

Predicting the Future: Evaluating Technology through Dynamic Stochastic Economic Modeling

(or: why engineers and economists need to talk)

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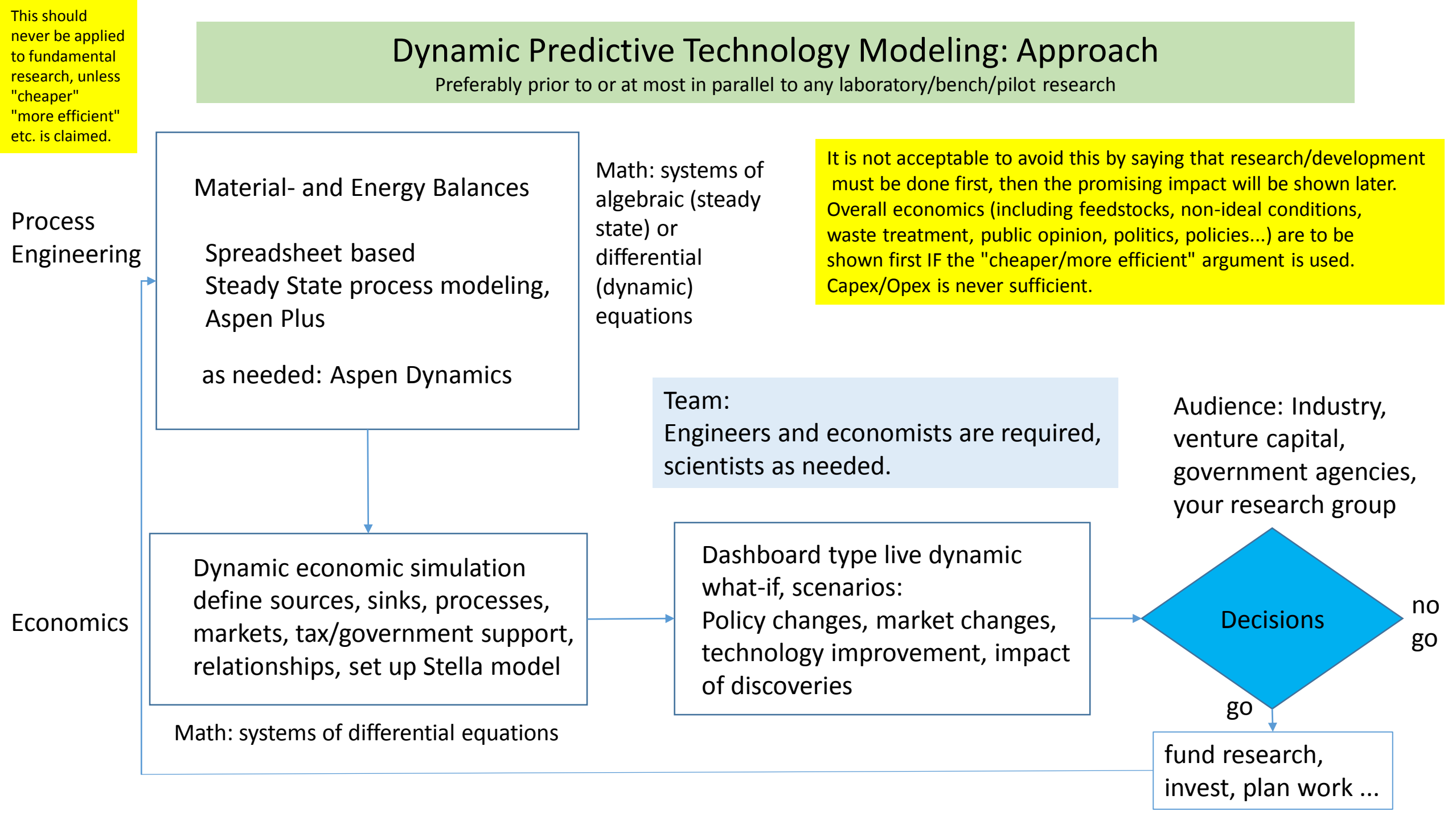
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Dynamic Predictive Technology Modeling: Approach

Preferably prior to or at most in parallel to any laboratory/bench/pilot research



Dynamic Predictive Technology Modeling Success Stories

Bio-Butanol, 2010:

predicted that no fuel bio butanol will be produced, also predicted fuel bio ethanol return to positive territory in 2014

Proof: no fuel butanol industry emerged. Fuel bioethanol returned to profitability as predicted.

Fuel from algae, 2011:

predicted that no success is possible without very substantial government support.

Proof: no algae fuel is being produced.

Renewable Solar Thermochemical Ammonia, 2012:

Work was started with dynamic predictive modeling, not lab work. The technology approach appeared reasonably competitive with state of the art natural gas based ammonia even with no benefit from avoiding fossil CO₂.

Proof: substantial industry- and government funded work towards renewable ammonia is in progress globally (electrolytic hydrogen production is currently favored). Renewable ammonia will first be used to decarbonize shipping, with outlook to use it as a hydrogen vector.

Ongoing:

Small Scale Renewable Ammonia from Wind:

Under way, via NSF INFEWS project. Viability of small scale renewable ammonia synthesis in the Midwest U.S. is the focus. Engineering is ready to be integrated into dynamic economic modeling.

Engineering economics (capital & operating cost) look promising, dynamic economic modeling will show overall viability.