INVESTOR SUMMARY

THE OPPORTUNITY

Large internal combustion engines (ICEs) – marine and stationary – are responsible for massive CO_2 emissions. Regulations (EU ETS, FuelEU Maritime, IMO) are tightening rapidly, creating a **global, urgent need** for practical CO_2-reduction solutions.

Pumpcharger AS has developed a **simple, low-risk, high-impact** technology that enables:

- ~99% CO_2 capture
- Zero NOx
- 4-10% lower fuel consumption
- Retrofit capability for existing engines
- CO_2 capture cost of 900-1000 NOK per tonne CO_2

This is ~40% less expensive than amine-based capture and requires **no chemicals**.

THE TECHNOLOGY

Pumpcharger replaces atmospheric air with a controlled mixture of O_2, CO_2 and H_2O (“synthetic air”). The engine operates normally, but the exhaust contains only **CO_2 and H_2O**, enabling **direct CO_2 capture by condensation**.

Key advantages:

- Uses only commercial components
- The only change is synthetic air
- No new materials or chemistry
- Low technical risk
- Compatible with existing engines
- Scalable from 1–90 MW

This is a **practical, near-term decarbonization solution**.

MARKET SIZE

Segment	Estimated units
Stationary engines	~ 1,000,000
Marine engines	~ 80,000
Heavy-duty engines	Millions

BUSINESS MODEL

Pumpcharger AS will generate revenue through:

- sale of synthetic-air systems
- retrofit packages
- licensing to engine builders
- service and maintenance
- CO_2 capture modules
- future high-O_2 performance upgrades

The model scales globally with low marginal cost.

COMPETITIVE ADVANTAGE

Cost: 900-1000 NOK/t CO_2 vs. 1500-1700 NOK/t CO_2 for amine

Simplicity: no chemicals, no absorber towers, no regeneration heat

Retrofit: works with existing engines

Regulatory fit: directly aligned with EU ETS, FuelEU Maritime, IMO

Performance gains:

- 2–5% absolute efficiency improvement
- 5-10% higher power output
- 4-10% lower fuel consumption

Zero NOx: unique advantage in ECAs and coastal zones

This combination is unmatched by any competing technology.

TRACTION AND READINESS

- Patent filed: **PCT/NO2025/050140**
- TRL 5 completed
- TRL 6 and 7 planned within 12 months
- Strong interest from engine builders and maritime operators
- Clear pilot candidates after TRL 6

FINANCIAL IMPACT (20 MW example)

- CO_2 emissions avoided: ~95,000–100,000 tonnes/year
- CO_2 tax savings (1,500 NOK/t): ~140-150 MNOK/year
- Fuel savings: ~10-30 MNOK/year (18% reduction, 9000 NOK/t)
- Net benefit per engine (tax savings+fuel savings-capture cost: ~60–90 MNOK/year

WHY INVEST NOW

- Regulatory pressure is accelerating
- Market is enormous and underserved
- Technology is low-risk and near-commercial
- Norway has a unique competitive advantage
- Internationally patentable according to Patent Cooperation Treaty (PCT)
- TRL 6 is the final step before pilots and revenue

Pumpcharger is positioned to become a **global leader** in practical CO_2 capture for engines.