

How we develop the best process for methyl methacrylate

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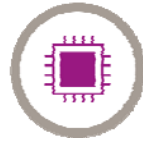
What methacrylates are used for

Construction



Chemical dowels
Cement additives

Electronics



Optical specialty products
for LED applications

Automotive



Rear lights
Car body panels

Aerospace industry



Cabin windows

MMA and derivatives

Pharmaceuticals and medical tech



Tablet coatings
Implants

Raw-material extraction



Flow improver for oil and
gas transportation

Paints and coatings



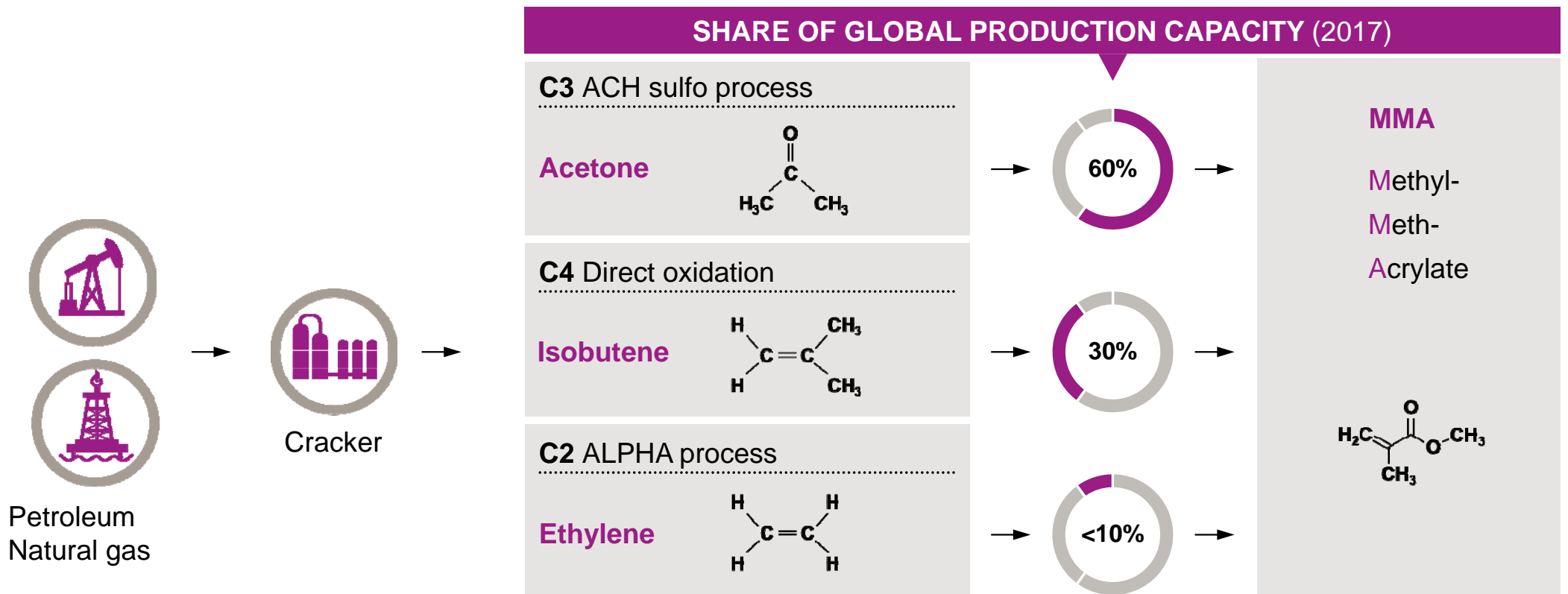
Gloss effects
Brilliant depth effect

Communication



Light-guiding PMMA films

How MMA is produced



LiMA combines proven technology and our own development

Development goals



Higher efficiency

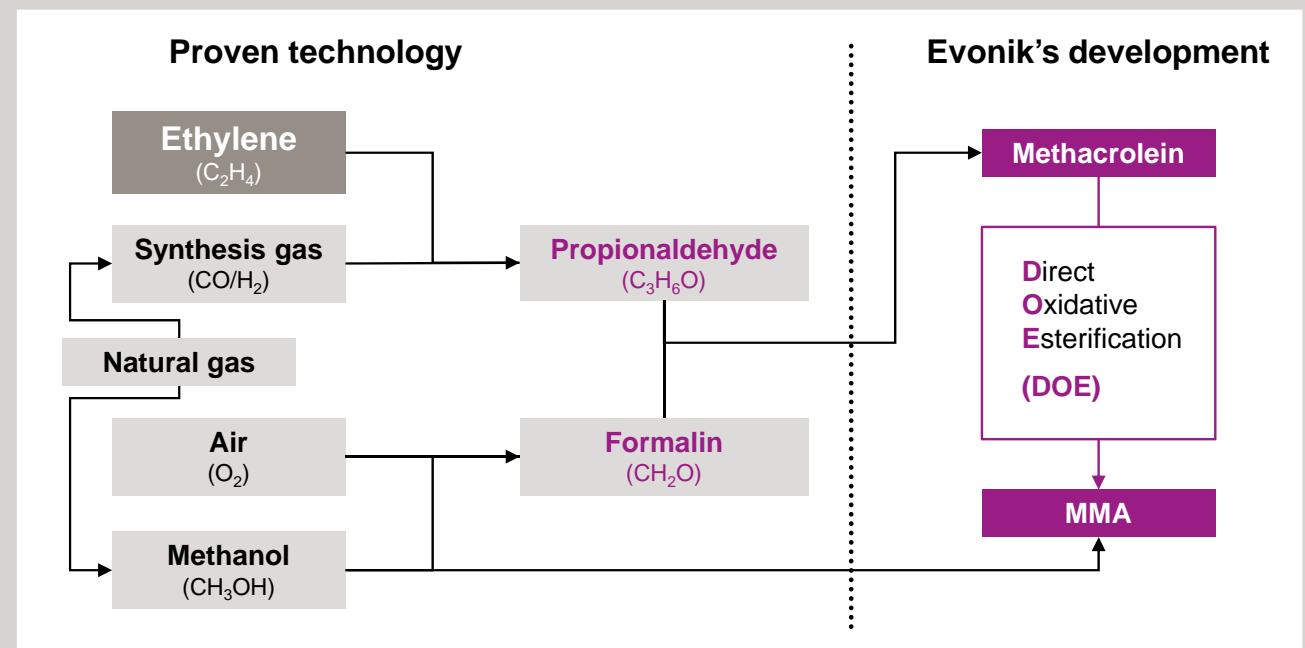


Less environmental impact

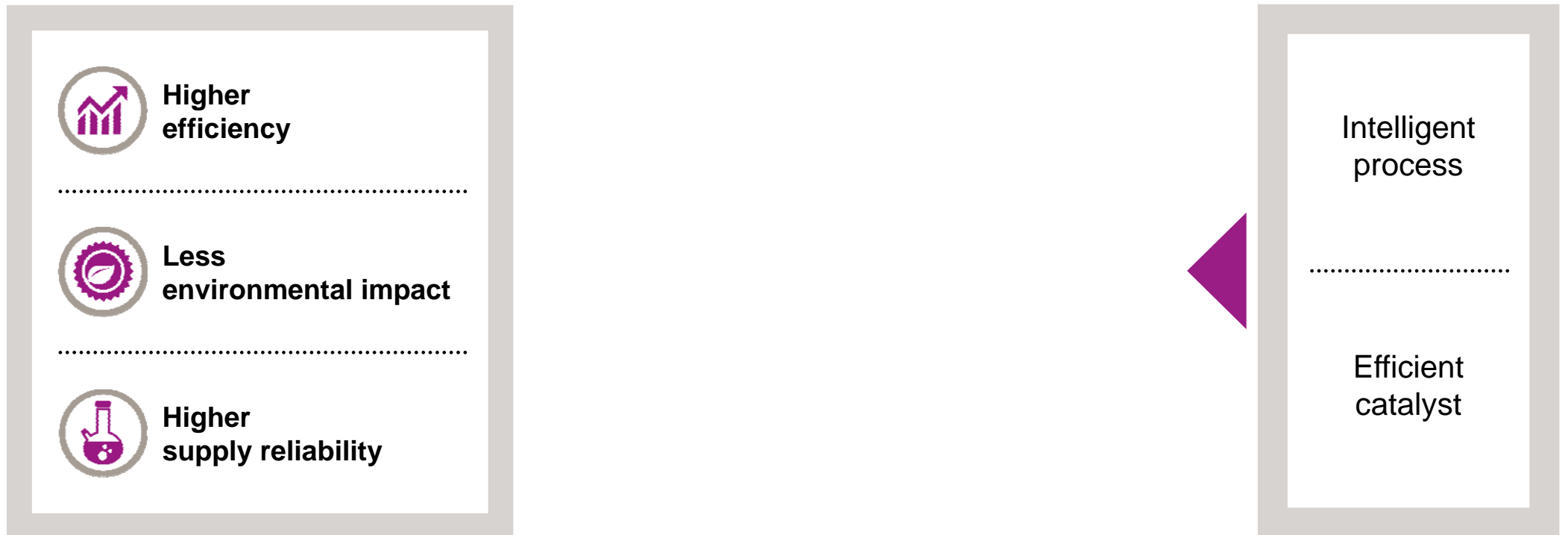


Higher supply reliability

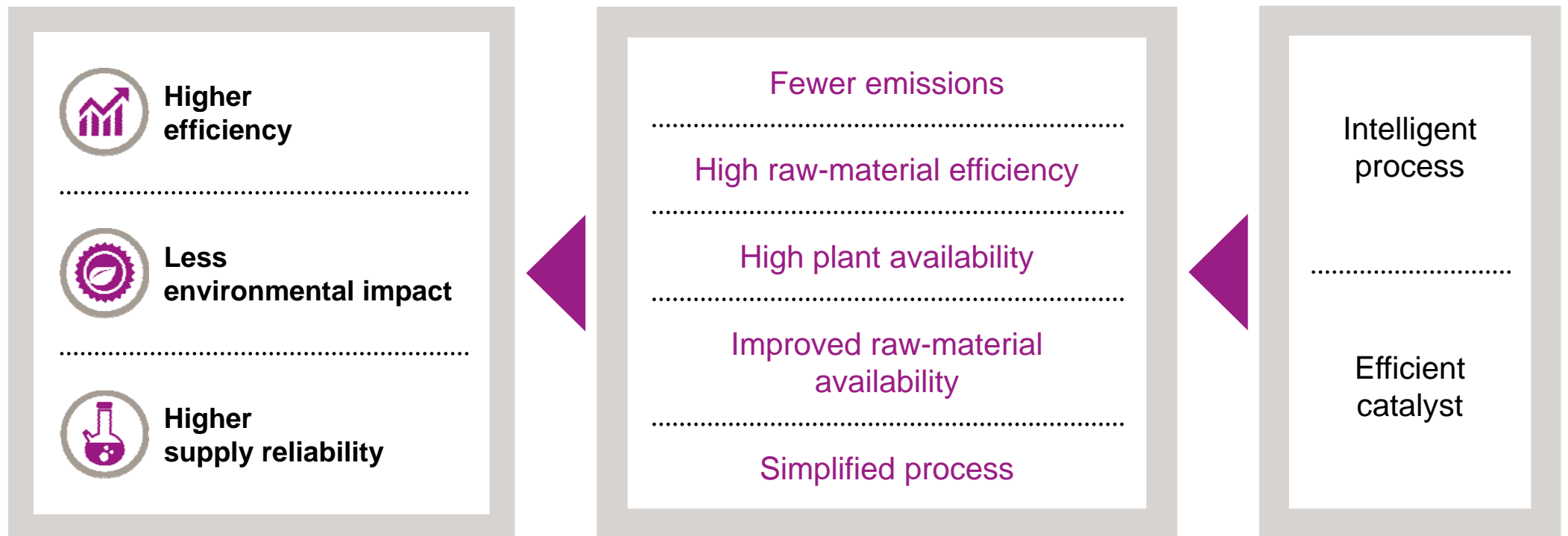
LiMA (Leading in MethAcrylates) process overview



LiMA uses an intelligent process and an efficient catalyst



LiMA is best in class for production of MMA



How LiMA increases efficiency



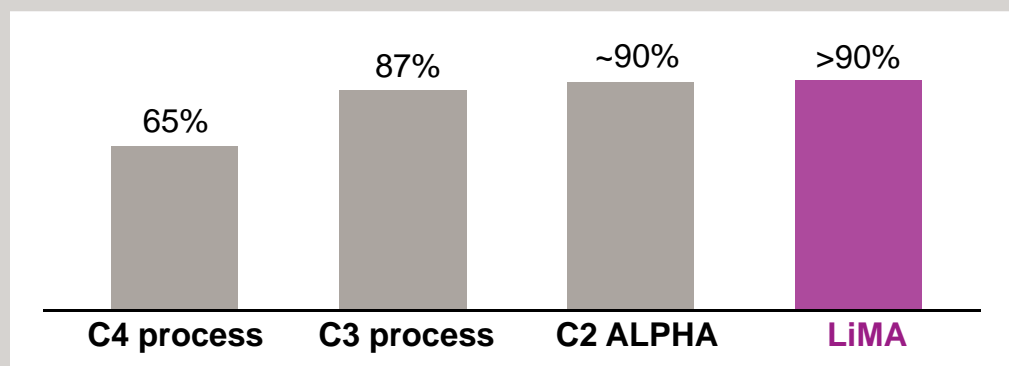
INTELLIGENT PROCESS

- Robust technology: All steps in the liquid phase under moderate reaction conditions
- This leads to increased availability and minimizes technical complexity

EFFICIENT CATALYST

- High selectivity leads to almost complete raw material yield
- This increases the overall yield to more than 90%

Yields of the various processes



Source:
PERP08/09-07, Nexant Inc.



How LiMA decreases environmental impact



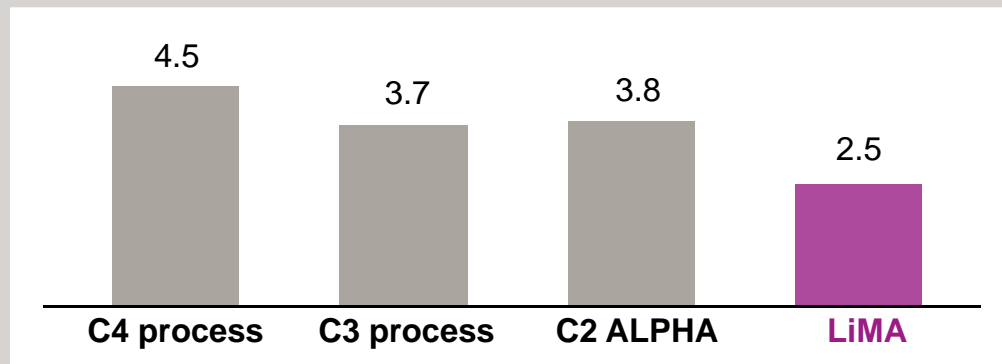
INTELLIGENT PROCESS

- Low wastewater streams, reduced recycle streams
- This simplifies the overall process and minimizes energy and steam requirements

EFFICIENT CATALYST

- Catalyst is highly active at moderate temperatures
- This minimizes by-products and reduces wastewater volumes and thus CO₂ emissions

Metric tons CO₂ equivalent per metric ton of MMA (industry average)



Source: CEFIC, internal calculation



How LiMA improves supply reliability



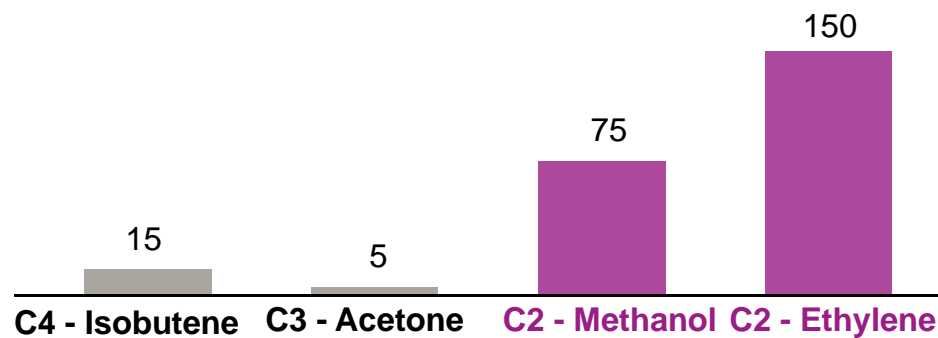
INTELLIGENT PROCESS

- Ethylene and methanol can be used highly efficiently as raw-material sources
- Their excellent availability ensures sustainable supply and economy of scale

EFFICIENT CATALYST

- New catalyst accesses C2 raw-material sources for MMA production
- LiMA complements Evonik's range of raw materials

Global annual production in millions of metric tons



Source:
IHS Markit



LiMA shows outstanding results in pilot operation

ROBUST TECHNOLOGY

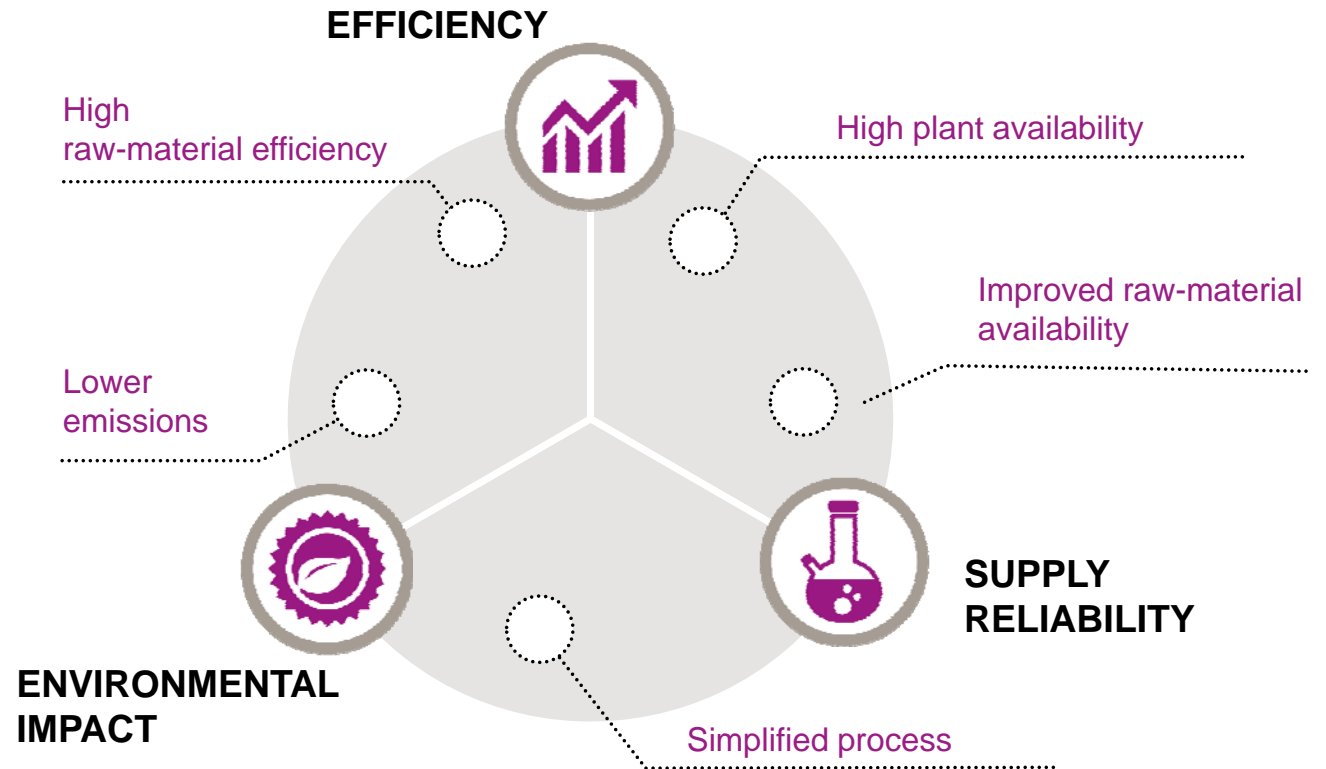
More than 8,000 hours of pilot production prove that all development goals were reached

PRODUCT QUALITY

MMA produced with LiMA can be used even for most demanding optical applications

BEST IN CLASS

in efficiency, environmental impact, and raw-material availability





EVONIK

POWER TO CREATE