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ACP Science and Technology Workshop

The Sustainable Fuel Supply Chain

Johannesburg

January 28th 2010

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Renewable Biomass Power - The Challenges

- Establishing the supply chain from farm to power plant.
- Cropping and Power Contracts
- Sustainability and Carbon Savings
- Risk management between agricultural and power markets.

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How to keep the lights on - sustainably?

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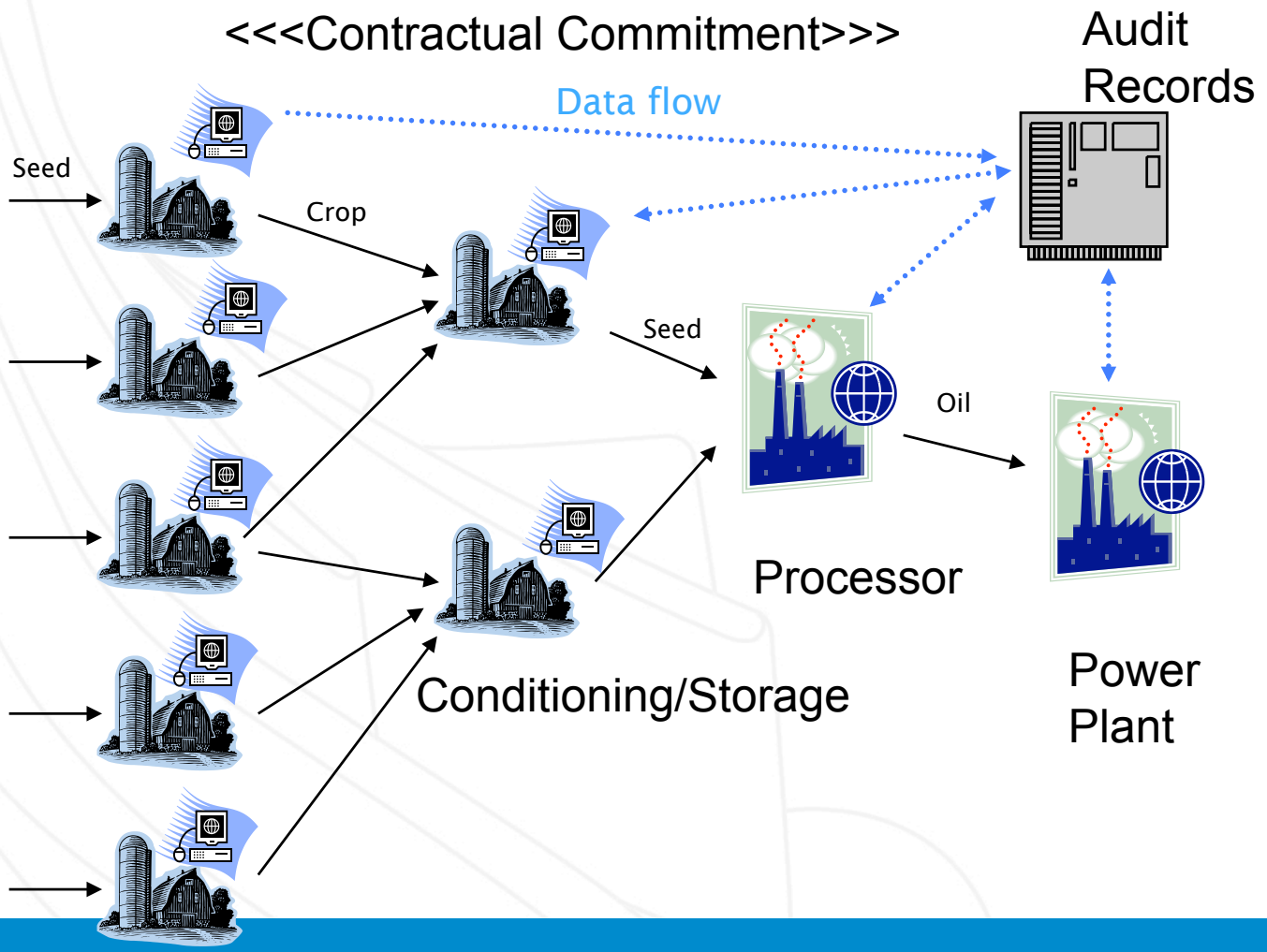
Establishing the Supply Chain from Farm to Power Plant



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Establishing the Supply Chain - Land

- Land availability in the region of the plant
- Soil type/fertility/current vegetation/ agronomy/cultivation techniques
- Environmental impact assessment for forest, wetlands, areas of scientific interest
- Sufficient Water supply
- Sufficient land for both food and fuel
- Preservation of land rights
- Farmer interest in new local market (what are their alternative opportunities?)

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Establishing the supply chain- Infrastructure

- Crop conditioning (drying/cleaning) facilities at farm of origin or centralized ?
- Crop storage facilities - at farm of origin or centralized?
- Primary Processing facilities (Oil Extraction/Refining) – close to the farm of origin or at the power plant?

Establishing the supply Chain - Equitable Contracts

- Relationship between all parties should be non-adversarial.
- Long term (10-20 years) contractual commitment requires transparent pricing throughout the supply chain
- Equitable pricing should be based on publicly available data or commodity exchange
- Element of risk sharing
- Element of Profit sharing
- Co-operative venture between farmers/generator

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Sustainability- For now and the Future

- Increasing awareness but…means many things to many people.
- Social? Environmental? Ecological? Economic?
- The definition is still evolving….
- The renewable energy sector needs to provide reassurance
- One thing is clear…

Renewable resources should only be used to meet human needs while preserving the environment

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Indirect Land Use Change (ILUC) Sensitive Areas

- Land with high diversity value
- Forests of native species
- Areas with endangered ecosystems
- Biodiverse grasslands
- Wetlands and peat lands
- Expect international standards to develop (EU definitions in 2010)

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ILUC- a complex debate.

- Land usage expansion occurring on the margins for food, feed, housing, infrastructure.
- Should biomass for energy be penalized for indirect carbon effects while fossil fuels and food are not?
- How can indirect effects be predicted with any precision?
- How can cause and effect be established?
- Ignores the need for energy security in developing countries
- A logical long term approach from Government needed to reassure investors in renewables
- Restoration of idle arable land should be considered a priority for supplies of food, feed and fuels to the benefit of rural economies.

The Supply Chain - Investor confidence

- Investors require sufficient feedstocks and chain of custody for biomass from farm to power plant.
- Sound financial models based on prudent assessment of feedstock supply and power market demand.
- Sustainable Crop Production
- Long term stability of Government policy and incentives for renewable power
- Access to local and national grid connections

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- Investors require risk management between feedstock and power markets as not always moving in tandem
- Agricultural markets affected by plantings, weather, competition between crops, local and global supply and demand
- Power markets affected by fossil fuel availability and global supply and demand
- Consider hedging mechanisms such as futures, options or contracts linked to a common index (e.g. electricity markets)
- Long term price agreements preferable

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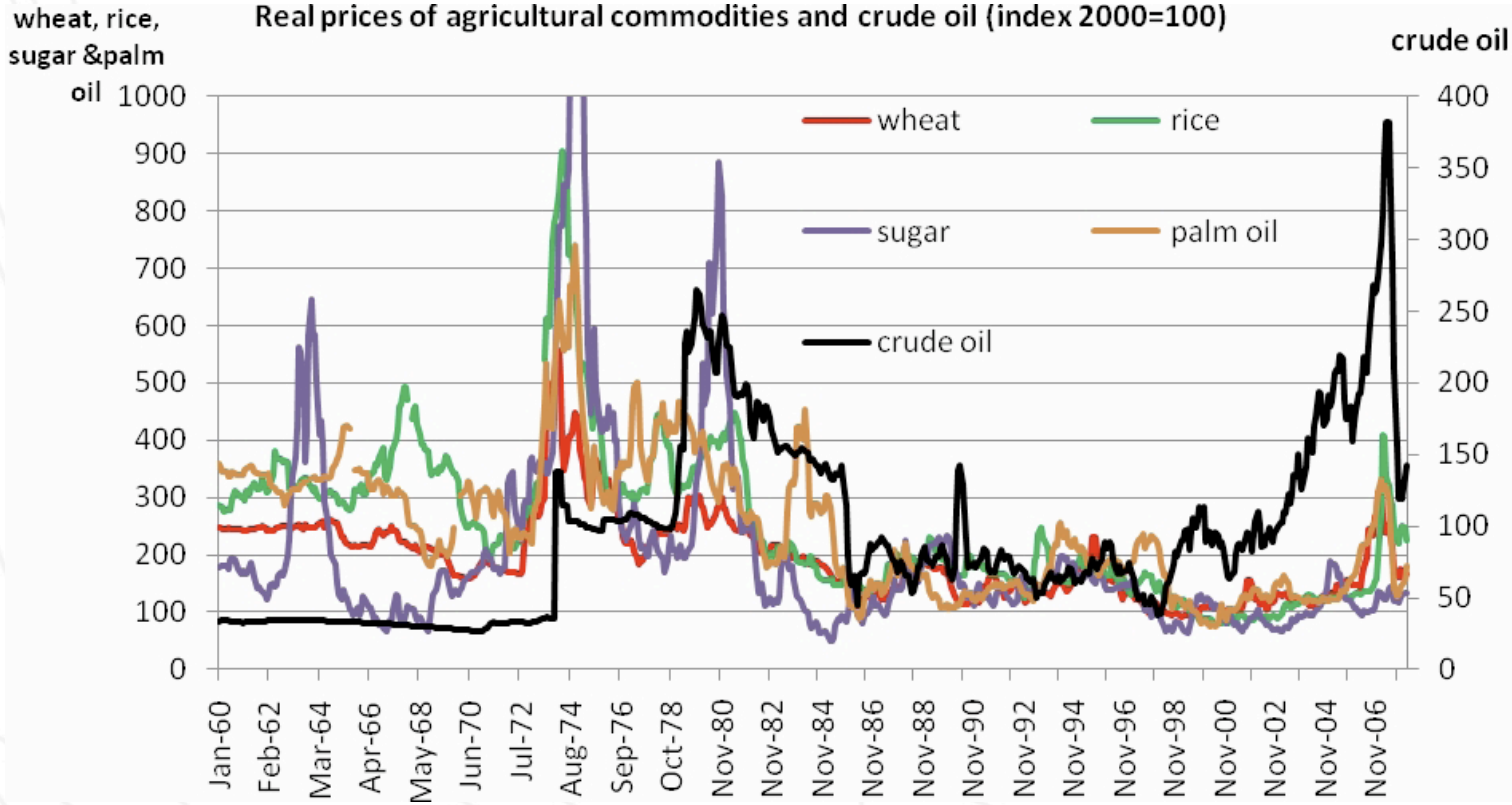
Food versus Fuel - Real crop prices have experienced 4 spikes since 1960 but overall trend is lower.



Source: UNCTAD, BEA

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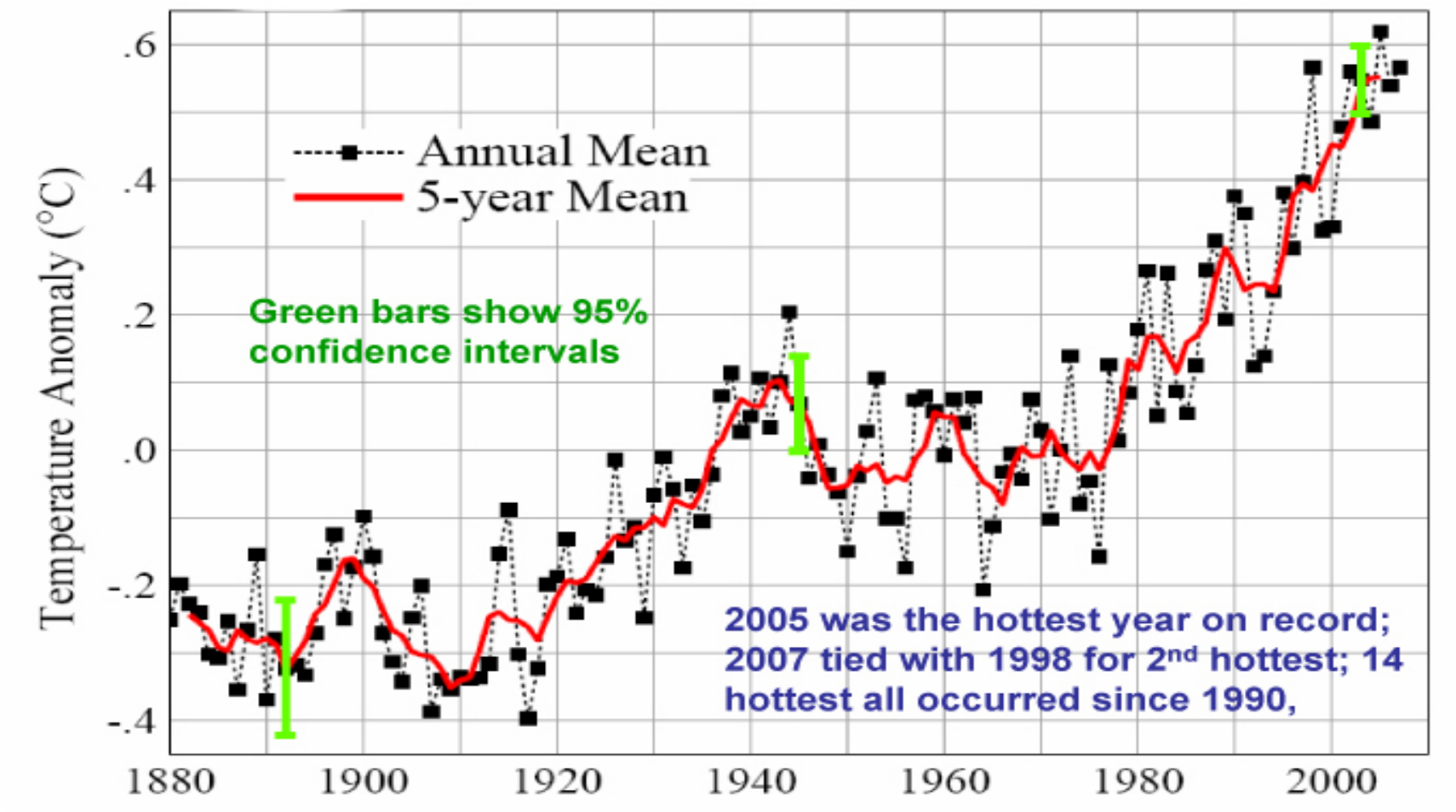
Climate Change – The Reality



http://data.giss.nasa.gov/gistemp/graphs/

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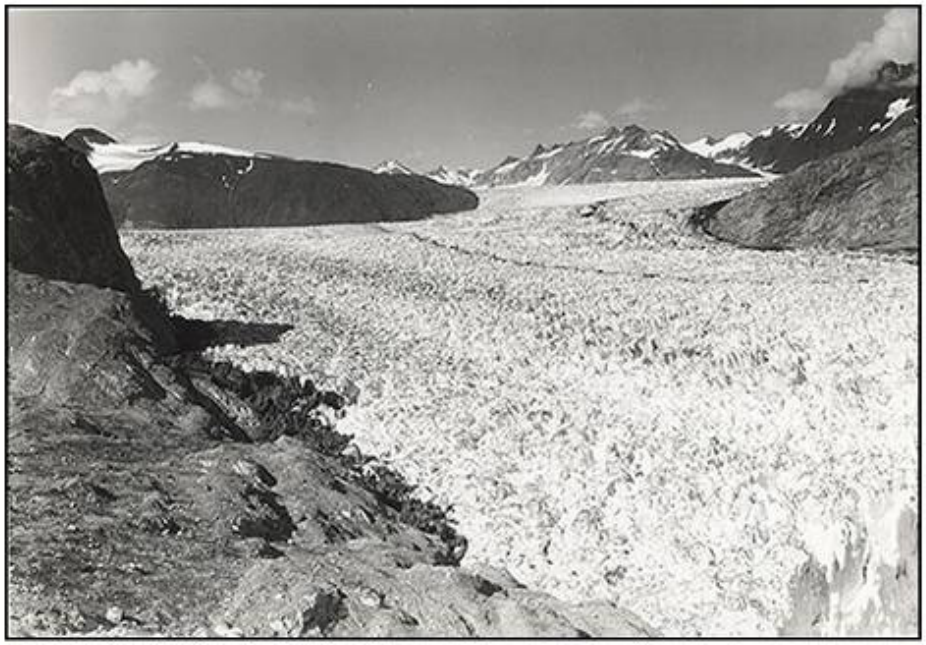
Muir Glacier



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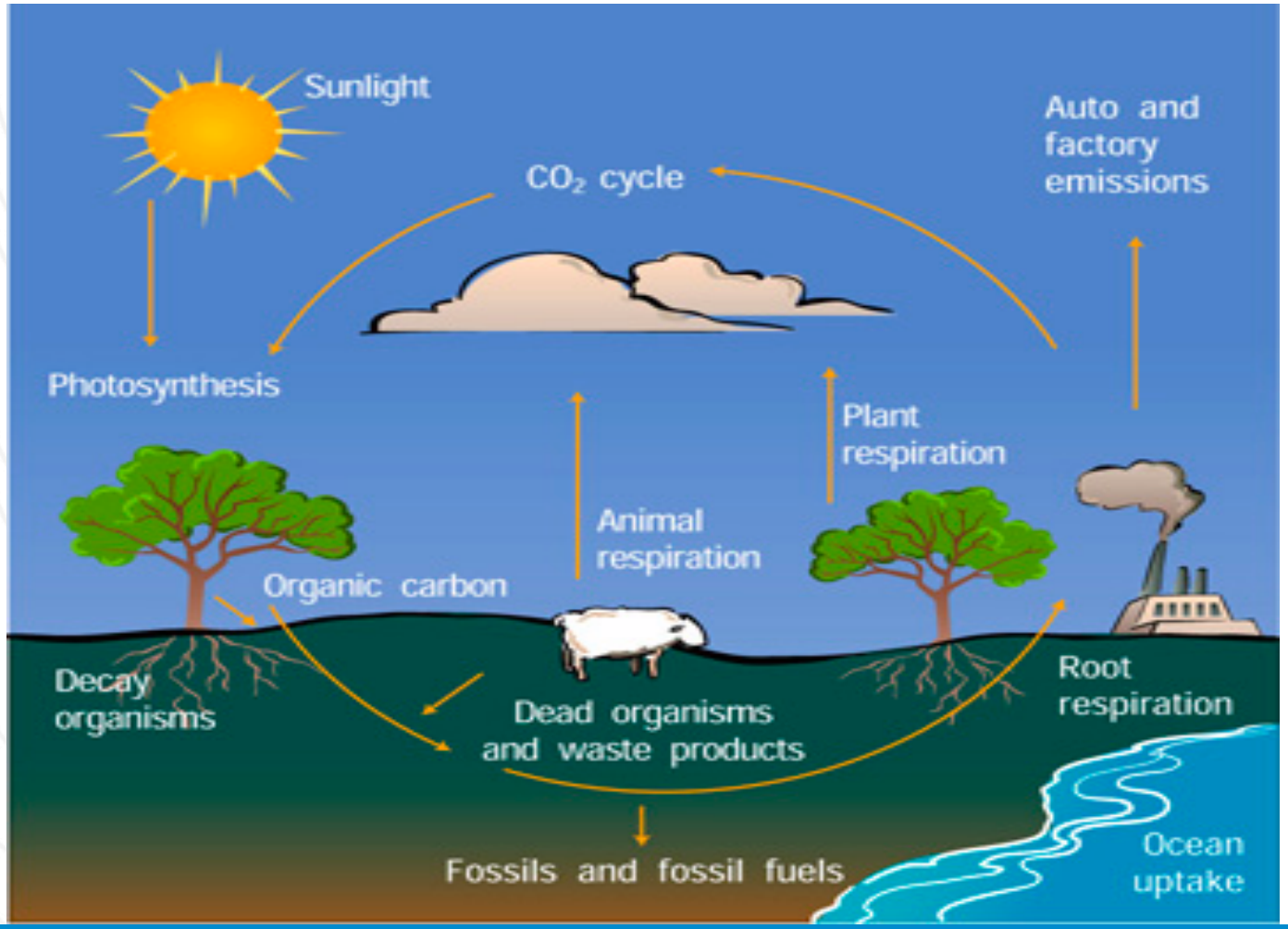
Carbon cycle emission savings from biomass



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Climate Change - Carbon Savings can be improved

- Measure carbon savings from farm to power generation compared with fossil fuels
- Agronomic practice> fertilizer> transport> primary processing> efficiency of power generation
- EU minimum biomass GHG savings standards to rise:

2009	35%
2017(Jan)	50%
2017	60%

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- Renewable power projects requires the involvement of all stakeholder in the chain at the outset.
- Assessment of impact on environment, communities and food supplies is required
- Equitable transparent contractual links, profit sharing or full co-operative status will provide long term commitment from stakeholders.

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- Government policy can provide vital stimuli but stability in legislation is vital to give investors confidence
- With appropriate assessment of the environmental impact renewable power from biomass can deliver considerable benefits in economic growth for local communities, reduction in reliance on fossil fuels and mitigation of the effects of climate change.
- Thank you for your attention