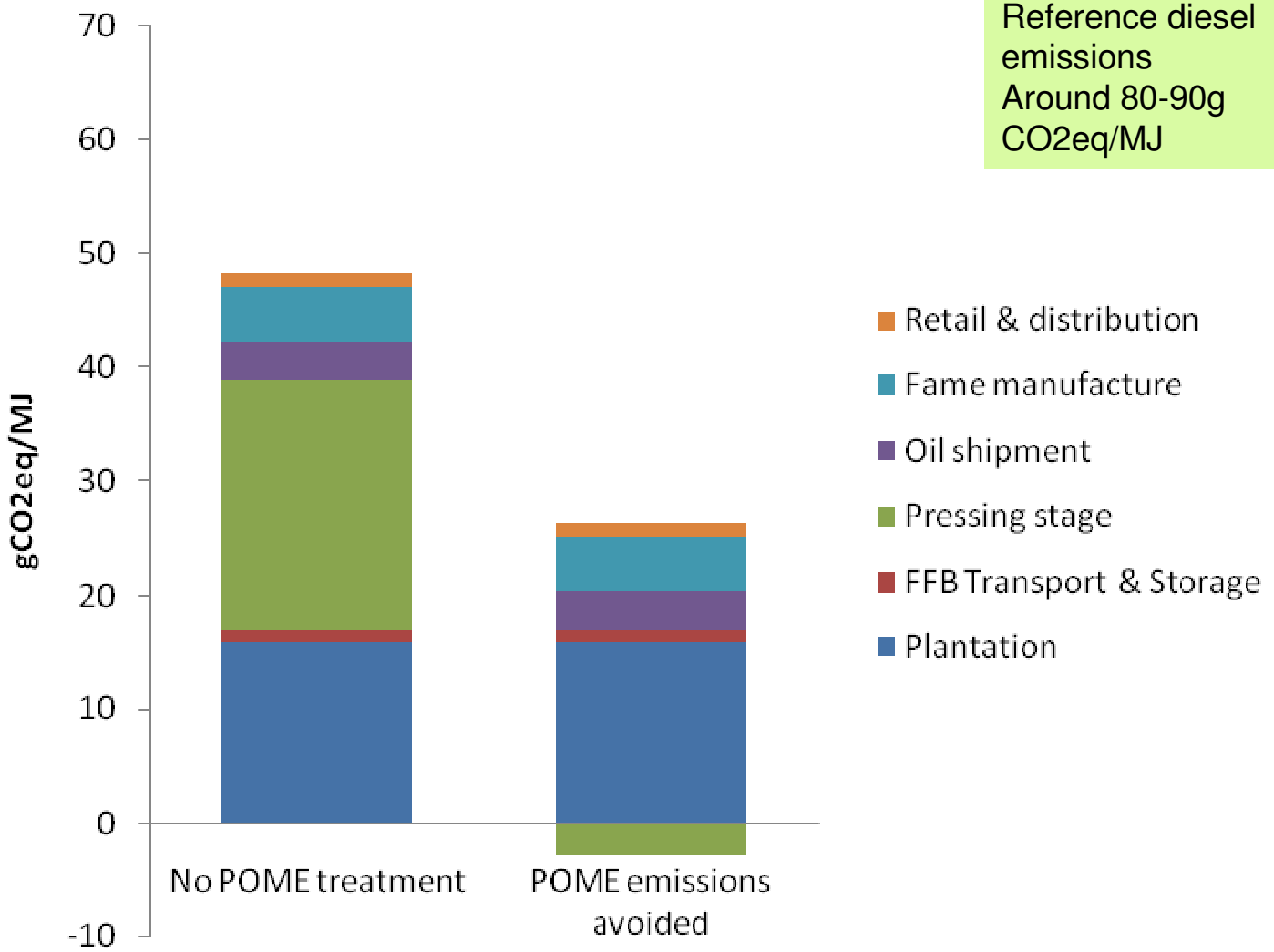
In operation

How are these groups measuring different aspects of sustainability?

- The total GHG emissions in every stage of it's life - growing, processing and transporting the biofuel
  - Nitrous oxide, methane and carbon dioxide
- The amount of water used and quality of effluent
- Whether the right to use of the land is equitable
- Whether using the land for biofuels might displace food crops
- Direct and Indirect land use change
- Maintenance of Biodiversity
- The number and types of jobs created plus labor conditions

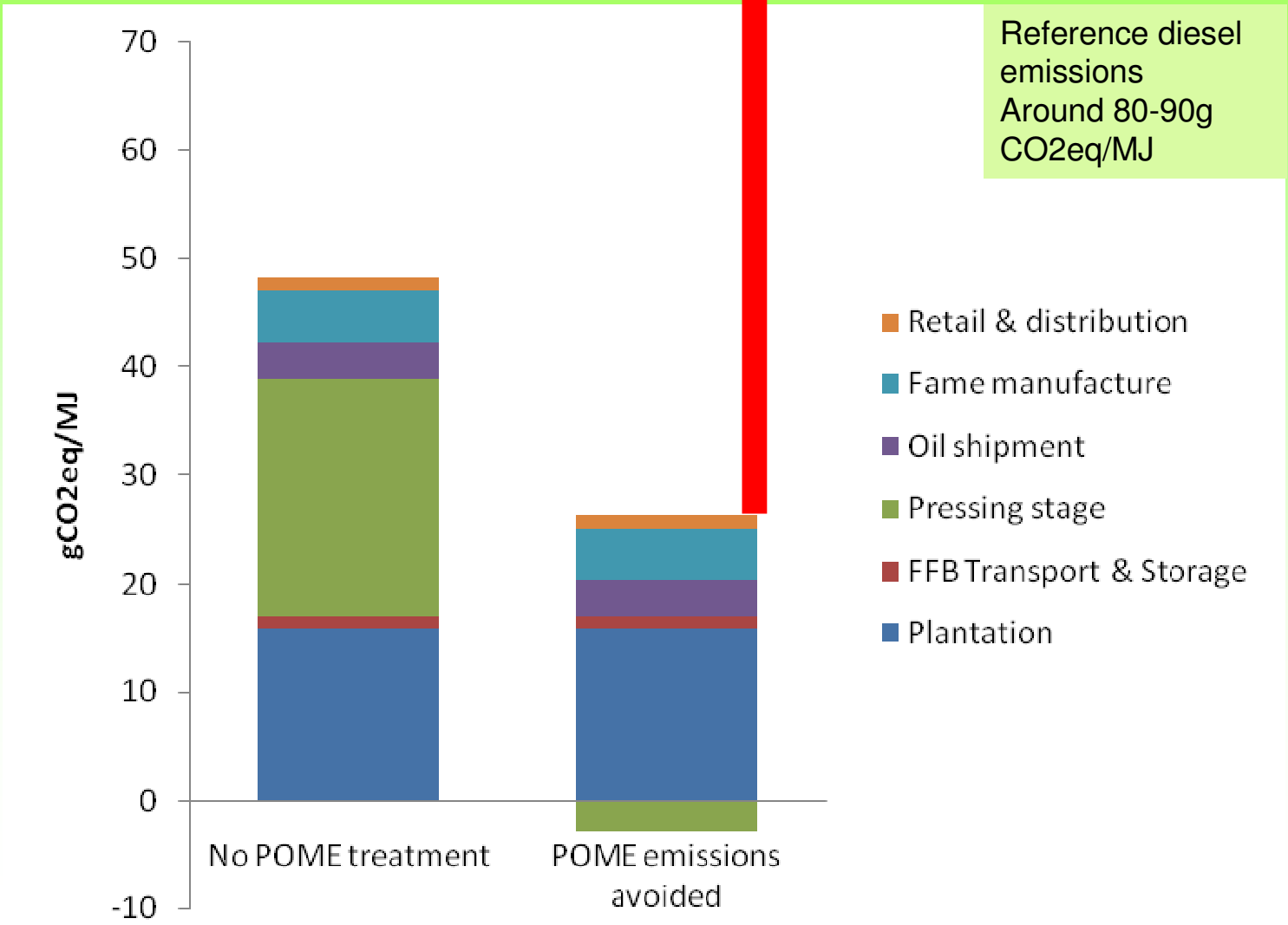
For Palm Oil, GHG emissions could be improved at the same time as delivering energy for processing

Reference diesel emissions
Around 80-90g CO2eq/MJ



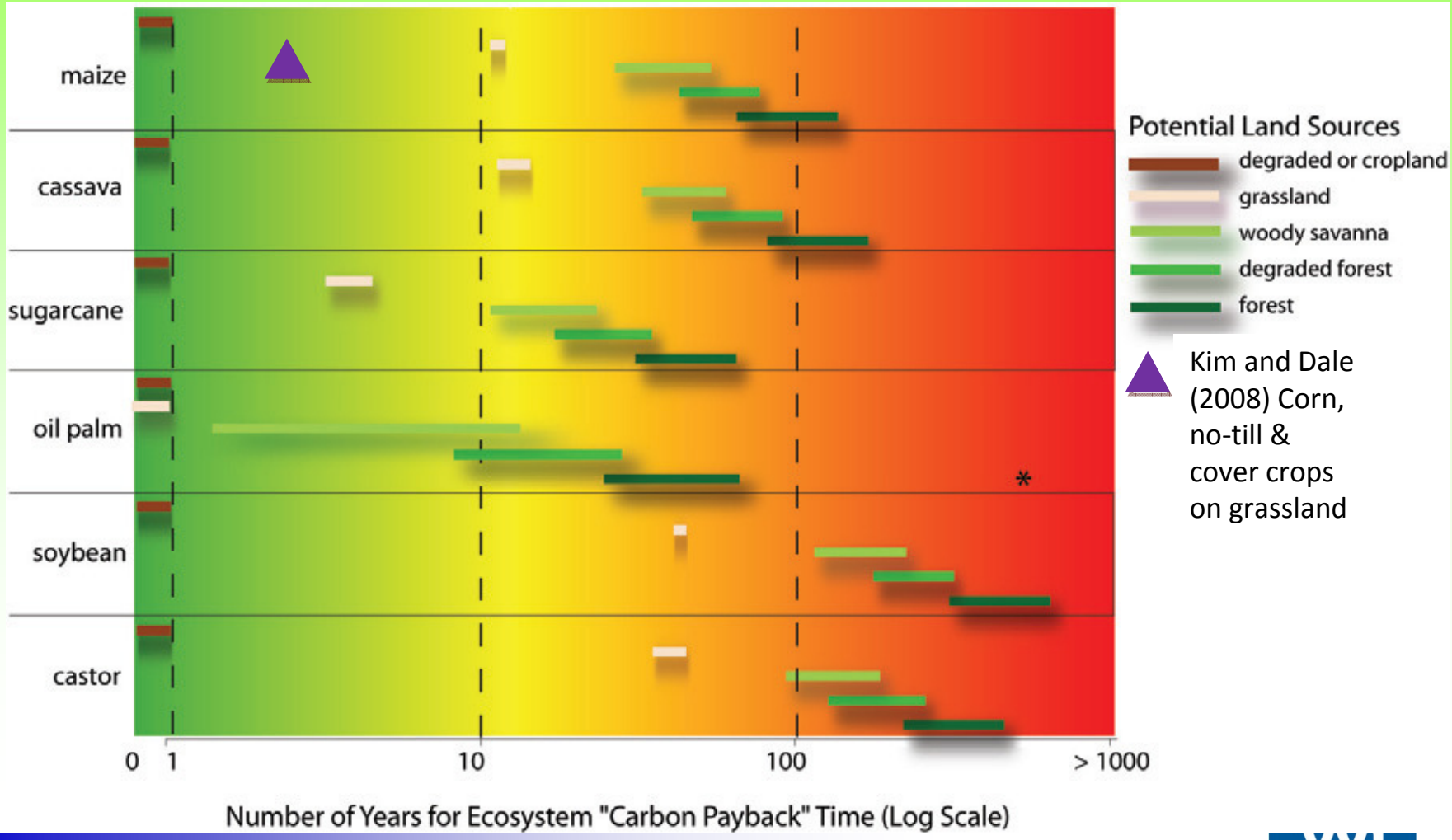
Source: JRC, EU CAR and Concawe, 2008

But emissions from land use change can negate these savings



Source: JRC, EU CAR and Concawe, 2008

Land use change could negate GHG savings from biofuels



Source: Gibbs (2008) and Kim & Dale (2008)

Bioenergy Sustainability and Financing

- Evidence that bioenergy projects comply with sustainability principles is required by:
  - Sources of debt funding
  - Sources of equity funding
  - Carbon offset creation processes
- IADB - “Biofuels Sustainability Scorecard”
- IFC - “Environmental and Social Performance Standards”
- CDM – “Projects must assist host countries in achieving sustainable development”

Bioenergy from Palm Oil Mill Effluent

Bioenergy and Carbon Offsets from Palm Oil Mill Effluent

- 60 tonne FFB/h mill (typical for 10,000 ha)
- Add enclosed digestor and gen-set ($2-2.5 million)
- 6,175 m3/d methane emission avoided
- 8,800 MWh/y electricity produced
- $700,000 electrical sales revenue (at US$80/MWh)
- 40,250 tonne CO_2 equiv/year offset
- $805,000 value of offset (at $20/tonne CO_2 equiv)
- Payback 1.5 years

Bioenergy from Palm Oil Mill Effluent

AD of biomass – Natural palm Oil - Thailand

Biomass:

- POME - palm oil mill effluent

Basic conditions:

- 12m3/h PMOE
- Temperature of PMOE fresh from mill 80°C -> cooling-down in open lagoon

1 x JGS 320 GS-B.L.C

Power output:
1064 kWel.
Commissioning:
2005

Bioenergy from Palm Oil Mill Effluent

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