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POWER-GEN Europe 2015
CIMAC panel discussion
Load pick-up capability Power2
Comparison 1-stage vs. 2-stage turbocharging

- Determined on GE Jenbacher J624 engine
- Nominal load:
  - 1-stage: 4,020 kWel
  - 2-stage: 4,400 kWel
Load pick-up capability Power2 & VCM 2-stage turbocharging & variable inlet valve combined

Calculated for high-speed gas engine, port injection & 2-stage turbocharging

Full load: earlier IVC to gain engine efficiency & enabling increased cylinder compression ratio
Load pick-up capability Power2 & VCM
2-stage turbocharging & variable inlet valve combined

Calculated for high-speed gas engine, port injection & 2-stage turbocharging

Full load: earlier IVC to gain engine efficiency & enabling increased cylinder compression ratio

Optimized filling at lower part load with later IVC

Later IVC (= «less Miller»)
Earlier IVC (= «more Miller»)
Fuel savings with 2-stage Power2 – a worthwhile technology also for peaking?

Benefits for a 5 MW gas engine:

<table>
<thead>
<tr>
<th>Rhrs p.a.</th>
<th>3,000h</th>
<th>3,000h</th>
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<tbody>
<tr>
<td>Engine eff. improvement</td>
<td>+2% pts (Power2)</td>
<td>+3.5% pts (Power2 &amp; VCM)</td>
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<tr>
<td>Electr. outp.</td>
<td>5MW</td>
<td>5MW</td>
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<tr>
<td>Fuel savings *)</td>
<td>€ 60,000</td>
<td>€ 105,000</td>
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*) base efficiency: 44%
gas price € 0.04 / kWh

Plus potential to increase bmep and optimise further!

➡️ Even for a peak shaving application with 3,000 rhrs p.a. the fuel cost saving for the operator is substantial
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