



Energy savings in polyolefin production. Modernization brings optimized sustainability throughout the process.

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» MOTIVATION: Polyolefin production faces two key challenges: rising energy costs and the need for carbon footprint reduction. These challenges are also an opportunity. By modernizing your plant with retrofitted state-of-the-art solutions, you can reduce energy use, increase sustainability and cut carbon emissions.

As a key technology partner, Coperion has the overall process knowledge to engineer tailored retrofit solutions which deliver continuous improvement and a fast return on investment (ROI). We have been designing, engineering and installing polyolefin systems for many years. As a complete scope provider, Coperion not only has extensive experience but also a comprehensive knowledge and understanding of the entire production process.

We are committed to partnering with our customers for the entire operating life of their polyolefin plant. Our wide-ranging

expertise enables us to analyse and identify energy-saving possibilities along the entire value chain.

By studying a plant's operation and preparing feasibility analyses, we can identify and propose additional cost-effective measures to increase plant throughput. These will in turn reduce specific energy consumption, and therefore increase profitability.



Opportunities for improvements in energy efficiency and reduction of carbon emissions can be found at almost every stage of polyolefin production. From conveying and storage, to feeding, extrusion, pelletizing and packaging, Coperion can analyse and identify improvements to both individual components and overall Operational Excellence.

The results are reduced energy consumption and increased efficiency, plant throughput and profitability. As global en-

ergy prices increase, energy savings represent a significant ROI whilst also helping producers meet their energy reduction commitments.

Older plants offer even greater potential for process optimization and energy savings.

Revealing the potential in your plant.

Case study: HDPE plant with throughput of 90 t/h.

Energy consumption of the whole production system

Potential savings: **up to 16 %**

- Energy consumption **before** modernization: **-31,385 kWh**
- Energy consumption **after** modernization: **-26,373 kWh**

Process modernization

> Status Quo

The polyolefin plant is operating as usual.

> Hypothesis

There is potential for energy efficiencies and related cost-savings and carbon emissions reductions.

> Concept

Proposals for retrofitting to state-of-the-art components and adopting energy-reduction measures, to achieve desired outcomes.

> Evaluation

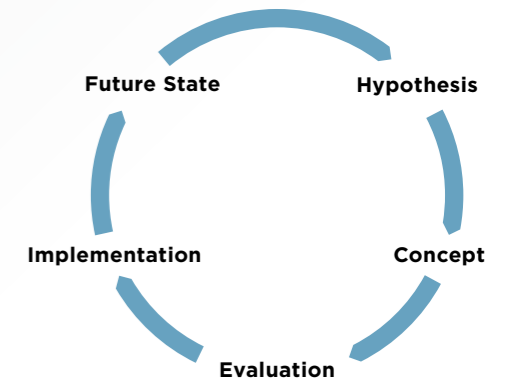
Analysis of current energy use and emissions, and of projected savings and reductions through the adoption of proposals.

> Implementation

Development of implementation schedule. Retrofitting of components and application of energy reduction measures.

> Future State

The polyolefin plant is operating as normal - but with greater efficiency than ever before.



1. Conveying

Potential savings: **up to 35 %**

2. Feeding

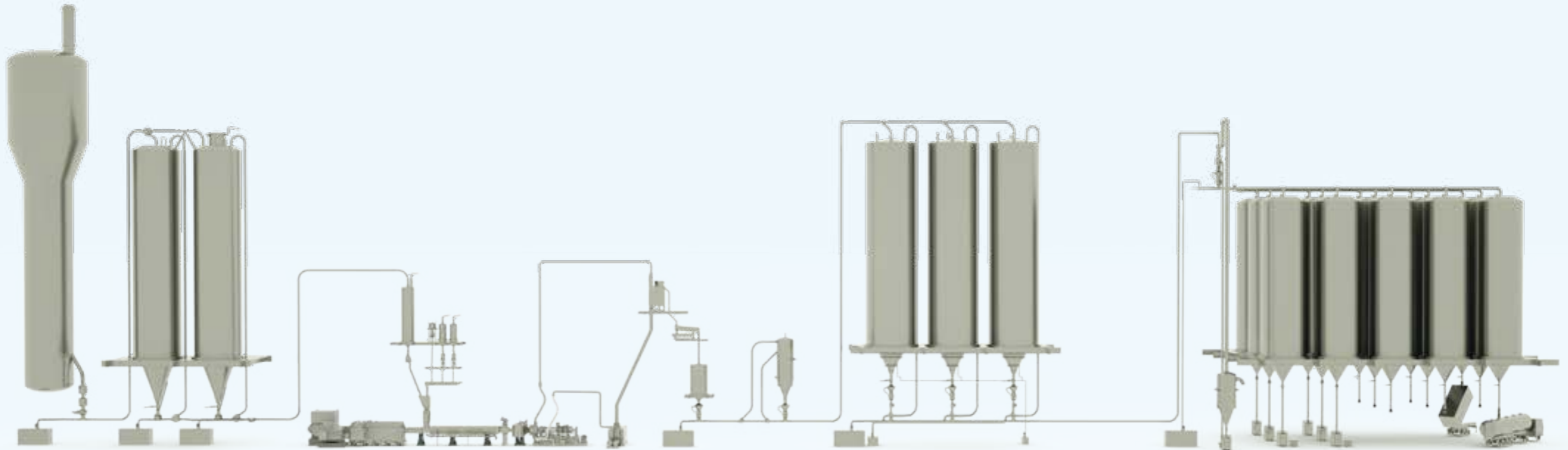
Potential savings: **up to 20 %**

3. Extruder

Potential savings: **up to 15 %**

4. Logistics and loadouts

Potential savings: **up to 25 %**





ROI case studies:

Reducing energy consumption in polyolefin production

Complete system savings

Coperion undertook a comprehensive analysis of a polyolefin plant. By implementing energy reduction measures throughout the production process, and realizing plantwide improvements, the customer benefited from:

- › 8-15% energy savings
- › ROI in less than 1.8 years

Component enhancement

Coperion identified a potential for energy savings through a simple change to an PP system producing 55,000 kg/h. By changing the screw configuration of the ZSK 350 extruder, the customer realized:

- › Energy savings of 12,000 MWh per year
- › ROI in less than 1 year

›› Energy-saving improvements

By undertaking analysis of each plant's line – from individual components to the overall system – Coperion is able to provide proof of the energy savings available. Utilizing state-of-the-art Coperion technology developed through extensive research

and development, we apply system-wide solutions which deliver substantial reductions in energy use and CO₂ emissions, with a swift ROI.

COMPONENTS:

Reactor to extruder conveying / storage

- › Utilize state-of-the-art components to deliver energy savings
- › Reduce initial temperature loss and re-use of surplus energy downstream for heating

Extrusion / pelletizing

- › De-bottleneck (improvement of identified process or equipment limitation, e.g. feed intake)
- › Reduce pressure loss in the extruder discharge section
- › Increase compounding efficiency
- › Reduce inefficient energy consumers (e.g. exchange outdated motor or frequency inverter designs or eliminate unnecessary utilities)
- › Implement new Coperion developments (e.g. new screw design, drive, process section)

Other conveying / storing / screening / packaging

- › Reduce VOC (volatile organic compounds) through improved silo degassing
- › Reduce dust, waste and 'angel hair' through improved conveying technology
- › Utilize latest Coperion developments (e.g. FLUIDLIFT ecoblue®)

SYSTEM:

Improving Operation Expenditures (OpEx)

- › **Optimize unit operations**
Operation of single units only when required (e.g. dryer with variable drive)
- › **Reduce energy consumption**
Modify plant set-up to increase throughput within existing footprint



Summary

When your polyolefin plant was first built, it utilized state-of-the-art technology. Since then, energy prices have risen – and appear set to continue rising. At the same time, pressure to minimize CO₂ emissions has increased.

Through extensive research and development, Coperion has continued to introduce more advanced technology for polyolefin production. Today's state-of-the-art components are engi-

neered to increase throughput whilst reducing energy use. This enables lower costs, a smaller carbon footprint, and greater plant profitability.

The enormous potential for gains through modernization can be realized by any polyolefin production plant. The older the plant, the greater the potential for optimization and energy-saving.

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