

# TECHNOLOGIES TO CLOSE THE LOOP



## Energy Conversion & Engineered Fuels from Waste Resources

Environmental Law Institute  
American Bar Association  
Committee on Energy & Environmental Infrastructure

February 23, 2016

Washington DC





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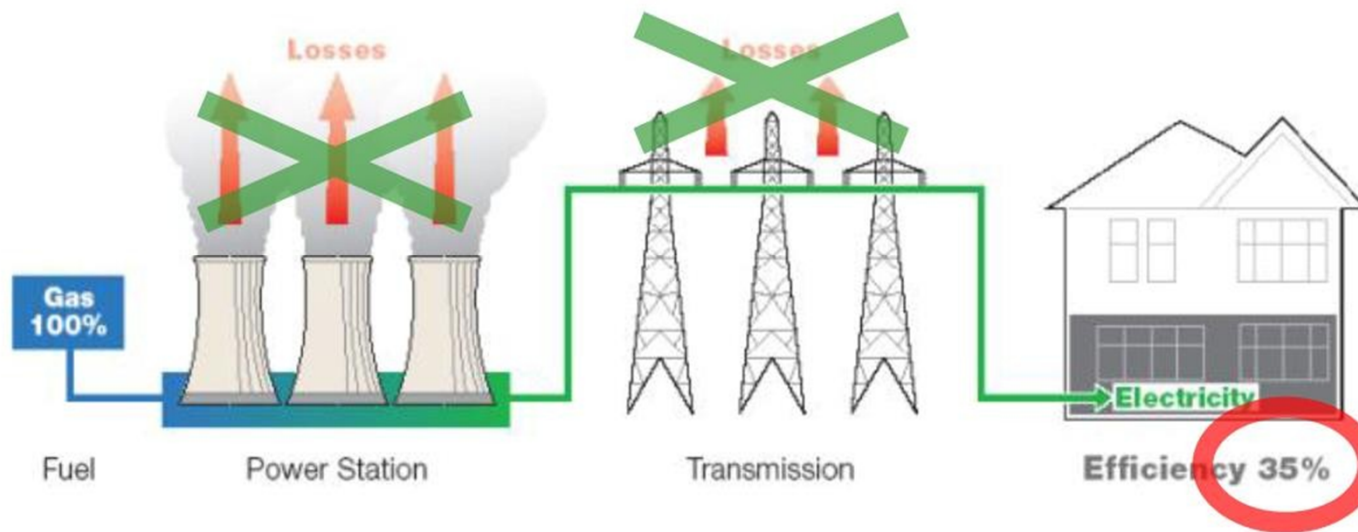
**Overview**

- Leveraged Green Energy (LGE – www.lgefund.com) is a Green VC Fund established in 2007 located just outside of Washington DC (Arlington, VA).
- LGE has unique industry knowledge, extensive relationships, and a solid reputation in the renewable energy sector, all of which have been achieved through decades of collective relevant experience of the team.
- Unprecedented global economic, political, environmental and financial market forces provide significant opportunities for LGE’s technology portfolio that includes unique and patented technologies that can decarbonize industrial operations very efficiently

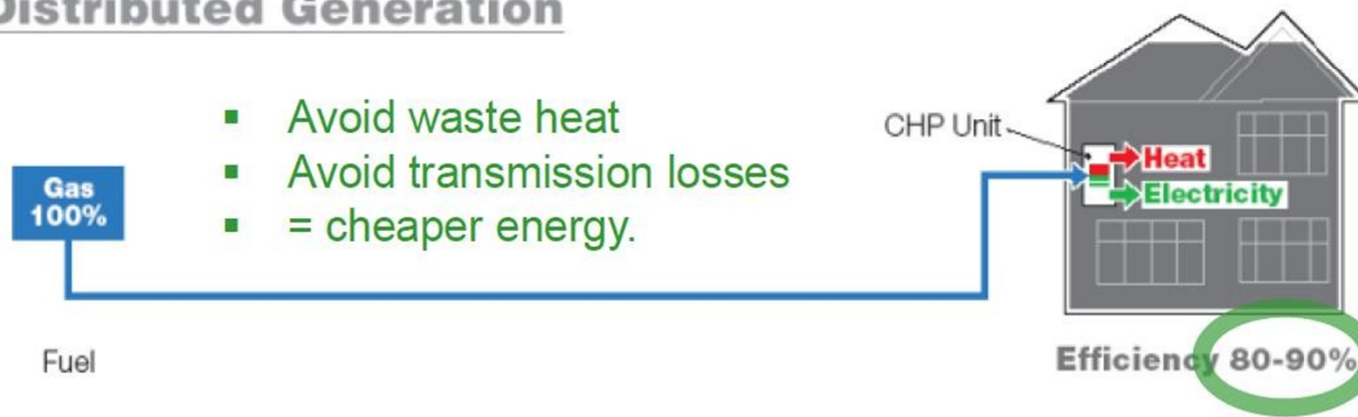
**Material conversion to extend the useful life of materials such as waste and improving energy efficiencies are core LGE technology and business drivers.**

3 | Circular Economy + Energy Recovery + Distributed Energy = 0 GHG

### Centralised Generation

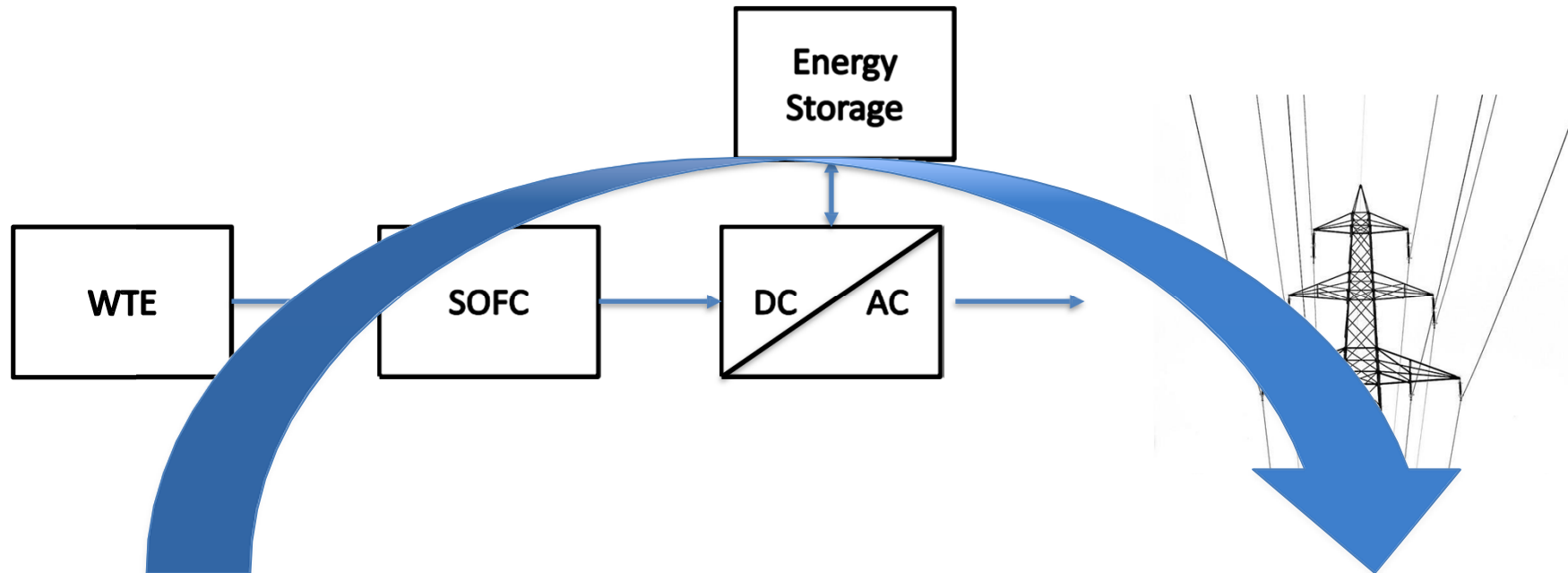


### Distributed Generation



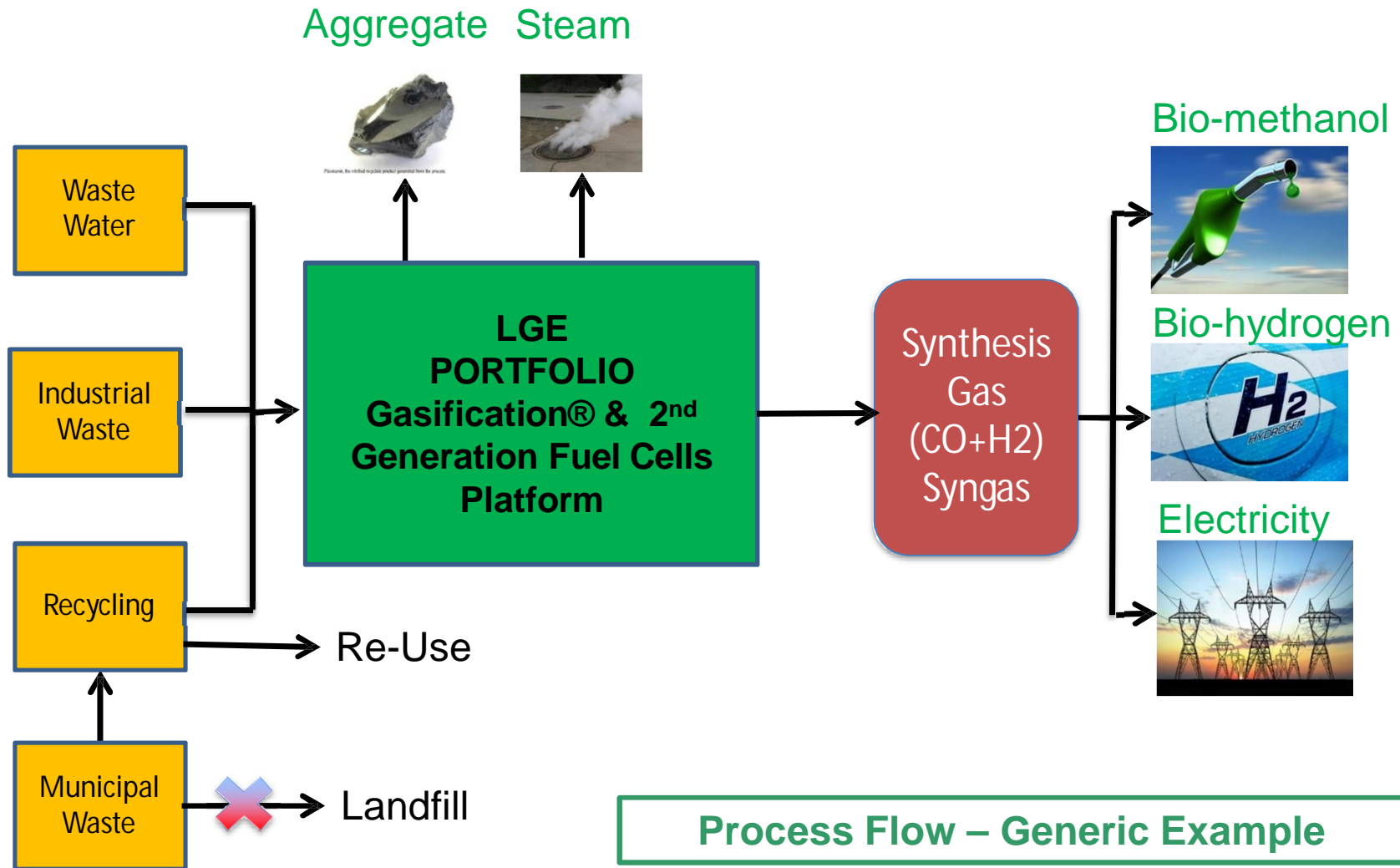


4 | Syngas and Fuel Cells : Waste to Bytes





5 | Converting waste liabilities into clean syngas and energy



## 6 | Enabling the Change

Circular Economy is predicated to alignment of disparate laws and asynchronous policies to a new goal and incentive structure that promotes conservation, rewards recovery, bans waste of waste and caps GHG.

- Legislative implementation should foster development of new technologies, enable the development and eventual 'export' of sustainable businesses/laws and practices and provide to circular champions a head start in global mega markets like the ones that are shaping in China and in India.
- Spreading higher integrated environmental standards around the world should be viewed as a competitive advantage

## 7 | Financing the Shift to Circular Economy

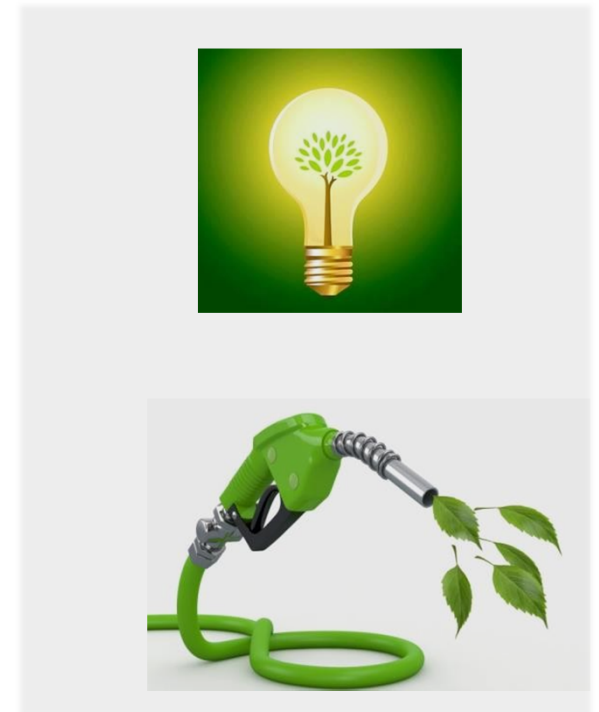
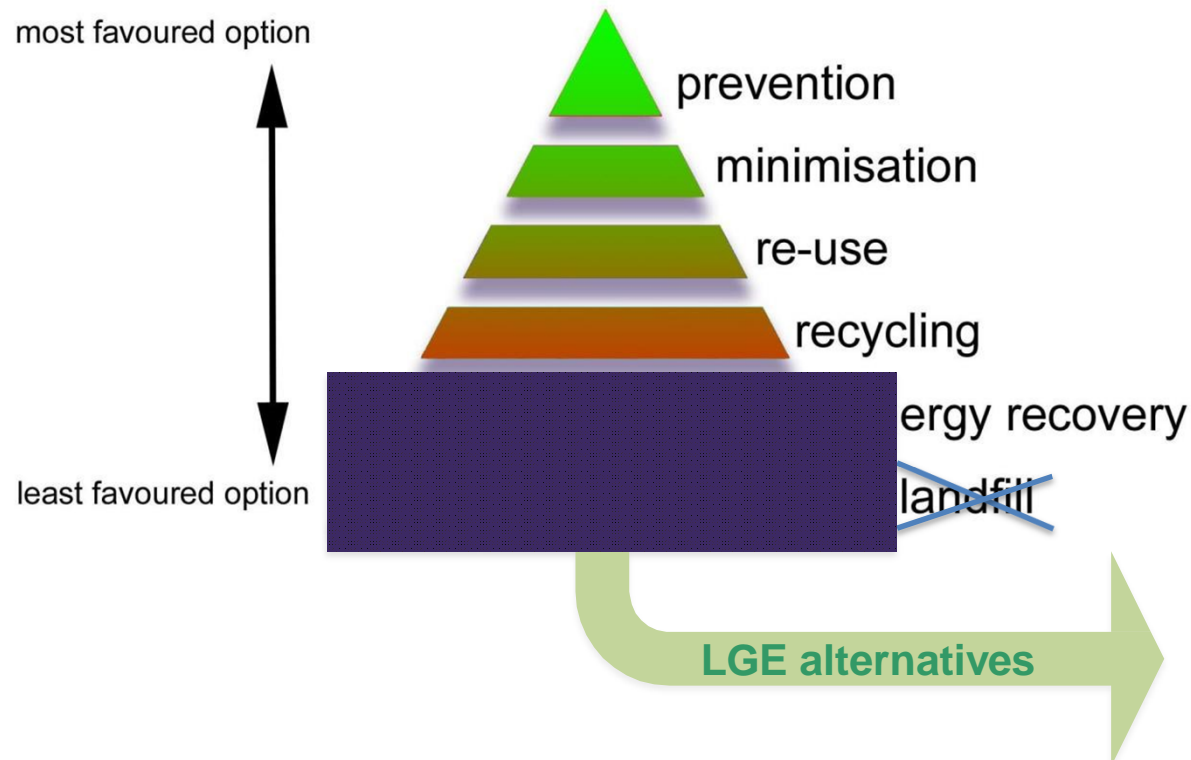
Estimates for the financing needs of the green economy is estimated to several trillion dollars. Sources:

- Public funding: European Commission, European Investment Bank, the Green Climate Fund, Green Banks, Multilaterals
- Establish mechanism so that Green Bonds proceeds are used through structured and predictable circular economy programs and develop links between the use of funds and their measurable effect on GHG
- Private funding: Pension funds and insurance companies through re-balancing of their portfolios (Portfolio De-carbonization Coalition)
- Mixed public/private sources: 'green bonds', the Project Bond Initiative, PPPs with circular economy focus.



- **Promote appropriate technologies and projects through green indices and green bonds**
  - Channel capital into the development of green technologies
  - Channel savings into green projects through both the equity and bond markets.
  - The associated green investment vehicles can allow environmentally-minded investors to invest in green-technology companies
- **Accelerate de-carbonization of investment portfolios**
  - Integrate climate risks into investment strategies so that investors can mitigate these risks and improve the resilience of their investment portfolios.

9 | LGE Fund Invests in New Technologies to Support the Circular Economy



***LGE Fund invests in new processes and technologies that encourage efficient use of waste, enhance the value proposition of waste handling companies, minimize the carbon footprint of cities and industrial operations and offer a sustainable and efficient alternative to landfills***

10 | Syngas from waste is a key element for regulatory policies going forward



*Current practices have to change to respond to complex eco-liabilities.*

*We need to leverage waste resources and invest in technologies.*



# 11 | Multi-industry Potential to Develop Circular Economies

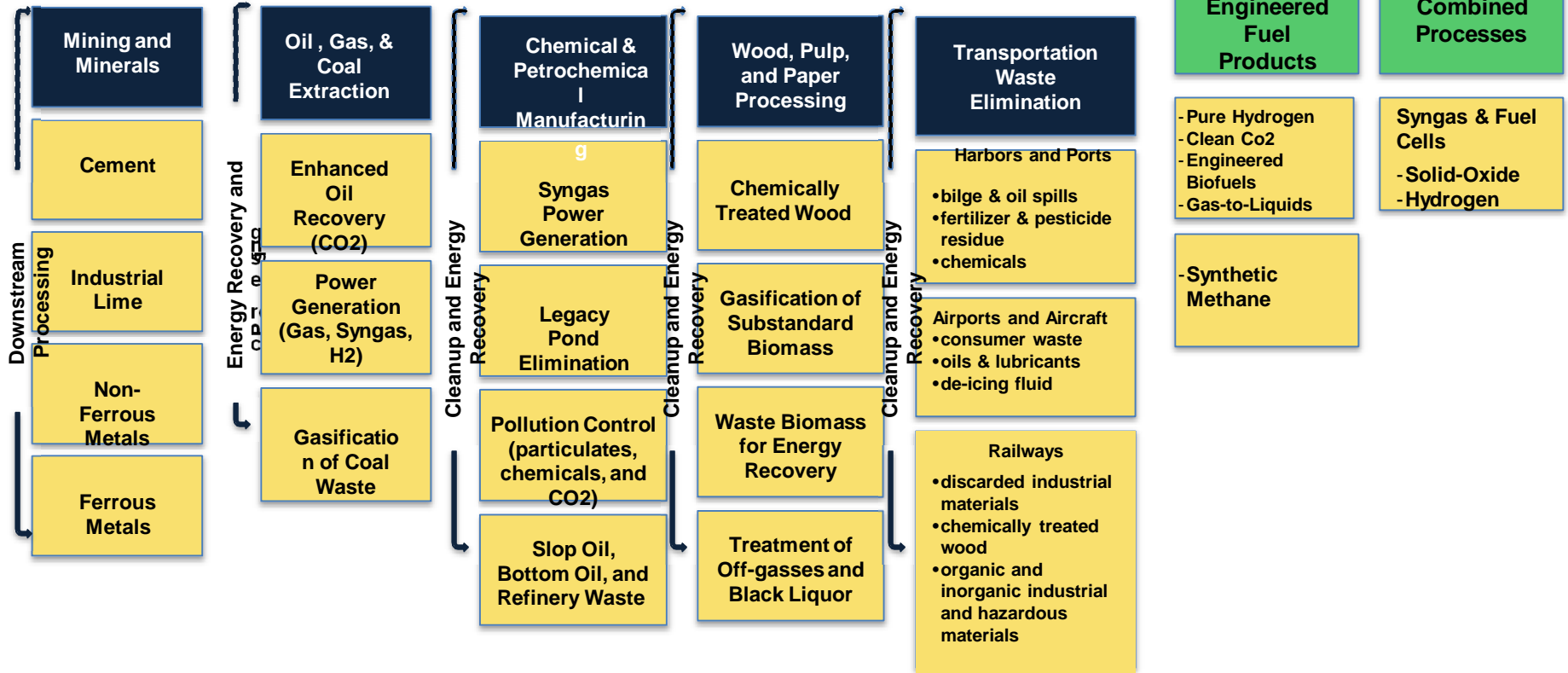
Gasification of Organic Materials (industrial process for engineered fuels)

Direct Treatment of Inorganic Materials (recovery of materials)

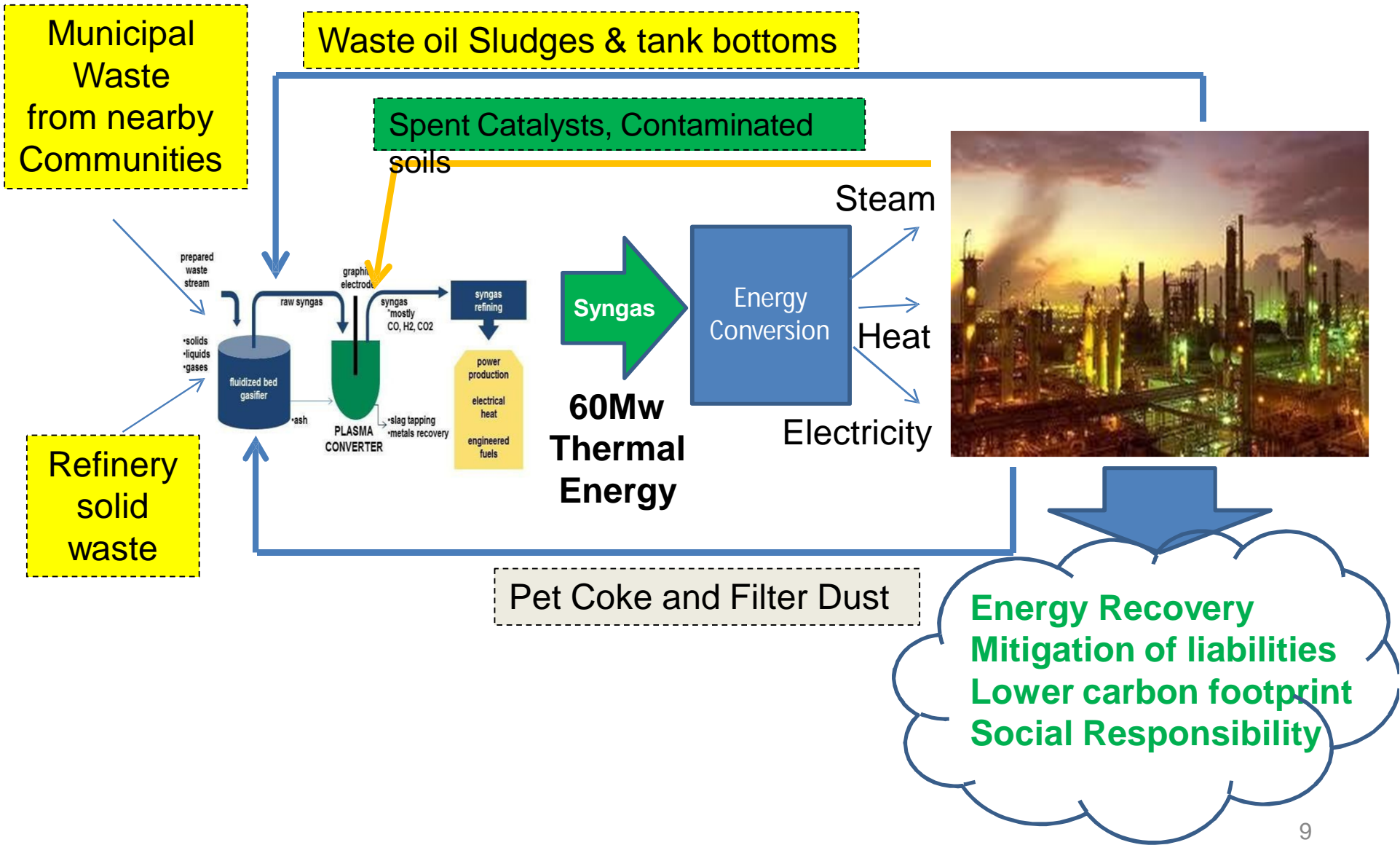
New Processes

Clean Syngas and Usable Recovered Materials

New Products



Closing the Circle in a Refinery



13 | Closing the Energy Circle in Highly Energy Intensive Industries

- Municipal Waste
- Industrial waste
- Petrochemical waste
- Legacy Ponds
- Medical waste
- Sewage Sludge



Cement

Steel



Alumina



Refineries



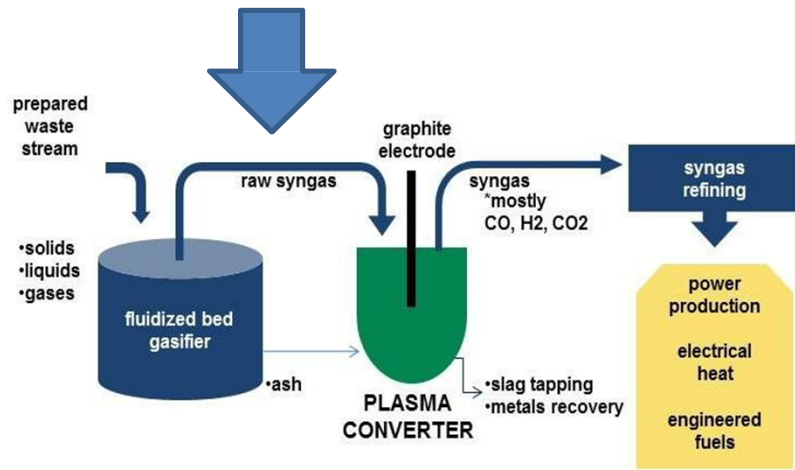
- SynGas Supply to Industry
- Cost Reduction
- Efficient management of waste liabilities
- GHG reduction
- High IRR
- Compliance with Regulations
- Circular economy



Integration between W-T-E and Cement leads to low energy cost and GHG

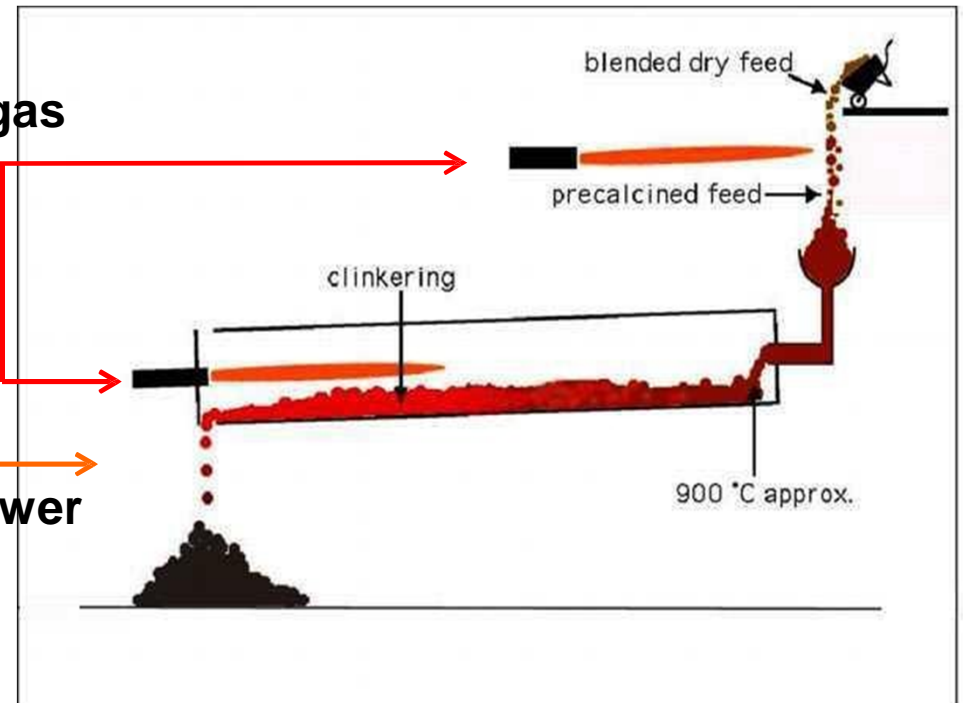


Waste



Syngas

Power



## Leveraged Green Energy

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