



Implementing Bioenergy Supply Chains in the UK

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*Innovation Manager, Energy Solutions, UK
& Ireland*

Energy
Solutions





Leading Group in environmental solutions

Revenue **€29.4 billion**
219.730 employees

WATER

The global benchmark
for water services

WASTE MANAGEMENT

The global benchmark
for waste management
and resource recovery

ENERGY SERVICES

The global benchmark
for energy optimisation
€8.9 billion



Veolia –UK Energy portfolio



power **302**MWe



chp capacity **256** MWe

co₂ reduction **346,000** tonnes



biogas/biomass power **43**MWe



compressed air **13**MW

heat **2,228**MWth



refrigeration **59**MW

Veolia & Renewable Energy

- Veolia has significant experience in the operation of facilities using renewable energy sources:
 - *157 biomass facilities using wood as fuel and with a total installed output of 859 MW.*
 - *25 biomass facilities using fuel other than wood and having a total installed power of 183 MW.*
 - *21 geothermal facilities with an installed power of 153 MW.*
 - *113 solar facilities (thermal and photovoltaic) with an installed power of 8 MW.*
- In particular, Veolia has acquired over the last several years a recognised know-how in the area of biomass energy production.
- Amongst its worldwide facilities, Veolia manages biomass cogeneration plants with a total installed capacity of 560 MWe.

Combined heat and power

Biomass solutions

District Heating

Construction of energy plant

Energy management

Emissions trading

Environmental compliance



Veolia & Biomass Fuels

- Experience of many kinds of biomass for our projects and/or plants

**Distillers' dried
spent mash**



Coffee grounds



**Palm oil press
residue**



Vine cuttings



Wood chip



**A & B grades wood
mix**



**Wheat / rice / barley
straws**



Rice husk



Peanut shell



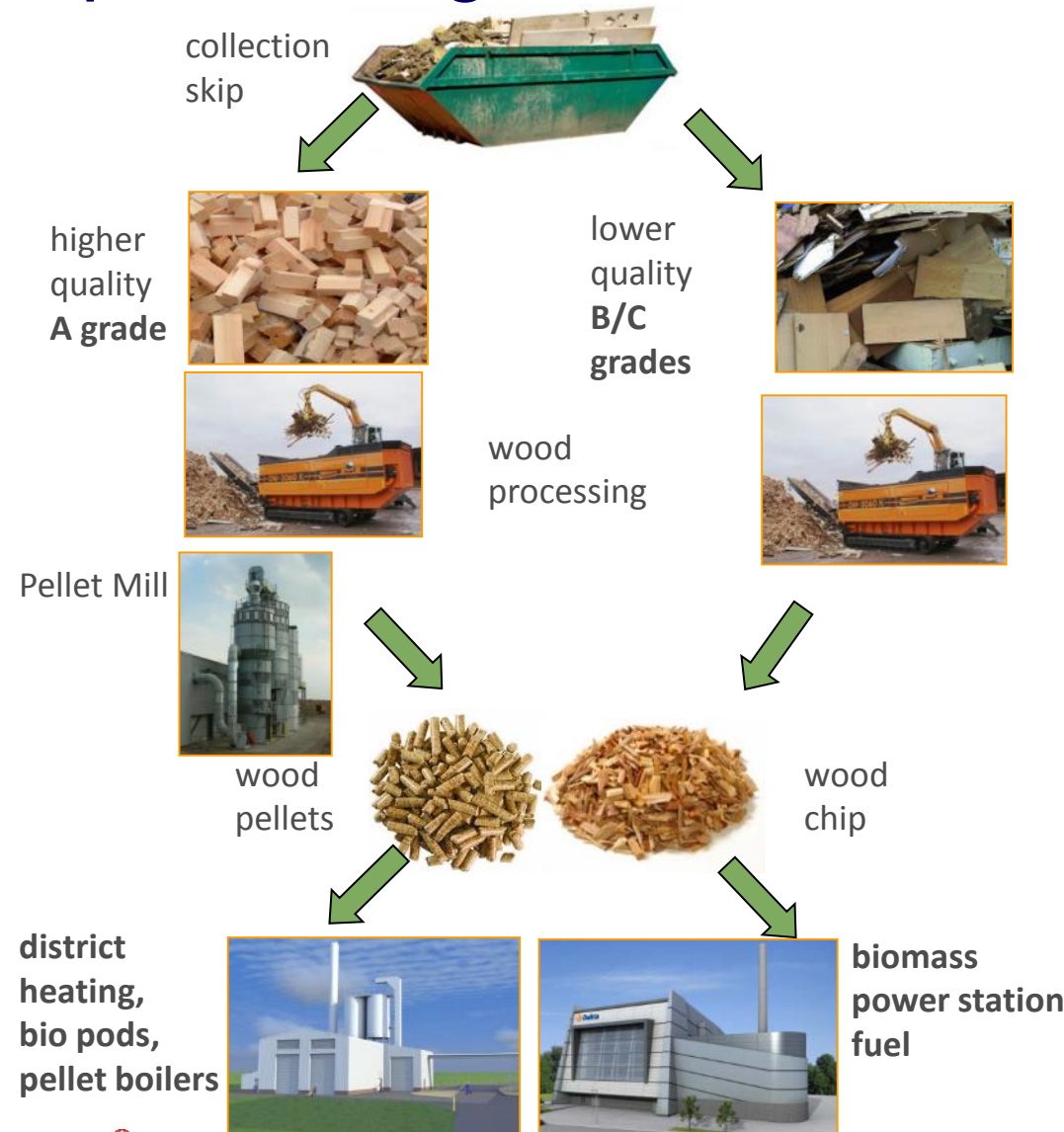
Olive wastes



**Energy crops :
Miscanthus**



Veolia's approach to sourcing, & processing waste wood



- Life-expired wood comes from:

- Civic Amenity sites
- Manufacturers
- Building and Demolition sites

- The wood is then processed for use in either:

- **PELLET production (A Grade)**
(used to supply district heating/pellet boiler schemes/ bio pods and a limited number of external customers)

or as

- **POWER STATION fuel (A, B, & C Grades)**
(such as Chilton Bio Power Station)

Biomass fuel supply

*Biomass fuel users
- powers stations,
schools, community
energy schemes*



*Used wood:
all soft and hard
woods - pallets, off-
cuts, boxes, packing
cases, chipboard,
plywood, melamine,
laminates, MDF*



*Wood grading,
pelletization, quality
control and storage*

*Grade A
wood pellets*



*Dalkia biomass CHP
and heating plants*

*Carbon
neutral heat
& electricity*



*Industry/district
energy schemes,
business parks,
campuses, eco towns*

Sustainable Utility Solutions

DBE Pellet Mills

- 2 existing (Pollington and Chilton) and 2 potential Pellet Mills of up to 50,000 tonnes production capacity each
- Main destination of pellets is DBE's own BioPods, Industrial and district heating schemes
- We have worked in the past with Drax power station who mix biomass in with their coal fuel to extremely tight specifications
- Leaders in pellet production in the Dalkia group



Pollington Pellet Mill



Pollington includes wood storage and processing



Dairy Crest Process Steam from Biomass



Dairy Crest Process Steam from Biomass



Chilton Biomass Power Station

 Dalkia



From
concept...



...to
completion...

...in 18 months.



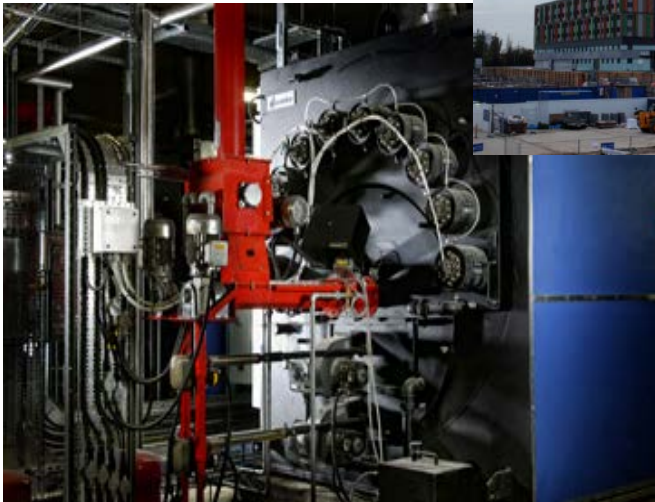
Biomass District Heating: Hale Village



Biomass District Heating: Hale Village



Biomass District Heating: Hale Village

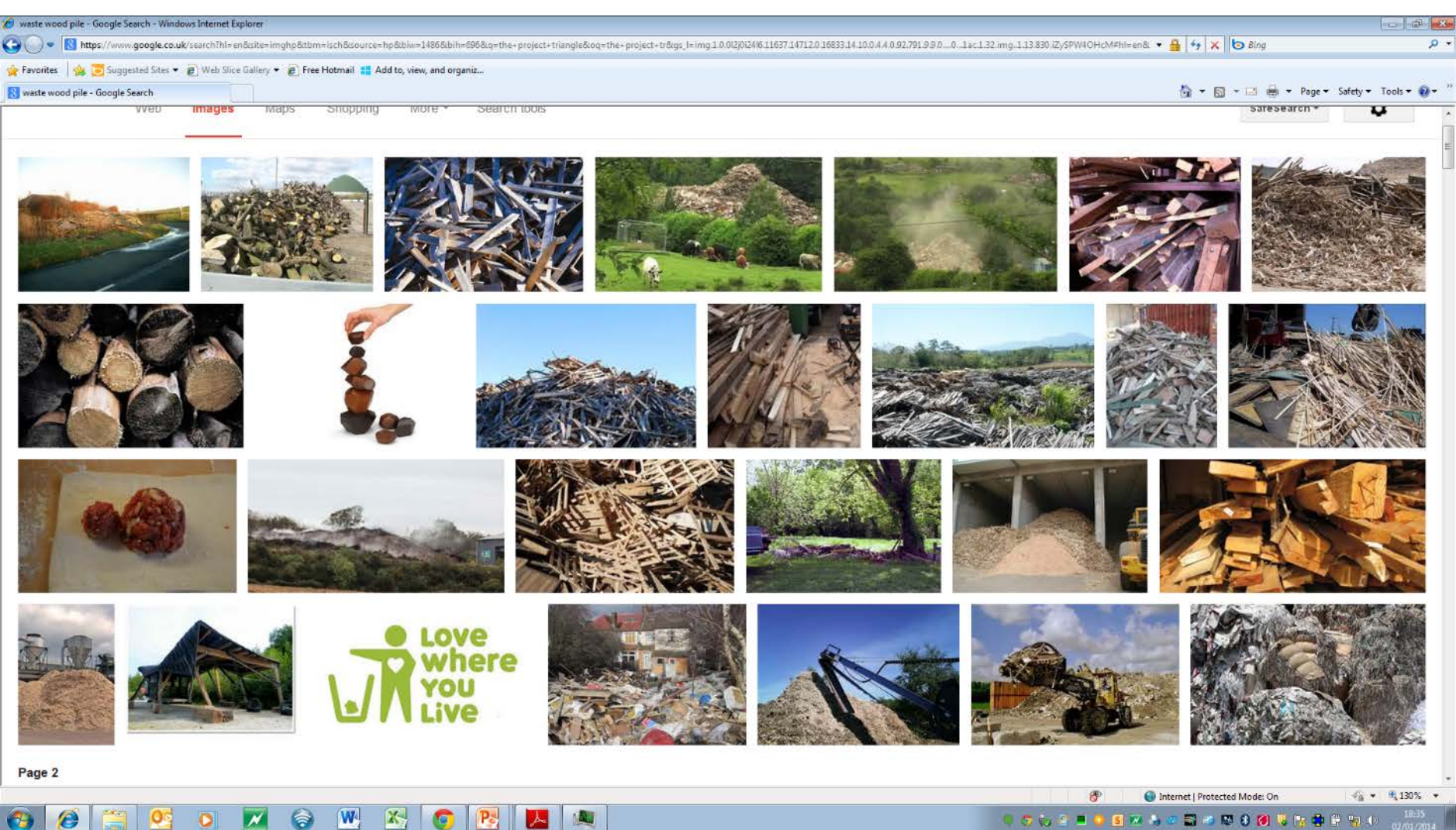


We have a problem with waste wood...

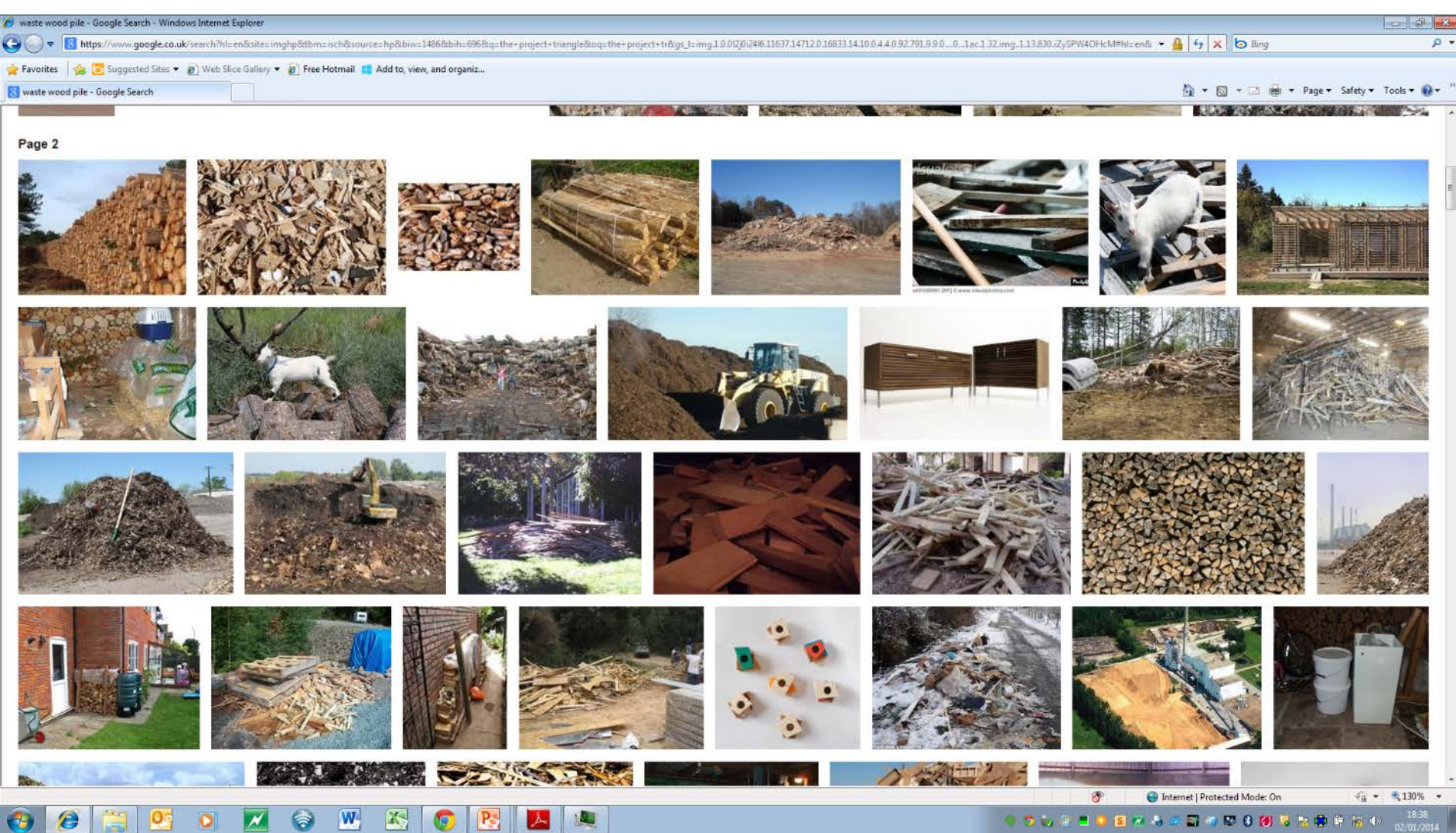


**The waste industry is
learning about the fuel supply industry**

What is Waste Wood?



What is Waste Wood?



What will the fashion be next year?



The Fuel Consumption Industry is Learning About The Waste Industry

→ Quality of biomass fuel is the most important point for the reliability of the plant

→ Avoid Contaminants

Control moisture content

Chemical Analysis is critical to understanding of performance



Potential Contaminants



The Waste Industry is Learning About the Fuel Supply Industry



The Waste Industry is Learning About the Fuel Supply Industry

Biology



The Waste Industry is Learning About the Fuel Supply Industry

Biology

Crops



The Waste Industry is Learning About the Fuel Supply Industry

Biology



Crops

£

\$



¥

€



The Waste Industry is Learning About the Fuel Supply Industry



The Waste Industry is Learning about the Fuel Supply Industry



The Waste Industry is Learning about the Fuel Supply Industry

**Looking 4
all scrap
cars**



Where there's Muck there's Brass



CAR SCRAPPER

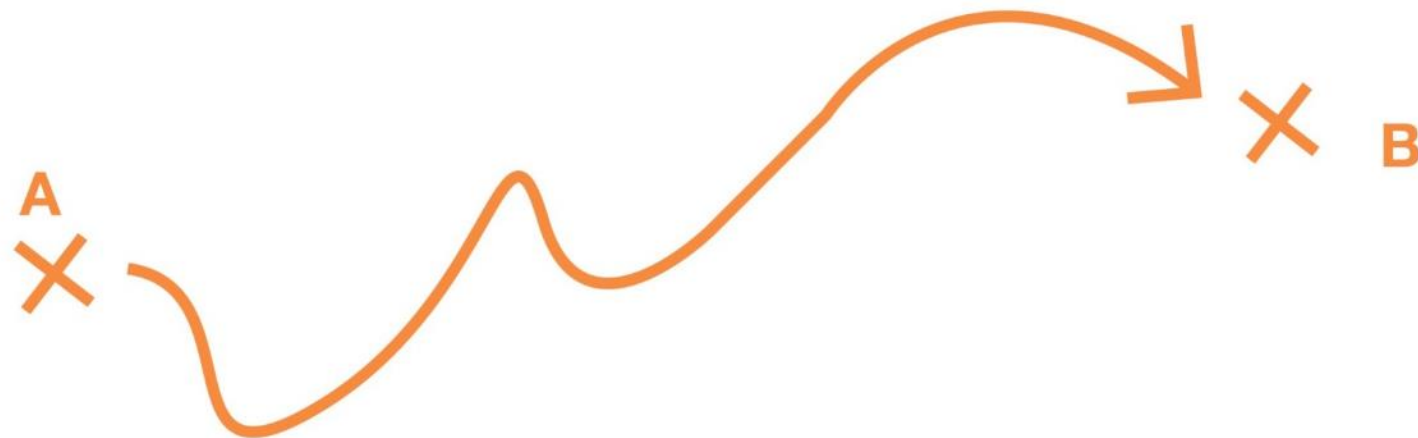
Mr. SCRAP MAN



The Fuel Supply Industry is Learning about the Fuel Supply Industry



The Fuel Supply Industry is Learning about the Fuel Supply Industry



The Fuel Supply Industry is Learning about the Fuel Supply Industry



£ \$
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The Fuel Supply Industry is Learning about the Fuel Supply Industry

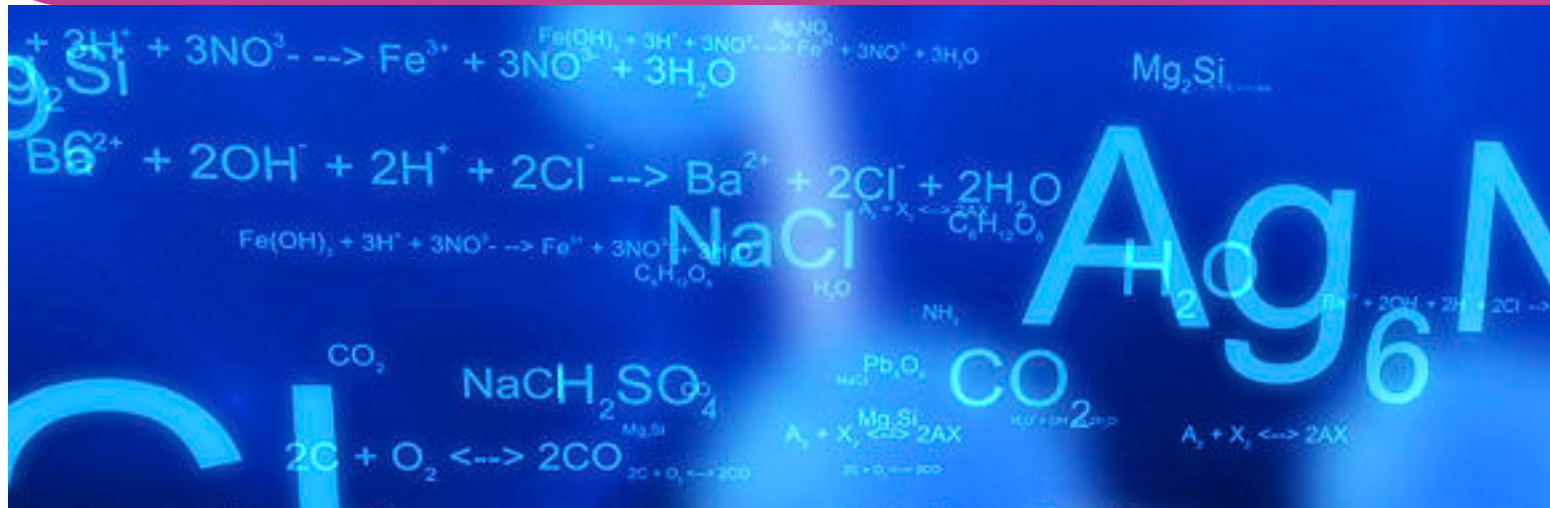


The Fuel Supply Industry is Learning about the Fuel Supply Industry



[illegible]

The Fuel Supply Industry & The Fuel Consumption Industry need to know about....



UNDERSTANDING GRAVITY:
SPACE-TIME IS LIKE A
RUBBER SHEET. MASSIVE
OBJECTS DISTORT THE
SHEET, AND—

WAIT.



THEY DISTORT IT
BECAUSE THEY'RE
PULLED DOWN
BY... WHAT?

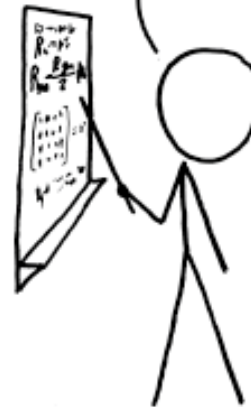


SIGH

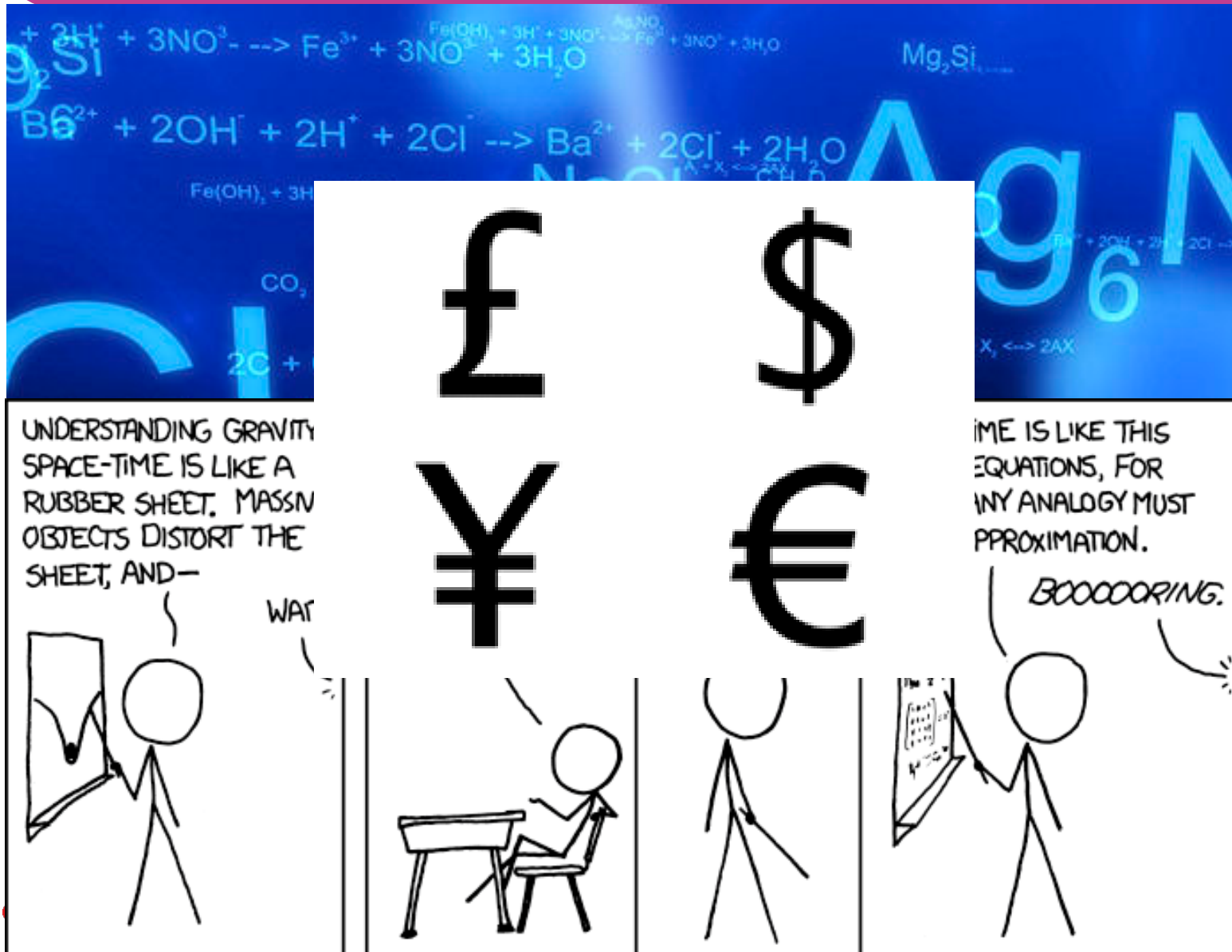


SPACE-TIME IS LIKE THIS
SET OF EQUATIONS, FOR
WHICH ANY ANALOGY MUST
BE AN APPROXIMATION.

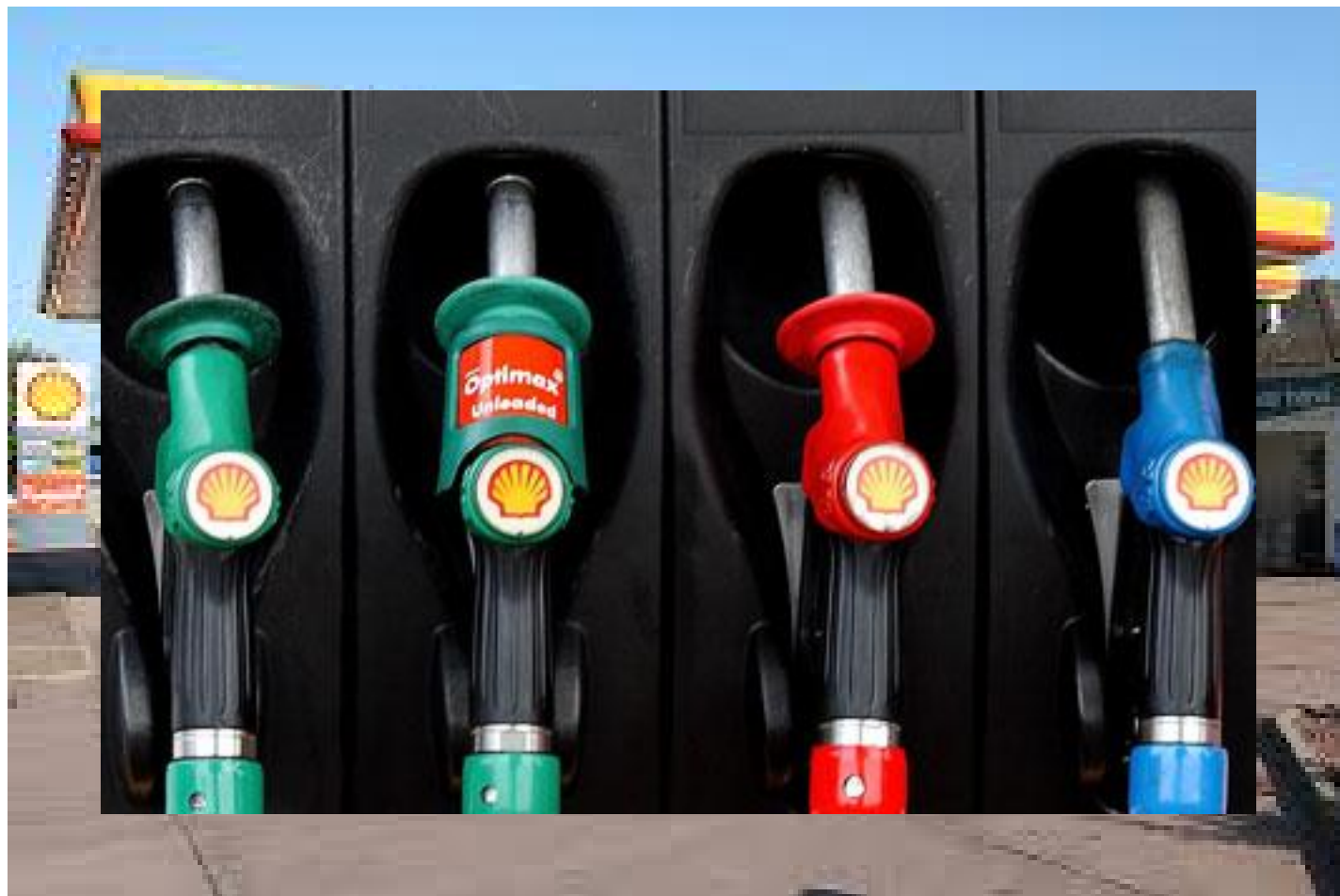
BOOOOORING.



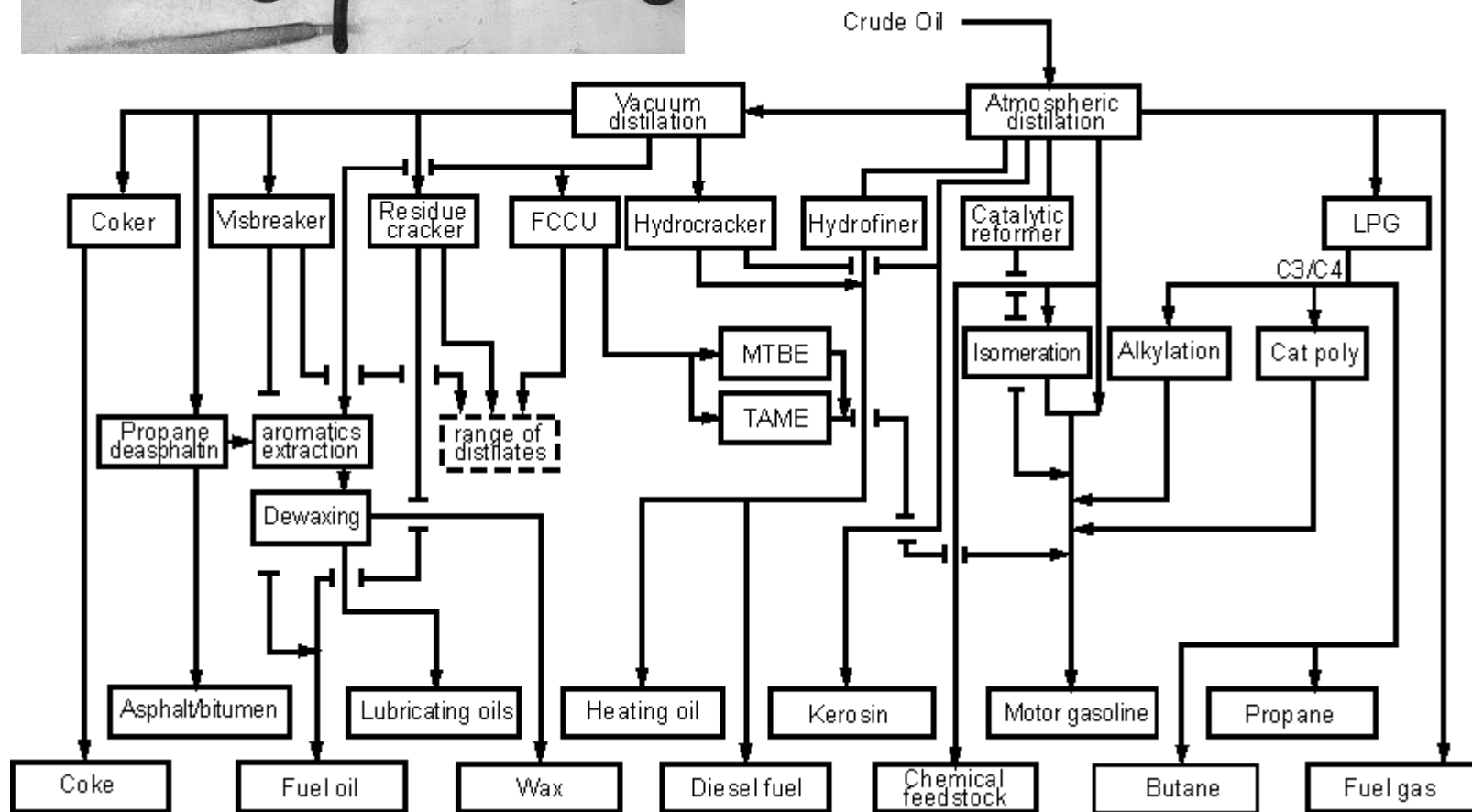
The Fuel Supply Industry & The Fuel Consumption Industry need to know about....



utopia



utopia



utopia



By-Products &
Co-Products



Chemical Composition
Moisture Content
Particle Size Distribution



Boiler Fuel

We need to establish a Fuel Supply Industry



Veolia & Biomass Fuels

**Distillers' dried
spent mash**



Coffee grounds



**Palm oil press
residue**



Vine cuttings



Wood chip



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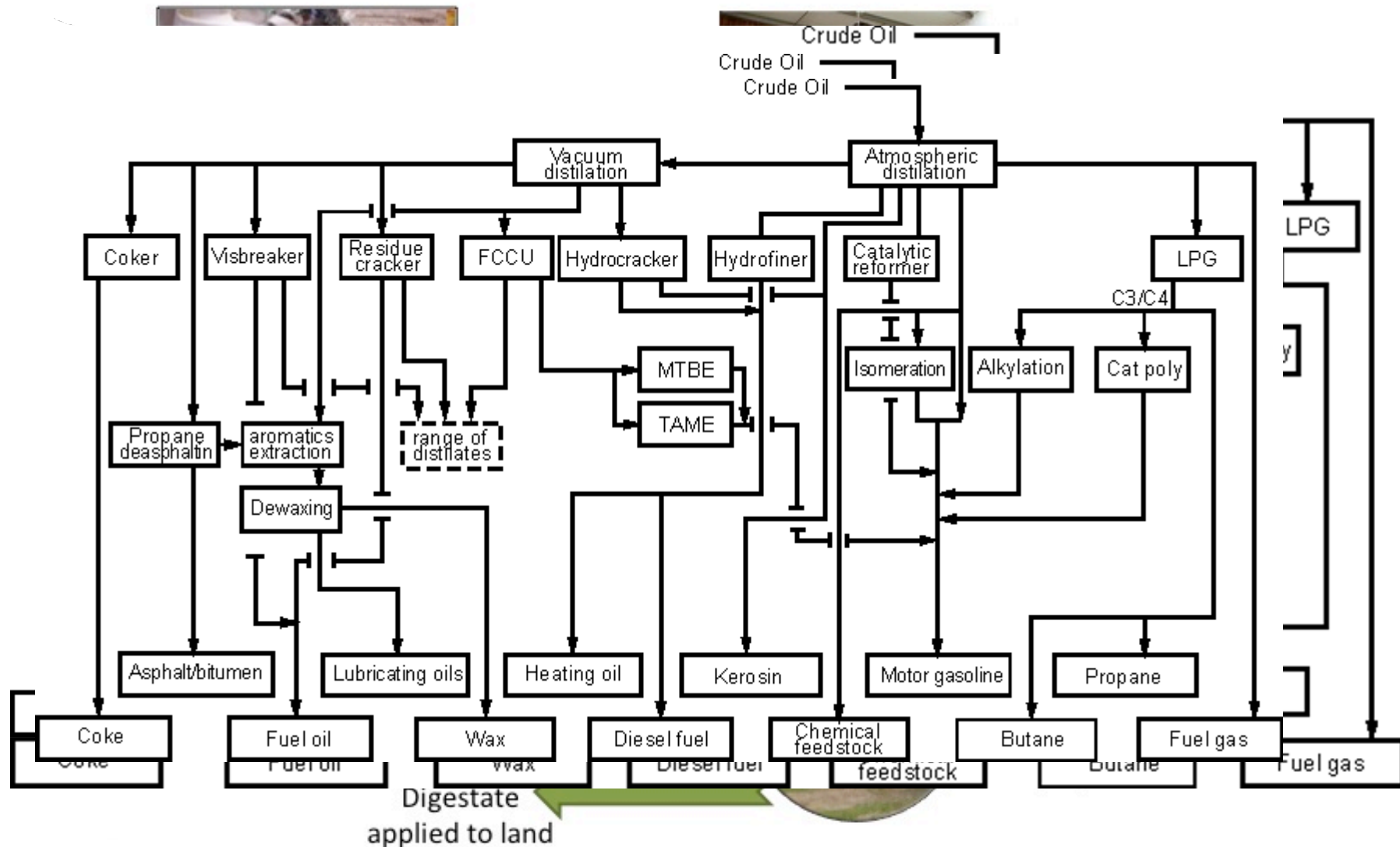


Olive wastes



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Any Questions?

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