

26th World Gas Conference

1 – 5 June 2015, Paris, France

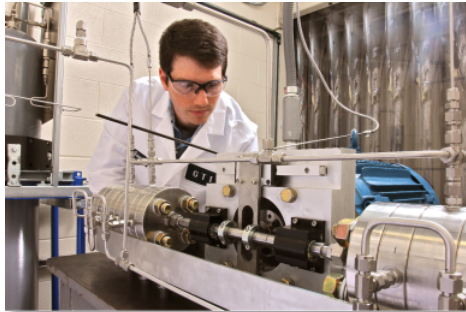


Development of an Inexpensive Free Piston Linear Motor Compressor (FPLMC)

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Project Team



gti[®]

Compressor Design

- > Stage geometry and valve design
- > Compressor fabrication
- > High-pressure testing



CEM

Linear Motor Design

- > Motor topology trade study
- > Motor controls development
- > Motor fabrication and assembly



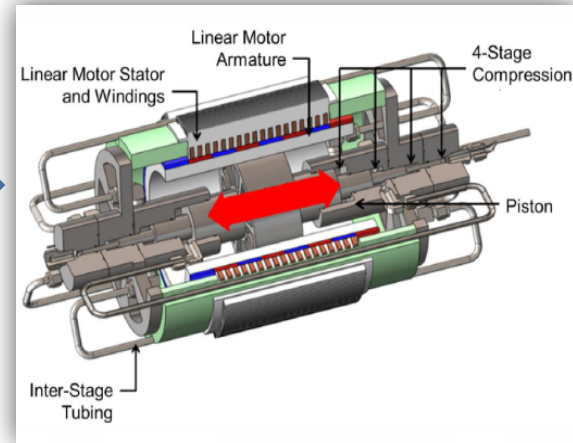
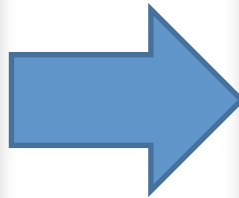
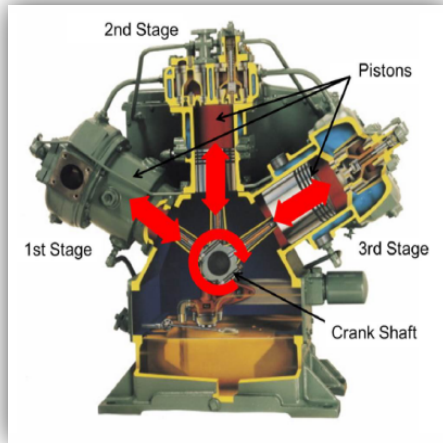
Argonne
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Seal/Coating Development

- > Seal and coating bench testing
- > Target 15,000 hour life

What do we do?

- We replace the motor, crankshaft, connecting rods, crossheads, and piston rods of a traditional reciprocating compressor with a linear motor that directly drives the compressor pistons.

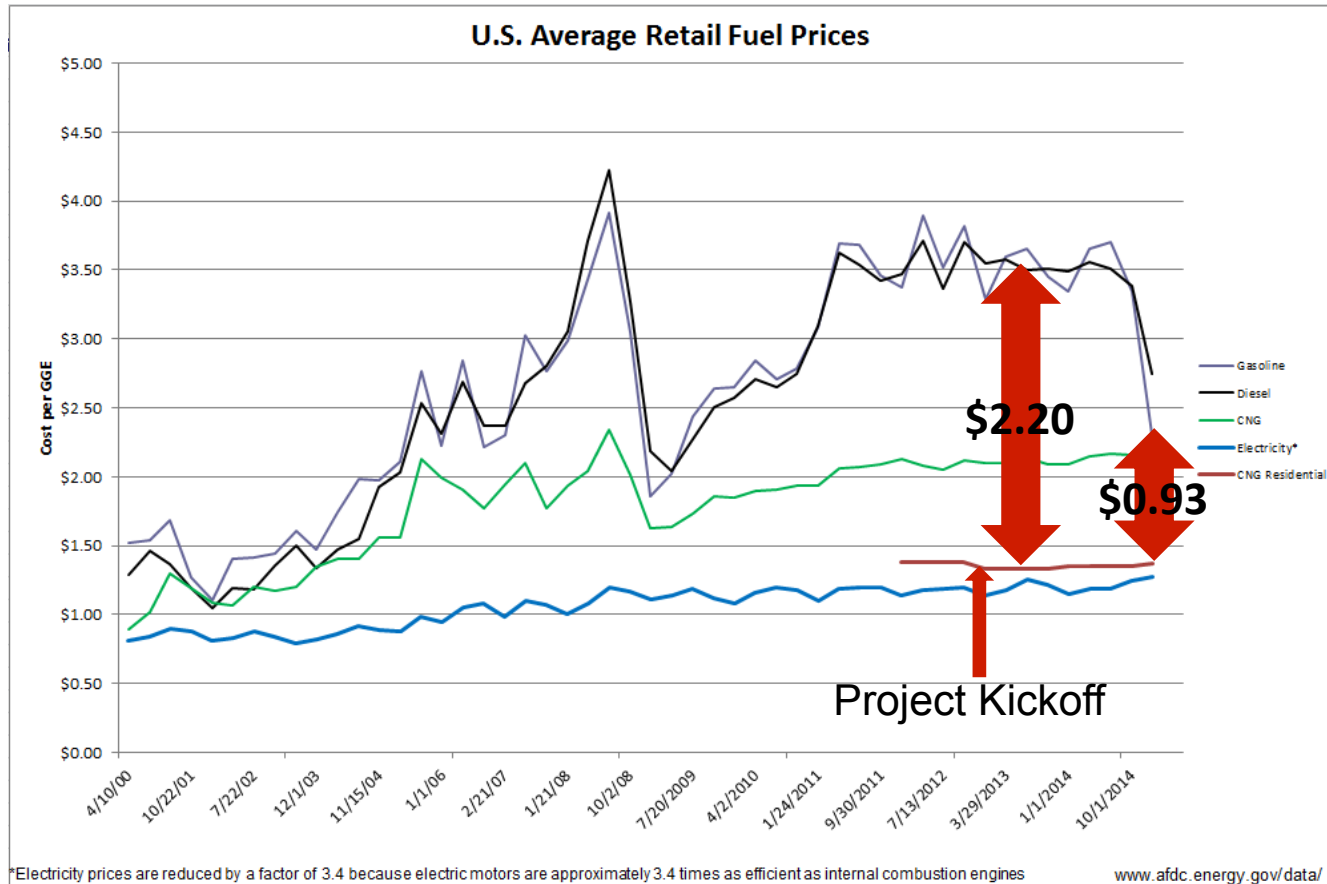


Benefits

- Single moving part
- No oil and lubricants
- Full pressure starts
- Variable flow
- Hermetically sealed
- Increased durability

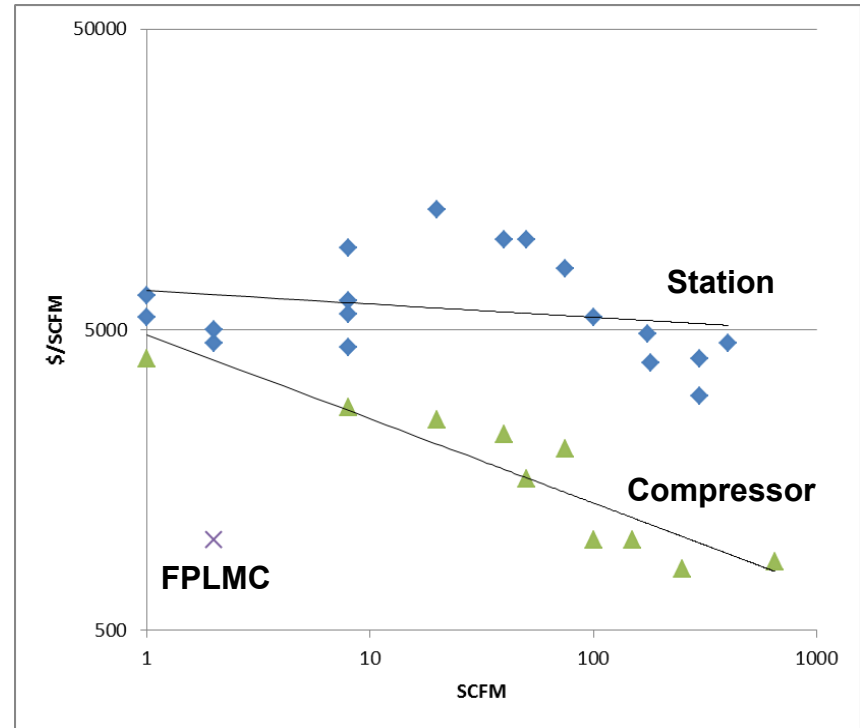


Why do we do it?



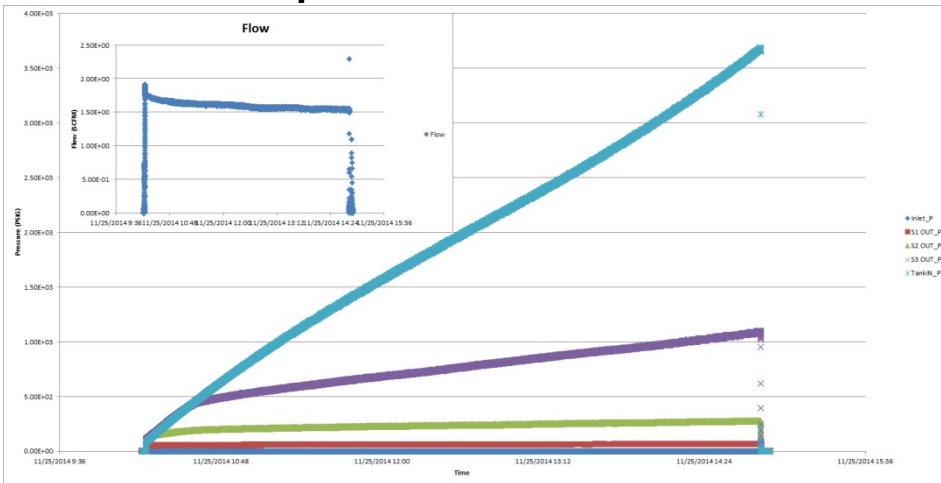
Why do we do it?

- Compressor: \$4,000 - \$550,000
- Dispenser: \$25,000 - \$60,000
- Time-Fill Post: \$4,000 - \$7,000
- Storage: \$70,000 - \$130,000
- Card Reader: \$10,000 - \$30,000
- Gas Dryer: \$10,000 - \$300,000
- **FPLMC Estimate (GTI)**
 - **~\$2000 (\$1000/SCFM)**



Current Status

- Compressor successfully tested at full power up to 3600 psi



Metric	Prototype
Power	~1.7 kW (2.3 HP)
Electric	240 V Single Phase
Flow	2 SCFM (1 GGE/hr)
Inlet Pressure	0.25 PSIG (.1 Mpa)
Discharge Pressure	3600 psig (25 Mpa)
Speed	15 Hz (900 rpm)
Stroke length	1 inch (25.4 mm)
Weight	~150 lbs (68 kg)
Cost	\$2000

Continuing and Future Work

- Complete long term durability testing of the prototype
- Investigate scaling up the design
- Investigate alternative applications to get technology into market and lower cost of adoption



Connect With Us

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