# **ASX** Release



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## **Dougga Gas Condensate Project Update**

ADX Energy Ltd (ASX Code: **ADX**) has made significant progress on the definition of its Dougga Gas Condensate Project offshore Tunisia. Key recent achievements are summarised as follows:

3D Geological Modelling incorporating fracture modelling indicates a 103% increase in Gas In Place "GIP" estimates. This increase is expected to result in a positive revision of recoverable resource estimates for the discovery.

- Agreement by ADX and its National Oil Company partner ETAP to vary the Kerkouane work program from the acquisition of 3D exploration seismic and the drilling of an exploration well to the drilling and productivity testing of updip Dougga (called Dougga Sud) enabling the drilling of the Dougga Sud to determine the productivity of the Abiod reservoir, the updip volumes identified on 3D seismic and the condensate content of the gas.
- Expressions of interest for a rig option to drill the Dougga Sud ("Dougga-South") well have yielded very positive responses in terms of rig capability and day rate for late 2017 to early 2018.
- Preparation of an application for the second renewal of the Kerkouane license which contains Dougga. The three year renewal will include a 36% relinquishment of the exploration block and the commitment to a future exploration well. The relinquishment area does not impact the Dougga gas discovery, the Kerkouane gas discovery or the remaining exploration prospectivity of the block.
- The presentation to the Tunisian Authorities of the Dougga Development Concept Study with technical outcomes by TechnipFMC. As predicted by ADX, a subsea tie back to an onshore gas plant is the most desirable technical and commercial option. Study derived capital costs and schedule estimates will be available in mid June.

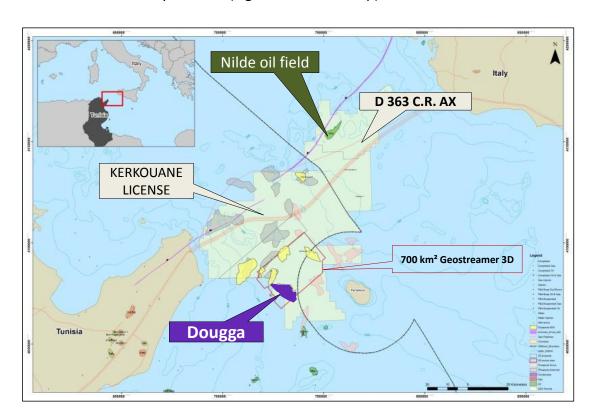
ADX intends to bring together this work to define the appraisal and development potential of Dougga in July 2017 with a view to securing either a farmin partner or a financial partner to participate in Dougga Sud well.



#### New Reservoir Studies Resulting in a 103% increase in Gas in Place.

ADX has concluded a detailed reservoir study of the offshore Dougga gas condensate field with the objective to conduct reservoir simulation studies and optimally place future production wells. An additional important outcome of this work is a new so called "gas in place" resource estimate which is expected to result in a significant 103% contingent resource increase relative to previously announced figures for the 2C case of 173 mmboe (Table 1, further below) if similar recovery factors were applied. The previous resource figures were based on a more basic volumetric assessment, undertaken both by ADX and third parties. Once reservoir simulation studies are completed ADX will announce the resulting new contingent recoverable resources.

The new Dougga 3D geological model has incorporated a fracture model which is the result of new insights gained by ADX in its recent Nilde oil field studies. Nilde is situated approximately 70 km to the northeast from Dougga on the same structural trend on the Italian side of the Sicily Channel (Figure 1 location map).

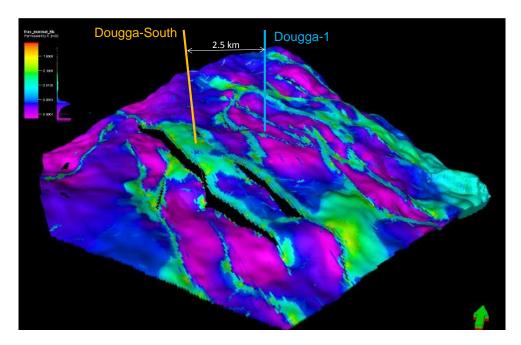


**Figure 1:** Location map of ADX offshore Sicily Channel acreage. Dougga gas condensate field is within the Tunisian Kerkouane license

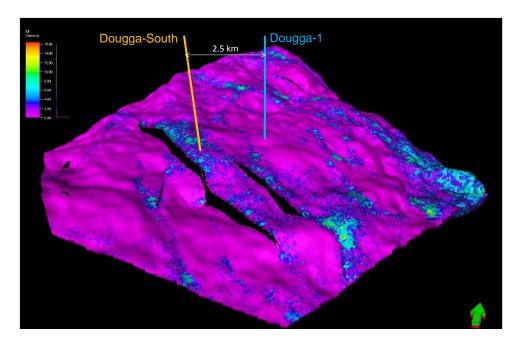
The fracture prediction work has been undertaken by an Italian consultancy group which is highly experienced in the Sicily Channel area and with fractured carbonate reservoirs in general. The same consultancy group also undertook the Nilde fracture and structural



modeling work. Figures 2a and 2b show 3D visualizations of the fracture permeability and fracture connectivity at the top of the main Abiod gas condensate reservoir.



**Figure 2a:** Top Abiod reservoir 3D structure showing (relative) vertical permeability. Green areas and blue colours define areas of relatively higher predicted fracture permeability.



**Figure 2b:** Top Abiod reservoir 3D structure showing (relative) fracture connectivity. Blue colors define areas of relatively higher predicted fracture permeability, such as around proposed Dougga-South well location.



In addition to the fracture modelling a 3D geocellular model was created (using Schlumberger - Petrel software), together with an updated petrophysical and structural model, incorporating 3D seismic derived reservoir attributes.

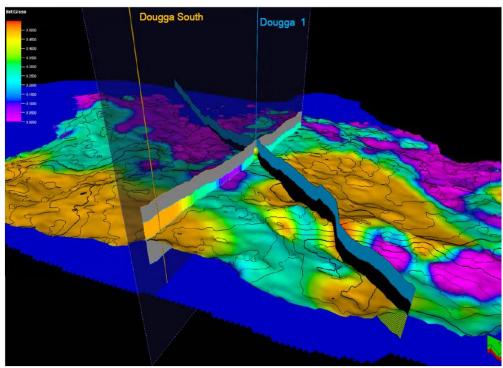
As a consequence of this work, a fully integrated 3D model has been created enabling future reservoir simulation and optimum well placement.

A more accurate estimate of in place resources for the proven Abiod reservoir has been achieved by integrating the 3D seismic structure and seismic attributes (seismically derived indication of reservoir quality) with petrophysical data. Figure 3 is a 3D image of the top Abiod reservoir structure with colors showing potential reservoir (matrix) sweet spots derived from geological modeling in conjunction with 3D seismic attributes.

An additional important outcome of the work undertaken was a more accurate estimation of gas and liquid resources. Table 1 shows the previously ASX announced contingent resource figures. The corresponding GIIP (gas initially in place) figure for the previously announced 2C case of 173 mmboe has increased by 103%. A significant part of the increase is due to the incorporation of fracture volumes and the 3D seismic derived Abiod net pay map (Figure 3).

The new 3D model predicts that the highest fracture densities and connectivity can be expected in the compartment targeted by the proposed well Dougga Sud (or South) well. A combination of good fracture density and connectivity could facilitate very high gas condensate flow rates.





**Figure 3:** Top Abiod reservoir 3D structure showing proposed Dougga-South appraisal well location and Dougga-1 discovery well which is approximately 300 meters further downdip. Lateral distance between wells is approximately 2500 meters. Colors show net Abiod reservoir section, based on 3D geological modeling constrained by seismic attributes. The best expected Abiod reservoir sections (matrix) coincide with orange colors, blue to purple areas are relatively lower net Abiod reservoir section.

DOUGGA CONTINGENT RESOURCES	<b>1</b> C	2C	3C
Total Oil Equivalent [mmboe]	88	173	268
Liquids: Condensate & LPG [mmbls]	47	91	142
Sales Gas [bcf]	264	517	804

Table 1: Previously ASX announced Dougga contingent resources

CONTINGENT RESOURCES DEFINITION Refer to ASX announcement by ADX dated 26/9/2012. Contingent Resources: those quantities of petroleum estimated, as of a given date, to be potentially recoverable from known accumulations but, for which the applied project(s) are not yet considered mature enough for commercial development due to one or more contingencies.



As discussed previously, the gas in place volumes calculated from the revised geological model are approximately double the gas in place volumes attributable to the recoverable resources in Table 1. The model predicts that the highest fracture density and connectivity is to be expected to occur in the compartment which the proposed well Dougga Sud will intersect. The predicted combination of good fracture density and connectivity could facilitate very high gas flow rates at this location.

## **Work Program Variation.**

The agreement by ETAP to vary the work program from the previous commitment of 500 Km2 of 3D seismic and an exploration well to the drilling and testing of the Dougga Sud well is a very important enabler to source a funding partner and progress the appraisal of the Dougga area resources with a view to determining the resource and productive potential of the prognosed 600 m thick Abiod reservoirs.

## **Drilling Rig Expressions of Interest**

ADX circulated expressions of interests (EOI) to 11 Drilling Rig providers determined to have the necessary capability and availability to provide a drilling rig capable of drilling and testing the Dougga Sud well to a total 3100 m subsea in a water depth of 330 m. ADX has received an excellent response from a number of high specification rigs at attractive commercial rates. ADX is currently in a process of technical and commercial clarification with a number of parties with a view to submitting a preferred rig option during late 2017 or early 2018.

#### **Renewal Application**

Following the successful variation of the committed work program for Kerkouane permit to enable the drilling of Dougga Sud, ADX is now in the process of submitting a jointly agreed application with its partner ETAP for a second license renewal allowable under the petroleum code. The three year renewal will include a 36% relinquishment of the exploration block area and the commitment to an exploration well during the renewal period following the drilling, evaluation and productivity testing of the Dougga Sud well. The relinquishment does not impact the Dougga gas discovery, the Kerkouane gas discovery to the North of the block or the prospective exploration inventory covered by 3D seismic which includes the Dougga-West oil prospect. Importantly the three year renewal period will provide sufficient time to evaluate the results of Dougga Sud and if successful make an application for a production license for the Dougga area.



#### **Dougga Concept Studies**

On the 23<sup>rd</sup> of March 2017, ADX announced that it had engaged TechnipFMC to undertake a development concept study for the Dougga Gas Condensate discovery. TechnipFMC has considered alternative conceptual designs, based on existing, proven technology for the potential development of Dougga. The Dougga Gas Condensate discovery is ideally located only 45kms from shore in 330 meters of water, to be developed via a subsea tie back to an onshore gas plant where raw gas can be processed to produce pipeline quality gas, valuable Condensate and LPG's.

TechnipFMC has extensive experience in subsea developments and gas processing as well as important knowledge of operating in Tunisia. From the results of this study, ADX and its partner ETAP will be well placed to assess the potential viability of the Dougga gas condensate project.

### Way Forward

The Dougga Gas Condensate discovery is potentially a very valuable resource given the high liquids content and the strong demand for gas in Tunisia. Gas utilisation is growing at approximately 4% per annum and Tunisia is now importing approximately 60% of its requirements. Domestic gas currently achieves a gas price of US\$5 to US\$6 per MMSCF.

The potential for increased resource volumes based on the initial outcomes from our current geological studies is very encouraging. It is expected that this increase in gas resource will be accompanied with improved productivity from improved matrix quality and fracture permeability compared to the results from downdip Dougga 1 well which is prognosed to have suffered significant reservoir damage from excessive mud invasion.

ADX expects to be well placed to commence discussions with potential farminees and financial investors by July 2017 with a view to attracting funding for the Dougga Sud well by the end of 2017.

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