

Armstrong Energy

Financing waste to fuel & chemical plants

Presentation

September 2016

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Who is Armstrong Energy....

- ▼ **Established 10 years**
- ▼ **London based investment firm**
- ▼ **Clients**
 - ▼ **Private**
 - ▼ **Wealth managers**
 - ▼ **Family offices**
- ▼ **Capital**
 - ▼ **Equity**
 - ▼ **Debt**



What are we....

- ❖ **Team of investment professionals**
- ❖ **All have track record in renewables**
- ❖ **Ethos**
 - ❖ **Effective business leadership**
 - ❖ **Simple business models**
 - ❖ **Create attractive returns**
 - ❖ **Lifecycle asset management**
 - ❖ **Managed exits and refinancing**



What makes us different....

-  **Flexible**
-  **Entrepreneurial**
-  **Ethical**
-  **Citizenship**

MAKING A POSITIVE IMPACT ON THE COMMUNITIES IN WHICH WE WORK AND LIVE ISN'T SOMETHING WE DO BECAUSE WE HAVE TO, WE DO IT BECAUSE IT IS FUNDAMENTAL TO WHY WE ESTABLISHED ARMSTRONG ENERGY. ALL OUR PEOPLE SHARE OUR VISION FOR DELIVERING POSITIVE CHANGE.



What do we look for....

- ❖ **Renewable energy**
- ❖ **Environmentally friendly**
- ❖ **Socially relevant**
- ❖ **Project led**
- ❖ **Preference to asset backed investment**
- ❖ **Strong operational team**
- ❖ **£5 to £20 million**
- ❖ **Institutional approach to due diligence**

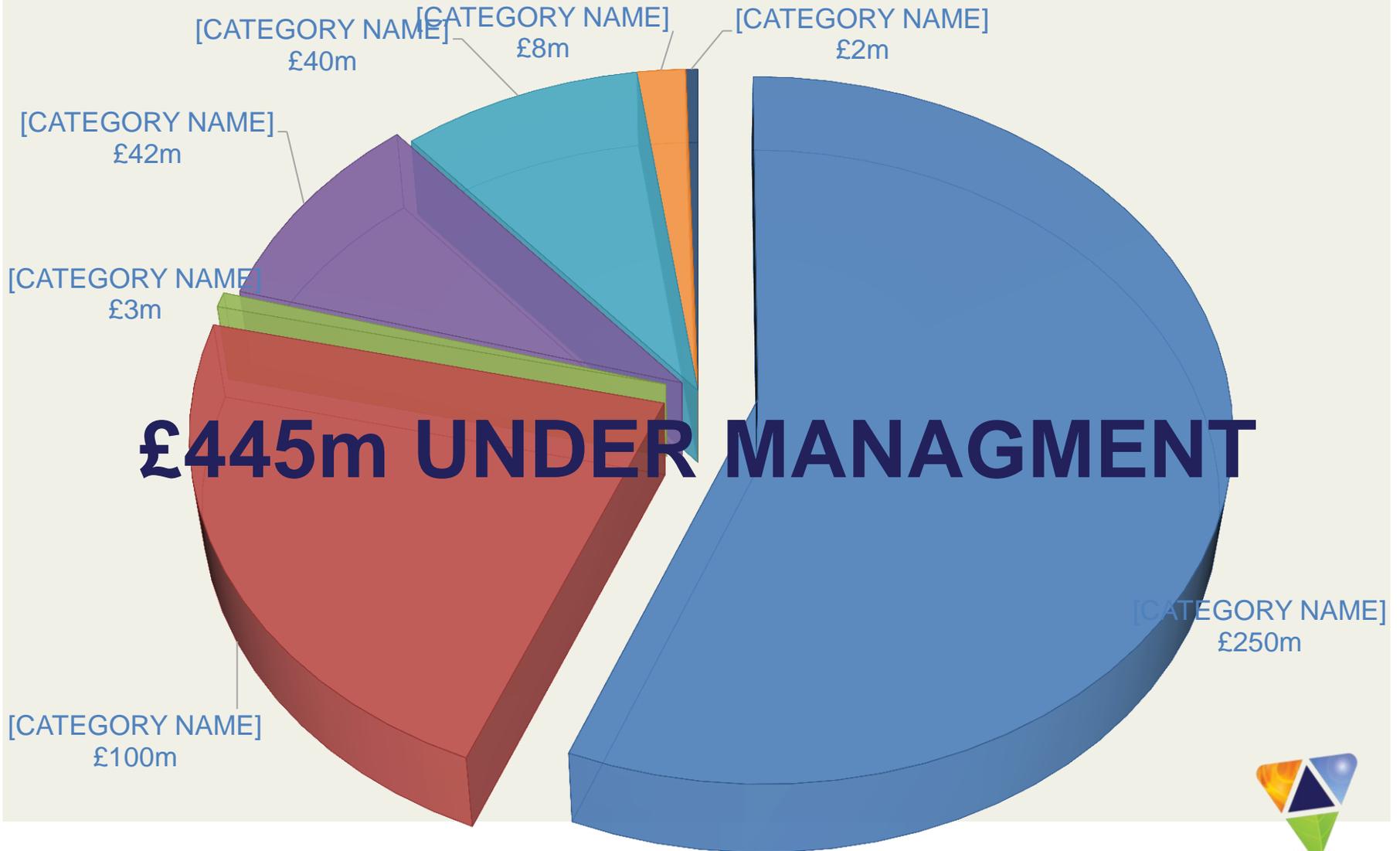


Current investment types....

- ▼ **Solar PV**
- ▼ **Power reserve**
 - ▼ **Bio-Diesel**
 - ▼ **Battery**
 - ▼ **Gas**
 - ▼ **Hybrid**
- ▼ **Sugar production**
- ▼ **New battery technologies**
- ▼ **Chemical from waste**



What have we done so far....



Why are we here at NEPIC conference....



Because of fuels & chemicals locked in waste....

- ❖ **Investment into chemical from waste**
- ❖ **First plant to be located at Wilton**
- ❖ **Plant capacity 20,000t**
- ❖ **First of multiple plants to be located in UK**



How are we going to do this....



Catalytic Hydrothermal Reactor....



How does it work....

**Cat-HTR depolymerizes low energy feed stocks
back to simpler smaller molecules – liquids
which have high energy density**

Biomass

**Brown coal
(Lignite)**

**Used
lube oil**

**Waste
plastics**

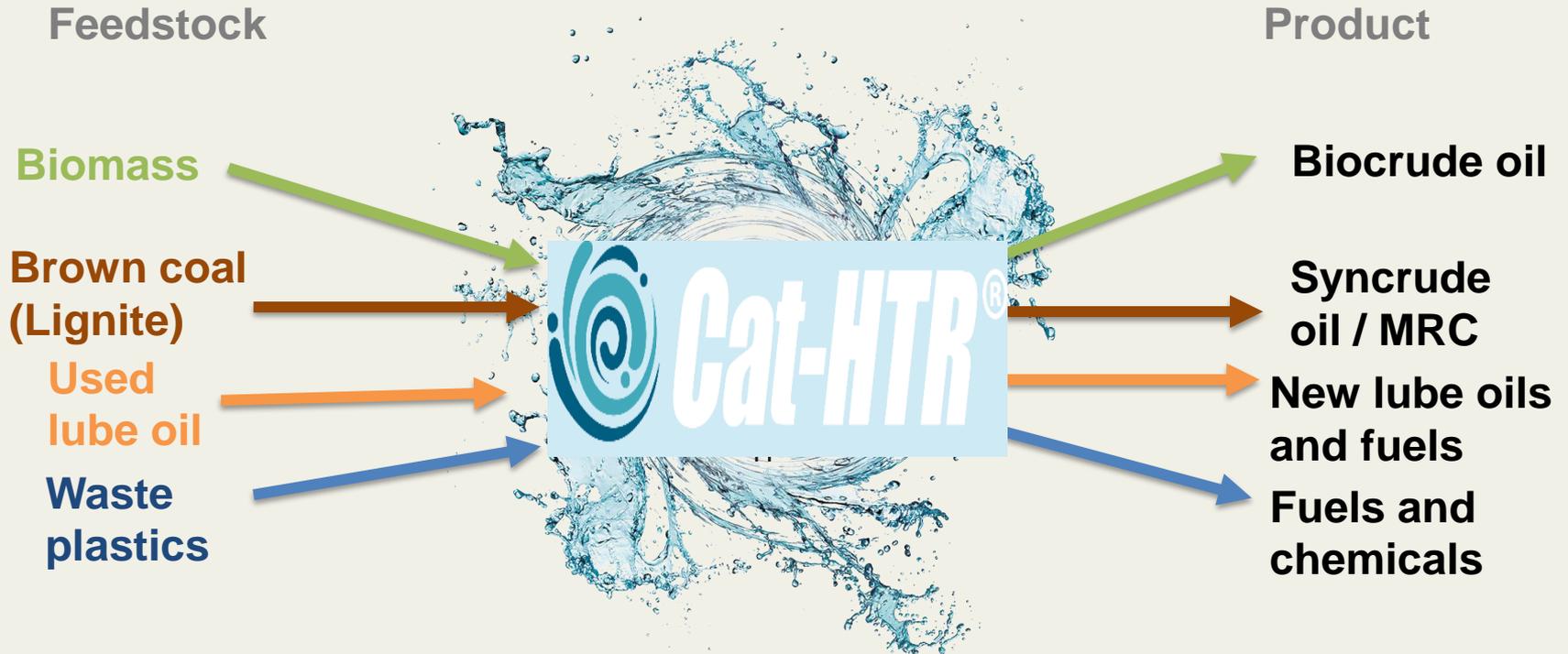
Cat-HTR®



Depolymerised - liquid



What is the output....



What is our current focus....

Feedstock

Product

Waste
plastics



Fuels and
chemicals



What is our raw material....

End of Life Plastics (ELP)



What fuel do we get from ELP....

Recovered Fuels

Recovered Fuels

- ▼ Kerosene

- ▼ Gasoline

- ▼ Diesel

- ▼ Heavy Oil

- ▼ Waxes



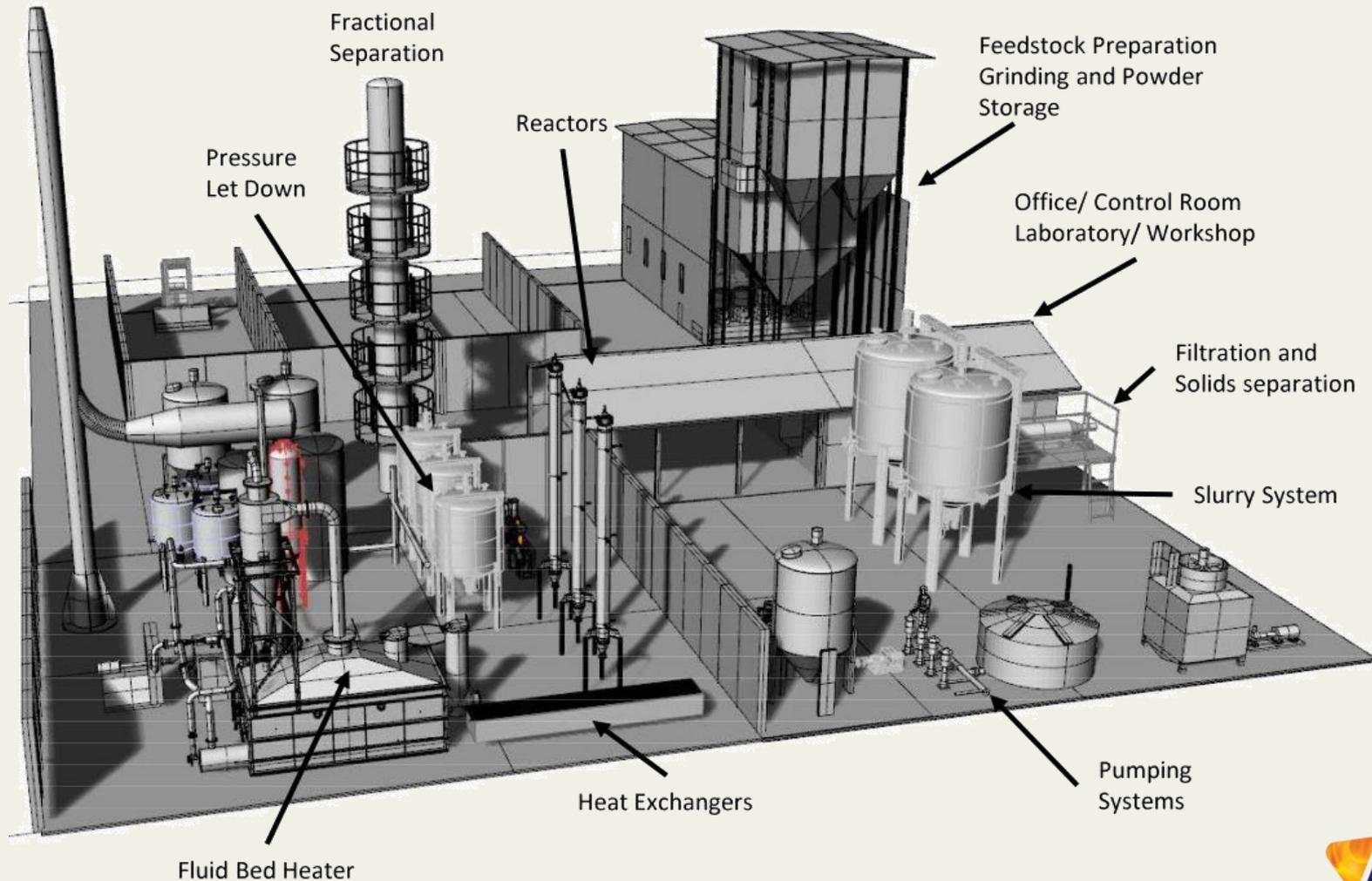
What more can we get from ELP....

▼ Recovered Chemicals

- ▼ **Aliphatics & Cycloaliphatic**
Fragrances & Polymer production
- ▼ **Phenols & Cresols**
Solvents
- ▼ **Stabilisers & Polymers**
Epoxy resins & plastic
- ▼ **Food Additives & Flavours**
Vanillin & Guaiacol
- ▼ **Waxes**
Waterproofing



What does the plant look like....



What else....

- ❖ **Looking for sources of ELP**
- ❖ **Looking for other organic waste streams**
- ❖ **Looking for off-taking of fuels & chemicals**
- ❖ **Looking for other viable projects**



What now....

That's it from me....



**ARMSTRONG
ENERGY**

Thank you....

