

Coal in the 21st Century



Just Transitions and Industry Transformation:
An Encouragement to See Change.

Panel on Just Transition
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Who

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Associate Director — Institute for Sustainable Energy — 2019 - 2020
Adjunct Professor — Questrom School of Business — 2018 - 2020
Research Scientist — Institute for Sustainable Energy — 2017 to 2018
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Recent Advisory Roles

Distinguished Associate — Energy Futures Initiative — 2017-2020
Advisor/writer for US DOE Quadrennial Energy Review 1.2 — 2016-2017



A clear (valid) definition
of the situation is a must.







Are we right about the
definition of the situation
with coal transitions?





“We’re Investing.”



“Because it’s
undervalued.”



Undervalued how?

2011 — ~\$1.27 trillion USD.

2020 — ~\$500 billion USD.

2023 — ~\$600 billion USD.

In 12 years, market value is eroded by ~50%.

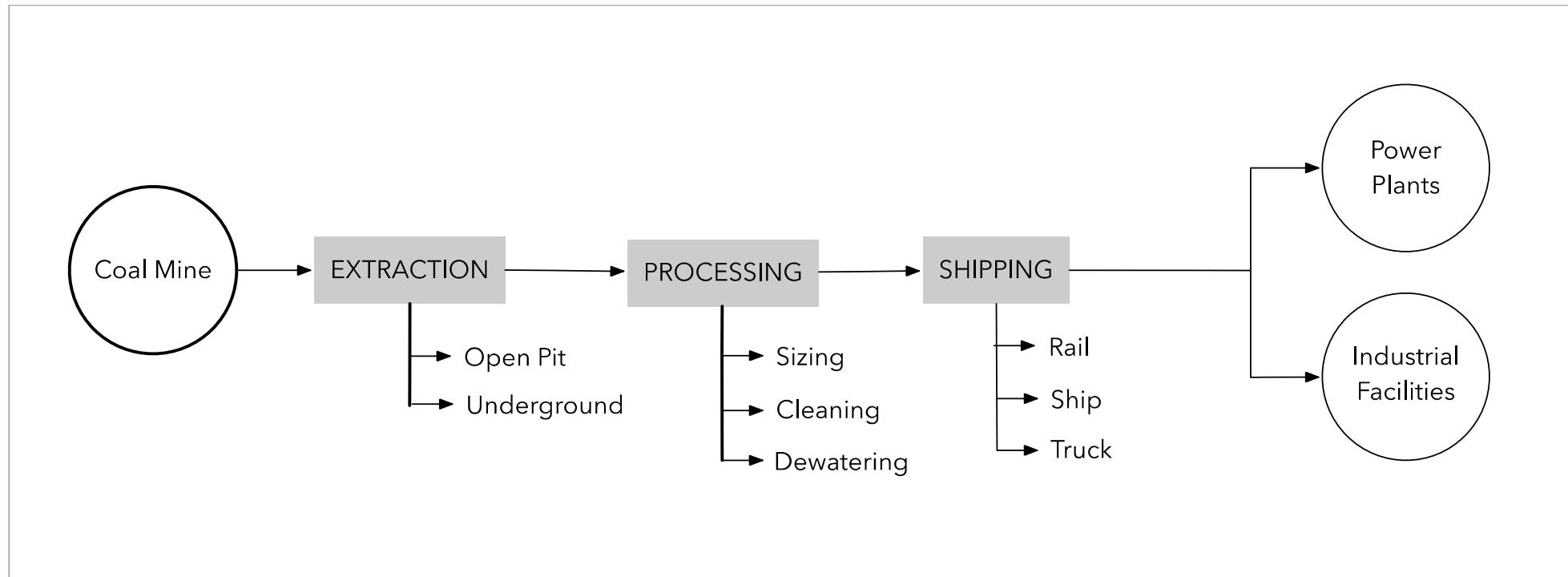
M. Garside, "Global coal mining market value 2010-2023," Statista.com. Available at: <https://www.statista.com/statistics/1137437/coal-mining-market-size-worldwide/>



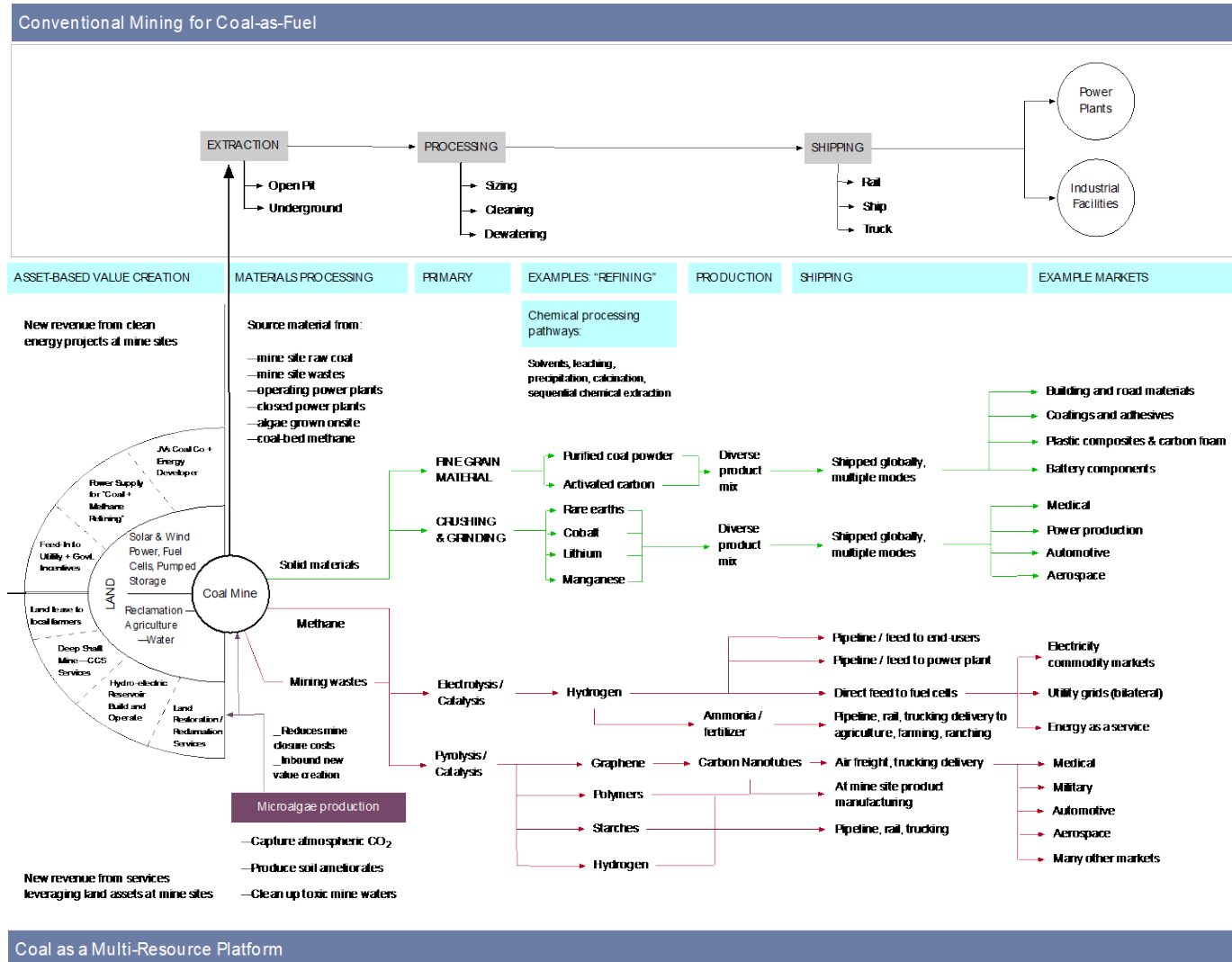
Surely, there is more
value in coal than
“buy low/sell high”



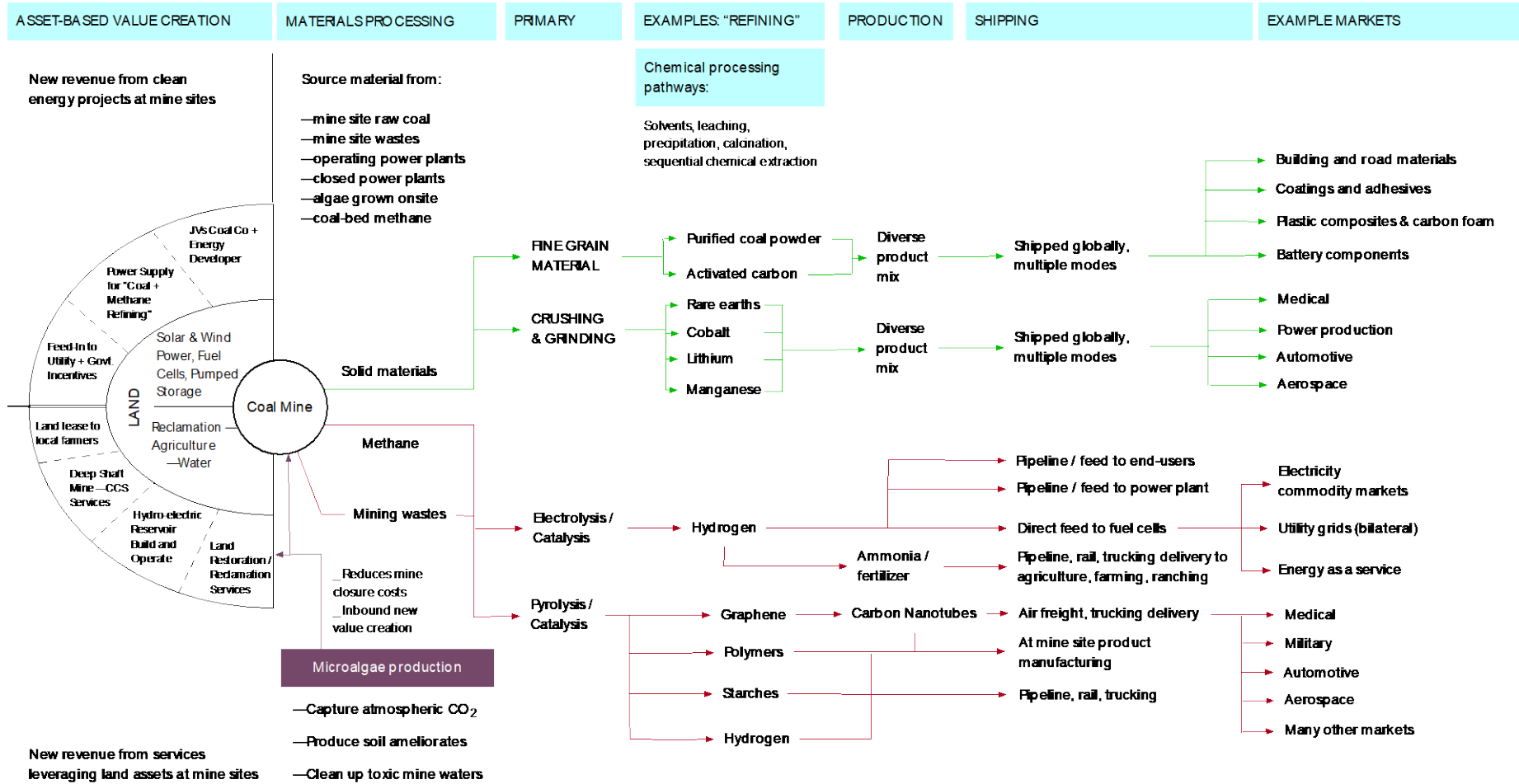
That was then . . .



The transit to something new . . .



Could this be now?



Coal as a Multi-Resource Platform



Three Value Creation Factor Structures

Leverage Mining Lands

(Project developed + operations)

- Solar and wind
- Pumped storage produced power
- Geothermal energy
- Water for agriculture
- Reclaimed lands for various uses — from agriculture to recreation
- Deep shaft carbon sequestration
- Microalgae production

Refine Extracted Coal

(Add circuits to core coal processing)

- Purified coal powder
- Activated carbon
- Minor and trace elements, e.g., rare earths, cobalt, lithium
- Carbon nanotubes all the way to graphene production onsite

Harvest from CBM

(Chemical and other new processing)

- Hydrogen
- Carbon nanotubes
- Polymers
- Starches
- Ammonia / fertilizer
- Graphene production onsite



Unique Advantages

Incremental development at low cost

- In-place infrastructure
- Established workforce
- First mover advantage
- Supportive communities



Premise

It's easier to phase out coal-as-fuel if new coal value is created while doing so.



Thank You



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