



STEFAN THORBURN, 2019-11-26

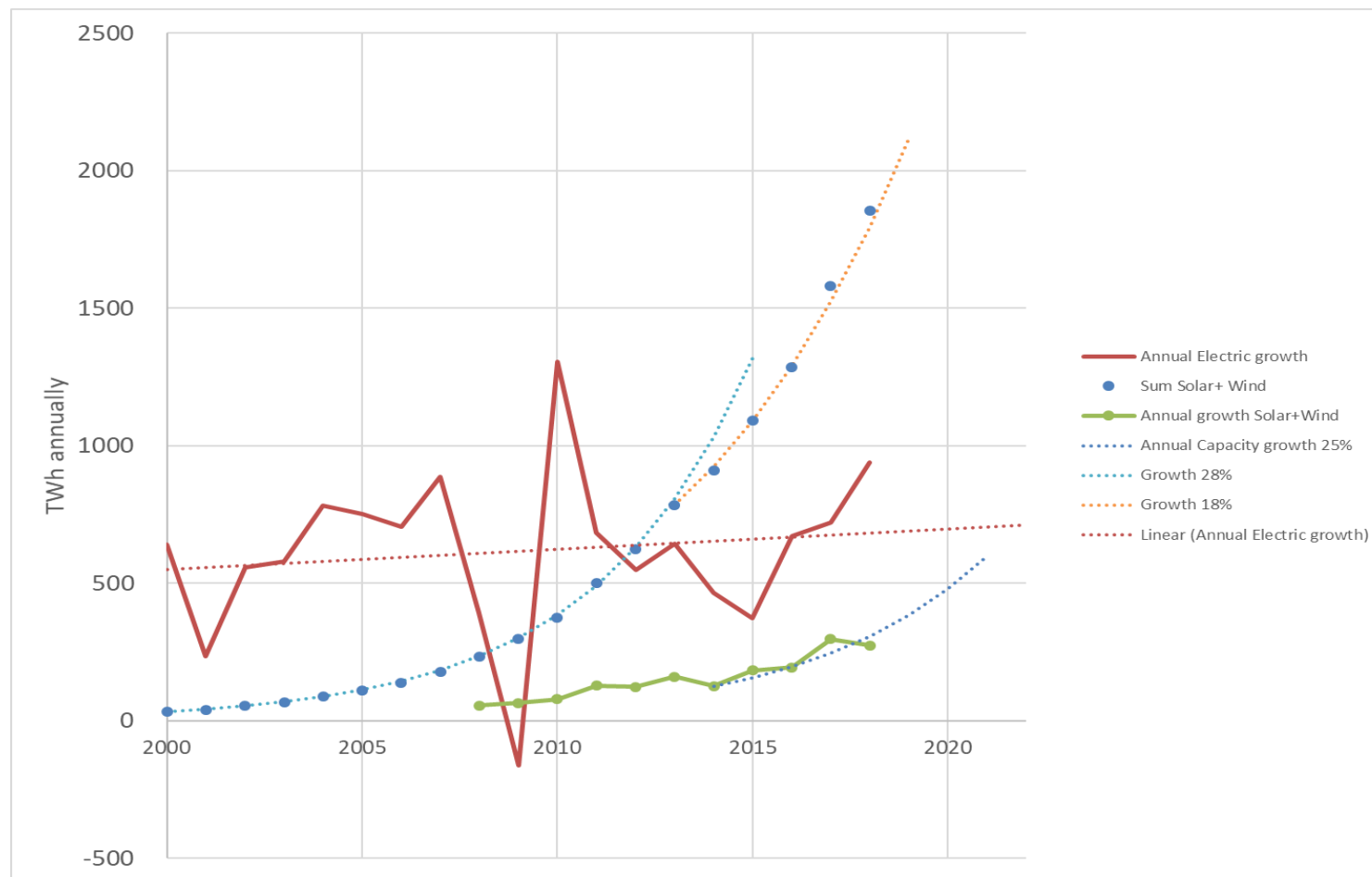
AI, Industries and grid flexibility

Selected parts for public sharing



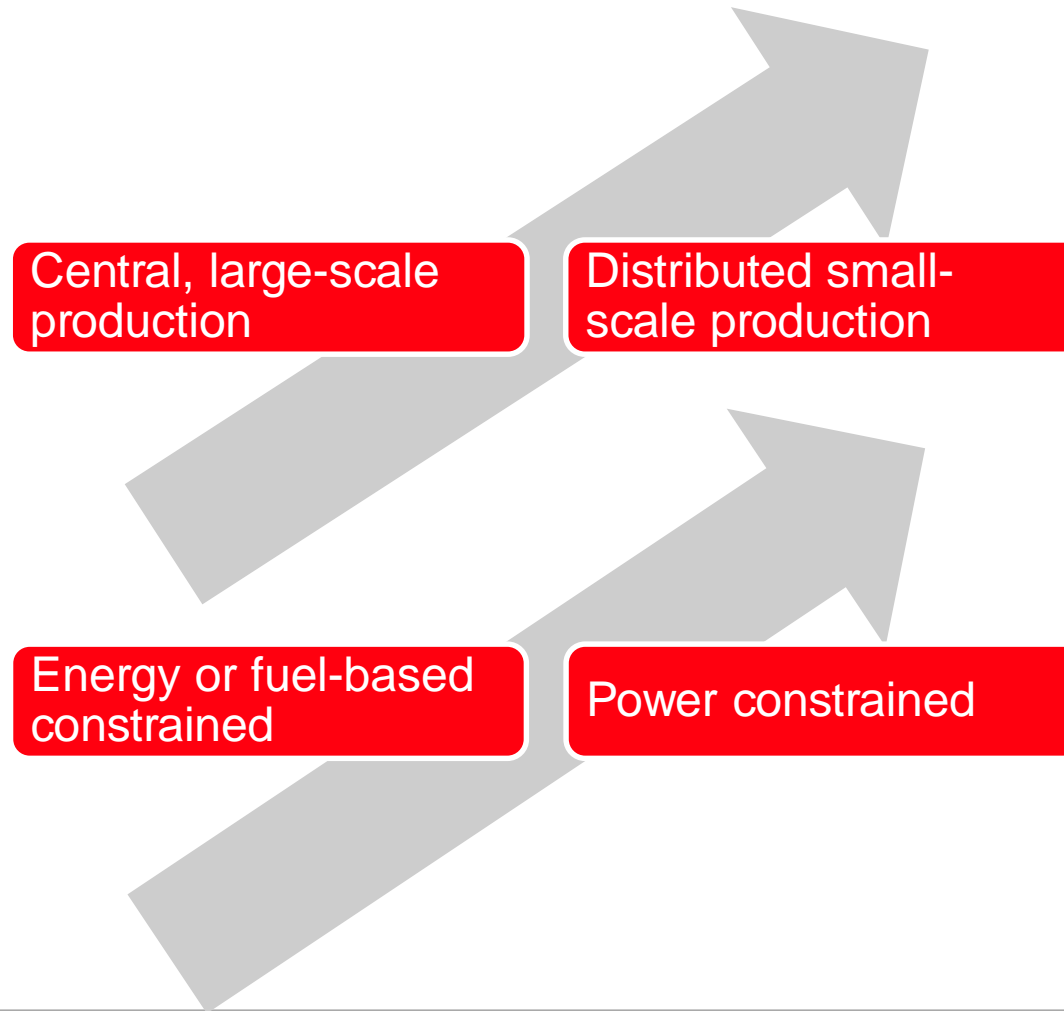
Forecast: 2022-ish we add new Solar and Wind faster than load growth

Fuel based production ends up in free fall due to zero marginal cost

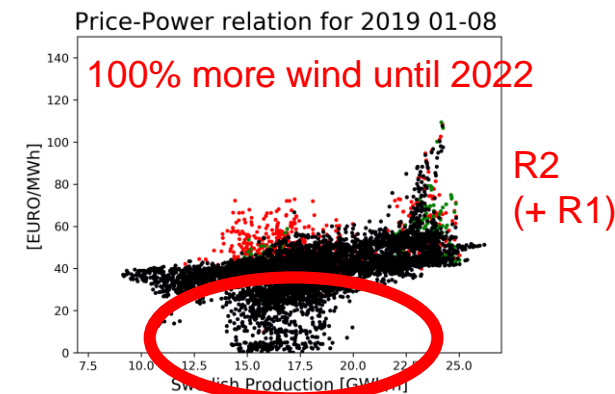
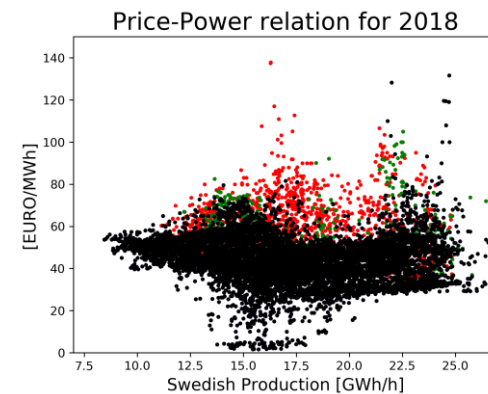
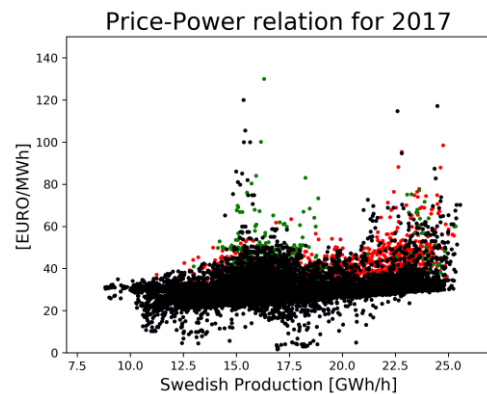
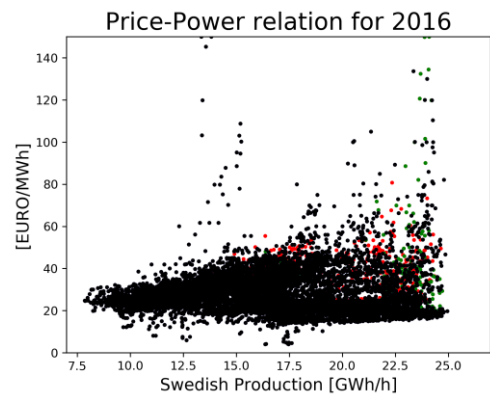
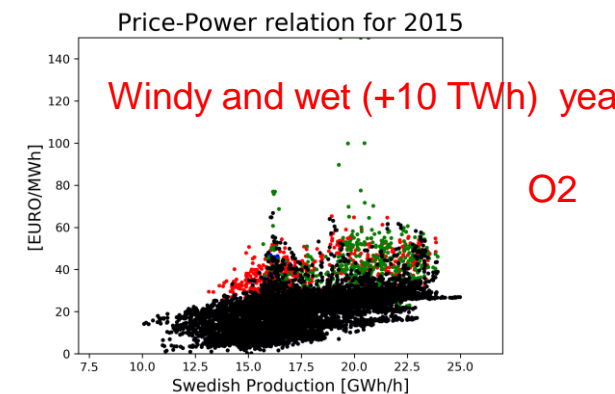
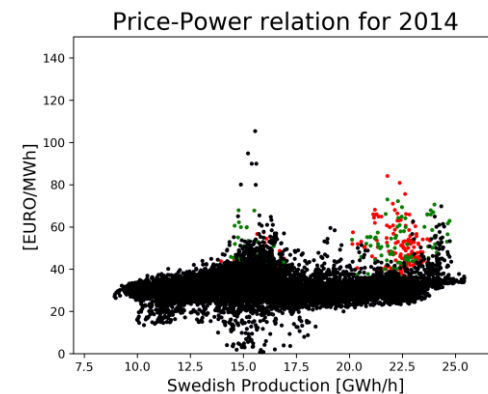
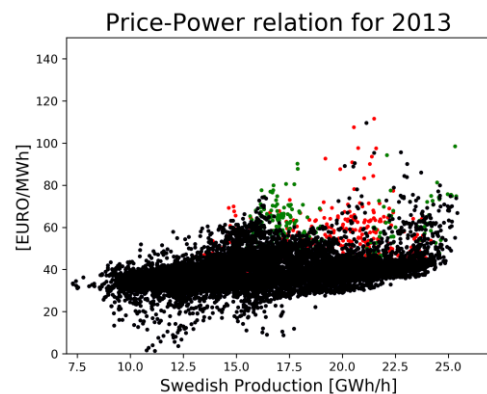
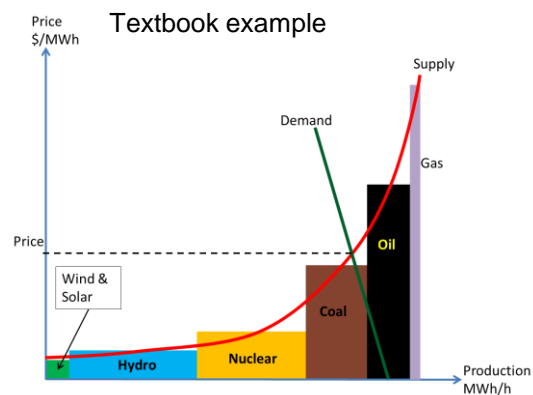


Lazard 10 year LCOE¹ drop:
Solar PV down 89%
Wind down 70%

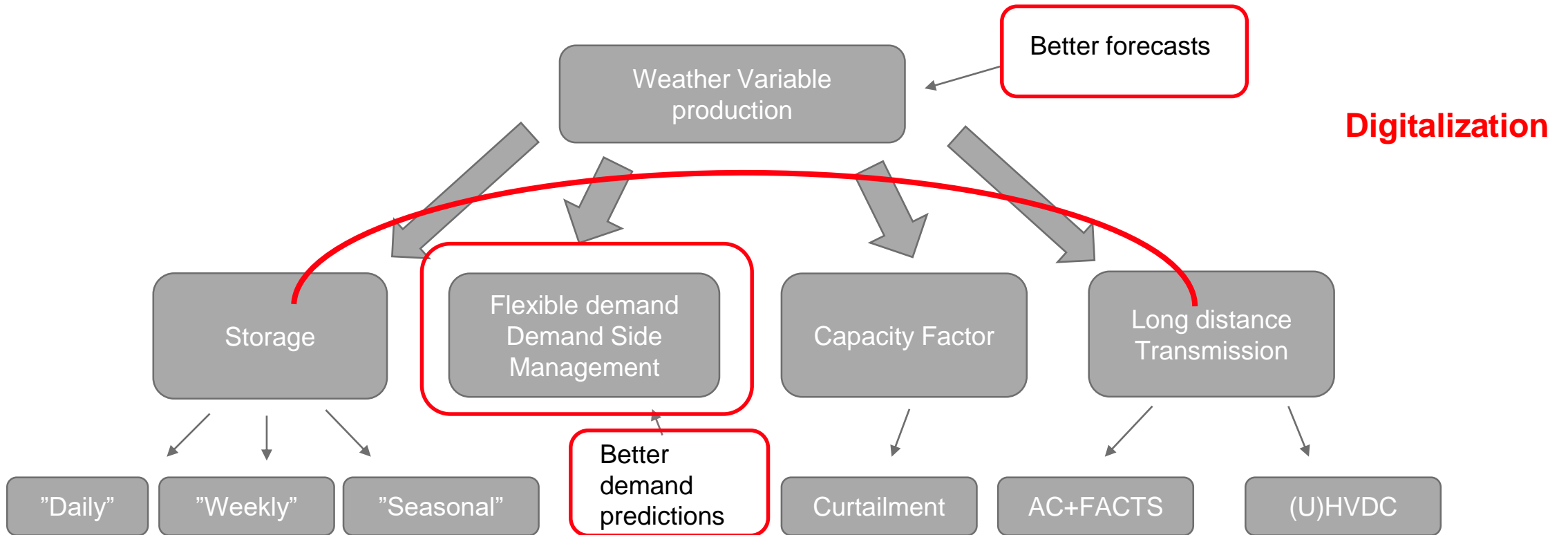
Two simultaneous paradigm shifts



Price variability in Sweden



How do we handle weather dependent production?



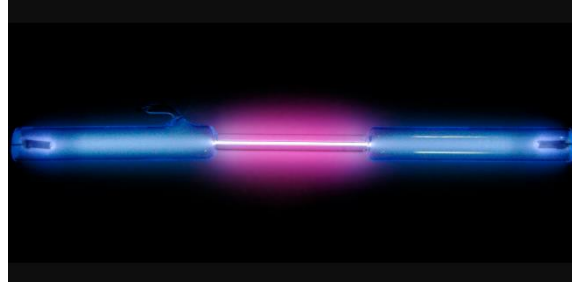
“Electrify everything”

Many of these new industries will have inherent demand flexibility

Datacenters + edge computing



H₂ for steel, transport and kerosene



Indoor green farming



E-Waste recycling



Battery Factories

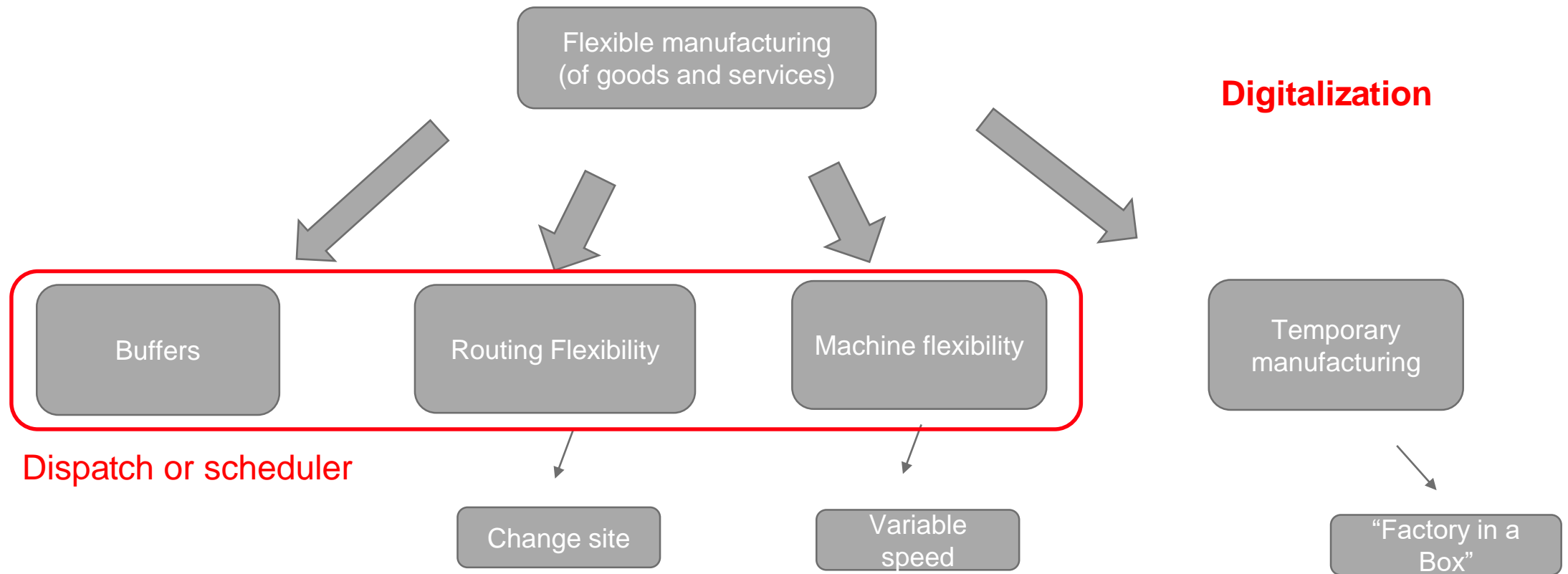


Cooling



Flexible manufacturing

Various strategies



Way forward

2013: Conclusions on industry demand response

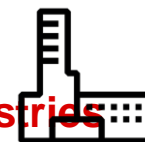


To increase the demand response potential, investments in increased production capacity, inventories and more flexible working hours may be required.

The reasons why most companies in Sweden do not make use of demand side management are, for example that

- they are producing at 100% capacity
- they have very small buffers
- they have no excess capacity
- it takes several hours or days to reach a stable production after a stop
- electricity is a small share of total production costs
- it is complicated and expensive to do it
- they have fixed price contracts for electricity
- they have not considered it

2025: AI, energy systems and next generation industries



Energy costs often ends up directly on the profit bottom line

Weather dependent electricity production is expected to increase price variability

New industries grows in this environment and may develop new tools making use of:

- Buffers
- Routing flexibility
- Machine flexibility
- “Temporary manufacturing”

AI in its various forms will be needed to connect widely disparated loops of locally optimized controls

AI will help us improve end to end efficiency of “optimized islands”

ABB