



Extrusion: Color Change Technology

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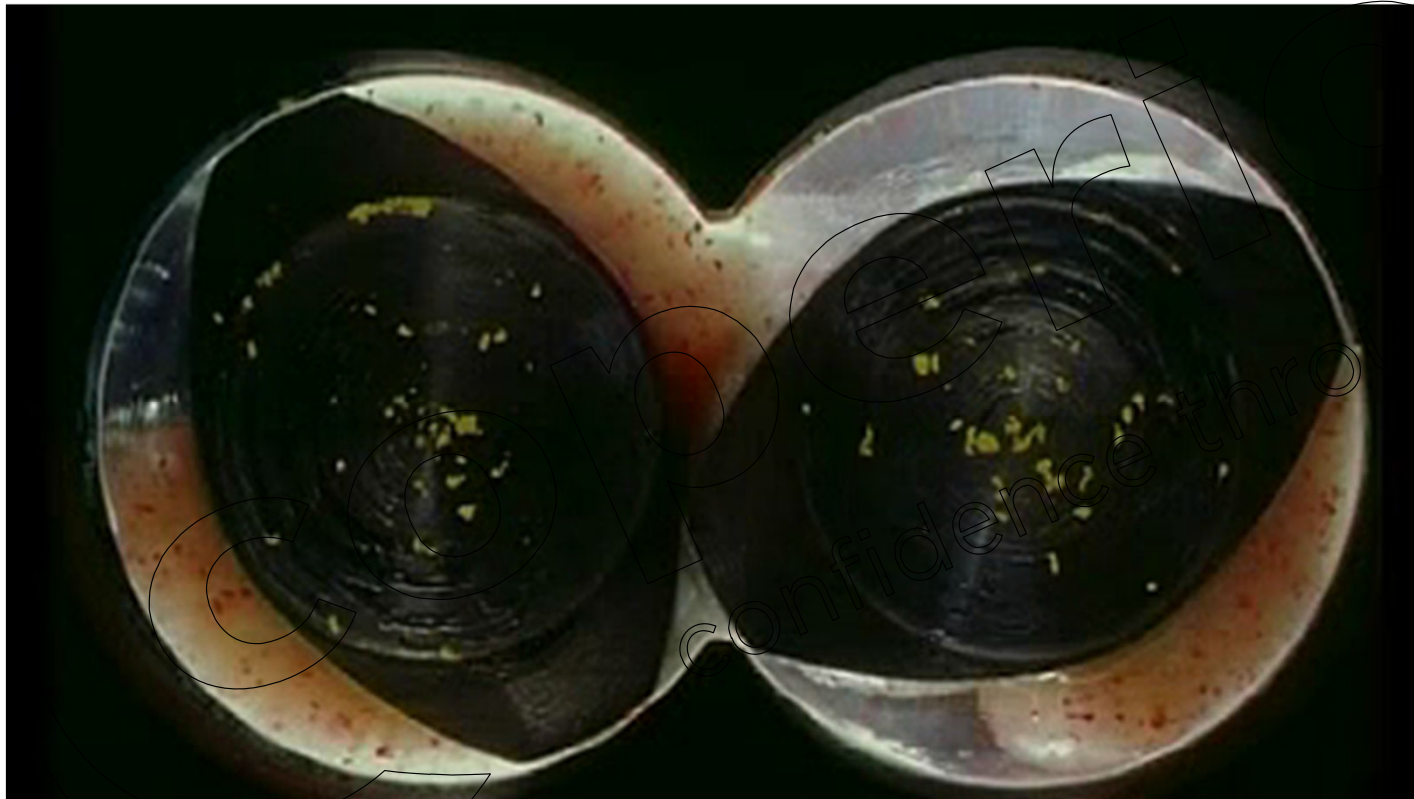


Coperion Technology Update 2025

ZSK Co-Rotating, Intermeshing, Self-Cleaning Screw Profile

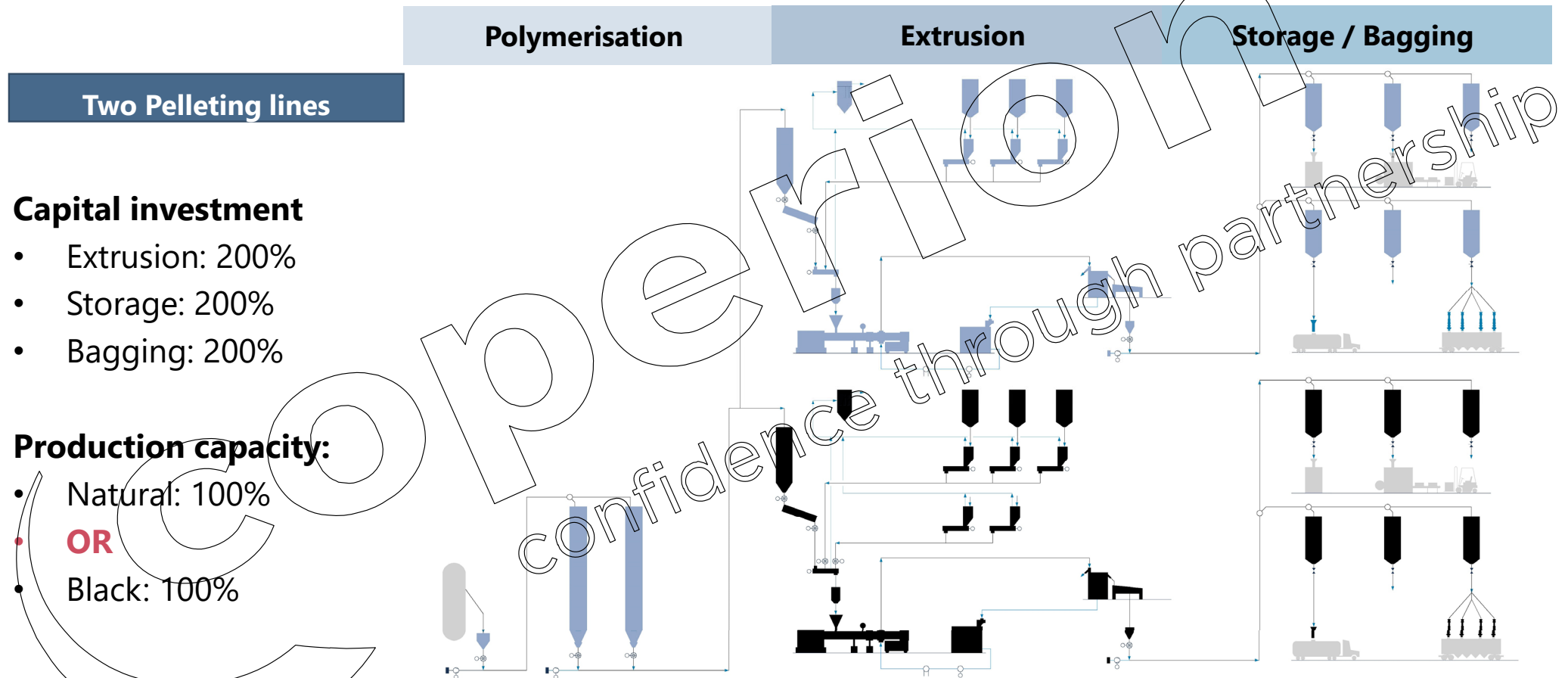


Video of screw profile with self cleaning effect



- With this customers are enabled to upgrade their system for color change. Also for retrofit!
- For black and natural production only 100% extruder capacity has to be installed, instead of two dedicated machines, where 200% installed with only 50% utilization
- 5 commercial references in PO; up to 94 t/h

Option 1 – Additional Full Capacity (Full Redundancy)



Option 1 – Additional Full Capacity (Full Redundancy)

One extruder is capable to produce natural grades and one additional extruder is capable to handle only black grades, both at full capacity

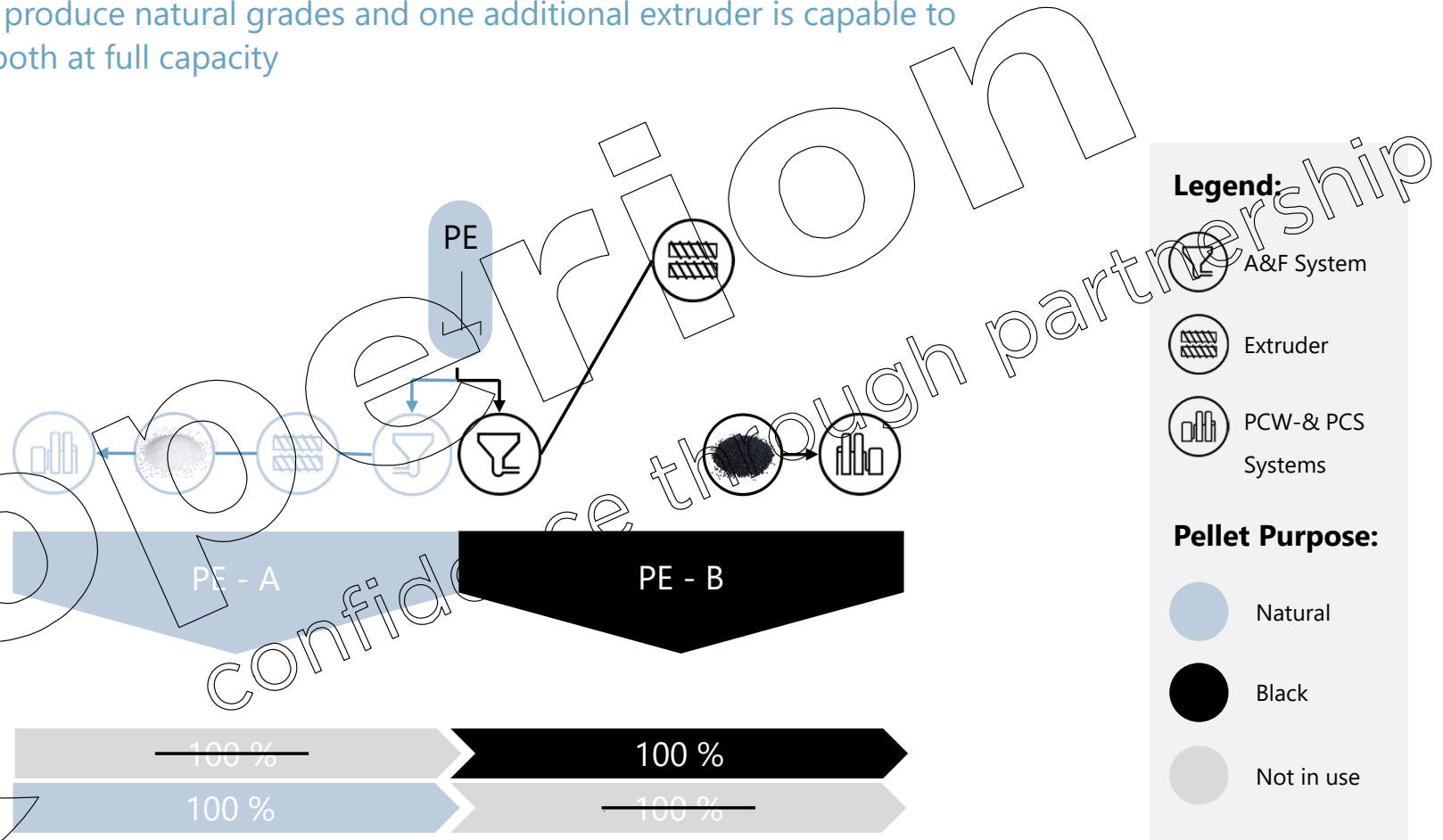
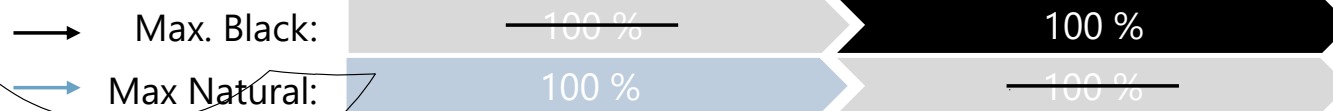
Reactor Capacity:

- 100 %

Downstream Capacity:

- 2 x 100 % = 200 %

Simultaneous Capacity:



Legend:

A&F System

Extruder

PCW-& PCS Systems

Pellet Purpose:

Natural

Black

Not in use

Option 2a/b – Additional Half Capacity Line

a- powder/
b - post compounding



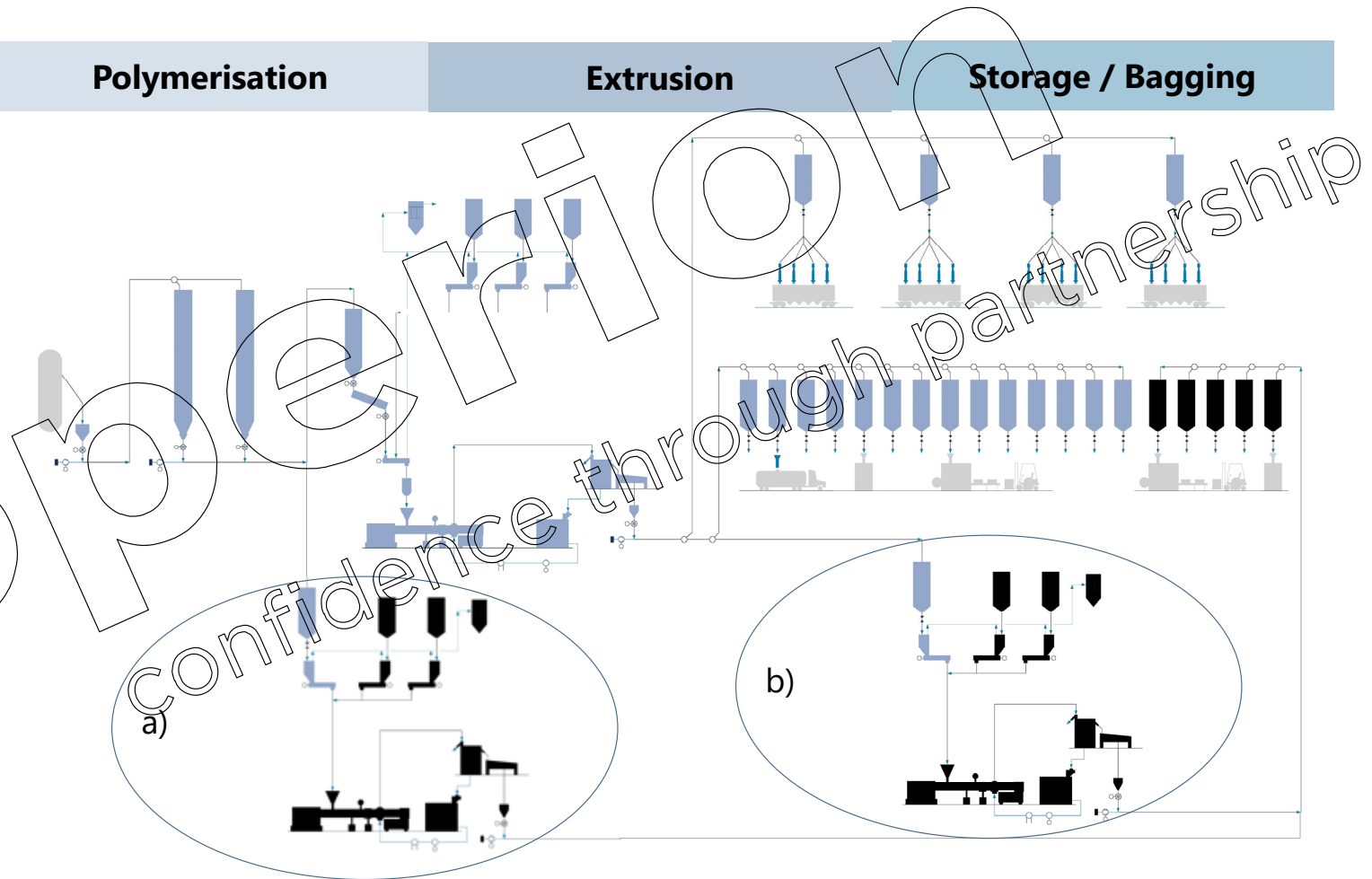
Offline Compounding

Capital investment

- Extrusion: 150%
- Storage: 1000%
- Bagging: 200%

Production capacity:

- Natural: 100%
- **OR 50% AND**
- Black: 50%



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Option 2a) – Additional Half Capacity Line (Parallel)

One extruder capable to produce natural grades and one smaller extruder shall be added for black grades only

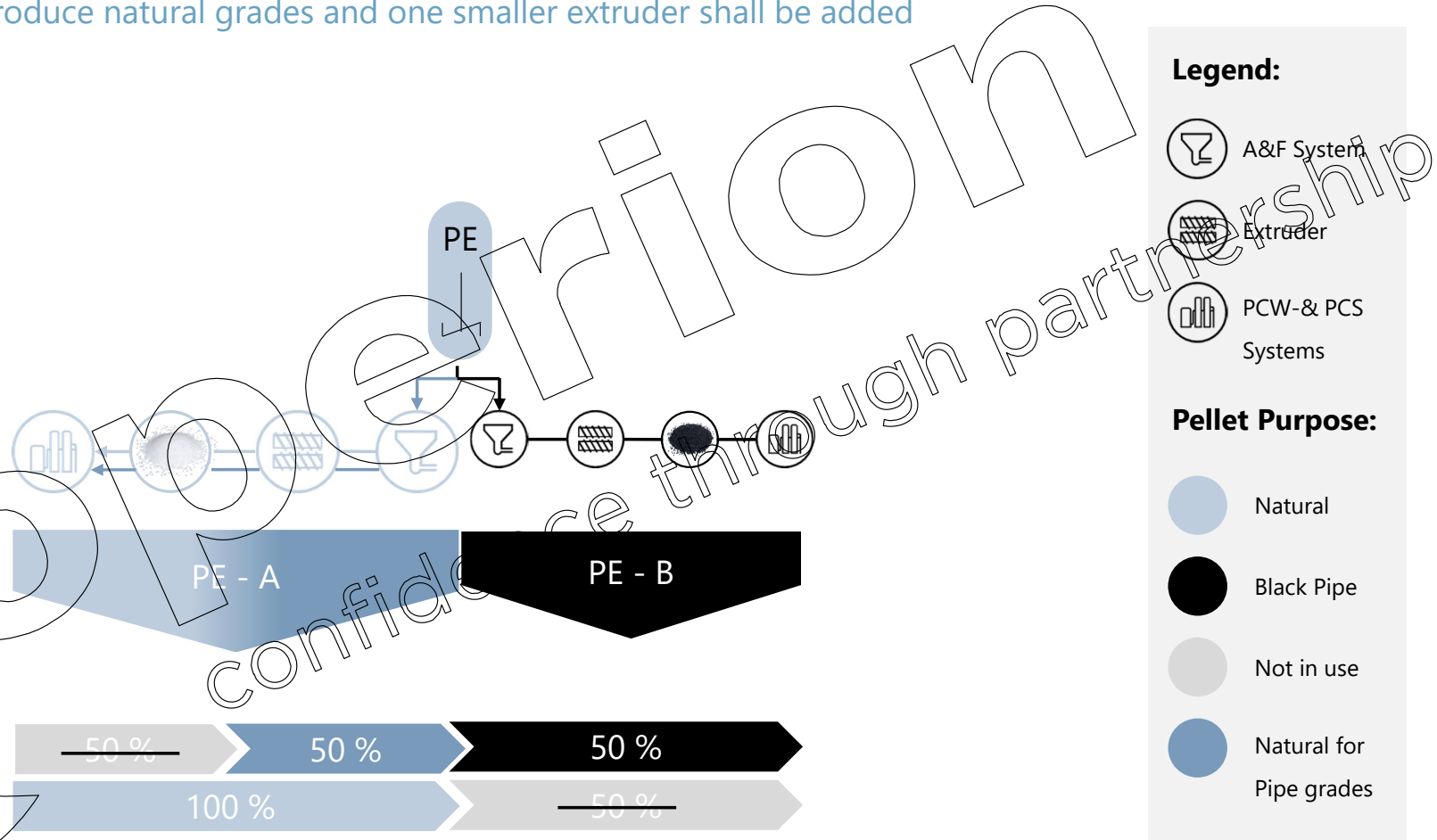
Reactor Capacity:

- 100 %

Downstream Capacity:

- 1 x 100 % or 50% AND
+ 1 x 50 %

Simultaneous Capacity:



Legend:

- A&F System
- Extruder
- PCW-& PCS Systems

Pellet Purpose:

- Natural
- Black Pipe
- Not in use
- Natural for Pipe grades

Option 2b) – Additional Half Capacity Line (Post compounding)

Pipe grade pellets can be fed directly to offline compounding machine or to (offsite) intermediate storage

Reactor Capacity:

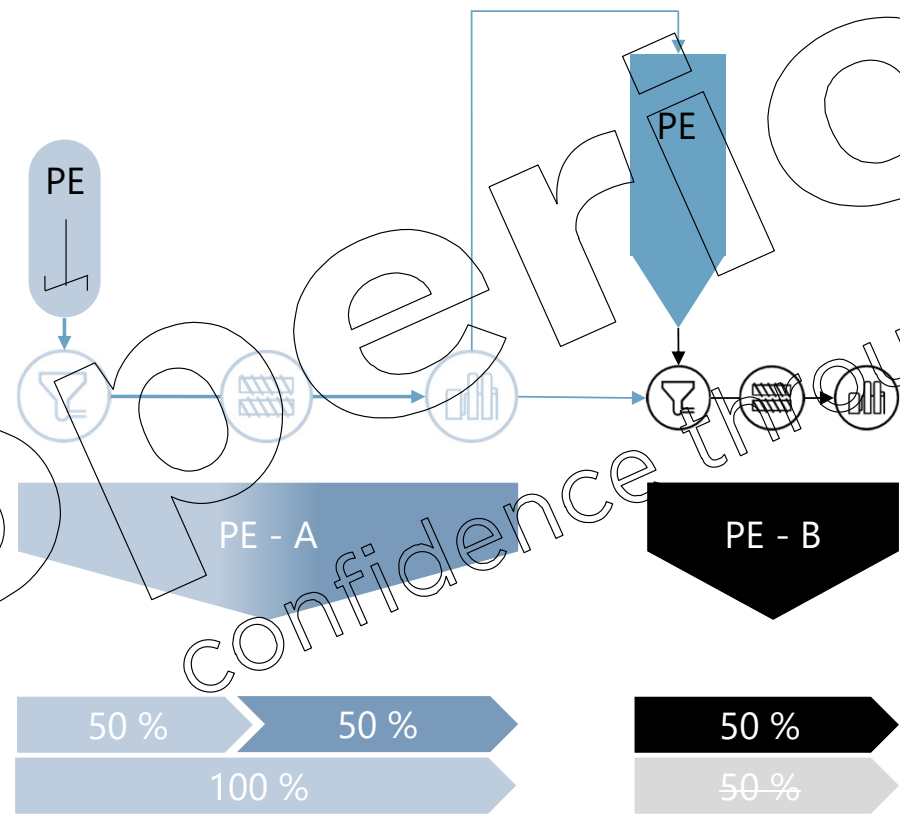
- 100 %

Downstream Capacity:




- 1 x 100 % + 1 x 50 %
- For Black or Natural

Simultaneous Capacity:





- Max. Black:
- Max Natural:



Legend:

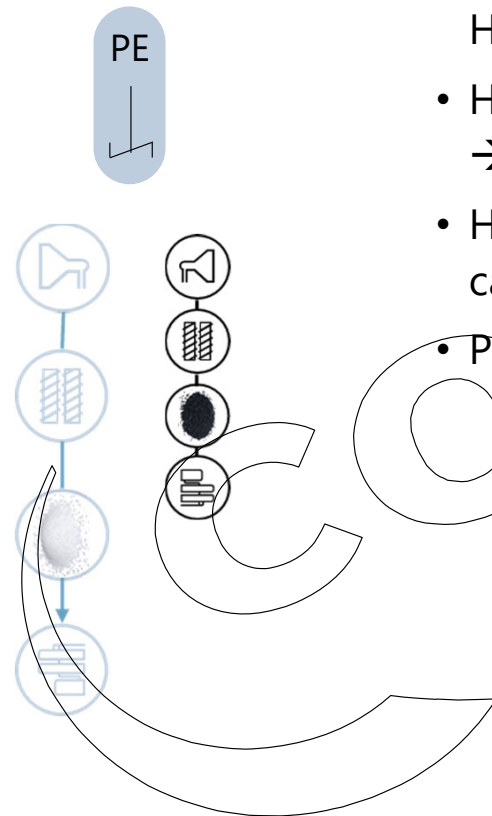
-  A&F System
-  Extruder
-  PCW-& PCS Systems

Pellet Purpose:

-  Natural
-  Black Pipe
-  Not in use
-  Natural for Pipe grades

Option 2a/b – Half Capacity Line

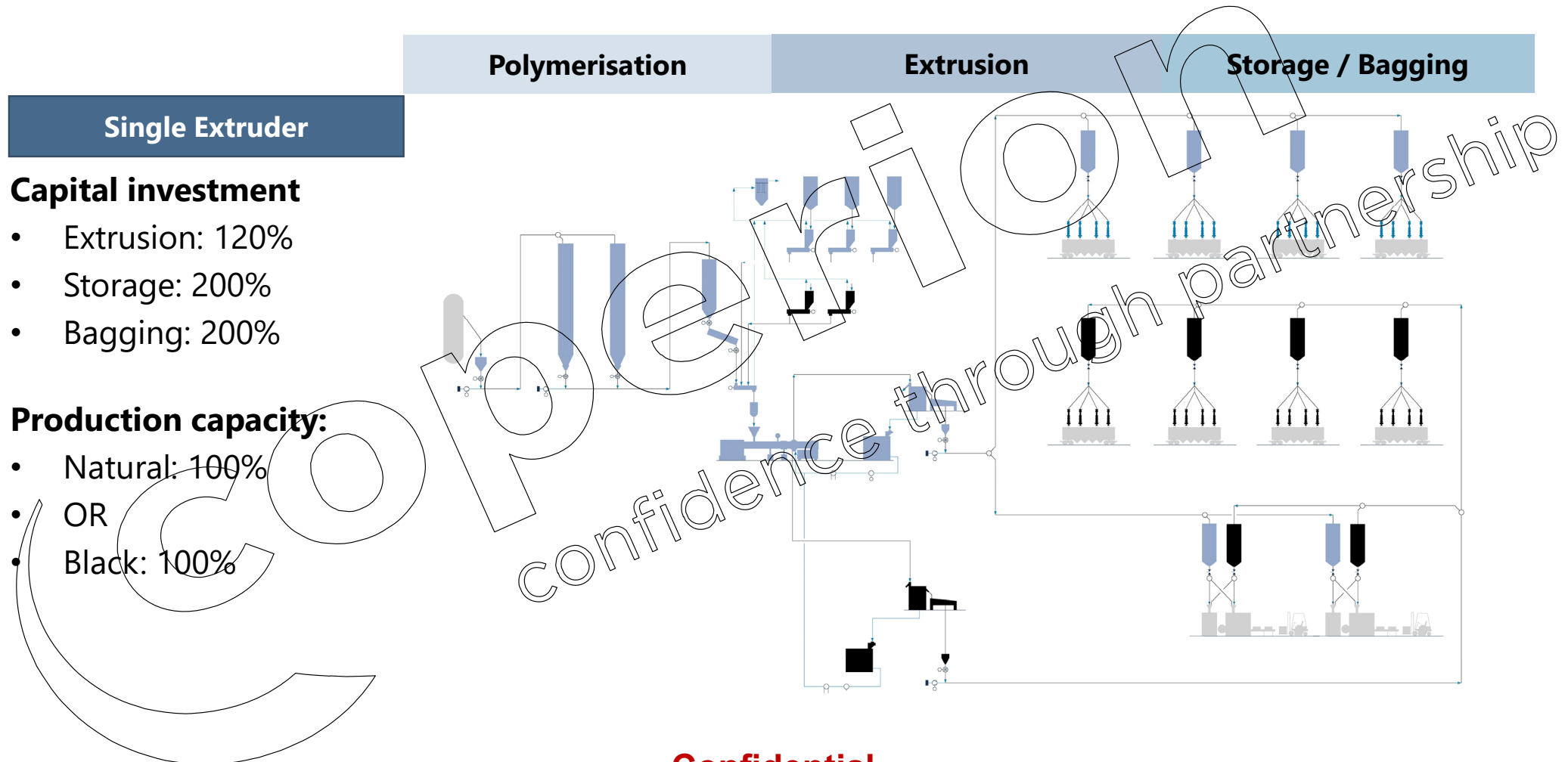
One extruder capable to produce natural grades and one smaller extruder shall be added for black grades only



- Only 68 % of the Downstream Equipment (Conveying, Extrusion, Material Handling) is used with strong dependency
- Higher operation costs due to 2 extrusion lines in operation in parallel
→ high complexity for operation and marketing; high CAPEX and OPEX
- Higher investment costs (Building, Equipment, Engineering) while 32% cannot be used
- Post Compounding: Energy must be introduced twice!

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Option 3 – Colour Change on Single Line



Single Extruder

Capital investment

- Extrusion: 120%
- Storage: 200%
- Bagging: 200%

Production capacity:

- Natural: 100%
- OR
- Black: 100%

Option 3 – Colour Change on Single Line

One extruder is capable to produce black and natural grades, both at full capacity

Reactor Capacity:

- 100 %

Downstream Capacity:

- 1 x 100 %

→ For Black or Natural

Optimized Capacity:

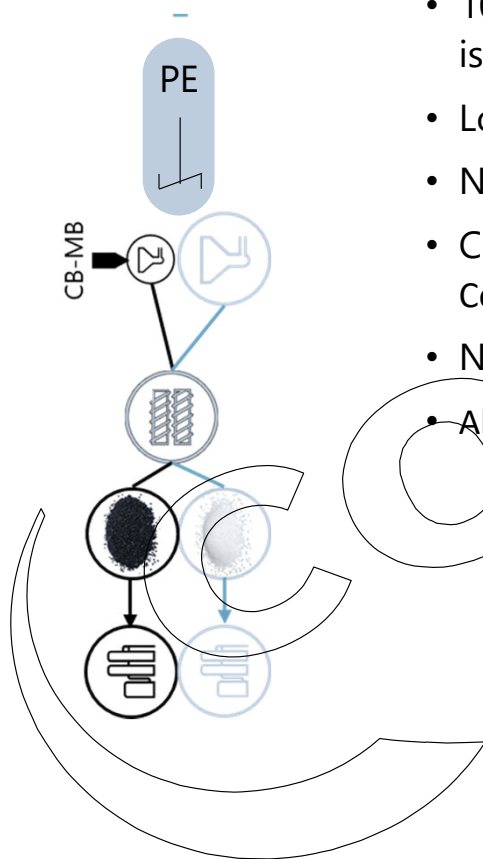


Facts and Data:

- Lowest equipment investment
- Smallest footprint
- Fastest ROI
- Full product range
- Only prime product

Option 3 – Colour Change on Single Line

One extruder is capable to produce black and natural grades, both at full capacity



- 100 % of the Downstream Equipment (Conveying, Extrusion, Material Handling) is used similar to the 100% reactor capacity
- Lowest investments costs and operation costs
- No limitations for products to be produced (no dependency for marketing)
- Coperion warrants maximum 5 hours transition time from black to natural Coperion
- No loss of production; 100% prime product
- Also for retrofit!

Comparison

Overview of all Options

	Footprint [m ²]	Equipment & utilization [€/h]	Energy / Utility [MWh] / [m ³ /h]	Plant capacity [TPH/ KTA]	Other expenses [€]
Option 1 Full capacity added	-- Additional full-size building and silos	-- 3rd complete train	- Additional start-up and shutdown	+	+
Option 2 a) Half capacity added	- Additional half-size building and silos	- 3rd small train	- Simultaneous operation	--	-- More labour work required
Option 2 b) Half capacity added (offline, compounding)	- Additional half-size building, silos & offsite storage	-- 3rd small train and additional PCS, silos & offsite storage	-- Re-melting	+	-- More labour work required, additional stabilizers
Option 3 Color change	+	+	++	++	++



Thank you very much for your attention.

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