Part I - material flows

KRIPSH diagrams like figs 7.1, 7.2

Do for Examples A-C
Link to KLEMs database?
Issues:

- Oil and coal: is $\dot{R}$ or $\dot{E}$? I think $\dot{R}$ at this point
  Switch to $\dot{E}$ later!

- Include $\dot{Q}$ (waste heat)? No → not a material
  flow

- write material balance equs? No. Not helpful.
  Maybe 1 or 2.

- what about $\dot{E}_{34}$ (and others)? Bundle into $\dot{R}_{34}$
  or $\dot{S}_{34}$

> **Why include?**
> - Economy is material
> - Introduce examples A, B, C
> - Introduce Auto industry production as a case study.

Part II - Energy Flows
  - Energy diags like Fig 5.1, 6.1, etc.
  - Extract energy flows from mat'l diagrams.

  Energy becomes the focus.

  - Add $\dot{Q}$

  - Some $\dot{R}$ are $\dot{E}$ flows.

  - derive
    1st Law, Total Energy, embodied energy equs

  - Don't link to X yet
  - Link to BEA data from Becky?

  - Do for Examples A, B, and C.

  - Include society (z) in the equs.

Part III   Currency and value flows.

- Leverage MKH notes from 24 July 2013

- Do for Examples A, B, C

- Link to BEA and Becky's work

- Address · value creation (value add)

  • Inflation (Fed) and need for
    ~~infl.~~ - adjusted currency flows

- Include both $\dot{x}$ and $\dot{c}$ diagrams.

- Issue:

  - If BEA already accounts for upstream inputs, is that compatible with matrix inversion approach?

Part IV — Energy Intensity ~~≈≈≈≈~~

  → link Part II (energy) with Part III (currency and value) to derive energy intensity formulation (ε_s)

~~Issue~~ Accumulation of embodied energy vs. ε. ~~Can't distinguish~~

Part I — Implications

- Accumulation of embodied energy vs. ε. Can't distinguish.
- dB/dt is an error term.
- Energy Quantification (thermal, exergy, useful work)
- Boundaries
- etc.

- Use Example of auto production throughout

- What of knowledge?
  - increase efficiency?
  - decrease waste?
  - reduce material in P to accomplish same ends?