CLoCCing on

A new National Grid innovation project is helping smaller, indigenous gas producers connect to the NTS in under 12 months for less than £1 million

Historically, national transmission system (NTS) connection applications were submitted for large scale entry/exit connections or to facilitate storage. However, more recently National Grid has been receiving enquires from smaller unconventional gas producers. These smaller gas producers are generally fast to market and the connection costs make up a large proportion of their total development budget. With a current minimum offtake connection (MOC) costing up to £2 million and taking up to three years to deliver, these smaller gas producers is currently find it challenging to connect to the NTS.

Project CLoCC (Customer Low Cost Connections) aims to reduce the cost of a connection to less than £1 million and the timescale (from initial enquiry to "gas on" date) to less than a year. These core objectives are being tackled through three separate project workstreams:

1) Development of an online customer connections portal
2) Innovative connection design solutions
3) Commercial optimisation

Within this article we will further discuss our technical workstream, led by Premtech.

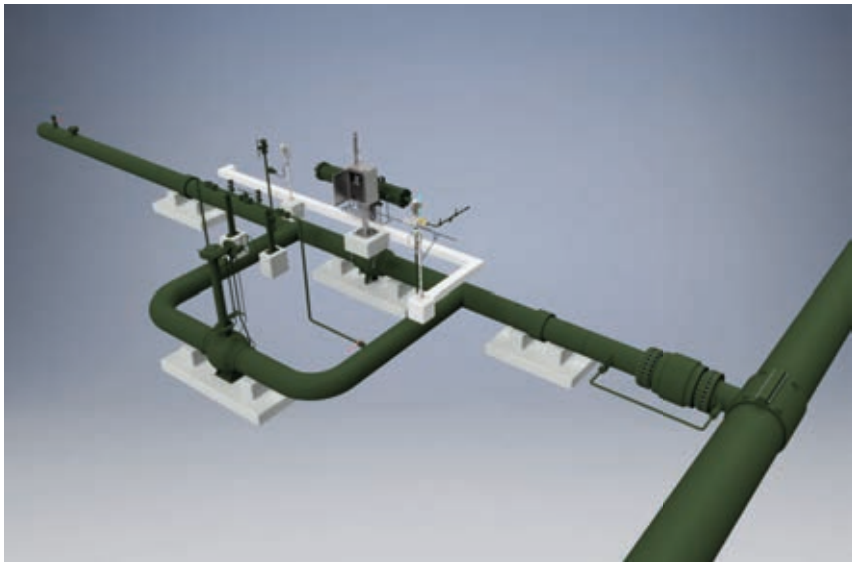
MODULAR DESIGNS

One way of reducing both the cost and time of a connection can be through the use of modular designs. Modular designs can be seen on UK gas installations in the form of pressure reduction skids and packaged boiler houses. Modular designs are also used within the US gas industry as these can decrease construction time of large pipework packages. Decreasing the construction time of the pipework is particularly useful in the US gas industry as gas producers like to extract the gas as soon and as quickly as possible. However, in these scenarios less 'optimised' designs may need to be used.

Modular designs can also provide additional benefits during planned and unplanned maintenance routines as whole modules can be replaced or bypassed during maintenance. Modular designs also reduce the number of interfaces and hence the number of compatibility and communication issues that may be faced. This inherently increases the quality and consistency of the end product, as whole modules can be pre-tested off site.

Unlike a bespoke design, modular designs can also be scalable and 'stacked' to meet the needs of the customer, i.e., if a customer required extra filtration due to an increase in flow rates then an extra filter module can be easily accommodated within the pipework.

By producing a standard, pre-



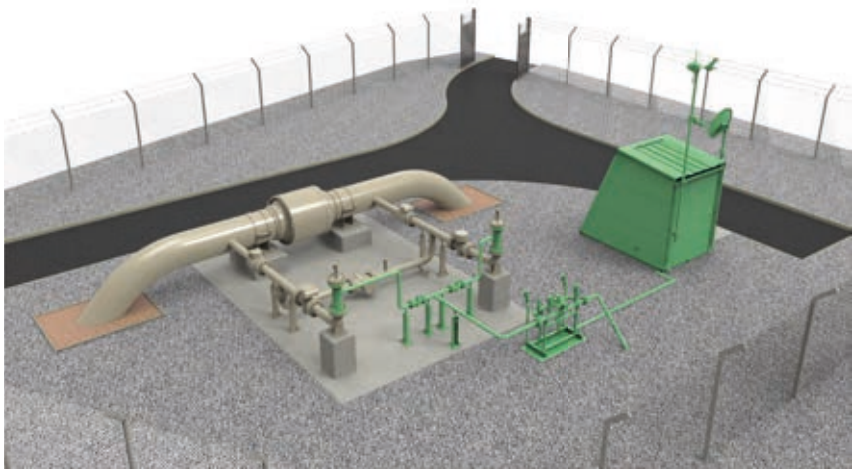


FIGURE 1 **A side by side comparison of a traditional buried MOC (above) and a CLoCC MOC (below)**

approved and appraised modular design, the need for site-specific design costs is reduced, thereby reducing the final cost of the connection to a customer.

CHALLENGES

One of the major problems encountered within the project was the need to provide power to the MOC module. Typically, an electrical connection is provided by the local district network operator (DNO), but these are very costly and can take some time to establish depending on site proximity to the electrical distribution network. As reducing both time and cost of the total connection are the overriding aims of Project CLoCC, it was necessary to consider alternative power sources.

One option is to utilise the renewable power kiosk that has been developed under National Innovation Allowance (NIA) funding. This kiosk is outfitted with both solar panels and a small wind turbine that can be used to charge a bank of batteries within the kiosk. These batteries then power the internal telemetry and communications systems.

The renewable kiosk in terms of whole life cost is a much cheaper alternative to the standard telemetry kiosk and DNO connection. At this stage, the renewable kiosk is undergoing further testing. If successful, the intention is for it to be used within business as usual. As the required testing needs to be undertaken over a winter period, the conceptual design and most of the detailed design phase of the project will have concluded long before final approval of the kiosk. This delay in approval causes some design challenges relating to actuator choice for the MOC design.

Up until recently, valve actuators have had to be compliant with National Grid specification T/SP/VA/1 or VA/2. These actuators require circa 240v DC at 200mm NB to be operated. Recently, a new specification for electro-hydraulic actuators, T/SP/VA/4, has been released. Actuators compliant with this specification only require circa 24v DC to be operated.

The renewable kiosk has a limited number of batteries, and therefore a limit on the amount of energy that can be stored. As the power requirements for a purely electric actuator vary with the valve size, a large sized valve would provide an energy drain on the renewable kiosk or rule it out completely. On the other hand, the new electro hydraulic actuators convert electric energy to stored hydraulic energy over a longer period. This suits the use of the renewable kiosk very well. However, there are currently no VA/4 actuators approved for use by National Grid, whereas actuators to VA/1 and VA/2 are widely seen within the gas industry. Fortunately, with the renewable kiosk requiring further trials, this affords the project the opportunity to test VA/4 actuators alongside the kiosk. Subject to both the kiosk and VA/4 actuators passing the additional tests required of them, the project can look to include them within the finalised designs where practical.

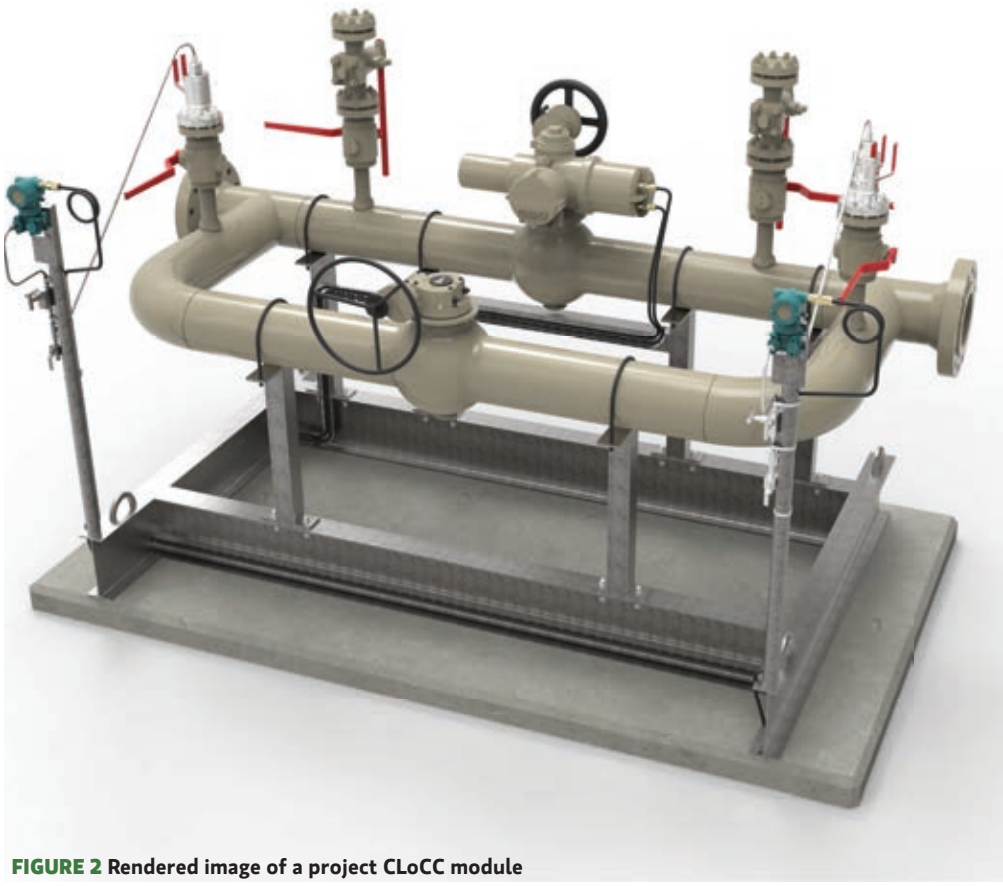


FIGURE 2 Rendered image of a project CLoCC module

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COST SAVING BENEFITS

When any new connection is made to the NTS, National Grid currently specifies that a remote operable valve (ROV) be included. The project has engaged with the relevant departments in National Grid and the distribution networks (DNs) through stage one and into stage two of the project to establish the history and reasons for the installation of a ROV at a minimum connection site.

Project CLoCC has taken this as an opportunity to simplify the connection with the removal of the remote operability function of the connection isolation valve at the minimum connection. Two sets of standardised designs are being developed by the project, one including an ROV and one without. The ROV function is not classified as a safety device, the valve

FIGURE 3 Renewable kiosk

only being closed upon request by National Grid GNCC (Gas National Control Centre) or the customer. Therefore, the need for remote operability was open for challenge and is currently under discussion.

Removing the ROV functionality not only removes the cost and complexity of an electrically powered actuator and remote control system, it also removes the need for the onsite telemetry kiosk to transmit signals to and from GNCC.

The metering and gas quality signals required by GNCC instead will need to come from the customer's own telemetry system. Ongoing discussions within National Grid are taking place on the feasibility of introducing this concept. A greatly simplified minimum connection design with significant cost savings has been achieved and could be offered due to this opportunity.

> By offering greater customer connection flexibility, Project CLoCC aims to open up the NTS network to non-traditional NTS customers

Once the outputs of Project CLoCC are delivered into National Grid for "business as usual" it is envisaged that for entry customers a connection with a ROV will be offered due to the additional gas quality risks of gas entering the NTS. However, for exit customers a connection without a ROV may be offered subject to the outcome of an appropriate risk assessment in order to reduce customer costs. Exit connection conceptual designs have been produced as part of Project CLoCC in order to show the extent of this achieved simplification in design.

For many of the gas producers identified by the project, connecting to the NTS will be of more benefit as despite the higher pressures (and therefore higher pressure costs) there are less restrictions on gas quality for the NTS. Connections to the NTS only require that the gas meets GS(M)R requirements, and not the requirements of the Flow Weighted Average Calorific Value (FWACV) process and Gas (Calculation of Thermal Energy) Regulations, as is the case with the DNs. There is also no need to odourise any gas injected into the NTS.

WHAT DOES THIS MEAN FOR THE FUTURE?

Upon successful completion, and delivery into business as usual in late 2018, gas producers will be able to connect to the NTS for less than £1 million and within 12 months should their flow requirements fall within the CLoCC asset capabilities.

By offering greater customer connection flexibility, Project CLoCC aims to open up the NTS network to non-traditional NTS customers. We aim to increase customer choice by directly aligning to project feedback received by our supportive stakeholders. ■

■ **To learn more visit:**
www.ProjectCLoCC.com

FIGURE 4 Simplified MOC