



SUPPLY CHAIN ISSUES FOR BIOFUELS

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IPIECA, Brussels

Michelle Morton

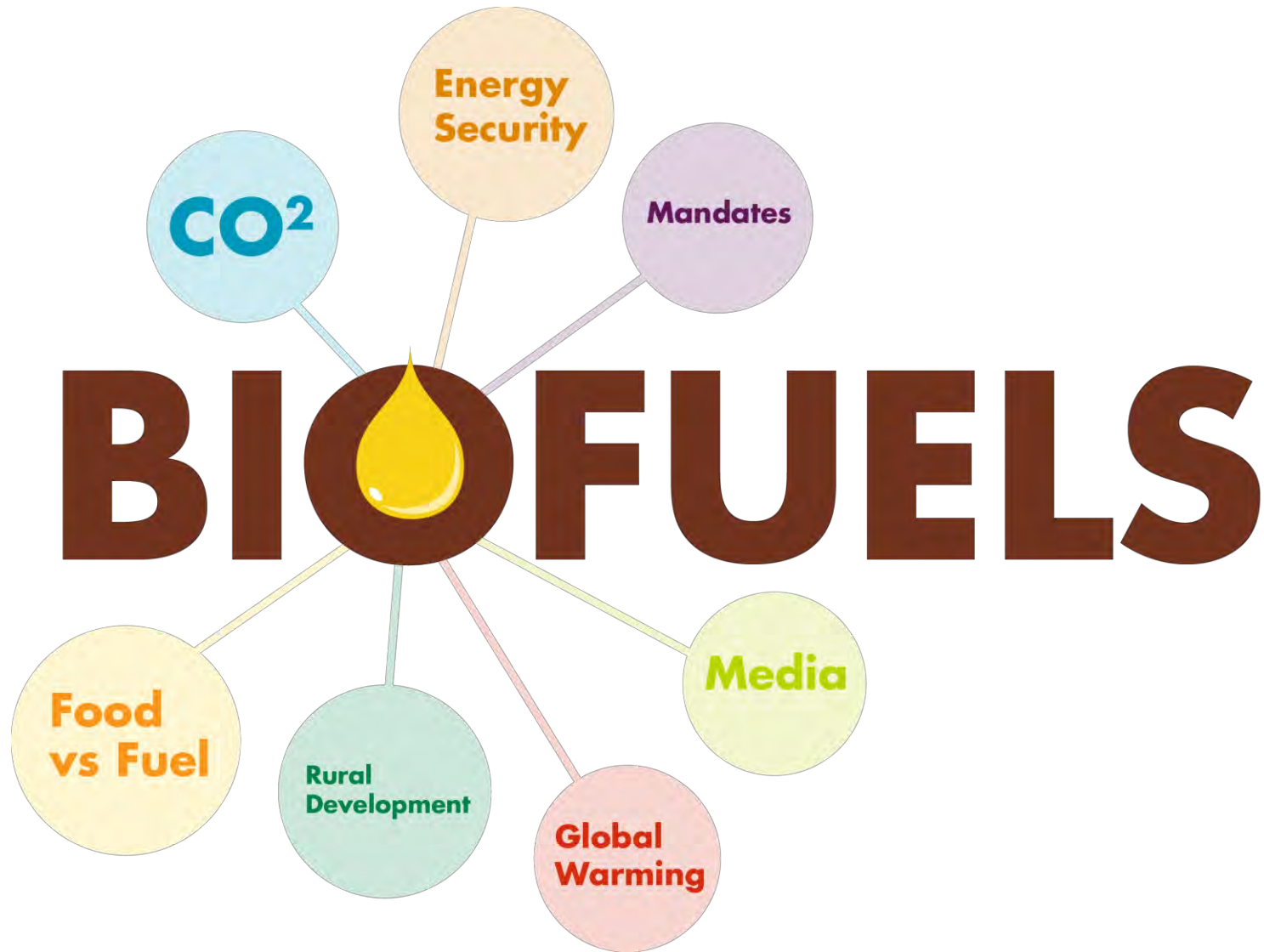
Biofuels Sustainability Manager

Shell International

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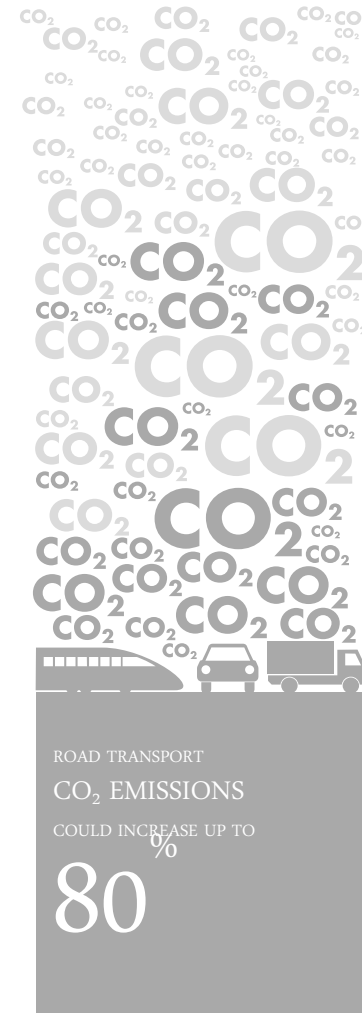
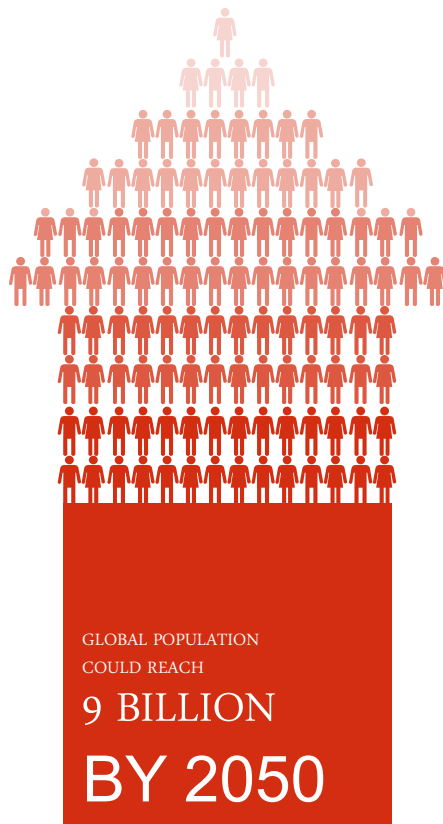
SETTING THE SCENE



MOBILITY GIVES ACCESS TO DEVELOPMENT DEMAND WILL INCREASE RAPIDLY

MOBILITY IS CRITICAL TO OUR DAILY LIVES.

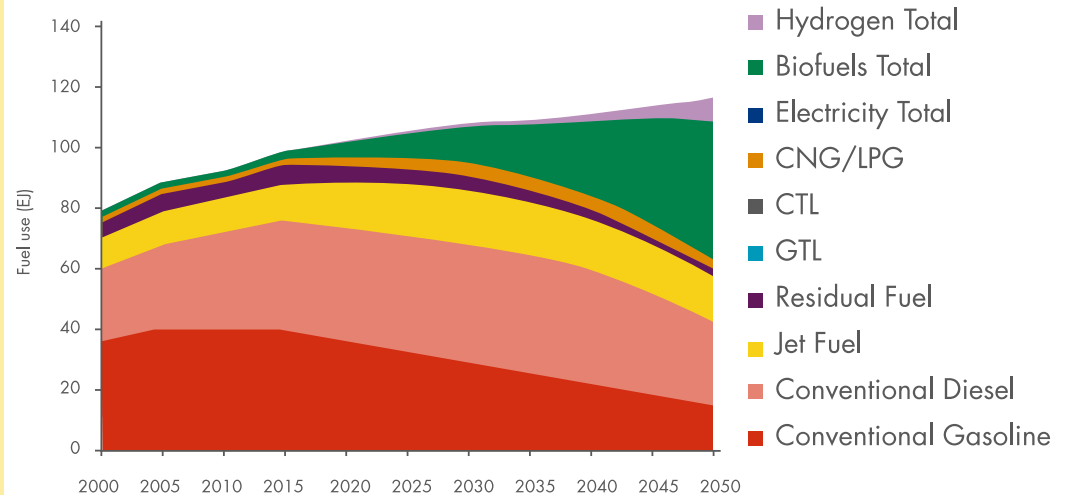
Transport accounts for a quarter of global energy use
and energy-related CO₂ emissions



LIQUID FUELS WILL CONTINUE TO DOMINATE

- Electric and H2 vehicles to increase
- Most vehicles will continue to use internal combustion engines
- Light duty sector will experience greatest level of change
- Heavy duty remains reliant on liquid
- Consumption of liquids to rise 20% between 2010 and 2030

Liquid fuels continue to dominate mobility to 2050



BIOFUELS ARE NEEDED AS PART OF THE FUTURE ENERGY MIX

BIOFUELS ARE THE MOST REALISTIC
COMMERCIAL SOLUTION

They offer:

- CO₂ Emissions Reductions
- Diversification and Energy Security
- Integration with existing infrastructure
- Rural Development Opportunities



TACKLING CO₂ AND SUSTAINABILITY CONCERNS

A number of CO₂ and sustainability issues have been linked to the production of ethanol and FAME

- Wide range of 'Well-to-wheel' CO₂ performance
- Agricultural social issues get linked to biofuels (e.g. workers' rights, local community land rights)
- Environmental issues in agriculture such as rare habitats and species, direct/indirect land use change, air+ water pollution, soil erosion
- Food security issues now linked by some to Biofuels
- Population increase, increasing meat consumption, a slowing down of yield increases, climate change pressure on arable land

FT.com
FINANCIAL TIMES
Biofuels: Environmental credentials are called into question
By Fiona Harvey, Environment Correspondent
Published: June 30 2008 00:33 | Last updated: June 30 2008 00:33

TIMESONLINE
Raising use of biofuels would harm the planet, says report

The New York Times
Europe, Cutting Biofuel Subsidies, Redirects Aid to Stress Greenest Options
By ELISABETH ROSENTHAL

Herald Tribune
Studies conclude that biofuels are not so green
By Elisabeth Rosenthal
Published: February 7, 2008

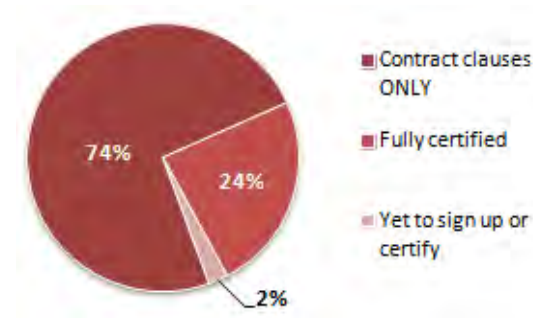
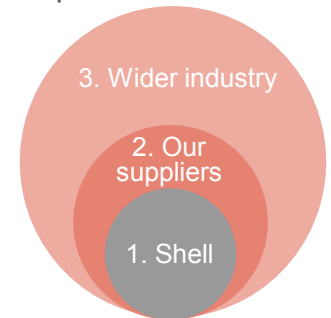
theguardian
News | London 2012 | Sport | Comment | Culture | Business | Money
Environment > Biofuels
Secret report: biofuel caused food crisis
Internal World Bank study delivers blow to plant energy drive
Aditya Chaudhary
guardian

BBC News Sport Weather iPlayer
NEWS UK
Home World UK England N. Ireland Scotland Wales Business Politics Health
13 April 2011 Last updated at 10:03
Biofuels targets are 'unethical', says Nuffield report
By Roger Harrabin
Environment analyst

SHELL'S APPROACH

- ❑ Internal Governance: Rules and practices to help assess risks in biofuels supply chain, implement controls, monitor compliance and report our progress
 - ❑ Where there are regulatory requirements in place, such as the EU, Shell's preferred approach for compliance is via certification against recognized credible multistakeholder voluntary sustainability standards.
- ❑ Ask our suppliers to sign up to sustainability clauses in new and renewed term contracts:
 - ❑ bio-components and feedstocks not knowingly linked to violation of human rights or cultivated, produced or manufactured in areas of high biodiversity value
 - ❑ suppliers develop and implement supply chain traceability systems
 - ❑ suppliers join relevant international bodies developing sustainability criteria for the production of particular feedstocks
 - ❑ Shell has right to audit supplier and requests support to audit further in chain
- ❑ Wider Industry: Engaging industry, governments, intergovernmental agencies and policy makers to encourage sustainability standards in the biofuels supply chain

Our approach & sphere of influence



Supplier sign-up, Q1 2012



CHAIN OF CUSTODY OPTIONS

- Segregation (also IP)
- Mass Balance ('X% certified' vs. Yes/no, tank/site/country/company, ...)
- Book and Claim (credit trading)



Table 1: Evaluation of CoC systems by relative level of success for four key factors

| CoC system | Fungibility | Disruption | Complexity | Auditability |
|----------------------------|-------------|------------|------------|--------------|
| Physical segregation | | | | |
| Tank level mass balance | | | | |
| Site level mass balance | | | | |
| Company level mass balance | | | | |
| Book-and-claim | | | | |

- Refer to IPIECA paper, published 2010, for general pros and cons of each option

SUPPLY CHAIN CHALLENGES

- Mass balance operational issues
 - Non-proportional feedstock allocation
 - Dock 'kissing' paper transfers
 - 'Double accounting' with multiple certification schemes
- Supply chain certification requirements
 - Inconsistencies between food/feed/cosmetics and fuels markets
 - difficult to have a complete chain certified to robust multistakeholder standard, claim is 'converted' to ISCC
 - end of supply chain certification requirement usually with 'customer claim' rather than member state reporting.
 - breaks in chain due to lack of certification very likely ('flash title transfers').
 - Most schemes modified to apply only where physical handling taking place.
 - Each voluntary scheme requires slightly different elements
 - length of time period
 - how to 'close books' at end of time period
- No clear process for updates to previously EC approved schemes

NEW PROJECT: CHAIN OF CUSTODY EFFICIENCIES FOR AGRICULTURAL COMMODITIES

- Project under Proforest's Sustainability Initiatives Support Programme (SISP) in coordination with ISEAL's biofuels' project
- Initial research study financed by Shell, further funding sought for next activities

The aims:

- identify main bottlenecks to the physical flow of certified product along the supply chain, and the related flow of verifiable sustainability data (for EU Reporting).
- work collaboratively to identify + implement solutions
- reduce audit + administration costs for supply chain actors
- increase the demand for certified sustainable commodities
- simplify the processes for the certification schemes

Contact: Bilge@proforest.net for more info and to get involved

SUMMARY

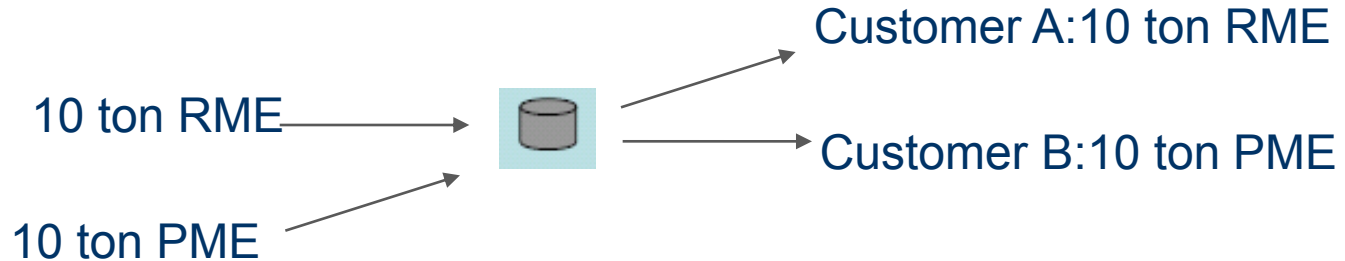
- Biofuels
 - Are needed to decarbonise the transport fuel sector
 - Can be sustainable, including CO2 savings, with appropriate social and environmental impacts
- Positive direct/indirect impacts of biofuels should be enhanced and negative impacts mitigated/reduced.
- RED in Europe is good first step in ensuring some safeguards towards sustainability
- Robust multistakeholder voluntary schemes which go beyond the RED requirements are valuable to improve performance (particularly for high risk feedstocks) and need to be more supported by obligated suppliers
- Harmonization of supply chain certification is needed to reduce barriers and inefficiencies
- What else could the oil industry do to support agriculture in becoming more sustainable?



BACKUP

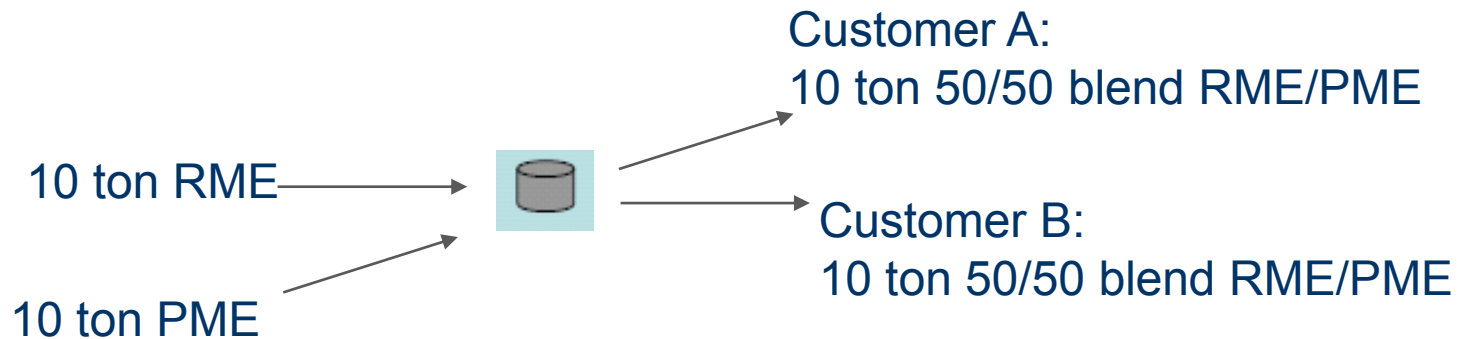
PROPORTIONATE VS. NON-PROPORTIONATE FEEDSTOCK REPORTING – SIMPLE EXAMPLE

Non-Proportionate feedstock allocation (allowed by EC for RED)



Disconnect between physical and data allocation

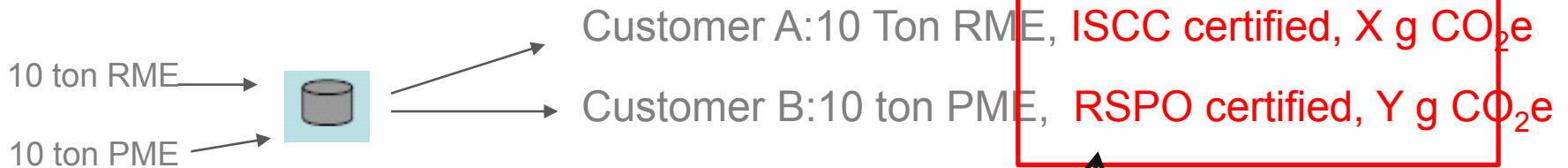
Proportionate feedstock allocation



Need to keep feedstock composition data for each tank

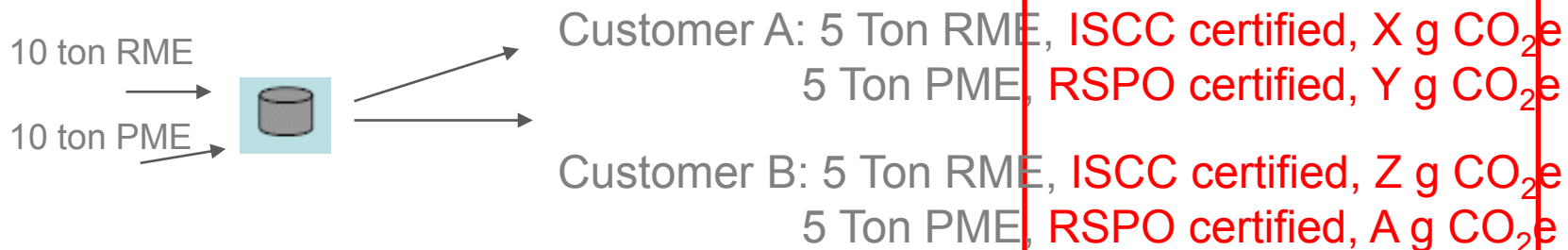
ALLOCATION OF SUSTAINABILITY DATA

Non-Proportionate feedstock allocation



Allocate any data from mass balance database for allocated feedstock (need to keep data for each feedstock in mass balance tool)

Proportionate feedstock allocation



More Complicated examples – mass balance is at a site, not a tank level, typically use at least 6 different feedstocks for each of ethanol and FAME in Europe