

Gear change proves greener and cheaper

Value Case Study



Reliability and operability

Project: NIA_NGGT0072
 Portable Valve Actuation
PEA cost: £97k
Duration: 8 months
Supplier: Premtech
PEA benefits: £340k per 5 valves
Benefits realised: £640k

£40k

cost savings with each gearbox

£640k

cost savings realised to date

Background

The National Transmission System (NTS) contains more than 3,000 large diameter valves, which are fitted with gearboxes and actuators. This technology means the valves can be operated remotely or locally to isolate the lines and control gas flow. Powered actuators are used most commonly on the NTS.

They use gas hydraulic, direct gas or electrical power to operate the valve. Some 2,000 of these large diameter valves are classified as non-critical. They are used infrequently, usually to isolate the line for routine operations or during maintenance. The maintenance, inspection and repair of the actuators on these non-critical valves can be time consuming and costly.

What's new?

A Network Innovation Allowance (NIA) project looked at the practicality, technical implications, operational benefit and whole-life cost of replacing permanent actuators on non-critical valves with other forms of valve movement.

It was found that a manual replacement for powered actuators – in the form of high-efficiency gearboxes – would provide a cost-effective solution.

Gearboxes allow the valve to be operated manually so the flow of gas can be managed within the pipeline. High-efficiency gearboxes reduce the turns

and rim pull (the amount of force that must be applied to the handwheel rim to open or close the valve) required to operate a valve, so the job can be done quicker and easier than traditional gearboxes.

The benefits

High-efficiency gearboxes are also cheaper to purchase and install. Compared with a local gas hydraulic actuator, costs are cut by £40k when a gearbox is used. Some 16 high-efficiency gearboxes have been installed so far on the NTS, saving a total of £640,000. With more gearboxes planned to be installed this year and next, these savings will continue to grow.

5.5
tonnes CO₂

avoided over the lifetime of
a high-efficiency gearbox

88
tonnes CO₂

avoided over the lifetime of the
high-efficiency gearboxes
installed to date

*With more
gearboxes planned
to be installed this
year and next, these
cost savings will
continue to grow.*

Maintenance requirements are significantly cut, too. In many cases, these gearboxes are designed to be virtually maintenance-free. The need for a separate control cabinet, which comes with powered actuation, is also avoided.

High-efficiency gearboxes also cut the time involved in operating the valve. With the number of turns needed to close the valve reduced, operators can finish the job 60-70% faster than before. This could bring significant safety benefits, particularly in emergency situations.

Environmental benefits are also achieved. Local gas hydraulic actuators use high-pressure gas to provide the energy needed to power the hydraulics. This causes a release of gas on each actuation - equivalent to 5.5 tonnes of CO₂ over the life of a single actuator. The hydraulic oils used in local gas hydraulic actuation consist of a range of chemical compounds which, if there is a spill or leak, can enter the environment, potentially affecting the surrounding soil and groundwater. By fitting high-efficiency gearboxes, the environmental risks associated with the use of hydraulic oils are completely avoided.

