Breakaway Research

# ADX Energy Ltd (ADX)

## Small Company, Big Plans

November 2018

**Oil & Gas Team**
**Stephen Bartrop,** Research Manager

**www.breakawayresearch.com**

Recommendation: BUY

### Company Information

| ASX Code | ADX |
|---|---|
| Share Price (A$) | A$0.012 |
| Ord Shares (M) | 1133 |

| Market Cap | A$13.6M |
|---|---|
| Cash & RCO Investment(*) | A$3M |
| Total Debt | A$0M |
| **Enterprise Value** | **A$10.6M** |
| (*) At September 30, 2018 | |

### Directors

| | |
|---|---|
| Executive Chairman | Ian Tchacos |
| Executive Director | Paul Fink |
| Director (Non-exec) | Andrew Childs |
| Director (Non-exec) | Rob Brown |
| Director (Non -exec) | Philip Haydn-Slater |

### Significant Shareholders

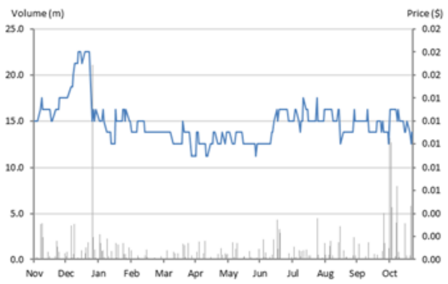
| | |
|---|---|
| J.P. Morgan Nominees | 12.6% |
| Jetosea Pty Ltd | 10.3% |

*Source: Company, as at 23/11/2018*

### Company Details

| | |
|---|---|
| Address | Level 2, Suite 14,210 Bagot Road Subiaco WA 6008 |
| Phone | +61 08 9381 4266 |
| Web | www.adxenergy.com.au |

### One Year Price Chart




*Source: ASX*

### Key Points

- ***ADX Energy has three potential company-transforming assets, in the appraisal and pre-development phase in Italy, Romania & Tunisia. All appear technically and economically feasible and are third party verified. ADX faces financial constraints and a key objective this year was to secure funds for drilling and in recent months has done so in respect of Romania & Italy. If imminent farm-out in Tunisia is successful, then ADX will have a three well drilling program in 2019, which should materially support its development plans, and catalyze the share price.***
- ***Key points:***
  - ***Contingent resource of 163 MMboe across the asset base.***
  - ***Two well appraisal program in Romania.***
  - ***Secured farm-in partner for Nilde oil re-development offshore Italy, which should help secure tenure.***
  - ***Appraisal drilling offshore Tunisia, farm-out underway.***
- ***ADX's assets are at various stages of maturity***
  - ***Appraisal onshore Romania has attracted funds from a UK E&P Reabold Resource and will initiate drilling in 2019. Valuation outcomes are meaningful to ADX, scale-able and offer the promise of rapid cash returns.***
  - ***Committed drilling offshore Tunisia at Dougga is appraisal of a discovered resource, and if successful could trigger a large gas project. This is a complex project and farm-out ahead of drilling is pivotal.***
  - ***Development: The Nilde project offshore Italy is a known field and offers the greatest absolute upside but tenure is not certain. If the license is ratified by Italian authorities, it would be a major catalyst for ADX.***
- ***Our valuation is based on planned drilling activity in Romania & Tunisia. There is substantial upside if Italy is ratified, to ~32 cps***
- ***The equity market is pricing ADX's resources too cheaply. Maybe the nature of the asset base and challenges of the past 4 years have under-whelmed investors. Farm-out success to bring capital and industry endorsement of ADX's work, and drilling activity should underpin value and provide market catalysts in 2019.***

***ADX is a small company and the success YTD in financing strategies needs to be seen in context with the company's modest balance sheet and market capitalisation. 2019 drilling activity and possible Tunisia farm-out provide catalysts. Our valuation ranges from 9c which attributes Tunisian & Romanian drilling in 2019. There is substantial additional upside if tenure in Italy can be secured.***

## *Investment Case: Large resource for 10c/boe !*

ADX has three core assets, one of which is development ready, and the other two appraisals of known discoveries. These are:

- The Nilde oil re-development offshore Italy. A development well is pending permit ratification, with a **2C oil resource of 33MMbbls,** before farm-out to SDOP Services.
- The Dougga gas, condensate & LPG project offshore Tunisia. A rig is contracted for appraisal drilling & farm-out underway. **2C gas & liquids resource of 122MMboe (gross)**
- Gas appraisal onshore Romania. Two wells are planned in early 2019. 2C & prospective resources are **25 Bcf (6MMboe),** net to ADX.

Our assessment of risked value for each is shown in Figure 1. Refer to the valuation section for more details on methodology, valuation and price target.

Combined resources in all three are 163 MMboe. Each of these assets offers different risks and returns, and ADX's key focus in 2018 and in the immediate period ahead is to lock in funding for an upcoming three well drilling program in Romania (2 wells, appraisal) and offshore Tunisia (1 appraisal well). With a drilling program upcoming, positive results could catalyse a major re-rating.

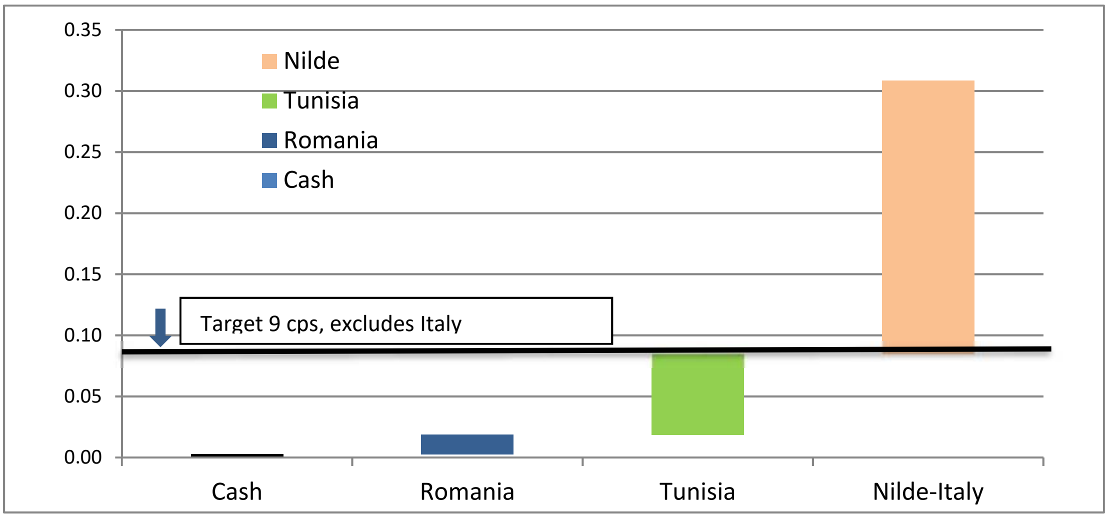



*Figure 1. Valuation by asset, in cps. Source: Breakaway Research.*

ADX's key challenge is financial capacity. Until recent farm-outs ADX had a 100% of each asset and faced permit obligations. A small balance sheet, low market capitalisation and lack of activity in the global farm-out market since 2014 made it tough for ADX to attract the funds to move these projects forward. But it's turning around. In the past half year ADX has secured funding to begin drilling in Romania. In Tunisia, a rig has been contracted and a farm-out process is underway for drilling by May next year. Our price target set is at 9 cps, and reflects expected value growth from these 2 assets.

**The biggest valuation driver though, is a proposed oil re-development offshore Italy, at Nilde**. In October 2018, ADX attracted an industry farm-in partner to underwrite the cost of a development well, however the farm-in is dependent on the permit being ratified by Italian Authorities. If not, then the farm-out will not proceed and the permit could be revoked. We are unable to assess risk of this at this time, and for this reason, value for Nilde is excluded from our target. Ratification would be a major value driver, as it would trigger the farm-in, drilling and potential development.

### Differentiated from peers: Very large resource base, low EV/2C, appraisal focus

ADX has a large 2C resource for a small company and it's larger than many peers. ADX is trading at an EV/boe of 10c/boe which is very low. It is hard to rationalise this as there are many companies which are larger but offer less in terms of appraisal or development projects. Farm-outs bring capital, look-through value and industry endorsement. Drilling in 2019 will better inform the investment case.



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## Core asset#1. Nilde Oil re-development offshore Italy. Exciting !

The Nilde oil field & surrounding license d363 CR.AX, offers a classic re-development opportunity, and is potentially ADX's most valuable asset. Despite having met all permit obligations, in January 2018, Italian authorities raised concerns about ADX's financial capability, and this has impeded ratification of the permit and commencement of drilling operations**. The October 21 announcement by ADX that it had secured an industry partner to farm-in and execute a Euro20.8M work program, is a tangible step in executing the planned development well at Nilde2.** Should the permit be ratified, it would resolve uncertainty over tenure and pave the way for drilling and field re-development

This project has all the hall-marks of a field prematurely abandoned because of production facility constraints, during a period of low oil prices over 30 years ago.

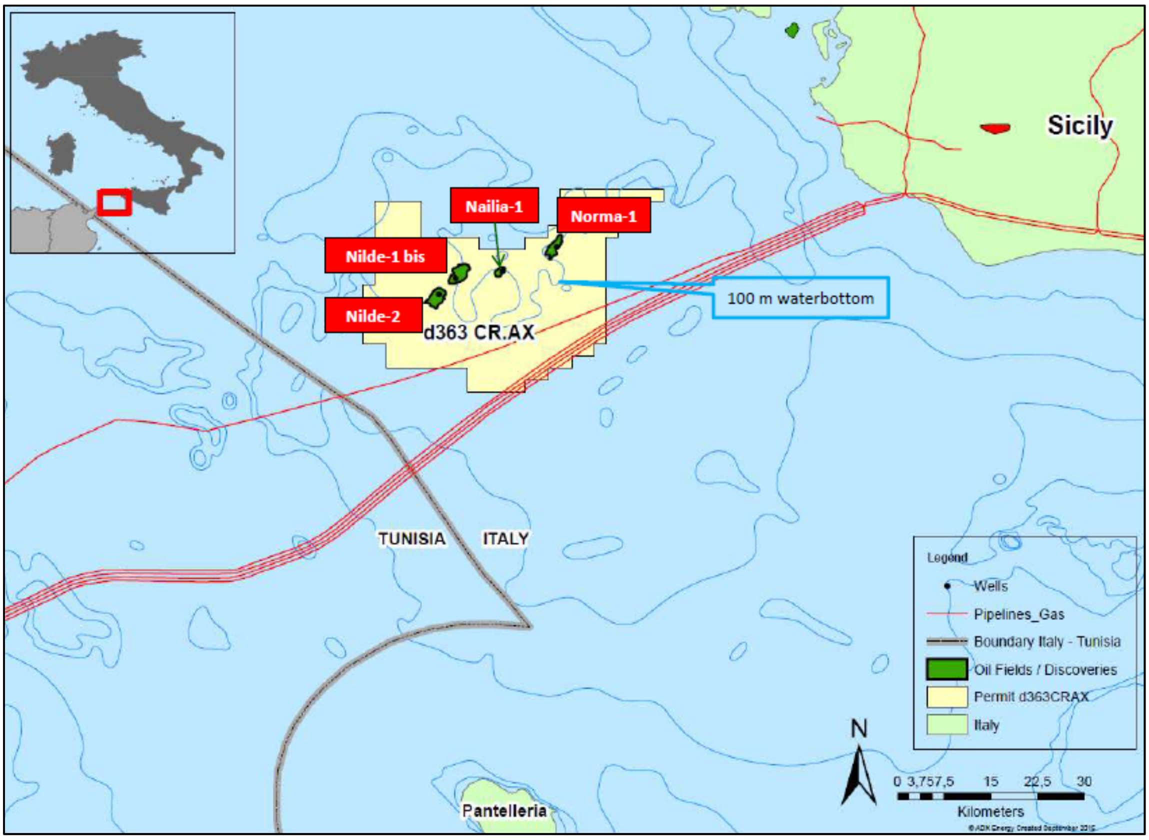


*Figure 2: Location of offshore Licence, d363-CR, containing the Nilde field and other discoveries. Source: ADX Energy*

### Location

The Nilde field is in shallow water, SW of Sicily, in Italian waters. It is a known field, with known geology and production history. It was in production between 1982 and 1989, and delivered approximately 21MMbbls over its production life. Remaining unrecovered oil resources have been independently re-determined by latest data and modelling techniques and are shown in figure 3. The key to any redevelopment of an older field, is in understanding what the previous owners did and why, and finding modern solutions to dated problems. ADX has outlined a strategy to de-risk key geological and production issues the previous owner faced (>30 years ago) and postulates a small, low cost fit-for-purpose development. Another key project enabler today, is a higher oil price.

### Tenure & work program

Tenure is in doubt. In January 2018, the Italian Regulatory Authority advised ADX it had formed a view that ADX had insufficient funds to retain tenure, despite ADX having met its work program obligations. On October 31, ADX announced it had secured a farm-in partner, "SDP Services" to fund a drilling program and expend up to Euro20.8M. The farm-out is conditional on Italian Authority ratification. We do not have a view on the outcome of the ratification process.



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## Key points & time-line

- Location: 54 km SW of the Sicilian coast, in shallow waters <100m.
- Ownership: Currently ADX 100%. If the license is ratified, SDP will earn 50% plus a 5% profit royalty and ADX will dilute to 50%.
- The license shown in Figure 2 contains the Nilde field, and 2 other discoveries, Norma and Naila.
- The field was discovered in 1973, as a JV between AGIP (now ENI) and Shell. It was appraised with 6 wells and entered production in 1982, producing into an FPSO, which was the first ever in AGIP (ENI's) history.
- Nilde ceased production in 1989, following water break-through in two key wells. Cumulative production was 21MMbls over the field life, with production peaking at 12,000 bopd in 1987.
- Basic geology: fractured limestones, with high permeability and primary & secondary porosity. Thus, wells flow at very high rates. Nilde 2 flowed at ~9000 bopd for 5 years.
- Oil quality is high with an API of 39°.
- Contingent resource estimates are shown in Figure 3. These have been independently audited.

| Contingent resources (MMbbls) | 1C | 2C | 3C |
|---|---|---|---|
| Nilde | 17 | 33 | 39 |
| Norma | 1 | 4 | 13 |
| Naila | 1 | 2 | 3 |
| Total | 19 | 39 | 64 |

*Figure 3: Source: ADX October 31, 2018; Senergy independent report, Feb 2016*

## Historical setting and new thinking.

Nilde partners (Shell & AGIP) ceased operations in 1989, following water break-through in two of the 4 production wells, resulting in a sharp drop in oil production. FPSO / Sub-sea production systems in the early 1980's were a new technology, and at that time lacked the sophisticated processing facilities that are now common. Specific to this field, there was no artificial lift to handle the water but today such systems are industry standard. Further, the field operated during an era of low oil prices. Finally, as both participants were super-majors chasing billion barrel projects around the world, it is understandable that further work at Nilde probably failed to meet materiality hurdles. The license was relinquished in 2004, although AGIP subsequently acquired seismic evidencing their interest in the fields remaining potential.

ADX was awarded the license in 2014, leveraging its proven model honed in Australia (at Nexus) of taking up discovered resource2 in leases not considered to be as material by the super-majors.

## Forward plan: Ratify permit, re-define the reserve base and confirm reservoir

On October 31, ADX announced it had secured a farm-in partner to pay for the next phase of work. The incoming party, a service provider "SDP Services" have agreed to fund a work program up to Euro 20.8M, in return for a 50% working interest, and a 5% net profit royalty. ADX believes this should address the Authorities concerns over ADX capital adequacy and enable the license to be ratified. If so, then the next steps are:

- Drill a Nilde appraisal well, close to Nilde2 to intersect all reservoirs in a crestal location. Key objectives are to (1) establish and test the oil column in reservoir unit "C", which ADX believes produced less than 10% of all Nilde oil but contains a very large oil-in-place (2) confirm the productivity and column height of the undrained lower reservoir, and (3) confirm recharging of produced zones since shut-in.
- If the Nilde-2 re-drill is successful, then ADX expects to move to engineering design in 2019.


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- Development wells and facilities construction would occupy most of 2020 and 2021
- First oil production is targeted in mid-2022.

### Development concept

The key elements of proposed re-development are quite different to the previous production system. Key points are:

- A fit-for-purpose leased facility for a short field life of ~7 years, with major kit being re-deployable.
- Production from 3 wells, the Nilde#2 re-drill and 2 new producers.
- Re-injection of gas and produced water.
- Mono-column tower with a gravity base, and with dry-trees (avoiding the cost of sub-sea) delivering into a stand-off FPSO shuttle tanker. ADX has already signed MOU's with COPL for the mono-column production facility and SPEC Energy for the production facilities.
- Major production facilities are to be leased, to minimise up-front capex.
- Production rate to peak at 22,000 bopd, and a 7-year field life.
- Capex of US$114m including the Nilde#2 re-drill, plus US$22M pre-production costs incurred over 2019-mid 2021, as detailed in ADX's market release June 2018. Fiscal terms as per the same document, are attractive comprising a 7% gross revenue royalty, and 28% Government tax.

### Production and cash flow profile

ADX in its market releases indicates peak production rates of 20-22,000 bopd from three production wells. We accept this as reasonable given field history and numerous analogues. Decline will be relatively steep and production life 5-7 years, depending on reservoir performance, and oil prices. A key factor in terminal operations of any field when water rates reach high levels is whether there is enough oil coming out of the ground to pay the lease rates.

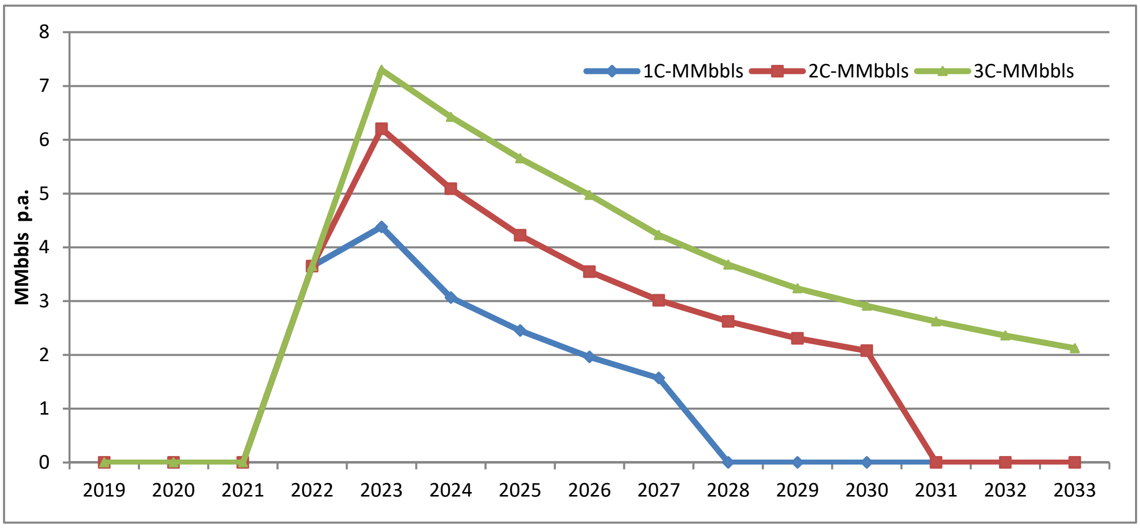


*Figure 4. 1C-2C-3C production profiles. Source: breakaway Research*

ADX's preferred funding model is for contractor terms & capex deferment which would keep development costs down, but the offset is rental costs for all the kit, which will likely be higher than outright ownership.

We have made estimates of production curves based on 1C, 2C and 3C resources. We have not assumed tie-back of Naila or Norma at this time, mainly for reason of materiality in the context of all the other assumptions made to this point, and the likelihood that tie-back decisions would likely only be made after a period of production from the main Nilde field.



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ADX's proposed development concept is low cost and all production scenarios show robust economics, however these calculations are sensitive to keeping upfront development capex (~US$140M ) low, and opex for leased equipment US$150,000/day. This is a low rate and reflects over-capacity in the services sector at this time. These figures are not certain until the JV engage with suppliers. In all scenarios, cash flows in the first few years are very high, but then fall sharply, in line with the production profile and reflecting the fixed opex nature of equipment rentals.

Our cash flow forecasts under 1C, 2C and 3C resource models is shown in figure 5.

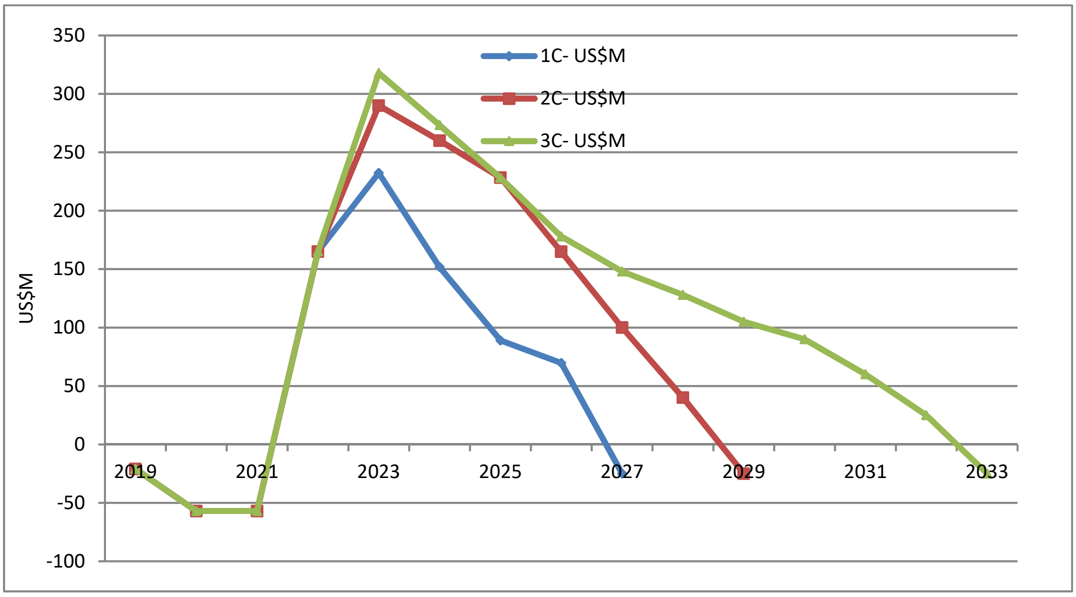


*Figure 5: 1C-2C-3C cash flow profiles. Source: Breakaway Research*

Our DCF profiles vs Brent price are in figure 6 for 1C, 2C and 3C resources.

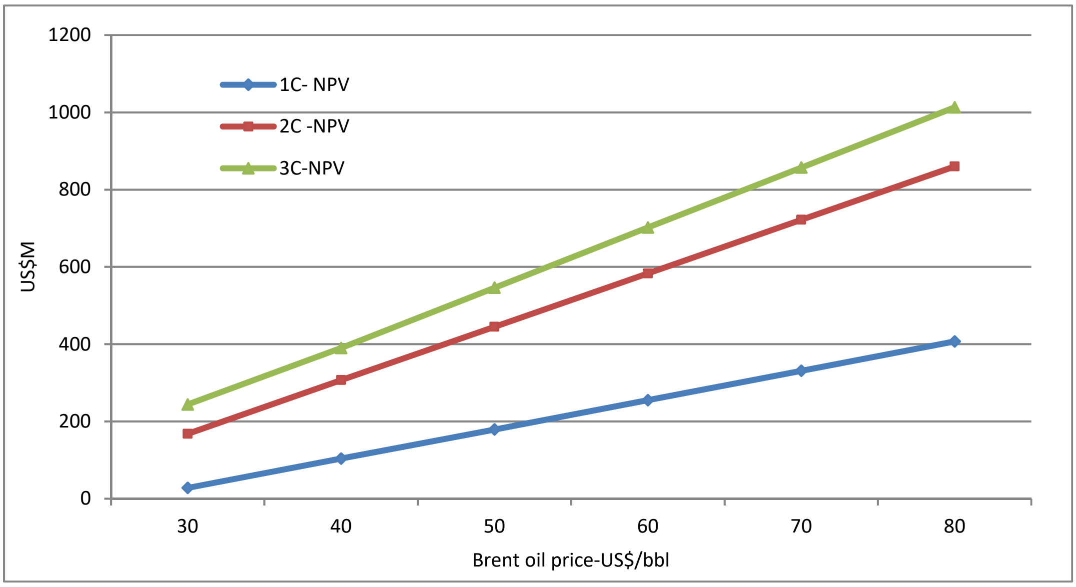


*Figure 6. NPV outcomes vs. Brent price. Source: Breakaway Research. Brent oil price on X-axis. NPV in US$M on Y-axis.*

Model results show cash flow profiles that are NPV positive at oil prices down to US$30/bbl, under all reserve scenarios. This is typical of high flow / short life fields, and where cash flows follow the production envelope and provide a pay-back of <1 year.

**Nilde field economics look very robust even on low side resource estimates and low oil prices.**

Our cash flow projections and risked valuation do not include the potential for future tie-back of the smaller oil discoveries at Norma and Naila.



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# Core asset#2. Dougga gas / condensate field offshore Tunisia. Challenging !

The resource potential is large, but this field needs appraisal to confirm reserves. Development as proposed poses engineering challenges, and involves relatively high up-front capex. It is a very interesting project, but it needs a farm-in partner to fund the next step, the planned Dougga Sud commitment well.

## Location

The Dougga gas & condensate field is located in the 100% owned Kerkouane PSC license is situated 45km from the Tunisian coast.

Dougga#1 was a gas condensate discovery made in 1981 by Shell but considered sub-commercial due to low test rates and no gas marketing options at that time. Since ADX's acquisition of the permit in 2010, 3D-seismic has been acquired along with independent resource and project evaluation. Refer to figure 7 for location map, and figure 8 for resource estimates.

Development will be expensive, and the next step is commitment appraisal well drilling, at Dougga Sud. A drillship, the Noble "Globetrotter II" has been contracted to drill and is available to ADX until May 2019. Drilling, and posting of a bank guarantee on spudding of the well, would satisfy permit work obligations, but will require ADX to attract a farm-in partner to provide funding. In the September quarter 2018, ADX reported the farm-out process was underway with a data-room open, and funding discussions are ongoing with multiple parties.

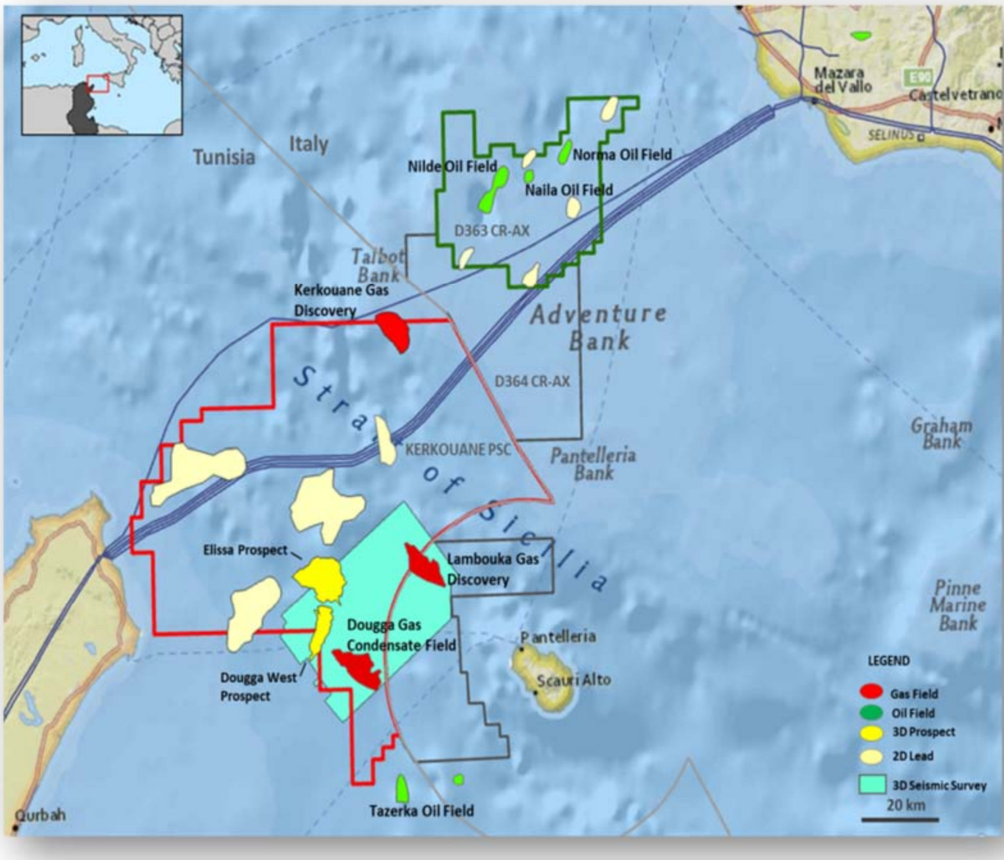


*Figure 7. Location offshore Kerkouane PSC, Tunisia. Source: ADX Energy.*


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## Tunisia Energy market overview

- Primary energy consumption approximates 6% p.a. over the past decade, interrupted by "Arab Spring" but has rebound since. It's currently estimated to be 400 PJ p.a. Approximately 53% of primary energy demand is natural gas, for power generation, industry and commercial. This makes the Tunisian domestic gas market approximately 200 PJ p.a.
- Demand overtook domestic supply in 2001 and now Tunisia is a net importer of gas from neighbouring Algeria. Gas imports account for around 50% of demand. The swing to imports resulted in a steep rise in domestic gas prices and along with depreciating local currency vs the Euro, makes imports quite expensive. Expenses for energy represent approximately 15% of GDP.
- Gas imports are approximately 100PJ p.a, and in this context, ADX's proposed Dougga gas condensate project could be readily absorbed to reduce import dependence. This makes development of gas strategic from a Government perspective.

## Key points and timeline

- The 100% owned Kerkouane license is situated 45km from the Tunisian coast. Water depths are ~320m. Refer to figure 7.
- Three wells were drilled in the license and all found gas-charged carbonate reservoirs, but only one (Dougga) was tested.
- In 1981, the Dougga-1 well was drilled by Shell to a depth 3992m. It discovered a 200m gas column in dual porosity fractured carbonates. The well flowed gas on test at sub-commercial rates, accompanied by liquids and $CO_2$. Test results were invalid, with high mud weights postulated for well-bore damage. The well was abandoned as sub-commercial, due to inconclusive results and on ready gas market.
- ADX acquired the licence in 2008 and shot 618km2 of 2D seismic and 3D seismic in 2010. Lambouka#1 was drilled in 2010 and encountered a gas column. The prospective reservoir was not flow rate tested due to well-bore instability. Deeper targets were not reached due to the trajectory of the well with the optimum drilling location in Italy
- The "Arab spring" in 2011 halted activity. ADX's acquired its partner interests and assumed a 100% working interest in 2013.
- Re-evaluation of Dougga from modern 3D concludes the Dougga#1 well was not optimally located and penetrated the gas reservoir 200m down dip from the crest of the structure.
- From 2014-current: multi-faceted technical, geological and commercial studies on Dougga, by TechnipFMC. These addressed specific engineering challenges including flow assurance to the coast, evaluation of processing options to extract the valuable liquids, and deal with the $CO_2$. Resources have been independently assessed by ERCE. Refer to figure 8.

| **Dougga unrisked Contingent resources** | 1C | 2C | 3C |
|---|---|---|---|
| Gas (net of inerts)- Bcf | 238 | 405 | 772 |
| Condensate- MMbbl | 15 | 31 | 64 |
| LPG- MMbbl | 19 | 32 | 56 |
| **Total BOE- Mmboe** | **69** | **122** | **227** |
| ADX internal estimate | 98 | 162 | 273 |
| **Dougga SW unrisked Contingent resources** | | | |
| Gas (net of inerts)- Bcf | 383 | 762 | 1550 |
| Condensate- MMbbl | 15 | 38 | 88 |
| **Totla BOE- MMboe** | **81** | **169** | **355** |
| **Total BOE within PSC- MMboe** | 33 | 69 | 145 |

*Figures 8: Sources: ERC Equipoise Pty Ltd. ADX ASX release, 27 August 2018.*


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## Forward Plan.

ADX engaged an independent review of the project geology, resource potential and development viability, by ERC Equipoise Pty Ltd (ERCE). These results were published by ADX on 27 August, 2018.

Key findings are:

- General confirmation of ADX's assessment of contingent resources.
- A sub-sea project with pipeline to shore is technically & commercially viable and chance of development is assessed at 70%
- ADX plans to fund drilling, including the provision of a bank guarantee of US$3m to the relevant authorities on spudding of the well, either from a farm-out, vendor finance, or both. Farm-out discussion have been initiated and data room-opened, to under-pin drilling of an appraisal well, Dougga Sud.
- This is a commitment well, to be completed for ADX to renew the permit for a further three years. The Dougga Sud well aims to test the up-dip extent of the main field, and is interpreted from modern 3D to be 200m up-dip from the discovery well, targeting the crest of the structure. A key objective apart from confirming the extent of the gas column is to determine well deliverability. The reservoir is a fractured carbonate, and ADX and ERCE both believe flow rates in the 15-20MMcfd are achievable, as evidenced from an offset well Tazerka#1 that flowed at 19MMcfd on test, from the same reservoir section.
- The Dougga Sud and Dougga well map is shown in this figure 9, along with other prospects which have been defined by modern 3D seismic and independently evaluated. The Dougga South West prospect is partially defined, with a prospective resource potential of 762 Bcf of gas and 38mbbls of liquids (un-risked Best estimate). The POS of this prospect is 30%. Approximately 41% of this prospect is within the PSC, the rest in an adjacent block, which would require unitisation. Information from Dougga Sud will better define this, and other prospects within the PSC.
- Drilling rig "Noble Globe Trotter2" is under contract until May 2019 to drill Dougga Sud. **In its September 2018 quarterly ADX reported that farm-out discussions are underway with multiple parties.**

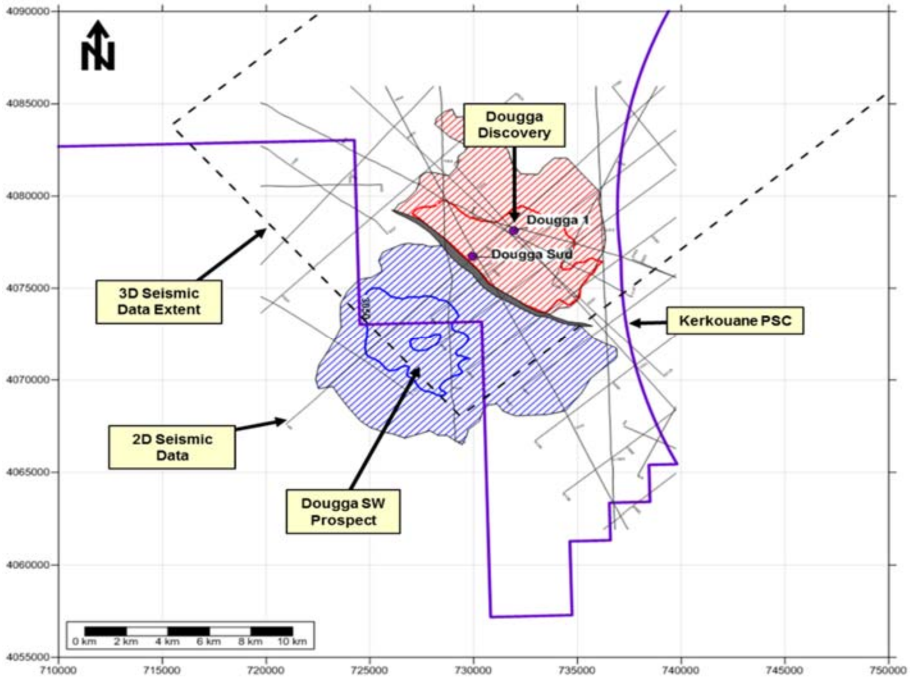


*Figure 9: Plan of Dougga#1 and other prospects &well locations. Source: ADX Energy.*



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## Tenure & work program

Drilling of the Dougga Sud well satisfies a three year license extension on completion. Additional exploration activity is discretionary.

## Development concept

ADX engaged TechnipFMC to review development concepts in 2017 and TechnipFMC concluded that a sub-sea production system, tied-back to an onshore gas plant is feasible and is the preferred development plan. Key elements are:

- 8 or 9 production wells, each capable of delivering 20MMcfd of raw gas, in 330m of water.
- Production through sub-sea manifolds, and piped 45km to an onshore plant.
- Onshore gas plant capable of processing 150MMcfd of raw gas and splitting into 87MMcfd of sales quality gas, and 13,500 bopd of LPG and condensate. Processing to include removal of $CO_2$, compression and disposal into a $CO_2$ well.
- Final size and scale of production would depend on the outcome of Dougga Sud, reserve size including and gas marketing.
- In its evaluation of the resource, independent reservoir assessor ERC Equipoise Pty Ltd (ERCE) stated that development was contingent on (1) a successful outcome at Dougga Sud, confirming assumptions about reservoir quality and fracture distribution, and (2) confirmation that horizontal development wells could flow at commercial rates. ERCE assigned a 70% probability of success to a development which is quite high.

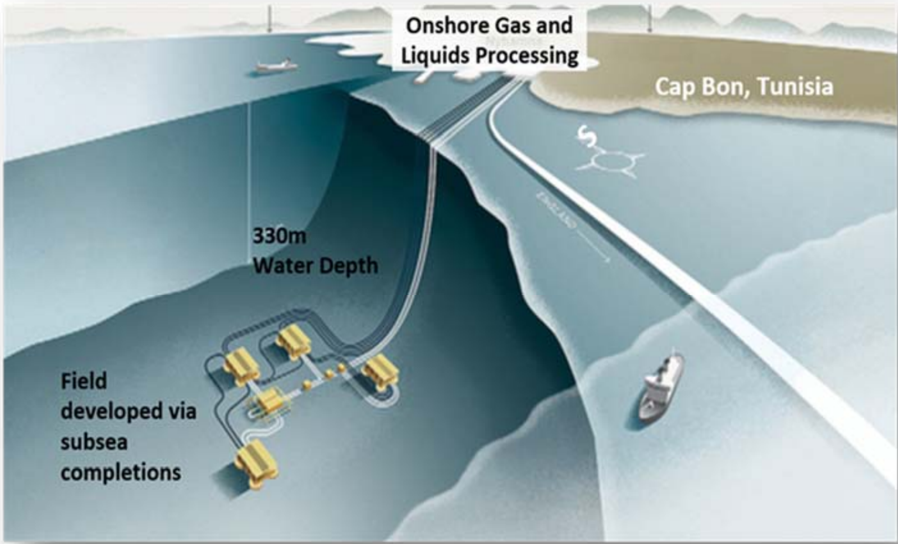


*Figure 10: Schematic of proposed sub-seal development . Source: ADX Energy.*

## Production and cash flow profile

We model production rates of 87MMcfd of sales gas, and 13,500 bpd of condensate and LPG, in the 1C and 2C resource case, with a shorter plateau period in the 1C case. The 3C resource case would justify a larger development, which we postulate to be 200MMcfd of raw gas. Key assumptions in our base case are:

- Gross capex US$1140M, including the Dougga Sud well.
- Annual opex ~US$20M.


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- PSC cost recovery phase ~5 years. We estimate the total Government take including taxes and royalties to be ~60% over the life of the field, depending on gas & liquids price.
- Oil price US$70/bbl, LPG price 80% of oil on a boe basis, and gas price of US$7.50/mmBtu

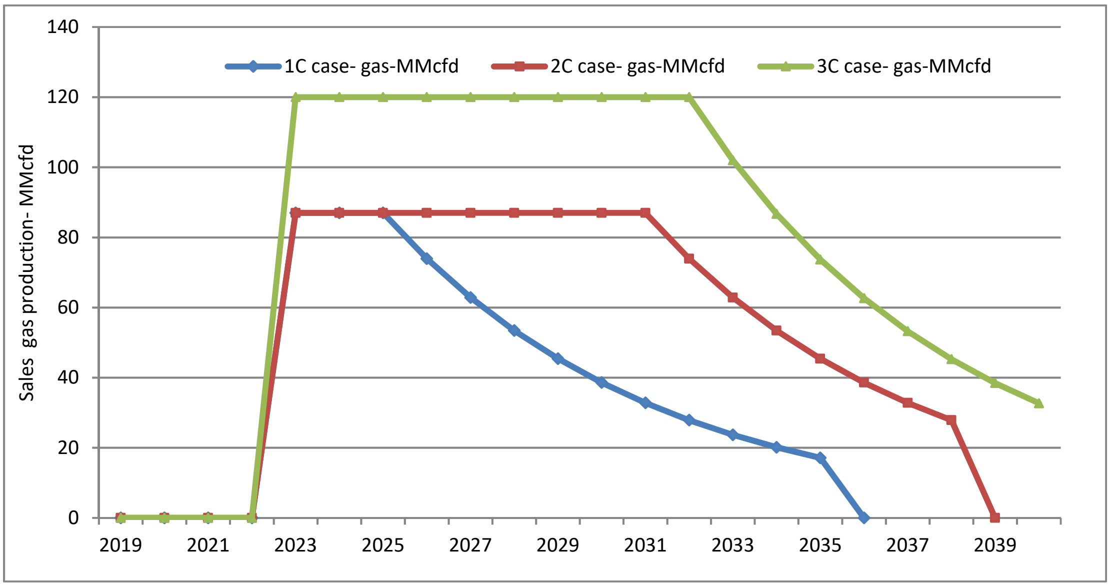


*Figure 11. Production envelopes for 1C-2C -3C resource cases. Source: breakaway Research.*

Dougga cash flows are quite different to the production profile, with Government share of revenue commencing after the capital recovery phase, which is 5.5 years in base case, and later or earlier for oil prices lower or higher. The project is not very valuable on a 1C resource base, and it is doubtful if a billion dollar capex would be sanctioned unless the 2C resource is proven.

In the early years of production life, during the capital recovery phase, the field would generate around US$300M p.a. to the contractor. Payback periods are relatively long due to the large capex upfront, in the order of 4-5 years depending on oil prices. After the capital recovery phase, the Government share rises quite steeply.

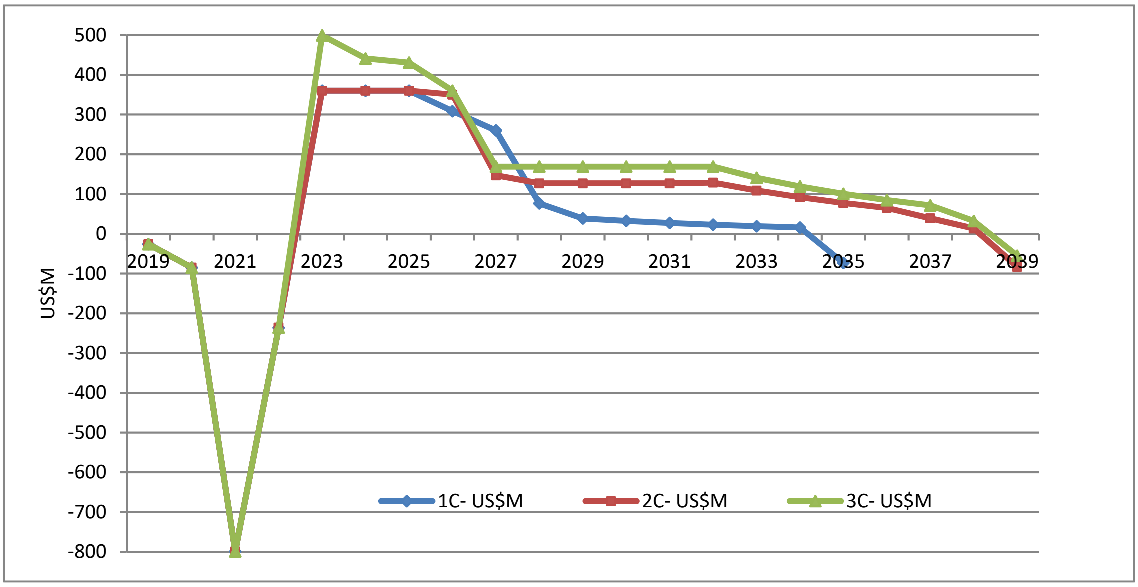


*Figure 12: Cash flow profiles for 1C-2C-3C cases. Source: breakaway Research.*

Our production and cash flow profiles do not assume tie-in of other prospects that could be "hubbed" through the offshore production system and processed onshore. The on-shore gas plant would have valuable ullage for many years after the Dougga field is depleted.



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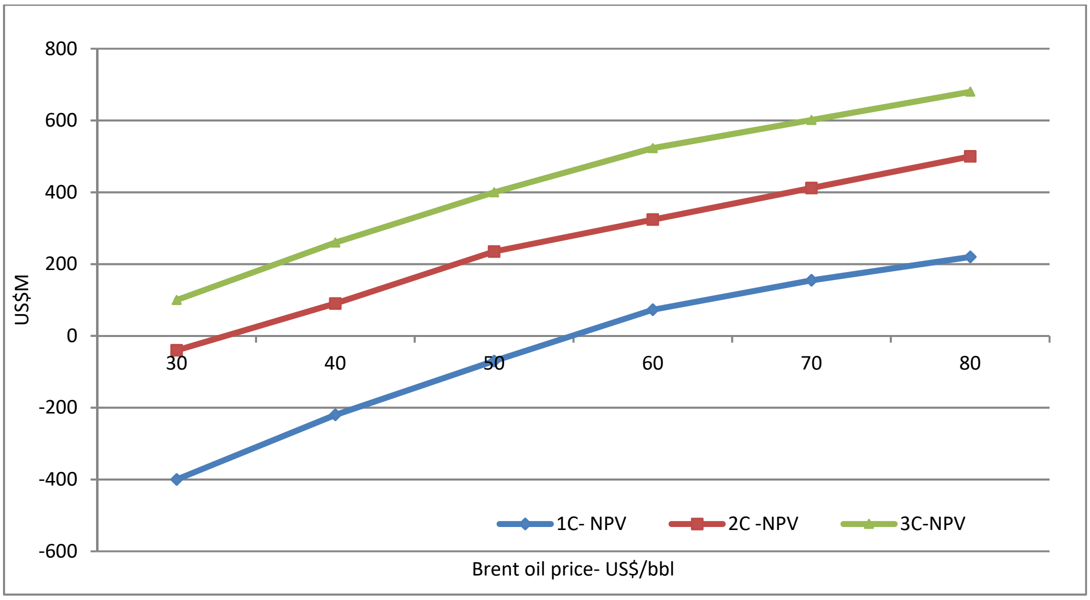


*Figure 13. NPV outcomes for 1C-2C-3C resource cases. Source: Breakaway Research*

## Key risks: farm-out required

There are a number of risks to be addressed sequentially.

The first is ADX's ability to introduce partners to fund, and ultimately execute a billion dollar capital project. The first critical step along the path is securing immediate funds to drill Dougga Sud, and then drilling the well within budget.

The second risk is in confirmation of the geology. Results of Dougga Sud would need to be in line with pre-drill expectations and confirm the resource. A sub-optimal well result would require a rethink of field development options, and would likely require more appraisal drilling and hence more funds. Based on our models, the NPV on a 1C case would probably not attract industry funds. Break-even on a 1C resource base is about US$55/bbl. Most large E&P companies stress-test their development economics based on 1P (or 1C) figures, and at oil prices which are lower than what equity market investors typically use to assess company valuations.

A relaxation of fiscal terms would improve project economics. Examples for such a case do exist in Tunisia.

The proposed development is capital intensive requiring expensive horizontal wells and sophisticated engineering and processing to handle the $CO_2$, and strip out the valuable liquids. Robust economics will require good flow rates to keep well count to a minimum. Flow rate testing, and pressure testing to assure flow all the way to the coast-line, will be pivotal data from the Dougga Sud well.


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## Core asset#3. Romania Parta licence. Pathway to early cash flow in 2019

Romania is not a house-hold name in the global oil and gas industry by today's benchmarks, but in fact has had oil and gas production for over 150 years. ADX entered Romania in 2008 and has since built in-country technical, operational and commercial capabilities. The region is prospective with numerous leads & prospects, albeit mostly small, but geological and capital risks are low, and successful outcomes are meaningful to ADX and offer potential for cash flows within a 1-2 year timeframe..

### Location and key points

In 2011, ADX was awarded the 1221 km2 PARTA licence and in June 2018, the IECEA MARE production license was acquired from the previous operator. In 2017, **ADX created a Special Purpose vehicle, Danube Petroleum, in order to secure funds for drilling at the asset level. In March 2018**, AIM-listed Reabold Resources Plc bought into Danube and has subscribed US$2M to acquire a 29% working interest. These funds will underwrite the first well in a planned two-well appraisal program, which the partners plan to commence in April 2019. ADX's working interest will reduce to 71.4%

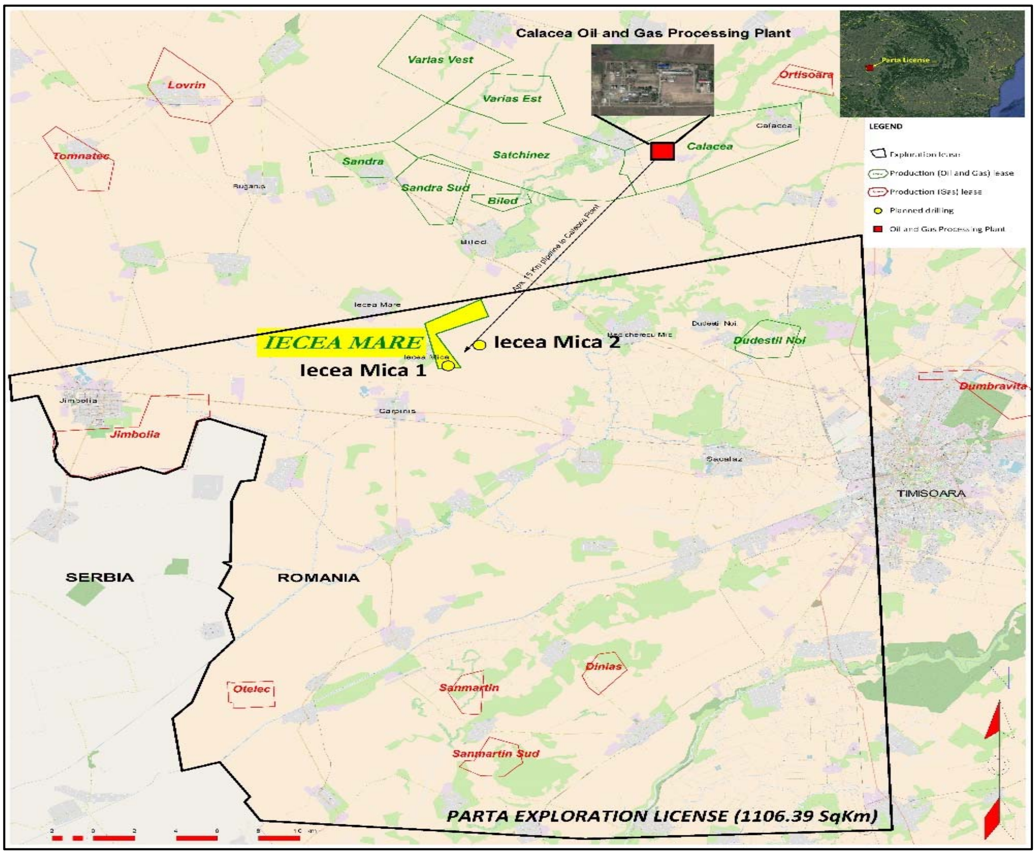


*Figure14: Parta exploration license, and Iecea Mare production license, onshore Romania. Source: ADX Energy*

### Appraisal and development plans

ADX acquired 2D and 3D seismic between 2013 and 2017, and has identified over 50 leads and prospects, with a total un-risked Best Estimate of Prospective resource of 45MMbbls of oil and 300Bcf of gas. Most prospects are small, with an average of 4MMboe for the top 20 prospects, but drilling and production costs are low, and scale-able. The permits have been previously produced, and the geology is known but seismic and drilling methods are out-dated. ADX have acquired and applied modern seismic, and plan a low-cost project, which is appropriate for operating in a mature basin.

The drilling plan is to re-drill prospects that were drilled in the 1980's but were not properly drilled causing damage to prospective reservoirs, inhibiting production testing.



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- The first well, Iecea Mica (IM1) is in the Parta License and targets a 2C contingent resource of 6.1 Bcf of gas, and a prospective resource of 12.7 Bcf. This will be a re-drill of the IM-35 well that was a discovery in 1988, and flowed gas on test at 1 MMcfd, but deeper zones were not logged due to well control issues and non-manageable deeper reservoir over-pressure. The re-drill aims to properly log and asses the deeper sections. In its latest market release, ADX refers to this location as "IM-1". Capex for this well is estimated by ADX at US$3.1M (gross), plus an additional US$2.6M (gross) in the success case to bring into production including a pipe-line to nearby gas plant.
- The second proposed well, Carp-55 is in a production licence, and targets 15.5Bcf (2C) and 15.6 Bcf (prospective). Being in a production license, and 15km from open access gas processing facilities allows for relatively rapid commercialisation if successful. The discovery well Carp-55 was drilled in 1990, and had gas shows in high porosity reservoirs, but completion issues negated proper flow-rate and pressure data measurements. In its latest release, ADX refers to this re-drill as "IM-2". The well cost is estimated at US$2.5M, plus US$4.1M to complete for commercial production.

**On 24 September 2018, ADX advised that all landowner and ministry approvals have been received for the first well.** Local environmental permits are still outstanding but are on-track for a 1Q 2019 spud date for the first well.

ADX market releases on August 11 and September 24 provide a very thorough analysis of the Romanian assets. The ASX release shows NPV-per well. The figures for the first well, IM-1 range from US$10M (net) in the event the well only recovers the 2C resources, to US$44M, if the prospective resource in deeper zones are proved. The figures for the second well are larger, ranging from US$40M in the 2C case, to just over US$80M in the 2C+prospective resource case. Our figures are very similar.

Independently assessed resource estimates are shown in figure 15.

| Resource estimates | Target reservoir | PRMS category | ERCE estimates Bcf | | |
|---|---|---|---|---|---|
| Prospect | | | P90 | **P50** | P10 |
| IM-1 | Pa IV | Contingent | 2 | **6.1** | 16 |
| IM-1 | Pa VI | Prospective | 2.4 | **4.4** | 7.3 |
| IM-1 | pa VIII Inf | Prospective | 2.7 | **8.3** | 21.3 |
| Total- IM-1 | | | 7.1 | 18.8 | 44.6 |
| IM-2 | PsB4.3 | Prospective | 5.4 | **15.6** | 39.1 |
| IM-2 | pa IV | Contingent | 4.8 | **15.5** | 43 |
| Total IM-2 | | | 17.3 | 49.9 | 126.7 |
| Total program | | Contingent | 6.8 | **21.6** | 59 |
| Total program | | Prospective | 10.5 | **28.3** | 67.7 |

*Figure 15: Recoverable hydrocarbon volumes, as per ERCE, disclosed to ASX 16 August 2018*

## Production and cash flow profile

Development of discoveries onshore Romania exposes ADX to a different risk/reward profile, and one that is manageable by ADX.

Key inputs & assumptions in our valuation are are:

- Attractive fiscal terms, with a 3.5% royalty and 16% flat corporate tax rate
- The drilling program targets gas. The European gas market is very large & diverse and we assume gas discoveries would receive spot prices, which track oil (with a discount).
- ADX has published extensive financial modelling, and we accept this as likely to be more accurate and better informed that our estimates. Assumption of a US$6.2/mmBtu gas price in ADX's modelling appears reasonable and we assume this figure.


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- We assume a per-well flow rate of 4MMcfd, for appraisal success only, rising to 7.5MMcfd for appraisal plus prospective in IM-1, and up to 10MMcfd in IM-2 in the upside case.
- Development capex for IM-1: US$6M, rising to US$8M if the prospective resource is realised. Capex for IM-2 is assumed to be US$9M.

Should either or both wells generate future revenue, then we expect cash-flow to remain within Danube Petroleum, and then be used to further exploration and development activity within the license area. In terms of funding the proposed second well, ADX states it may sell further equity in Danube, down to a level of 50%.

Compared to the other two opportunities in ADX's portfolio, Romania is smaller but involves far less capital at-risk and is much more scalable given the number of leads and prospects in the licence area.

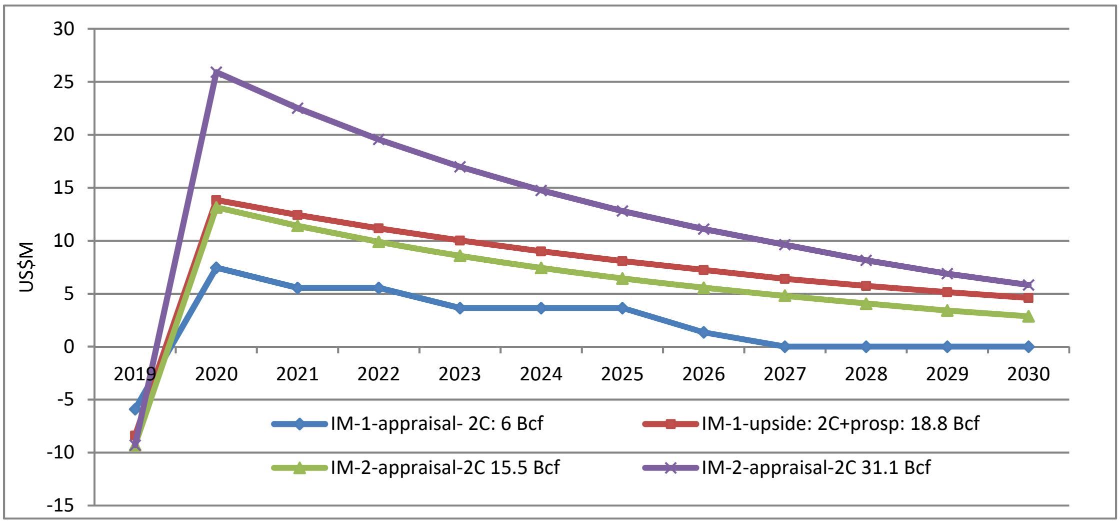


*Figure 16: US$M Cash flow profiles for first two Part wells, 100% basis. Source: Breakaway Research.*

There are other prospects in the permit. ADX report there are over 50 leads with a prospective un-risked resource potential of 45MMbbls of oil and 300Bcf of gas. We do not assume activity or discoveries on other prospects, and at this time assign no value to exploration beyond the current 2 well program. This is conservative.

## *Resources summary.*

Figure 17 summarises ADX's contingent resource by region or asset. The figures for Nilde and Italy are for 100% of the working interest. These would reduce to 50%, after farm-out and ratification.

| Contingent resources (MMbbls) | 1C | 2C | 3C |
|---|---|---|---|
| Nilde (100%) | 17 | **33** | 39 |
| Norma | 1 | 4 | 13 |
| Naila | 1 | 2 | 3 |
| **Italy Total- MMbbls** | **19** | **39** | **55** |
| Dougga (100%) | | | |
| Gas (net of inerts)- Bcf | 238 | 405 | 772 |
| LPG- MMbbls | 15 | 31 | 64 |
| Condensate- MMbls | 19 | 32 | 56 |
| **Tunisia Total MMboe** | **69** | **122** | **227** |
| Romania-net 71% | P90 | P50 | P10 |
| IM-1 Contingent | 1 | 4 | 11 |
| IM-2 Contingent | 3 | 11 | 74 |
| Total- Bcf | 5 | 15 | 85 |
| **Romania Total-MMboe** | **1** | **3** | **15** |
| **Total MMboe** | **89** | **163** | **297** |

*Figure 17. Contingent resource summary. Source: ADX reports.*



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## *Financial history & capital adequacy.*

ADX's financial history is summarised in figure 18. We show the figures for completeness although they are not meaningful to the investment case. ADX has no production or operating revenue.

The 2014 oil price crash and small capitalisation has imposed constraints on ADX's ability to raise capital, and at the same time the industry contraction halted farm-out market activity. Hence, the accounts reflect a company that has had little opportunity to work its assets for ~4 years.

In our view the book value of the assets are not a fair reflection of the intrinsic value, and we note

- The Nilde-farm-out of 50% in return for Euro20.8M work program, under-writes a minimum value for the acreage and,
- The securing of funds at the asset level to drill in Romania implies value for ADX's subsidiary, Danube Petroleum Ltd. ADX's ownership in Danube will dilute to 71% following Reabold Resources equity participation in Danube.

| Year to December 31 (A$M) | 2014 | 2015 | 2016 | 2017 | 1H 2018 |
|---|---|---|---|---|---|
| Revenue | 1.7 | 0.0 | 0.0 | 0.9 | 0.0 |
| Expenses | | | | | |
| G&A | 0.9 | 0.7 | 0.7 | 0.5 | 0.5 |
| Exploration / impairments | 1.6 | 1.2 | 0.9 | 1.8 | 0.9 |
| Other | 0.0 | -0.3 | 0.3 | 0.7 | 0.0 |
| Pre-tax profit | -0.8 | -1.7 | -1.9 | -2.1 | -1.3 |
| Net profit after tax | -0.8 | -1.7 | -1.9 | -2.2 | -1.3 |
| Operating cash flow | -2.0 | -1.8 | -1.4 | -2.0 | -1.1 |
| Investing cash flow | 0.1 | 1.7 | 0.0 | 1.2 | 0.0 |
| Equity issue | 0.9 | 0.0 | 1.5 | 1.9 | |
| Other financing | | 0.0 | 0.0 | 0.0 | 0.7 |
| Net increase in cash | -1.0 | -0.1 | 0.1 | 1.1 | -0.4 |
| Total Assets | 3.0 | 1.1 | 1.2 | 2.0 | 1.7 |
| Net Assets | 2.3 | 0.9 | 0.7 | 1.1 | 0.9 |
| Accumulated losses | -67.5 | -69.2 | -71.1 | -73.2 | -74.6 |

*Figure 18. Key annual financial statistics, from ADX Energy annual reports*

### Capital Adequacy & meeting drilling costs in 2019

- Cash at September 30, 2018 was A$2.8M. This includes funds held within Danube Petroleum which will be used for drilling the first well in Romania. ADX is seeking additional funds, via sale of equity in Danube, to provide funds for a second well. On August 16, ADX stated it planned to further reduce its working interest in Danube to 50%, in return for sufficient funds for two wells rather than one.
- The planned drilling at Nilde, should the licence be ratified, appears to be adequately funded by the SDP Services farm-in to fund a work-program of Euro20.8M. We believe drilling capex would be in the US$15-20M range.
- The Tunisian work program is not funded at this time. ADX states in its September quarter report it is in farm-out and funding discussions with "multiple parties". Fulfilment of the licence work program requires the drilling of Dougga Sud, and posting of a US$3M bank guarantee on spudding of the well.


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## *Valuation & price target. Risked NAV 9cps, upside to 32c including Nilde.*

**Our primary valuation method is DCF of expected cash flows, appropriately risked.** Figure 19 shows the results. Other traditional valuation tools such as Price/earnings, EV/EBITDA are not used as ADX does not have production or revenues.

We have developed a valuation stack to capture expected value from the planned 2019 drilling program offshore Tunisia and onshore Romania. These are independent events, and if both succeed then the risked NAV is ~ 9cps. Figure 1 on page 2 shows this graphically.

Nilde valuation is subject to uncertainty at this time and is not included in our price target. As a re-drill of a known oil field, which could be developed for low costs using modern production systems, the economics look robust and for ADX, the value impact in the success case is very large. A farm-out has been secured which underwrites the drilling of the development well but none of this will take place if the licence is not ratified. We are unable to form a view on when, or if, licence ratification will occur.

| **Valuation** | **Unrisked value 100% W.i.** | **W.I Assumed / est.** | **Unrisked NAV Net** | **Risk /POS** | **Risked NAV Net** |
|---|---|---|---|---|---|
| Cash (Sept 30) | | | | | 2.8 |
| Per Share- financial assets | | | | | **0.002** |
| Romania-Parta-IM35 | 11 | 71% | 7.8 | 80% | 6 |
| Romania-Parta-Carpinis-55 | 40 | 71% | 28.6 | 80% | 23 |
| Core value- Romania | | | | | 29 |
| **Per share- Romania only** | | | | | **0.03** |
| Dougga /Dougga Sud | 412 | 25% | 103 | 70% | 72 |
| Exploration- Dougga SW | 69 | 25% | 17.3 | 20% | 3 |
| Core value- Tunisia | | | | | 76 |
| **Per share- Tunisia** | | | | | **0.07** |
| **Total- Core value-2019 drilling** | **532** | | **157** | | **105** |
| **Core value- Ex Nilde** | | | | | **0.09** |
| Italy-Nilde | 722 | 50% | 361 | 70% | 253 |
| Total- including Nilde | 1254 | | 518 | | 357 |
| **Upside** | | | | | **0.32** |
| Shares on issue | 1133 | | | | |

*Figure 19. Valuation table. Source: Breakaway Research*

### Assumptions

Price assumptions in our DCF are shown in figure 20. Other specific assumptions are:

- In Romania, we have assumed probability of positive appraisal drilling of 80%. We further assume that ADX's effective working interest is 71% via its dilution to this level in Danube Petroleum. We view this drilling as low risk appraisal.
- In Tunisia, in addition to inputs mentioned in previous pages, we assume that ADX farms-out 75% of its working interest in return for funding through Dougga Sud and retains a 25% working interest. Without a farm-out, the work program is unfunded. Although only one well is planned to be drilled this year, we assign modest value for the Dougga SW prospect, which may be a southerly extension of the main Dougga field. Drilling on Dougga Sud will inform this.
- Capturing value for Nilde, will depend on the Italian authorities ratifying the permit, which is uncertain. The intent in this report is to convey the size of the prize. The farm-in by SDP, receipt of funds and completion of the licence obligations critically depend on ratification. If it is not forthcoming, then ADX may lose tenure and lose its investment in the license to date.



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| Assumptions | 2019 | 2020 | 2021 | LT Esc |
| --- | --- | --- | --- | --- |
| Brent oil price- US$/bbl | 70 | 70 | 70 | +2.5% |
| A$/US$ rate | 0.72 | 0.72 | 0.72 | 0.72 |
| Romania gas price –US$/mmBtu | 6.2 | 6.2 | 6.2 | +2.5 |
| WACC (post tax- real) | 7.5% | | | |

*Figure 20. Source: Breakaway Research*

## Other valuation considerations: Peer group

We have reviewed peer group resource based measures, specifically EV/2C, however the range is too wide to be of practical application, and many companies similar in size to ADX have no reserves or resources. However we reference the following two figures 21 and 22 to assert that ADX is cheap relative to peers, in the A$10-$150m market cap range. The cross plot in figure 21 shows 2C+2P resource+reserves on the y-axis, and enterprise value on the x-axis. It shows ADX has a very large resource for a very low equity market value. ADX's EV/2C measure is 10c/boe, at the bottom of the peer group. Figure 22.

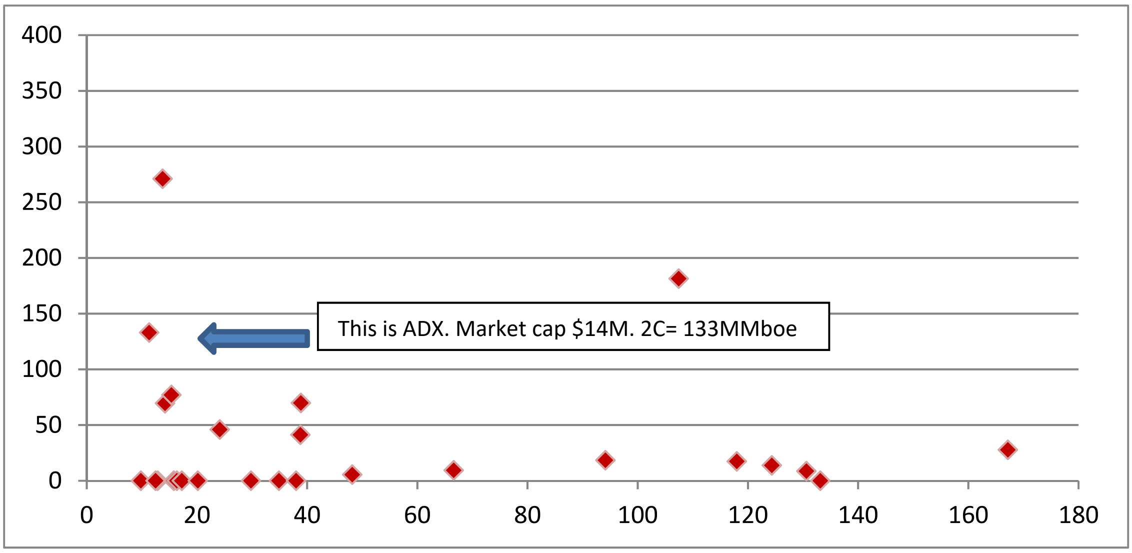


*Figure 21. Cross plot of 2C resources and market Enterprise value. Source: breakaway Research*

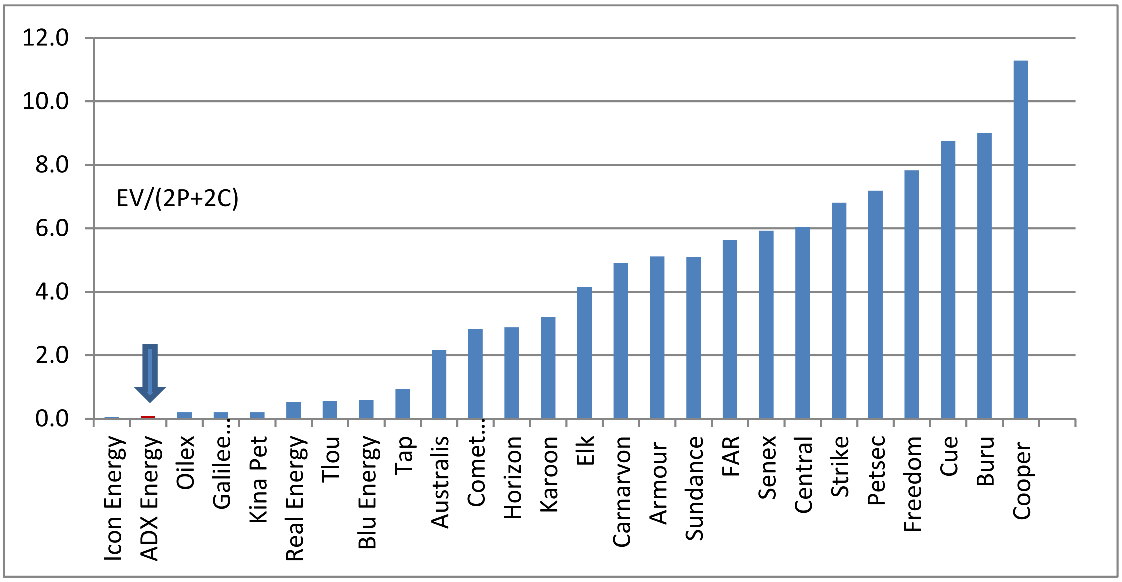


*Figure 22: Ranking of EV/(2C+2P) per boe. Low figures point to under-valuation. Source: Breakaway Research.*

## Other valuation measures: farm-out implications.

ADX has achieved a farm-out in two of its three projects, and conveys value for the acreage at least to the extent of the planned investment by the farm-in partner. These farm-outs are:

1. The US$2M investment in Danube Petroleum, by Reabold Resources to earn a 29% participating, implies that ADX's residual 71% interest would be worth ~A$7M.

2. The planned investment by SDP Services of Euro20.8M for a 50% working interest implies ADX's residual 50% is worth A$32.7M.

Together these two deals equate to 3.5cps. Further farm-out activity, in Tunisia, would add to this.

## Macro risks: Oil prices, gas prices and production rates

The key risks to our valuations are from reversal in oil prices, European gas prices, production profile and resource estimates

- Oil prices have rallied this year and may reverse if the global economy enters a recession, or if OPEC/ Saudi Arabia step up production leading to over-supply. Our long term input is US$70/bbl which is in-line with the past 10 year average of US$74 (in nominal terms), nearer $81 in real terms. However, oil prices are volatile. A price collapse would impact negatively in many ways. It would diminish investor confidence in funding small companies, make attracting industry partners harder, and it would place at risk the less robust projects in ADX's portfolio, specifically Dougga.
- European and Tunisian gas prices are predominantly oil linked, so erosion in oil prices would flow through to natural gas too.
- The production profiles we use to generate our economic models are based on 2C resource estimates, which have been published by ADX and its independent reserve assessors. We have no reason to doubt or discount the figures. However in the case of each asset, some data backing the figures are either old, limited in extent or of questionable quality. Although now supplemented with ADX's own more recent 3D seismic, the planned appraisal wells and Nilde re-drill come with a degree of geological risk. Post well outcomes may result in resource figures being revised, and if downgraded for any reason, may require additional drilling to resolve, with consequent loss of value.


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## *Board and Management.*

The Board and senior management have diverse technical and commercial experience gained from multiple companies across the globe, and Europe in particular. Mr Tchacos' prior experience at Nexus in particular is relevant. During his tenure there as Managing Director the company acquired a number of assets from larger companies and successfully commercialised them.

### Director and Executive Backgrounds

**Mr Ian Tchacos. B.Eng (Mech)**
**Executive Chairman, appointed 2 March 2010**
Mr Tchacos was appointed as Non-Executive Chairman on 2 March 2010, and appointed Executive Chairman on 28 September 2015. He is a Petroleum Engineer with over 30 years international experience on corporate development and strategy, mergers and acquisitions, petroleum exploration and production operations, commercial negotiation, oil and gas marketing and energy finance. He has a proven track record in a range of international company environments. As Managing Director of Nexus Energy he was responsible for this company's development from a micro-cap explorer to an ASX top 200 offshore producer and explorer.

Other directorships of listed companies in the last three years: Xstate Resources Ltd, 3D-Oil Ltd(current) and Reidel Resources Ltd (until 18/1/2016).

**Mr Paul Fink. MSc (Geophysics)**
**Executive Director**
Mr Fink has 27 years of petroleum exploration industry experience in technical and management positions. Mr Fink is a graduate from the Mining University of Leoben, Austria. He started his career as a processing geophysicist and then worked predominantly on international exploration and development projects in Austria, Libya, Bulgaria, UK, Australia and Pakistan as Exploration and Reservoir Manager for OMV. In 2005 he stated his own petroleum consultancy business working on projects in Romania and as Vice President (Exploration) for Focus Energy, leading their highly successful exploration campaign in India

Directorships of listed companies now and in the last three years: nil.

**Mr Andrew Childs. BSc (Geology and Zoology).**
**Non-Executive Director, appointed 11 November 2009**

Mr Childs graduated from University of Otago, New Zealand in 1980 with a Bachelor of Science in Geology and Zoology. Having started his professional career as an exploration geologist in the Eastern Goldfields of Western Australia, Mr Childs moved to petroleum geology and geophysics with Perth based Ranger Oil, later renamed Petroz NL. He gained technical experience with Petroz as a Geoscientist and later commercial experience as the Commercial Assistant to the Managing Director. Mr Childs is Chairman of Sacgasco Ltd and Managing Director of Petroleum Ventures Ltd.

Directorships of listed companies now and in the last three years include: Sacgasco Ltd (current), and Reidel Resources Ltd (until 30/3/2017)

**Mr Rob Brown. M.Eng (Chem), C.Eng, MIChemE, GAICD**
**Non-executive Director, appointed 17 October 2016**
Mr Brown is Perth based and has 25 years of petroleum industry experience in technical, managerial, and leadership positions. He is a Master of Engineering graduate of Leeds University in Chemical Engineering. Rob has worked in the North Sea, South America, India, North America, SE Asia and Australia. Ha has been responsible for highly successful operations, projects and developments and has proven experience against challenging capital, schedule and operating metrics with Amoco, Schlumberger, Lasmo, Cairn and Tullow. Rob has recently co-founded a Perth Based oil and gas advisory consultancy.

In the past three years, Mr Brown has not held Director roles with any other listed companies.


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**Mr Philip Haydn-Slater.**

**Non-executive Director, appointed 21 July 2017**

Mr Haydn-Slater was co-founder and director of HD Capital for over 5 years and has worked throughout his 36 year career within institutional sales for a number of well-known financial institutions. Prior to HD Capital, Philip spent 8 years as Head of Corporate Broking at WH Ireland in their London office. There he was responsible for the origination and managing the sales process for a significant number of transactions, including IPO and secondary issues for corporate clients on AIM and other international exchanges.

Philip's expertise was mainly focused on deals pertaining to the extractive industries and he continues to maintain a focus on oil and gas and mining for HD Capital. During his career he has worked in both London and Sydney for financial organisations including ABN Amro, Bankers Trust, James Capel & Co, and Bain Securities (Deutsche Bank) Sydney

In the past three years, Mr Haydn-Slater has held Director roles with: Sacgasco Ltd (Not Current)



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**Analyst Verification**

I, **Stephen Bartrop**, as the Research Manager, hereby certify that the views expressed in this research accurately reflect our personal views about the subject securities or issuers and no part of analyst compensation is directly or indirectly related to the inclusion of specific recommendations or views in this research.

**Disclosure**

Breakaway Research Pty Ltd (AFSL 503622) and its associates, or consultants may receive corporate advisory fees, consultancy fees and commissions on sale and purchase of the shares of ***ADX Energy Limited*** and may hold direct and indirect shares in the company. It has also received a commission on the preparation of this research note.

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