

Optimizing Cost and Quality in Kraft Paper Manufacturing

A Guide towards high-level Process Optimization and sustaining the economic Benefits in the Future



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IPPTA
Indian Pulp & Paper Technical Association

 **BTG**
A Voith Company

The Promise of Digital Process Optimization

Kappa of Kraft Pulp



Strength of Packaging Paper



Crunchiness of Chips



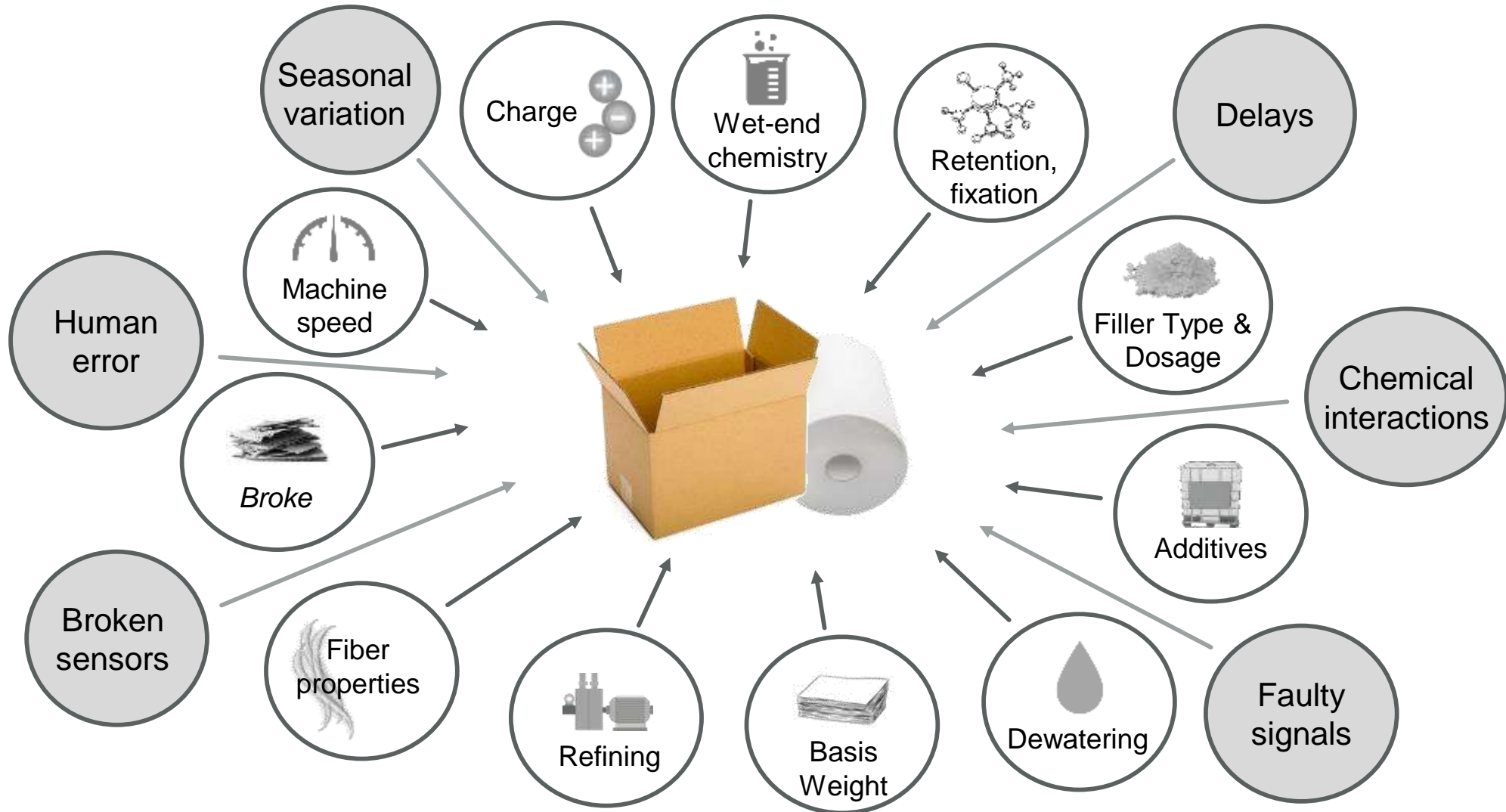
Cost of Production



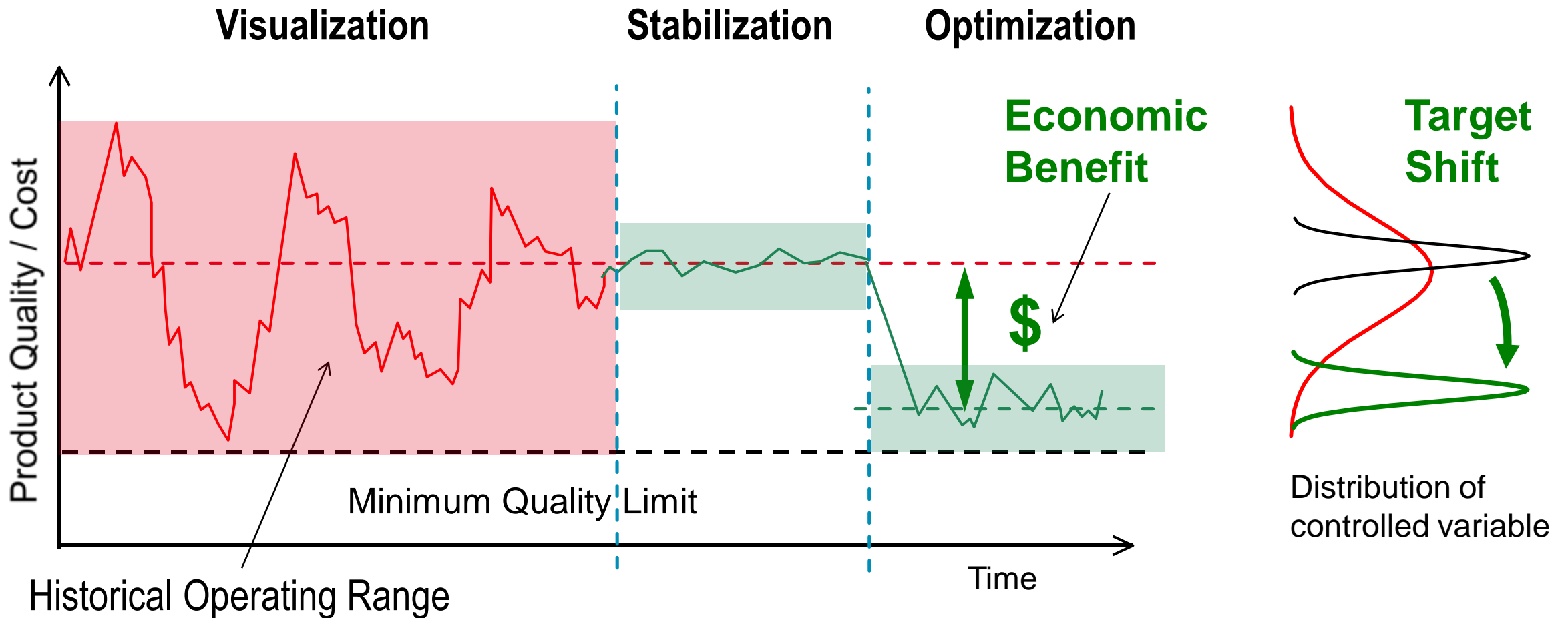
Real-time Prediction & Close-loop Control is possible!

(... **not easy yet, but possible**)

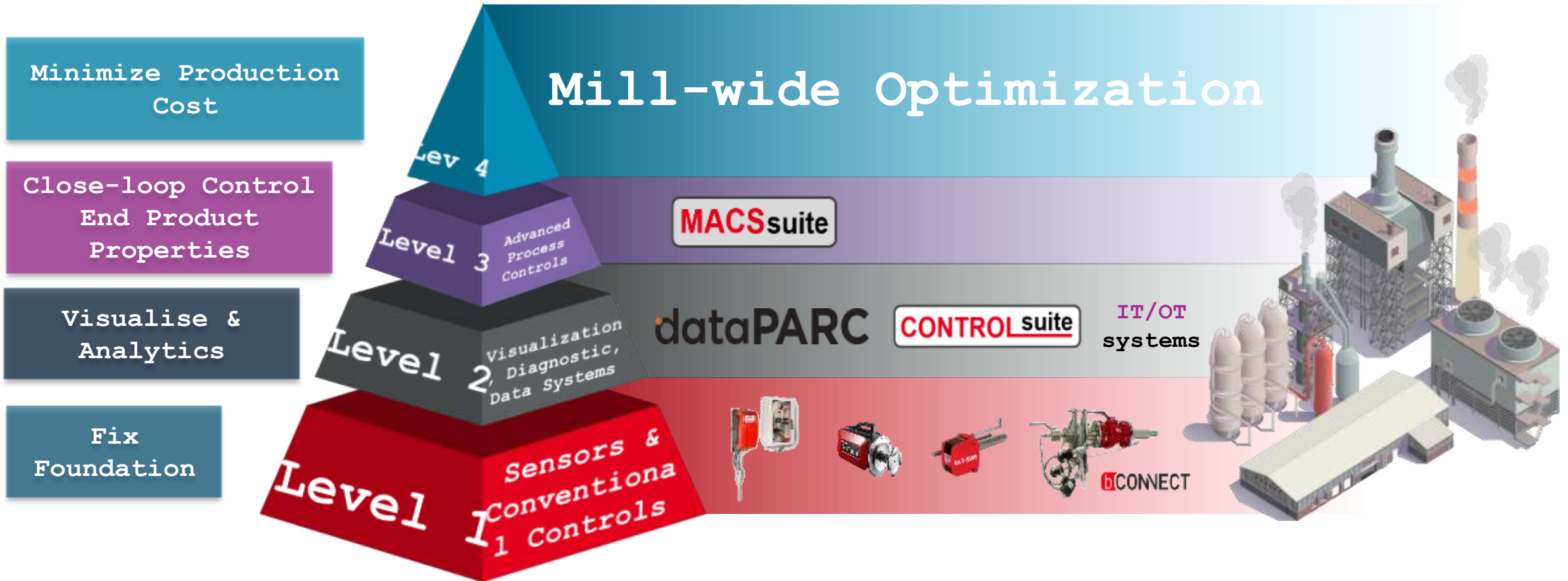
Quality & Cost Efficiency – Influenced by many Factors



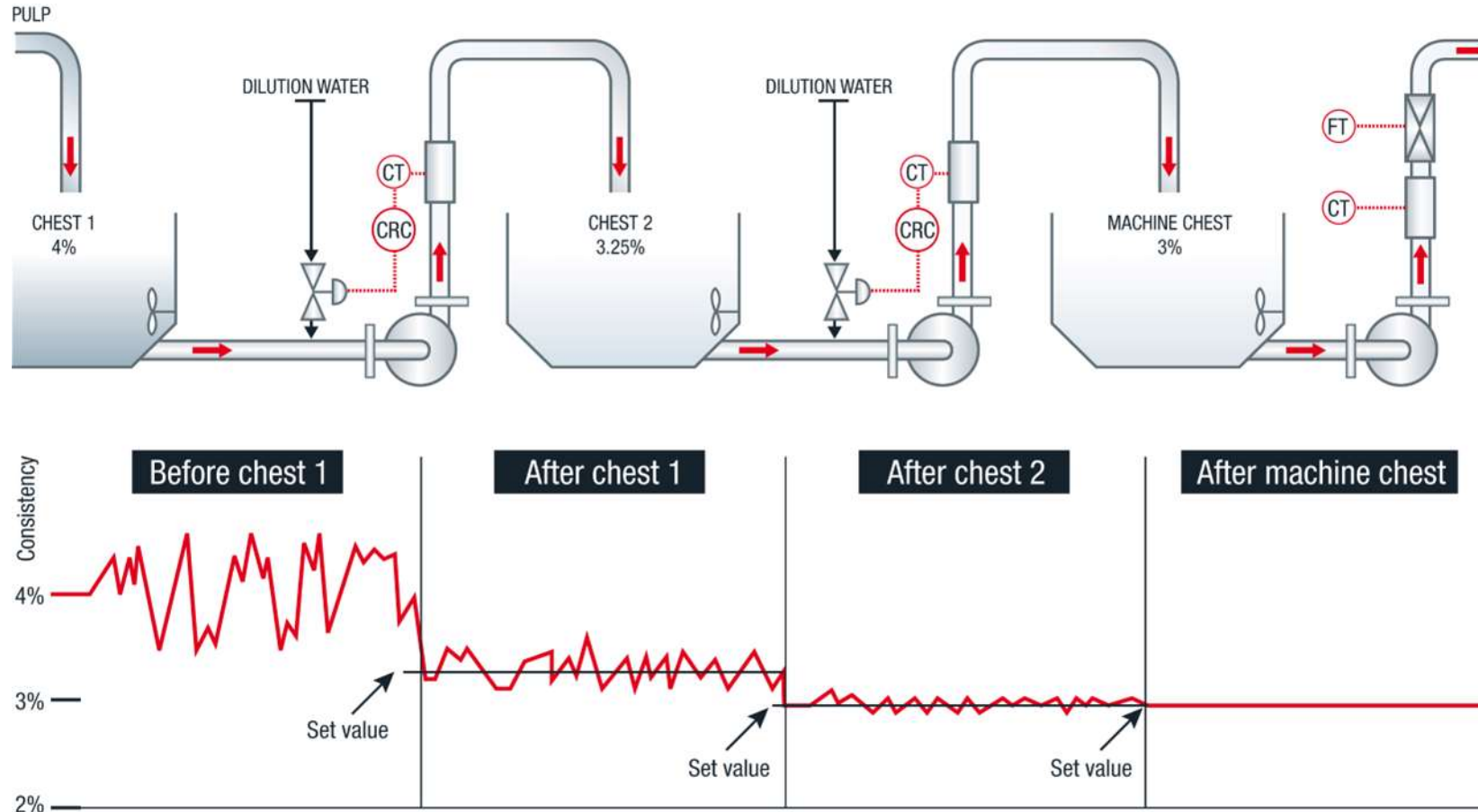
Goal: Variability Reduction & Target Shift



Pyramid of Sustainable Digital Solutions



Fiber Mass Flow – Control “Chain”

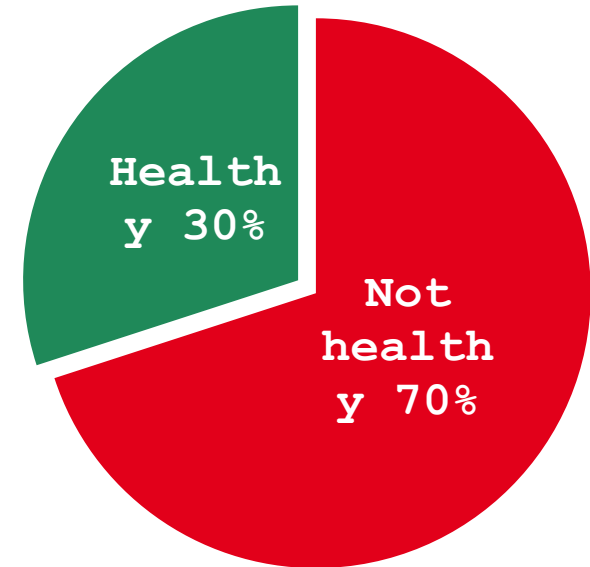


*When healthy, the chain continuously **reduces variation** as the stock stream approaches the headbox*

Fiber Mass Flow – Consistency Control

“Healthy” Consistency Control Loop:

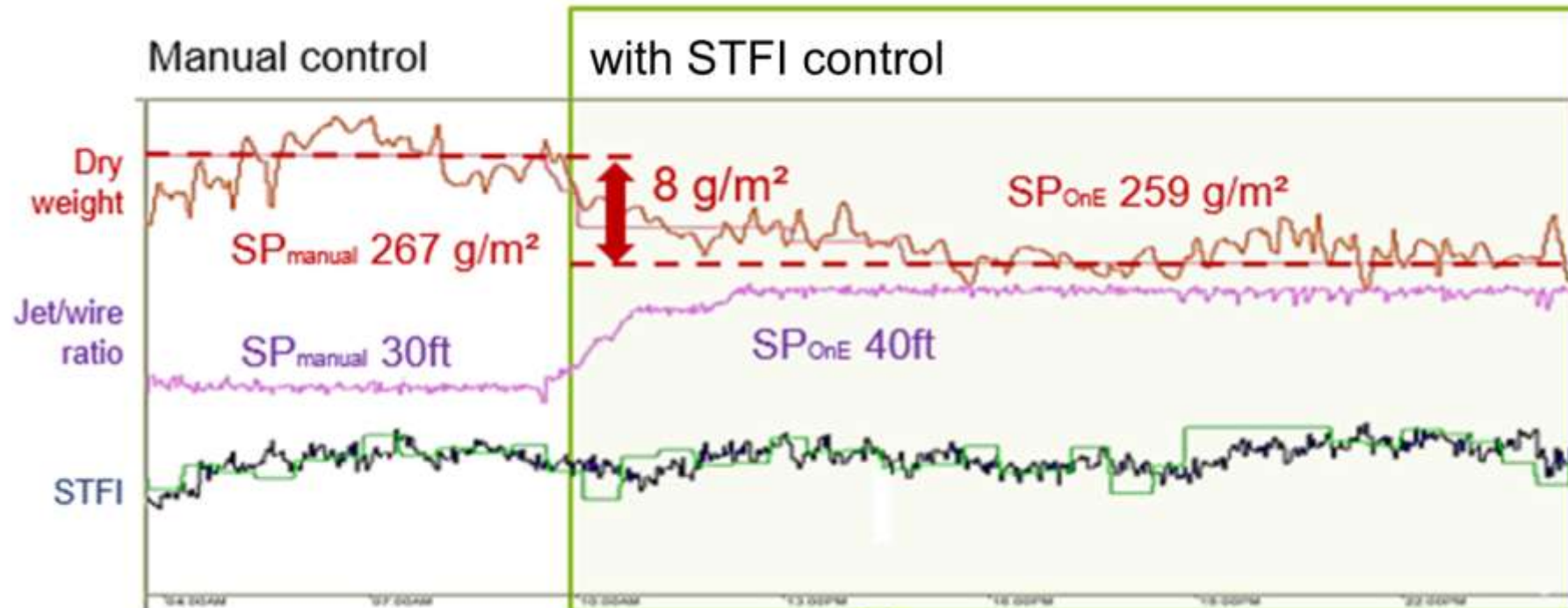
- Runs in Automatic mode
- Control valve has room to open / close
- Calibration done properly
- Enough dilution water capacity to handle process variability
- Has precise valve response



*Average of BTG surveys on paper machines lines:
~70% of consistency loops are NOT healthy.*

Case Study 1: Strength of Kraftliner (420k tpy)

Customer	Confidential, USA
Grades	Kraftliner
Capacity	420.000 tpy



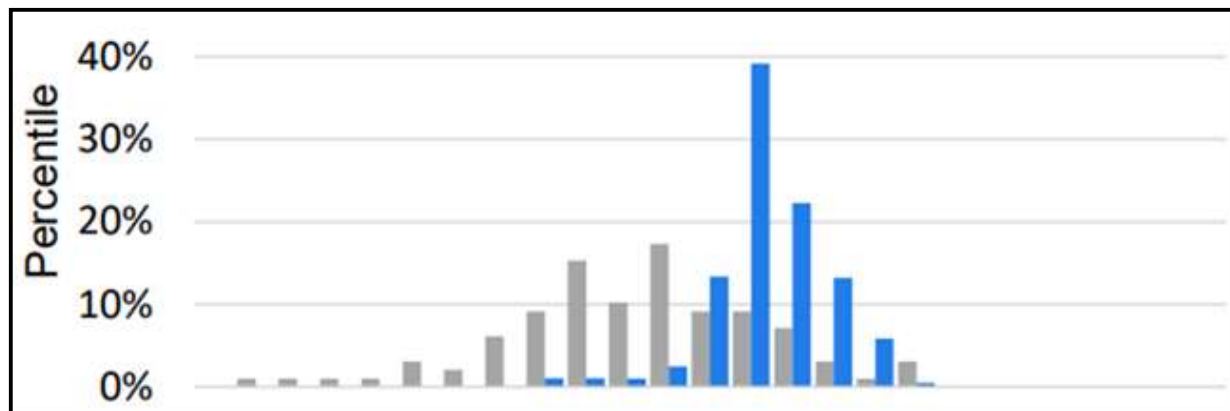
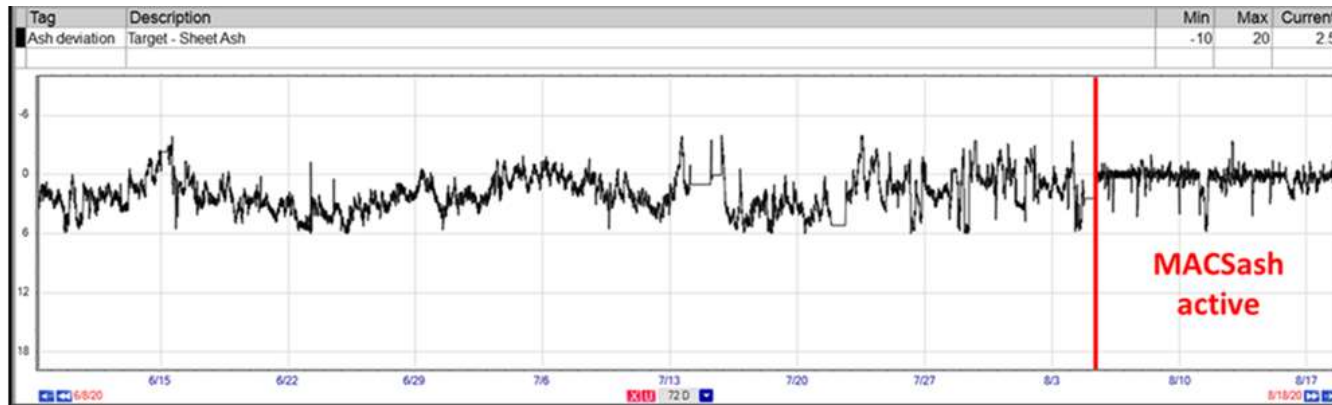
Case Study 2: Strength of Testliner (450k tpy)

Customer	Confidential, Central Europe
Grades	Testliner, Corrugating Medium
Capacity	450.000 tpy
Start-up	October 2020
Virtual sensors	SCT, CMT, Burst
Actuators	jet/wire ratio, starch consistency and rod pressure
Confirmed savings	average 4% starch savings in 2021 average 10% in 2022 (Jan - March)

- **Continuous operation for >4 years** due to close cooperation and joint adjustments
- **Repeat order** for next machine to be started up soon

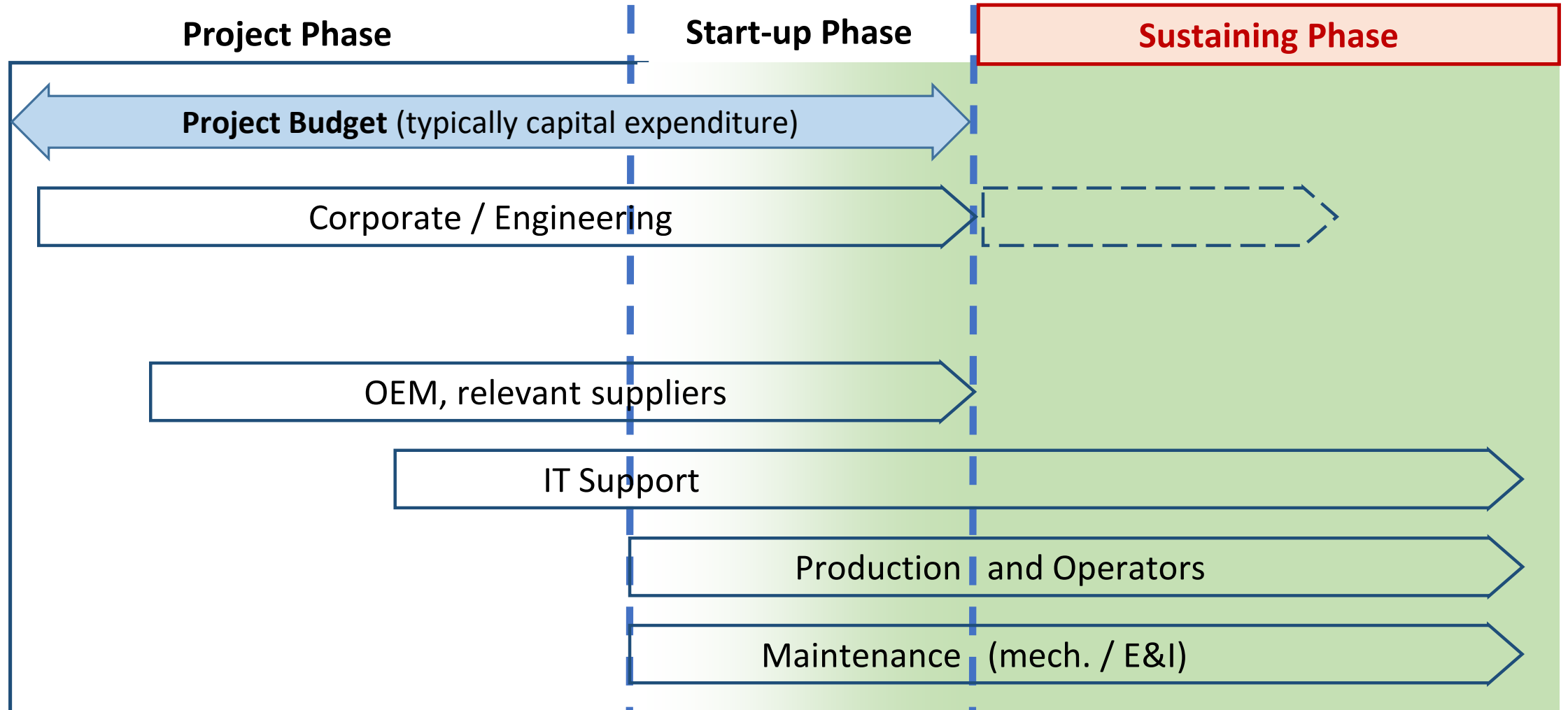
Case Study 3: Label Paper (ash versus strength)

Agreed-upon Targets of the Project were met or exceeded

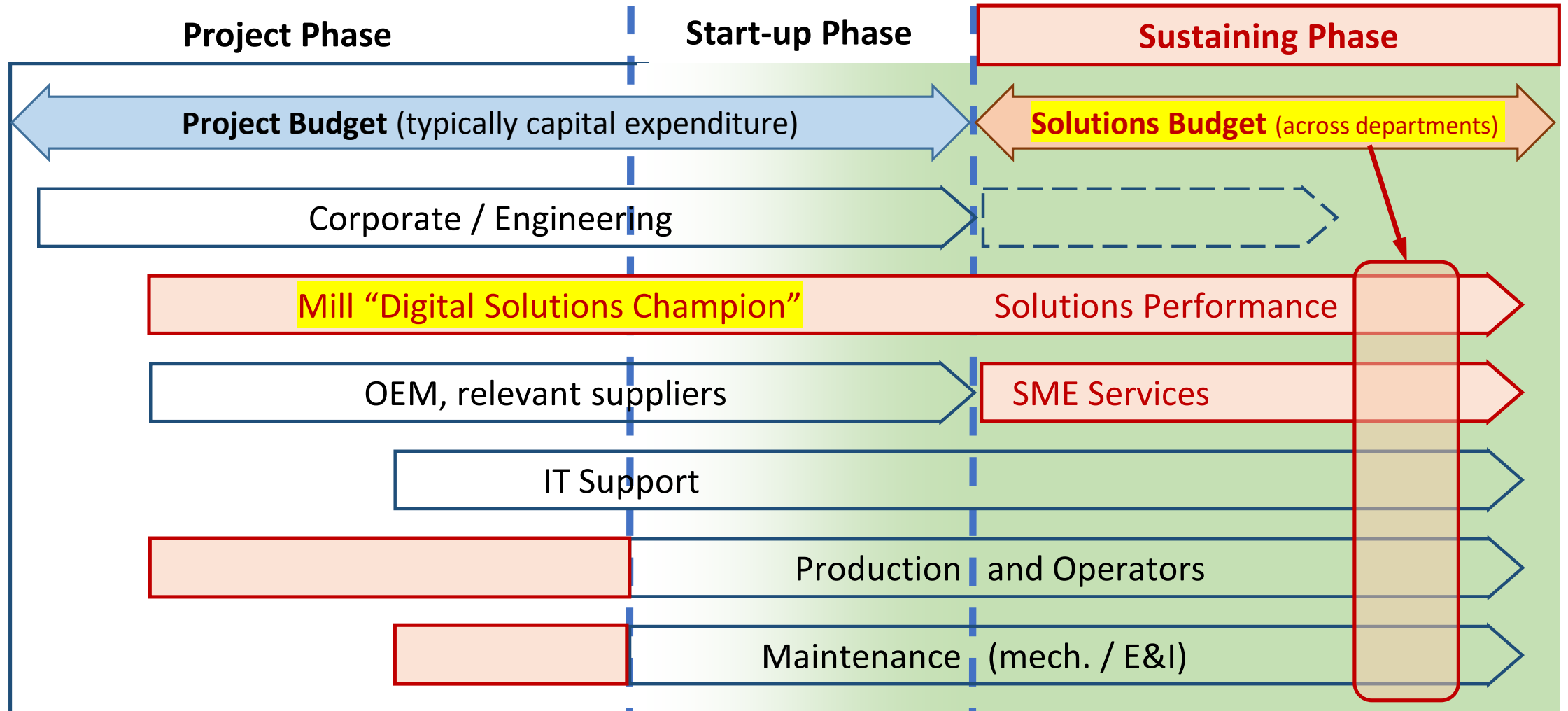


- Sheet ash distribution before (grey) & with BTG control (blue)
- **Target Shift made possible**

Digital Solutions – Typical Setup



Digital Solutions – Recommended Setup



Sustaining the Benefits of Optimization Projects

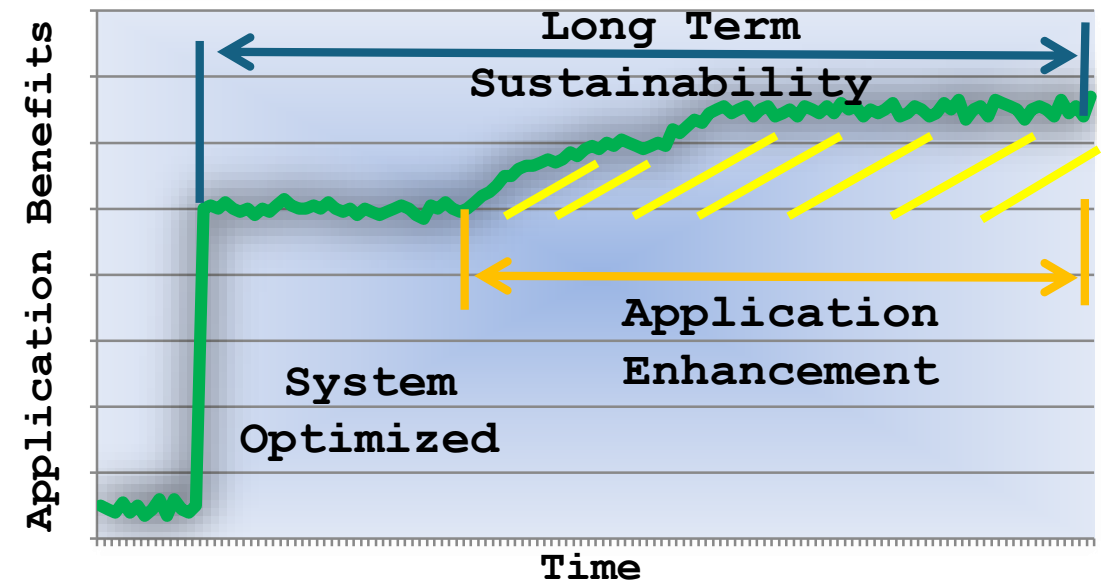
Keys to Performance Sustainability

- Involve all stakeholders early on
- Responsibility with authority
- Comprehensive system support
- Remote supervision; automated system reporting & monitoring

- Operations support

- Operator training

Sustained Application



Thank You!

Any Questions?