



# Bio-based Process Development with Artificial Intelligence

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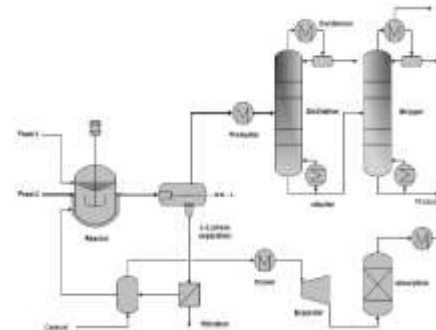
## FROM

- Known chemistry
- Physical properties (often incomplete)



## USING

- Human + Artificial Intelligence (PROSYN<sup>®</sup>)
- Process Intensification
- Process Integration
- Process Simulation/Optimization

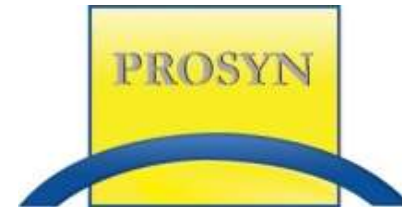


## TO

- Alternative process designs
- Mass and energy balances
- Production cost (Capex + Opex)
- Sensitivities

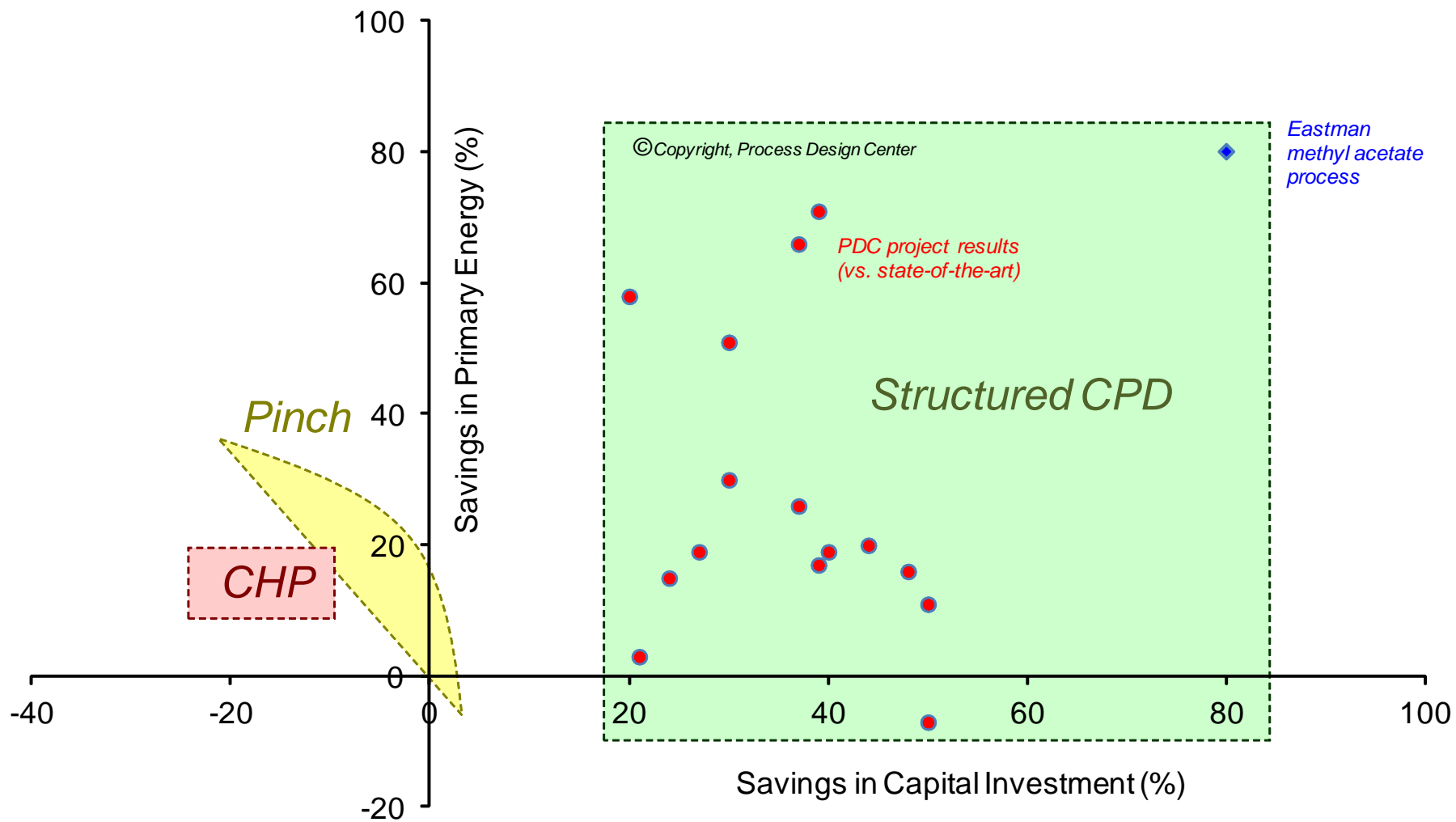


- Started in 1980s
  - Prof. Simmrock (TU Dortmund) consortium BASF, Bayer, Degussa, Hoechst, Hüls
  - Academic software
- PDC/Keuken & de Koning (> 1996)
  - Successfully applied PROSYN<sup>®</sup> in industrial projects
- Major investments in IT (> 2010)
  - Further professionalization
  - Transfer to new platforms (web-based in the cloud)
  - Currently more than 300 man years invested
  - New and extended modules
  - PROSYN<sup>®</sup> workshops
  - PROSYN<sup>®</sup> services & licensing



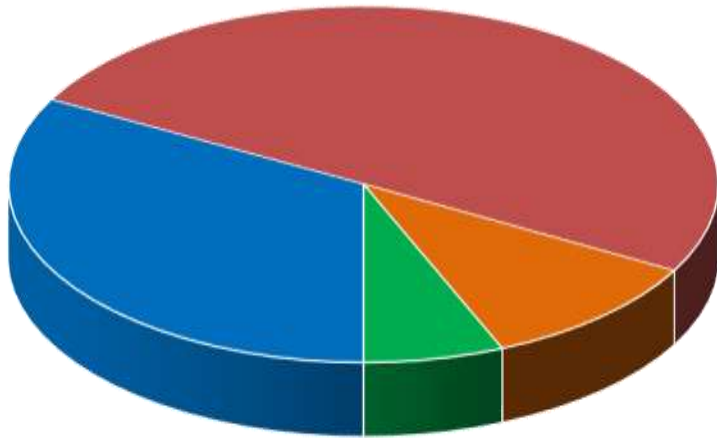


# PDC's re-design track record



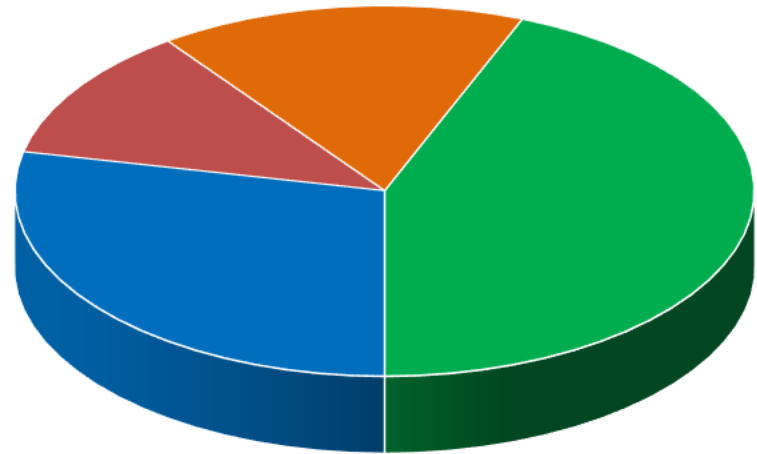


# Increase in Bio-based turnover



■ (Petro)chemical ■ Energy ■ CCS/CCU ■ Biobased

**< 2010**



■ (Petro)chemical ■ Energy ■ CCS/CCU ■ Biobased

**> 2010**



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