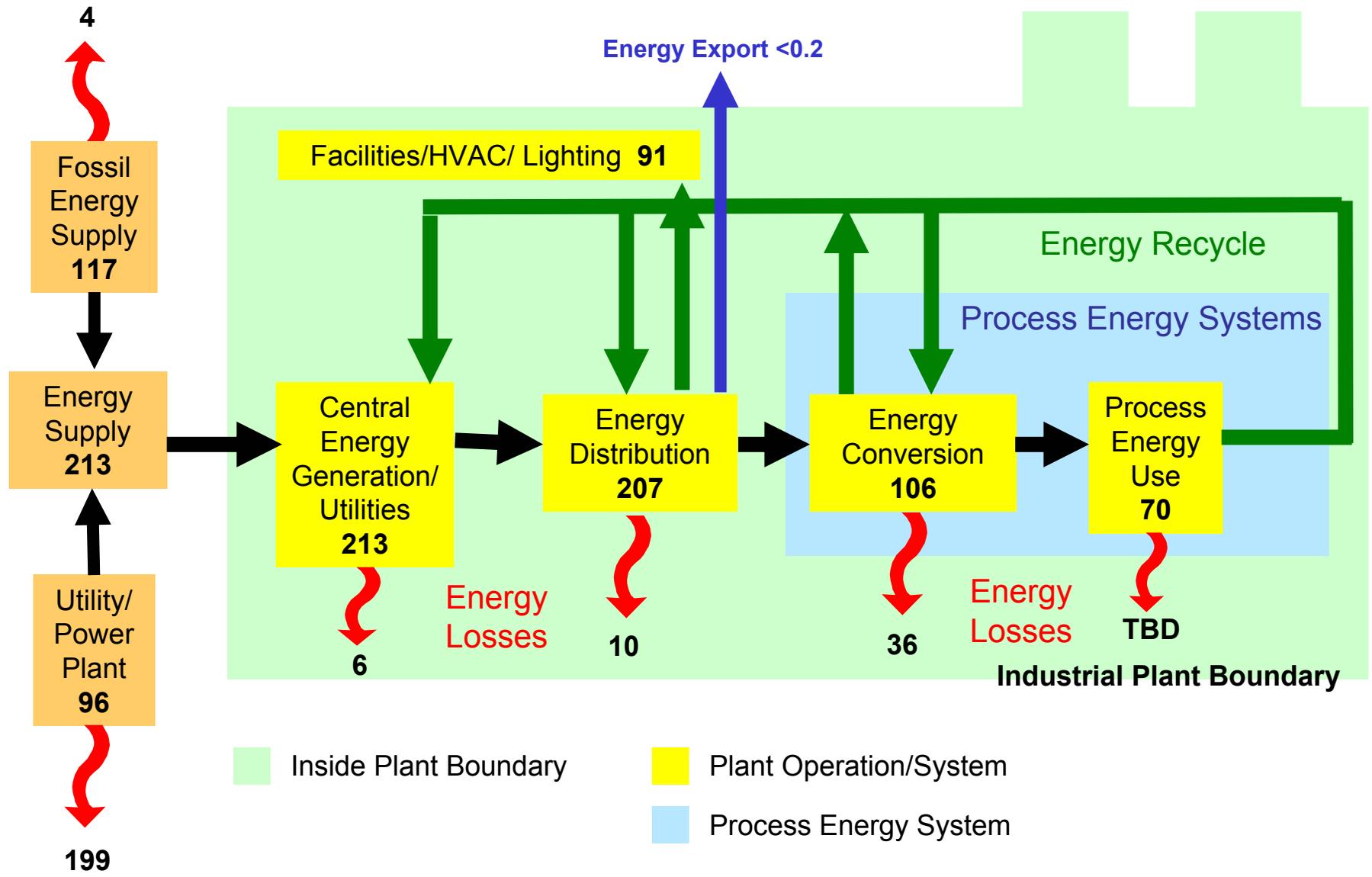


NAICS 333 Heavy Machinery (farm, mining, industrial equipment) Total Energy Input: 416 Trillion Btu



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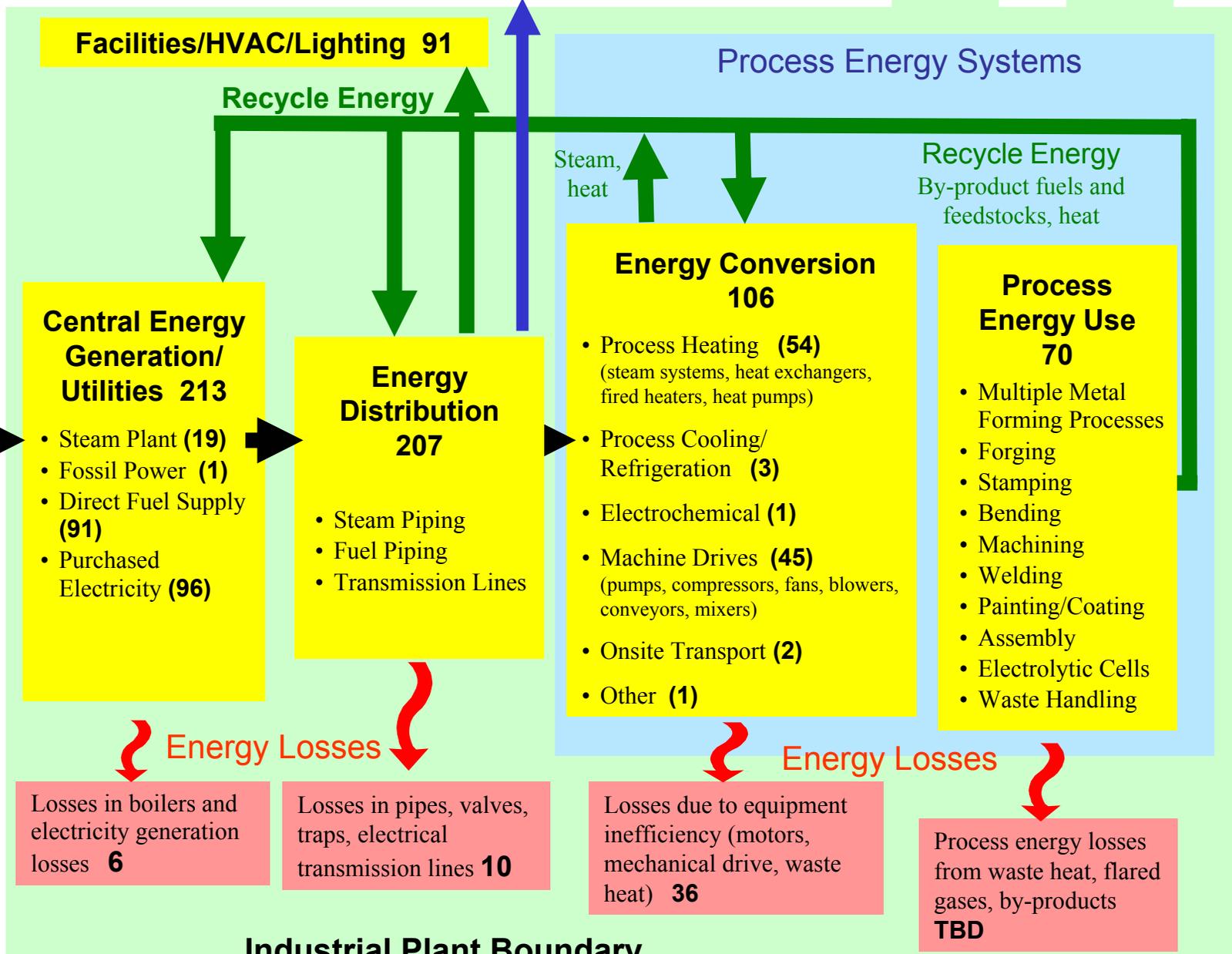
Distribution losses 4

Fossil Energy Supply 117

Energy Supply 213
 •Fuels
 •Purchased Electricity and Steam

Utility/Power Plant 96

Electricity generation and transmission losses 199



Facilities/HVAC/Lighting 91

Process Energy Systems

Recycle Energy

Steam, heat

Recycle Energy
 By-product fuels and feedstocks, heat

Central Energy Generation/Utilities 213

- Steam Plant (19)
- Fossil Power (1)
- Direct Fuel Supply (91)
- Purchased Electricity (96)

Energy Distribution 207

- Steam Piping
- Fuel Piping
- Transmission Lines

Energy Conversion 106

- Process Heating (54)
 (steam systems, heat exchangers, fired heaters, heat pumps)
- Process Cooling/Refrigeration (3)
- Electrochemical (1)
- Machine Drives (45)
 (pumps, compressors, fans, blowers, conveyors, mixers)
- Onsite Transport (2)
- Other (1)

Process Energy Use 70

- Multiple Metal Forming Processes
- Forging
- Stamping
- Bending
- Machining
- Welding
- Painting/Coating
- Assembly
- Electrolytic Cells
- Waste Handling

Energy Losses
 Losses in boilers and electricity generation losses 6

Energy Losses
 Losses in pipes, valves, traps, electrical transmission lines 10

Energy Losses
 Losses due to equipment inefficiency (motors, mechanical drive, waste heat) 36

Energy Losses
 Process energy losses from waste heat, flared gases, by-products TBD

Industrial Plant Boundary

NAICS 333 Heavy Machinery (farm, mining, industrial equipment) Total Energy Input: 416 Trillion Btu

