

Innovative financial tool for compressor station retrofits

Global Methane Initiative

April, 2018

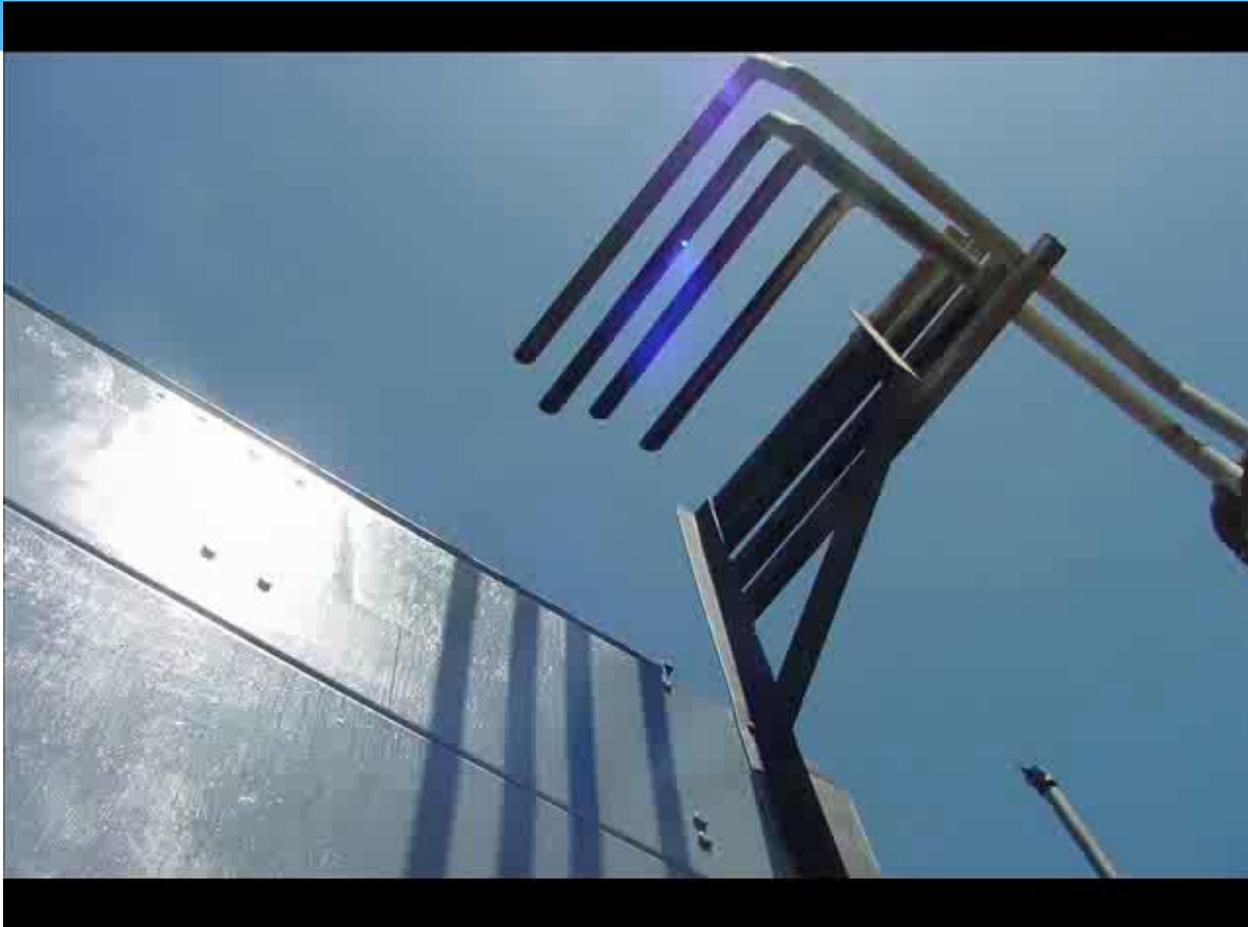
Executive Summary

- Centrifugal compressors equipped with wet seal technology are generally acknowledged as a leading source of methane emissions in the natural gas value chain.
- There are 3 approaches to reduce methane emissions from such equipment
- This presentation showcases a decision support tool that evaluates the three options from an economic perspective.
- The Life Cycle Cost Calculator is a web-based decision support tool that builds on previous work and takes it to the next level. This tool provides economic comparisons of methane reduction options to assist customers in decision making and ensures all factors are considered for individual compressor units, including initial costs, operational savings and emissions reductions.

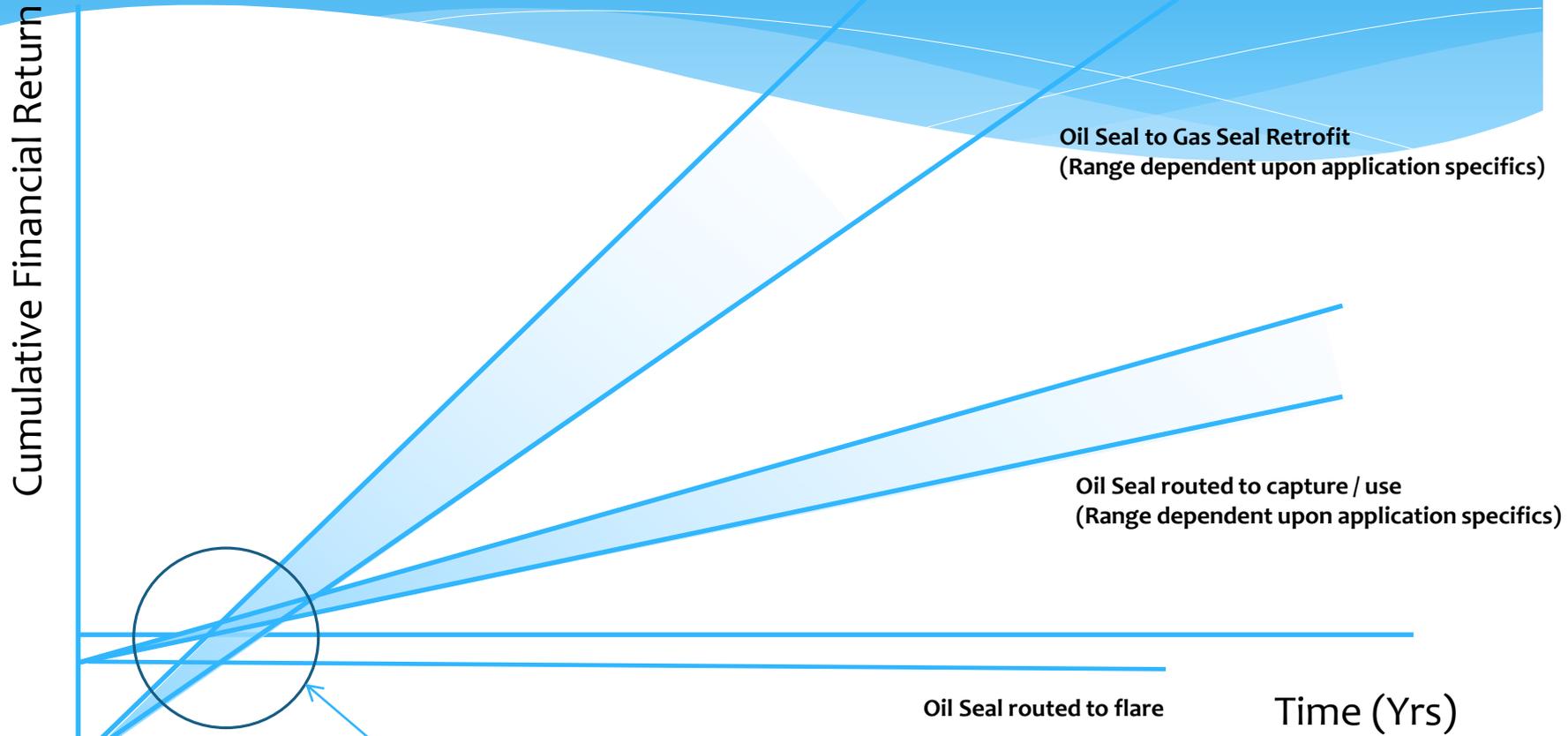
Who is FSA?

- An association of North American companies who manufacture fluid sealing devices and suppliers to process industries.
- Represents over 80% of the manufacturing capacity for fluid sealing devices in North America.
- Member companies and distributors have manufacturing and service centers in all 50 States, Canada and Mexico.
- FSA partners closely with the European Sealing Association (ESA).
- Industry represents engineers, machinists, technicians, laborers...

Our mutual objective

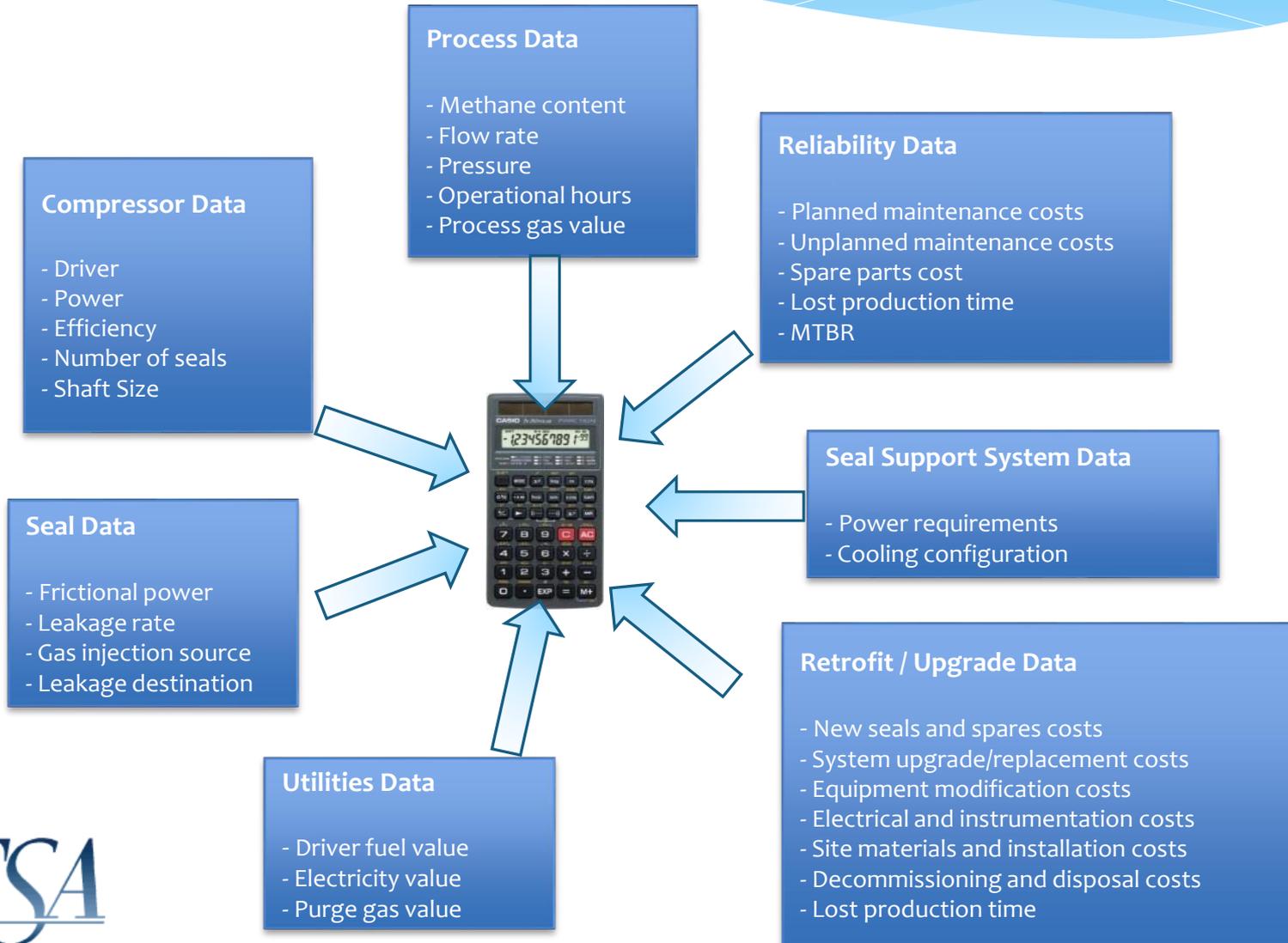


Economic Payback



The role of Lifecycle Cost Calculator

Life Cycle Cost Calculator



Life Cycle Cost Calculator Outputs

Costs Calculated

Annual Operating Costs

- Maintenance cost
- Value of leaked gas
- Consumables
- Energy consumed by seal
- Energy consumed by seal system

Total Life Cycle Cost

One-Time Costs

- Total retrofit costs
- Payback

Present Value

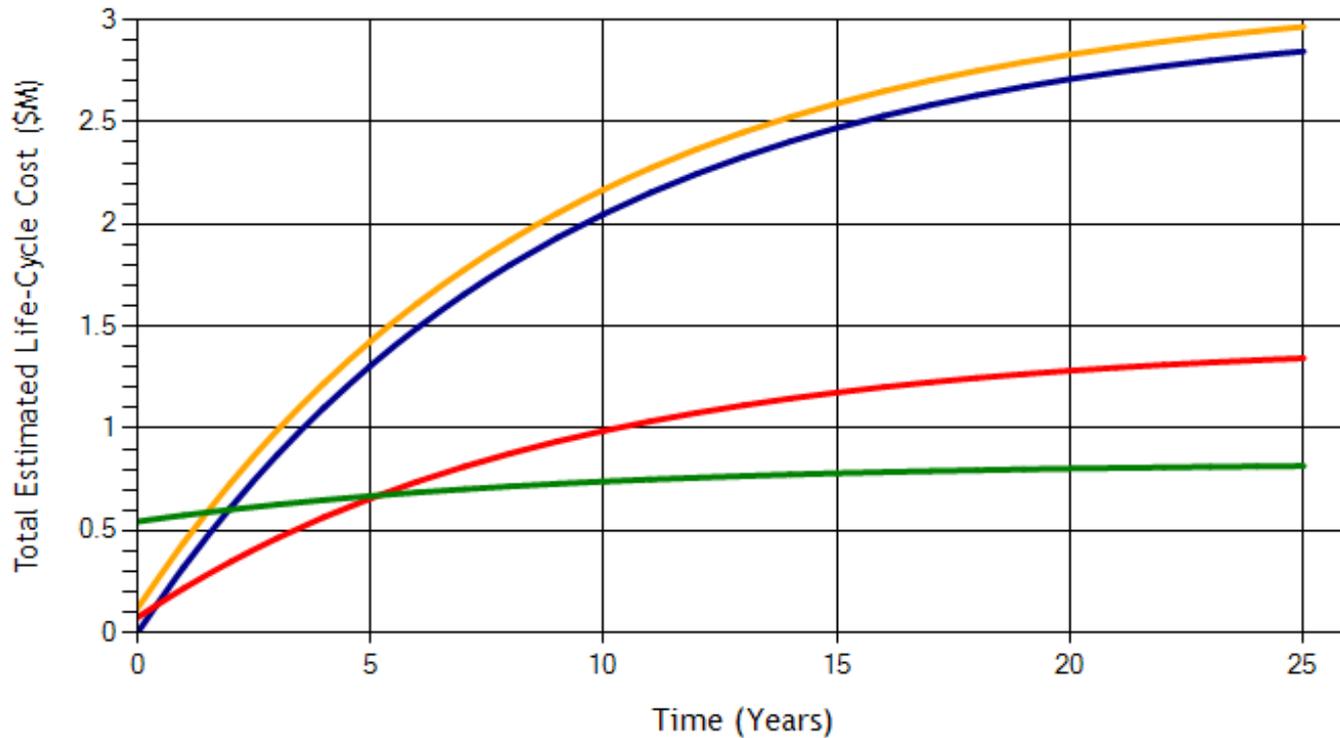
- Present value of annual operating costs over lifespan remaining

Pipeline compressor

Natural Gas:	96% Methane \$3.00 / Mcf
Flow:	50,000 scfm (1416 m ³ /min)
Pressure:	600 psig (41.3 Barg) Suction 1,100 psig (75.8 Barg) Discharge
Shaft Speed:	9,000 RPM
Driver:	Gas Turbine 10,500 hp (7,800 kW)
Shaft Diameter:	5" (127 mm)
Operational hours:	4,000 hr/year (167 days/year)
Spared:	Yes

Illustration Outputs

Life Cycle Cost versus Time



— Oil Seal Routed to Atmosphere — Oil Seal Routed to Capture/Use — Gas Seal
— Oil Seal Routed to Flare

Illustration Outputs

Life Cycle Cost versus Time

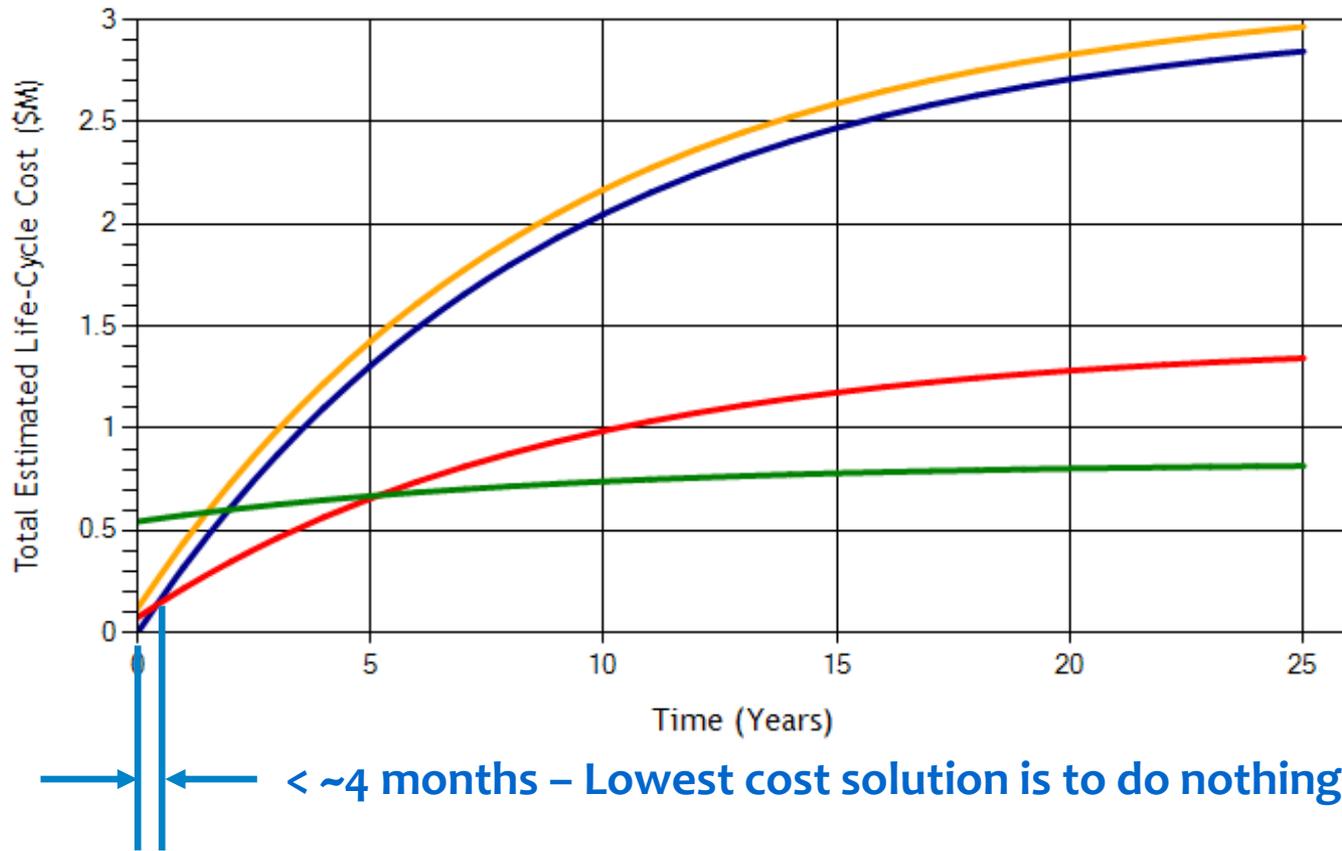
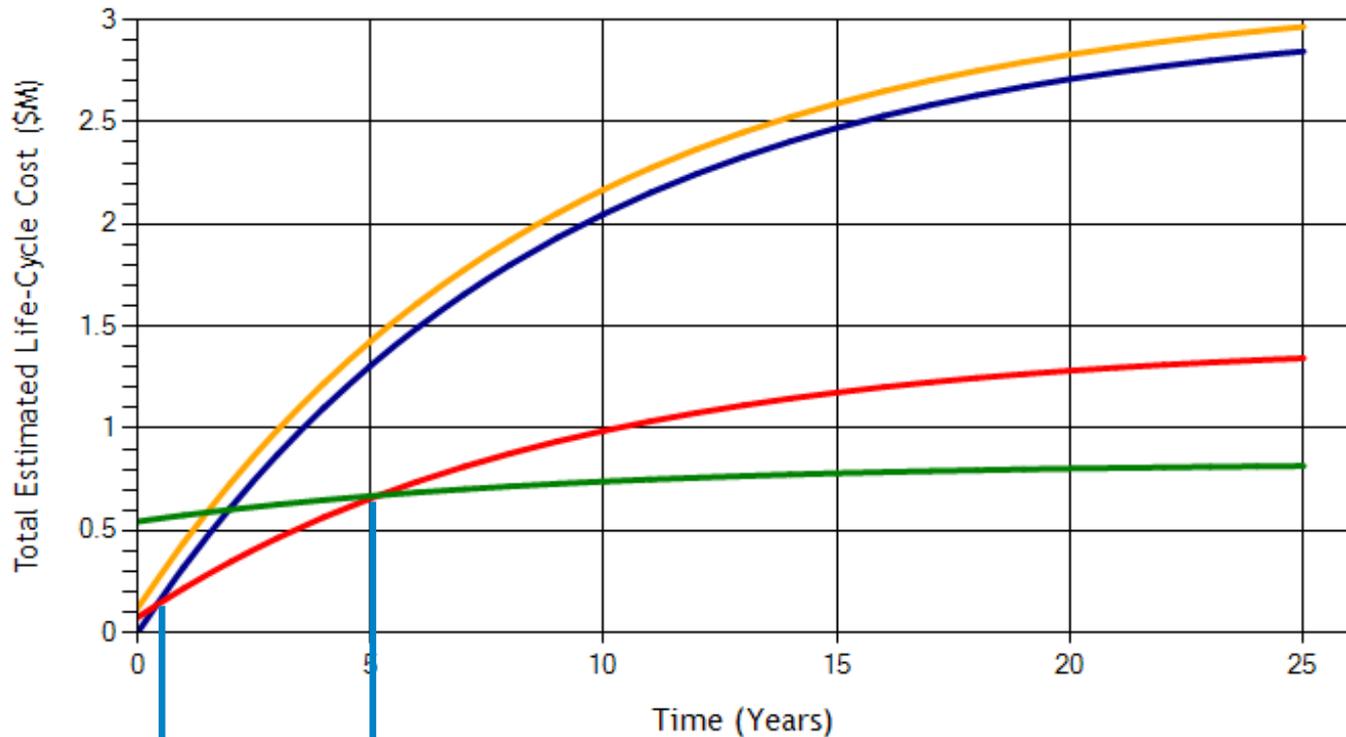


Illustration Outputs

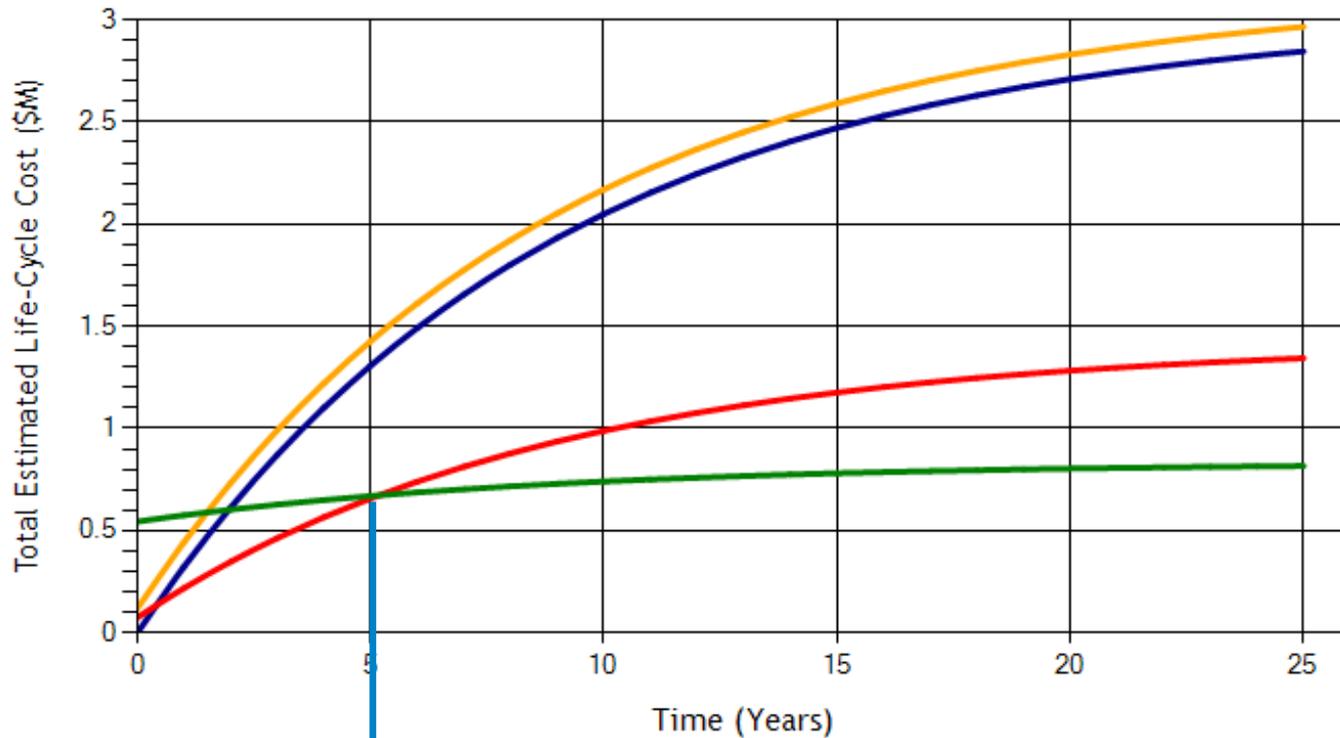
Life Cycle Cost versus Time



4 months to 5 years – Lowest cost solution is oil seal with leakage routed to capture/use

Illustration Outputs

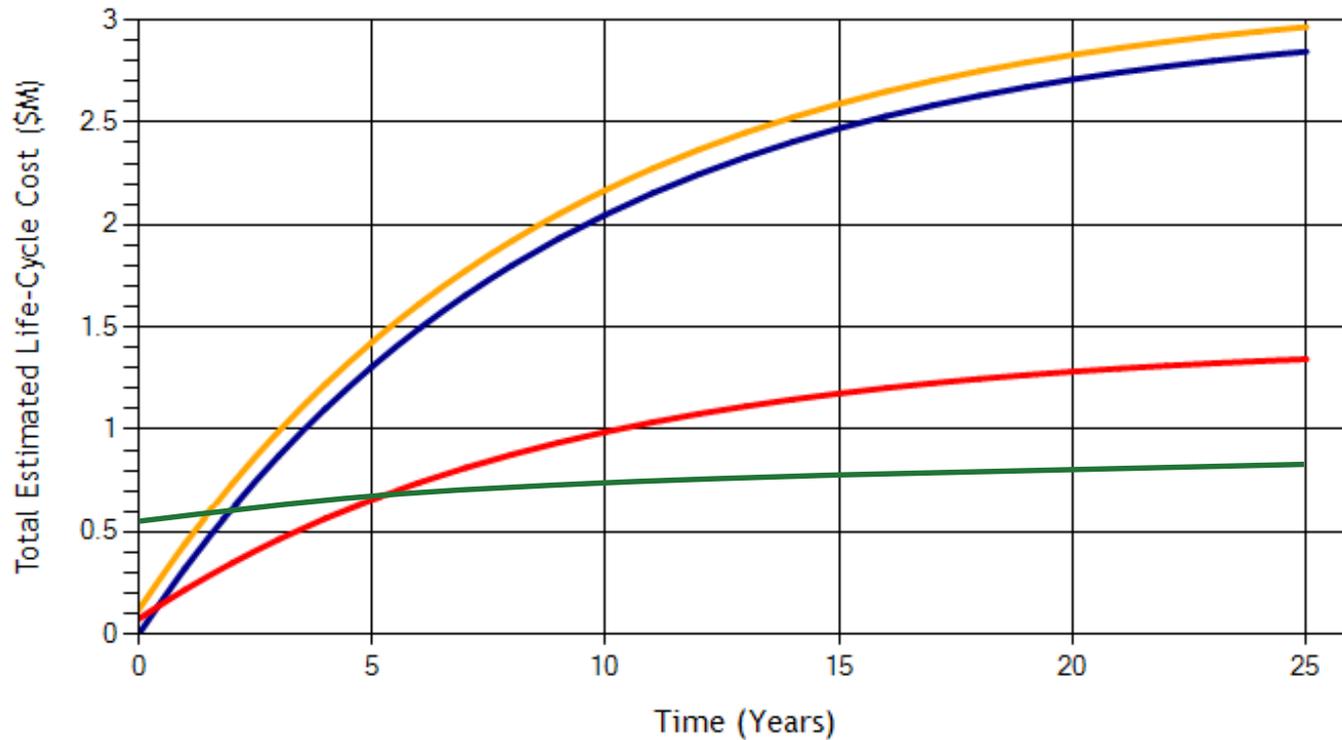
Life Cycle Cost versus Time



> 5 years – Lowest cost solution is gas seal

Illustration Outputs

Life Cycle Cost versus Time



— Oil Seal Routed to Atmosphere — Oil Seal Routed to Capture/Use — Gas Seal
— Oil Seal Routed to Flare

Concluding Comments

Select FSA members are exploring innovative commercial arrangements to reduce initial retrofit costs to optimize the retrofit solution in return for a share in future savings....

... The Lifecycle Cost Calculator provides decision support that is:

Insightful
Comprehensive
Customizable
Specific

Further Information

Accessing the Gas Compressor Lifecycle Cost Calculator is free



www.fsaknowledgebase.org
(Requires free user account to access)

Further Information

Fluid Sealing Association

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