

ADX ENERGY LTD (ASX:ADX)

July 15, 2021

Share price: A\$0.008

Target: A\$0.030

Oil, Green Hydrogen and Geothermal in Austria

ADX Energy is an A\$20 mm market cap company with onshore licences in Austria. ADX is the 3rd upstream player and only foreign operator alongside OMV and RAG. ADX is generating value from its geological assets along three models. (i) It produces ~340 boe/d (light oil) from long life mature assets with material low cost/low risk exploration upside. With high barriers to entry in Austria and RAG withdrawing from E&P, ADX is in a strong position to consolidate producing assets. (ii) ADX is looking to use depleted reservoirs with nearby renewable electricity generation and gas pipelines to develop a green H₂ business benefiting from seasonal energy prices' fluctuations. A pilot project could be sanctioned by YE21. (iii) There is unexploited geothermal potential in Upper Austria. This basin is already proven in Germany. Geothermal is an area of focus for Chevron and BP that are committing US\$10's mm to startups. ADX, Siemens and RED Drilling will start a pilot in 3Q21 to test a very efficient geothermal to power technology.

Large resources upside across multiple low-cost prospects

ADX's production comes from ~1 mmmboe 2P reserves in the Vienna Basin where the Flysch Play could add 6 mmbbl (recoverable). The main upside is in Upper Austria where ADX has highgraded 10 drill-ready prospects with 58 mmmboe of resources with 70 additional follow-on prospects and leads (covered with 3D seismic). With historical chances of success averaging ~48%, well costs of often only EUR1-5 mm and an extensive existing infrastructure, a discovery has good economics and can be quickly put in production. ADX is looking to initially farm-out two prospects of ~120 bcf and ~7 mmbbl to be drilled over the upcoming few months.

Using depleted reservoirs for H₂ production and storage

With the local oversupply of renewable electricity during the summer, green H₂ can be generated at a low cost and injected into depleted reservoirs in the Vienna Basin. H₂ would then be sold during the winter into neighboring methane pipelines at much higher prices. This is a rare instance of an H₂ project that would be profitable at current prices with an NPV10 of >US\$8 mm for a 30 MW capacity. Assuming a future H₂ market with sales price of EUR4/kg would boost the value of the development to ~US\$55 mm (A\$0.023 per share). A small 1 MW pilot with US\$2.5 mm capex 70-100% funded by EU and Austrian green finance would be already cash neutral.

Value build-up

Operating cash flow covers costs and debt servicing with EV/DACF multiples of 4.3x in 2022. The main sources of upside are: (1) Successfully drilling two prospects (~27 mmmboe) in Upper Austria would add A\$0.060 per share. The overall unrisks NAV for the 58 mmmboe exploration portfolio is ~A\$0.20 per share. (2) The Flysch Play could add A\$0.025 per share on success. (3) Obtaining funding for the H₂ pilot would start unlocking A\$0.004-A\$0.023 of H₂ value. Our Target price of A\$0.030 per share is in line with our ReNAV.

Rating & target		Old	New
Target		n.a.	A\$ 0.030
Yield			0%
Implied total return			275%
Share data	2020	2021e	2022e
Shares dil., mm	2,278	3,163	3,163
Mkt cap, US\$mm	\$13	\$19	\$19
EV, US\$mm	\$15	\$17	\$15
Financial Data	2020	2021e	2022e
Gas, mmcf/d	0.2	0.2	0.1
Liquids, bbl/d	270	274	271
Total boe/d (6:1)	298	302	294
CFO, US\$mm	(\$1)	\$2	\$2
Net capex, US\$mm	\$3	\$0	\$0
Net debt, US\$mm	\$2	(\$2)	(\$4)
CFPS dil., US\$/shr	(\$0.00)	\$0.00	\$0.00
EPS dil., US\$/shr	(\$0.00)	(\$0.00)	(\$0.00)
Valuation	2020	2021e	2022e
Share price, A\$/shr	A\$ 0.008	A\$ 0.008	A\$ 0.008
EV/DACF	-10.7x	6.0x	4.3x
EV per boe/d (US\$)	\$52,051	\$55,718	\$50,176
Net asset value			
CNAV, A\$/shr			A\$ 0.003
RENAV, A\$/shr			A\$ 0.029
Unrisked NAV, A\$/shr			A\$ 0.461
P/CNAV			2.8x
P/RENAV			0.3x
P/ENAV			0.0x
All figures in US\$ unless otherwise noted			
A\$/US\$:		0.74	

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Figure 1. Financial & operating information

ADX Energy Ltd (ADX AU)

Financial & Operating Information		2020a	2021e	2022e	2023e	2024e	2025e
Commodity Prices							
Brent	US\$/bbl	\$41.23	\$64.04	\$61.23	\$60.00	\$60.00	\$60.00
UK NBP	US\$/mcf	\$5.41	\$5.92	\$6.04	\$6.08	\$6.09	\$6.09
USD/CAD	US\$/C\$	\$0.75	\$0.75	\$0.75	\$0.75	\$0.75	\$0.75
A\$/US\$	A\$/US\$	\$0.74	\$0.74	\$0.74	\$0.74	\$0.74	\$0.74
Production							
Oil and Liquids	bbl/d	270	274	271	271	261	235
Natural Gas	mmcf/d	0.2	0.2	0.1	0.2	0.1	0.1
Total (6 mcf = 1 boe)	boe/d	298	302	294	302	282	249
% Oil and Liquids	%	91%	91%	92%	90%	93%	95%
Netbacks							
Realized Price	US\$/boe	\$43.25	\$55.17	\$56.66	\$55.33	\$55.45	\$55.55
Royalties	US\$/boe	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Production & Transport Costs	US\$/boe	\$46.36	\$28.21	\$28.92	\$28.22	\$30.23	\$34.26
Operating Netback	US\$/boe	(\$3.12)	\$27.70	\$27.74	\$27.10	\$25.22	\$21.29
Taxes	US\$/boe	-\$6.54	\$0.00	\$0.00	\$4.54	\$5.30	\$5.01
Cash Flow Netback	US\$/boe	(\$13.80)	\$21.60	\$21.49	\$13.77	\$10.51	\$5.61
Government Take	%	-15%	0%	0%	8%	10%	9%
Financials							
Cash Flow (CFO)	US\$mm	(\$1)	\$2	\$2	\$1	\$1	\$0
CFPS - diluted	US\$/shr	(\$0.00)	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
EBITDAX	US\$mm	(\$1)	\$2	\$2	\$2	\$2	\$1
E&D Capex	US\$mm	\$3	\$0	\$0	\$0	\$0	\$0
A&D Capex, Net	US\$mm	(\$0)	\$0	\$0	\$0	\$0	\$0
Total Net Capex	US\$mm	\$3	\$0	\$0	\$0	\$0	\$0
Total Net Capex/CFO	x	-2.6x	0.2x	0.1x	0.1x	0.1x	0.3x
Leverage							
Net Debt	US\$mm	\$2	(\$2)	(\$4)	(\$5)	(\$6)	(\$7)
Net debt/CFO (Trailing)	x	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Entry Net Debt/CFO	x	n.a.	1.1x	n.a.	n.a.	n.a.	n.a.
Capital Structure							
Basic Shares o/s @ YE	mm	1958	2458	2458	2458	2458	2458
Diluted Shares o/s @ YE	mm	2278	3163	3163	3163	3163	3163
Market Capitalization	US\$mm	\$13	\$19	\$19	\$19	\$19	\$19
Enterprise Value	US\$mm	\$15	\$17	\$15	\$13	\$13	\$12
Dividends & Sustainability							
Dividends	US\$mm	\$0	\$0	\$0	\$0	\$0	\$0
Dividends	\$/shr	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Dividend Yield	%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Free Cash Flow	US\$mm	(\$4)	\$1	\$2	\$1	\$1	\$0
Cash Use/CFO	%	-260%	24%	6%	8%	12%	26%
Performance							
Prod. Per Shr Growth (Y/Y) - dil.	%	-87%	-38%	-10%	2%	-7%	-12%
PPS Growth (Y/Y) DDA - dil.	%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
CFPS Growth (Y/Y) - dil.	%	-91%	-197%	-11%	-34%	-29%	-53%
CFPS Growth (Y/Y) DDA - dil.	%	-125%	-236%	31%	-20%	-19%	-52%
ROCE	%	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Net Asset Value							
CNAV (Atax) - diluted	A\$/shr	A\$ 0.003					
RENAV (Atax) - diluted	A\$/shr	A\$ 0.029					
Unrisked NAV (Atax) - diluted	A\$/shr	A\$ 0.461					
P/CNAV	x	2.8x					
P/RENAV	x	0.3x					
P/Unrisked NAV	x	0.0x					
Valuation							
Share Price, YE/Current	A\$/shr	A\$ 0.008	A\$ 0.008	A\$ 0.008	A\$ 0.008	A\$ 0.008	A\$ 0.008
P/CF	x	-9.5x	9.8x	11.0x	16.7x	23.4x	49.7x
EV/DACF	x	-10.7x	6.0x	4.3x	5.6x	7.1x	7.1x
Target EV/DACF	x	-24.9x	21.0x	20.8x	30.8x	42.3x	n.a.
EV per boe/d	US\$/boe/d	\$52,051	\$55,718	\$50,176	\$44,504	\$44,421	\$48,982
EV per 2P boe	US\$/boe	\$17.38	\$21.53	\$21.53	\$21.93	\$23.82	\$0.00
EV per 2P boe, with FDC	US\$/boe	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

a) EBITDAX = Pre-Int. & Pre-Tax Cash Flow; b) DDA = Debt-and-Dividend-Adjusted

c) CNAV incl. 2P reserves, RENAV incl. 2P reserves + Risked LT inventory upside, ENAV incl. 2P reserves + Unrisked LT inventory upside

Source: Auctus Advisors, Company Disclosures

**Futures strip as of 15-Jul-21

Central Europe's best kept secret

ADX entered Austria in 2019 with an acquisition in the Vienna Basin (East Austria) bringing ~340 boe/d production. In November 2020, ADX was then awarded appraisal and exploration licences in the Molasse Basin in Upper Austria with modern 3D seismic coverage, material drill ready exploration upside and contracted access to existing production infrastructure. While the company has assets in other countries (Italy and Romania), Austria is the key area of focus. Given specific dynamics in the country, ADX is in a unique position to be the beneficiary of ongoing drastic changes at one of the dominant incumbent operator.

Austria has a long history as an oil and gas producing province, having produced to date > 1 bn bbl of oil and 2.7 tcf of natural gas. At the beginning of the 20th century, the Austro-Hungarian monarchy was the third-largest oil producer in the World. Austria is also a gas hub for Europe. This is not well known as Austria has been a duopoly for oil and gas for > 50 years. While OMV remains committed to its upstream activities, RAG recently went through a change of strategy to focus on its utility and gas storage businesses rather than upstream oil and gas, and exploration in particular. As a result, while RAG had shot extensive 3D seismic on some of its assets ahead of planned exploration and appraisal activities drilling, RAG is no longer allocating capital to such activities and relinquished its exploration acreage position at the end of 2019.

This has resulted in RAG launching a programme of upstream asset divestments. With high barriers to entry for players not already operating in Austria, there are not many potential buyers of operated assets. In addition, seismic and well data is not owned by the State and therefore not easily available. This leaves ADX as the only other active exploration operator in Austria. With an extensive database obtained from RAG, ADX is in a strong position to grow by acquisition and exploration.

Austria has two other key assets that ADX is taking advantage of: (i) an extensive pipeline network transporting natural gas to Europe from Russia; and (ii) an important renewable power generation capacity with a large seasonal oversupply of electricity looking for a home. ADX is planning to use depleted reservoirs to store the oversupply of energy during the summer and sell it at higher prices during the winter. This could be done with green hydrogen (H₂).

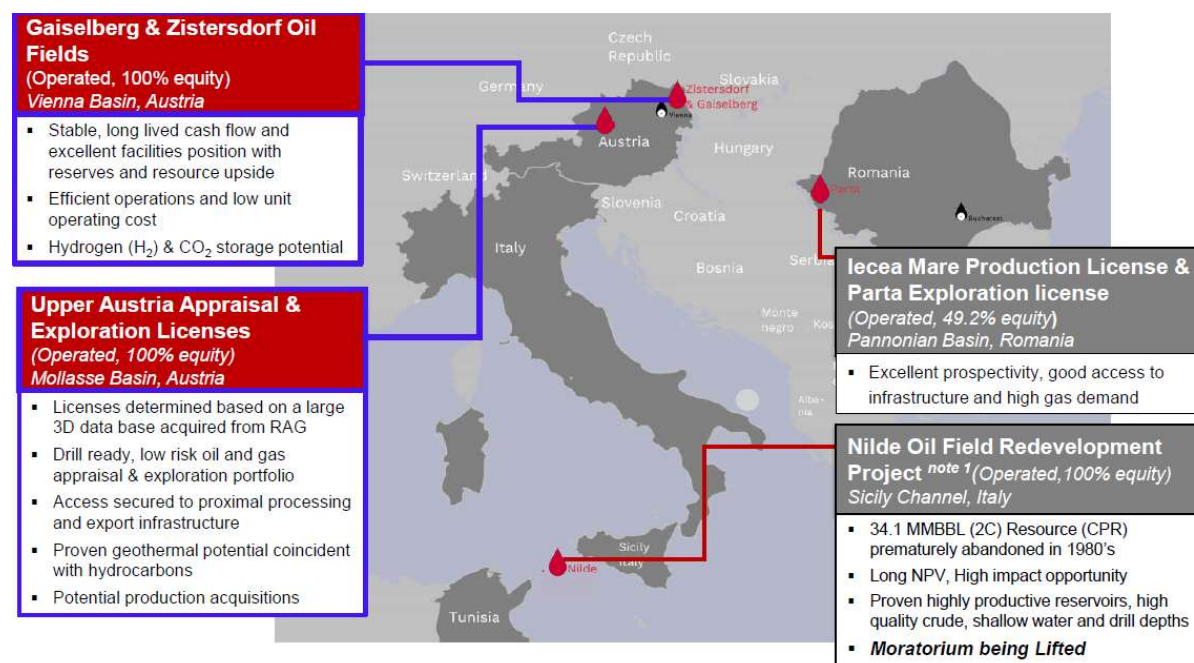
Asset Overview

ADX Energy has assets in three countries with the current emphasis on Austria. Overall, ADX produces ~340 boe/d and holds ~ 1 mmbbl 2P producing developed reserves and 6 mmbbl prospective resources in the Flysch Play (Vienna Basin). The Flysch Play has also some reserves as well as contingent (from 4 producing wells). In Eastern Austria, the 100% owned Gaiselberg & Zistersdorf licences (with the producing fields) have no expiry date. The depleted reservoirs that could be used for H₂ storage are located in this area.

The recently awarded Upper Austria (in Western Austria) appraisal and exploration licences in the Molasse Basin (100% WI) have a four-year initial term that can be extended for three additional 4-year periods. Commitments in the initial period consist of drilling two wells. So far, the company has matured 58 mmbbl prospective resources over 10 “ready to drill” prospects and identified an additional 70 prospects and leads. The potential geothermal assets are located in this area of Austria.

In addition, ADX holds ~37 mmbbl WI contingent resources in Italy and Romania. In Italy, the operations to redevelop the Nilde oil field are under a moratorium until 4Q21. In Romania, recent drilling operations on the Iecea Mare licence could not establish a flow rate at a 20 bcf discovery and ADX is reviewing options to potentially achieve a commercial flow rate.

Figure 1. Assets location



Source: Company

Figure 2. Licences, reserves and resources

Country	Licences	WI	Expiry Date	Commitments	WI Area (km2)	WI 2P mmboe	WI 2C mmboe	Prospective Resources mmoe	Other
Austria (Vienna Basin)	Gaiselberg &	100%	None	None	3,116	1	1	6	Green Hydrogen
Austria (Molasse Basin)	ADX-AT-I and ADX-AT-II	100%	2025	2 wells	450	0	0	58	Geothermal
Romania	Parta	49%	2023	1 exploration well + 3D/2D seismic	1,106				
Romania	Icea Mare	49%	2034	None	5	0	2		
Italy	d363 CR-AX	100%	2025-2045	3D seismic + optional well in year 4	724		34		
Total					5,401	1	37	64	

Source: Company

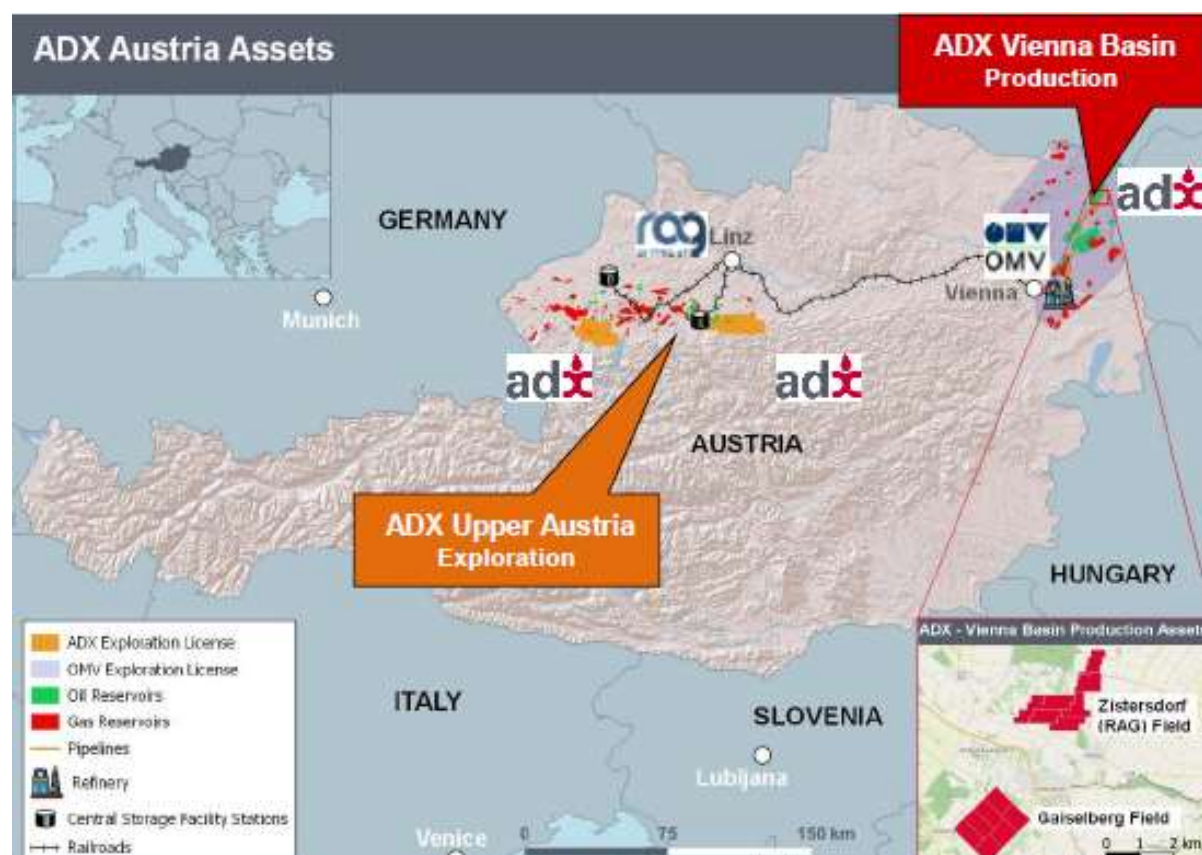
Austria E&P

Austria has a long history in oil and gas. The country has produced ~ 1bn bbl of oil and 2.7 tcf of gas across the Vienna Basin (Lower Austria) and the Upper Austria Molasse area. Austria benefits from extensive oil and gas processing and transport infrastructure. The country now produces a total of 25 mboe/d. The first gas pipeline was constructed in 1916/17 in Transylvania (Romania) to bring natural gas from the Magyarsaros area to Thorenburg and Marosujvar.

The two main operators are OMV and RAG. ADX is already the third largest producer and only the second explorer (along with OMV) in the country, as RAG is progressively withdrawing from upstream oil and gas production and exploration activities.

An important feature of the Austria upstream sector is that seismic data remains proprietary to the companies which hold the licenses or buy the data. As a result, there is an asymmetry of information to the benefit of the parties holding the seismic data. ADX has gained preferential rights to geotechnical data sets owned by RAG with an original cost estimated at EUR90 mm, which gives it a material advantage against potential competitors.

Figure 3. Austrian assets



Source: Company

Production in the Vienna Basin (Eastern Austria)

ADX made its first acquisition from RAG in 2019. RAG had already started at the time to retreat from the upstream sector. ADX' first asset in Austria was the Gaiselberg & Zistersdorf licences in the Vienna Basin with current production of ~340 boe/d (mostly light oil) from low decline reservoirs. A typical new well in that part of Austria produces 80-100 bbl/d of oil from stacked reservoirs where production typically is not comingled. The wells need to be perforated and developed sequentially from bottom to top. Water cut is currently high (up to 90%) reducing the individual reservoir perforation oil flow rates to 20-30 bbl/d. These restrictions lead to relatively low individual net oil well flow rates that can be maintained over a very long period.

With minimum investment, the company plans to produce ~0.9 mmboe 2P reserves by 2033 with production broadly flat at ~300 boe/d until 2024 and then progressively declining. The producing area on the license also includes 0.85 mmboe upside associated with four infill and very low risk appraisal wells. Some wells have already been approved for drilling by the regulator. Developing these additional reserves could extend the life of the production to 2042.

Important potential upside at the Flysch Play

An important source of potential upside on the existing producing license is associated with the geologically older Flysch formation. This is a very thick sandstone reservoir that is well developed in the surrounding licences operated by OMV with >100 development wells and approximately 30 mmboe produced to date.

The Flysch is an Upper Cretaceous naturally fractured sometimes tight reservoir with 8-14% porosity. This reservoir has to be developed with vertical wells targeting natural fractures or with horizontal wells which can be produced economically even in the absence of fractures. A vertical well hitting a fracture can produce 300-400 bbl/d (IP rate) while a horizontal well without natural fractures typically produces 150 to 200 bbl/d (OMV wells). A vertical well is expected to cost EUR1.2 to 2.8 mm (depending on depth) while the drilllex for a horizontal well is estimated at EUR3.5 mm.

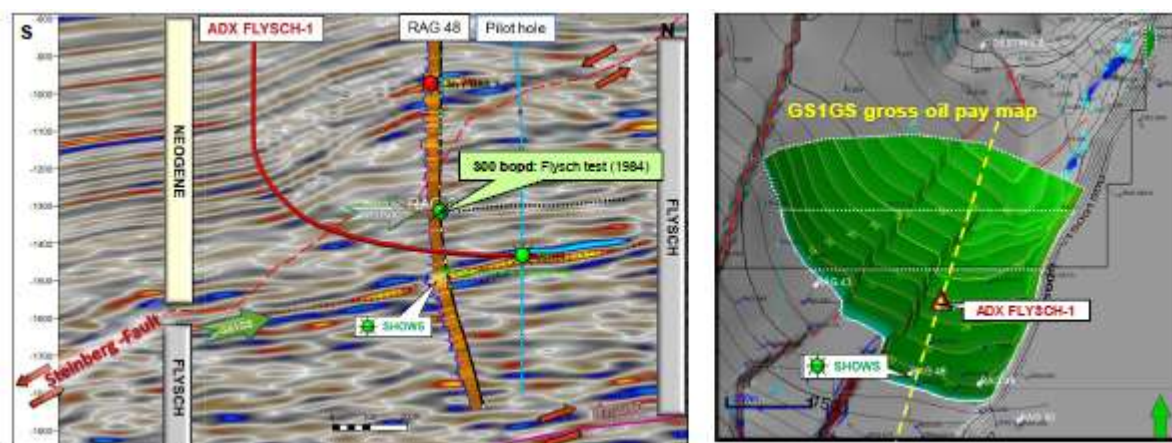
Overall, ADX estimates the Flysch reservoir could hold 60 mmbbl oil in place across its two production licences in the Vienna basin. Assuming ~10% recovery factor leads to 6 mmbbl recoverable resources. Around 15 historical wells have already been drilled into the Flysch on ADX' licences with four still producing oil and gas from shallow areas of the Flysch.

RAG drilled a well in 1984 that reached the Flysch but was never developed, due to the very prolific nature of the shallower reservoirs. The detailed plan to come back and develop the Flysch discovery following a successful Flysch production test was never

executed because the shallower Neogene production turned out to be much longer lived than anticipated.

The main residual risks are associated with poor 3D imaging (which ADX is seeking to address by reprocessing a recent 3D seismic survey acquired from OMV) and potential low reservoir quality which may require horizontal or multilateral wells to commercialise.

Figure 4. The Flysch Play



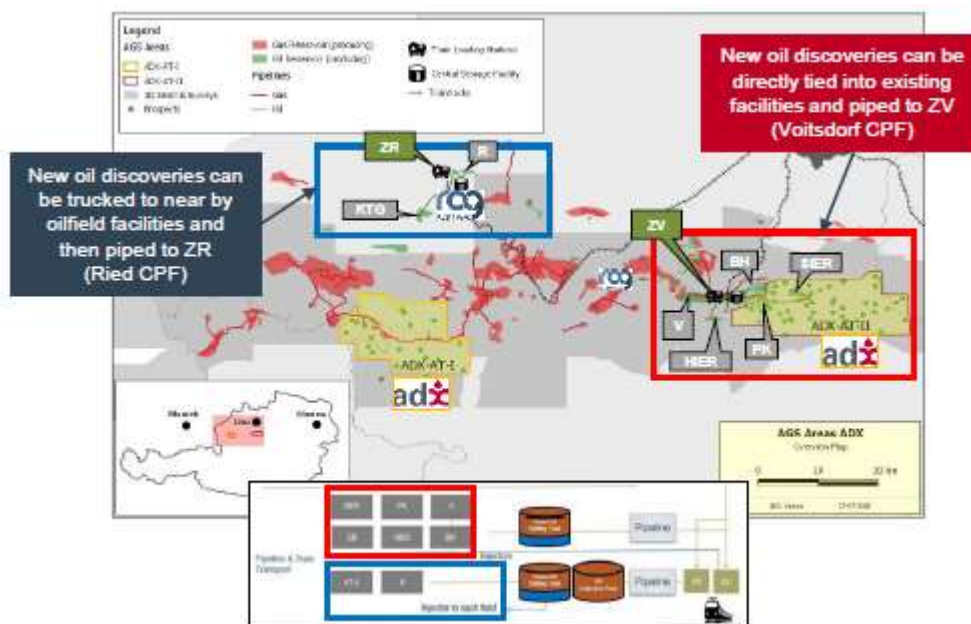
Source: Company

Very large upside in Upper Austria (Western Austria)

Exploration and appraisal licences (ADX-AT-I and ADX-AT-II) in the Molasse Basin in Upper Austria were awarded in November 2020. The licences cover an area of 450 km². In this part of Austria, RAG has produced 70 mmbbl of oil and 0.8 tcf of natural gas over time.

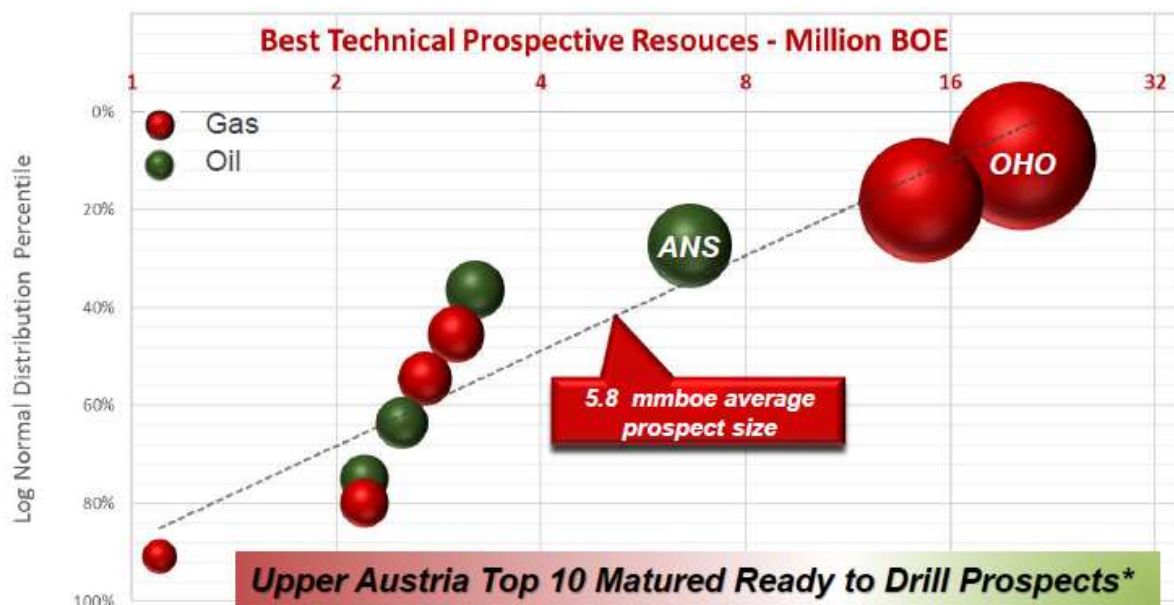
The ADX licenses are immediately adjacent to RAG's oil and gas fields, thus providing excellent geological understanding and direct access to infrastructure. ADX has access to 3,650 km² of high-quality 3D seismic that it obtained from RAG under a data usage agreement covering the area and highlighting a total of 81 oil and gas prospects and leads located at shallow to moderate depth (1,000 m to <3,000 m). Ten of these prospects are ready to drill, representing a total of 58 mmboe prospective resource (P50) and 140 mmboe in an upside case (P10). The target resources of each prospect range from just over 1 to 20 mmboe with an average prospect size of 5.8 mmboe (P50). The historical success rate of wells drilled on 3D seismic is 48% over the exploration targets drilled by RAG.

Figure 5. New licences in Upper Austria



Source: Company

Figure 6. Upper Austria – ready to drill prospects



Source: Company

The petroleum geology in the Molasse foreland basin is to some extent quite different from the Vienna pull apart basin. Individual well flow rates in the Molasse basin can reach 1,000-2,000 bbl/d (vs 80-600 bbl/d in the Vienna basin) with steeper declines. This leads to quick pay back periods for wells in Upper Austria. Prospects with less than 0.3 mmboe of resources are economically viable due to the proximity to existing infrastructure operated by RAG, highly productive reservoirs and relatively shallow drilling.

Well costs for the ten drill ready prospects range from EUR1.3-7.3 mm with drilllex potentially as low as US\$1/boe.



Six exploration and appraisal drilling locations have already been approved by landowners and authorities, some with an access road and drill site.

ADX has identified two stand out prospects that it is looking to farm-out:

- The Oho prospect is a gas and condensate deep prospect located at 4,365 m depth. The prospect is estimated to contain ~20 mmboe prospective resources with the well budgeted to cost EUR 6.6 mm. Peak production is estimated at ~3,800-5,100 boe/d with total capex of ~EUR45-95 mm with 4-6 wells. The lower capex and peak production rate correspond to the gas case. The prospect is high risk with a <20% chance of success. There is an upside case of almost 40 mmboe prospective resources (P10). Given the very high gas prices in Europe, a gas prospect has a similar value to an oil prospect.
- Anshof is expected to hold 6.6 mmbbl (oil) prospective resources and located at only 2,250 m depth for a well cost of only EUR1.8 mm. This is a low-risk prospect with 45% chance of success. **The well could be spudded in 2021.** Peak production is expected to be almost 4,000 bbl/d with overall exploration and development capex of EUR37 mm (including 7 wells). An Anshof well is expected to produce up to 900 bbl/d. There is an upside case of >16 mmbbl prospective resources (P10). There are also follow-up prospects and leads with P10 potential prospective resources of 13 mmboe.

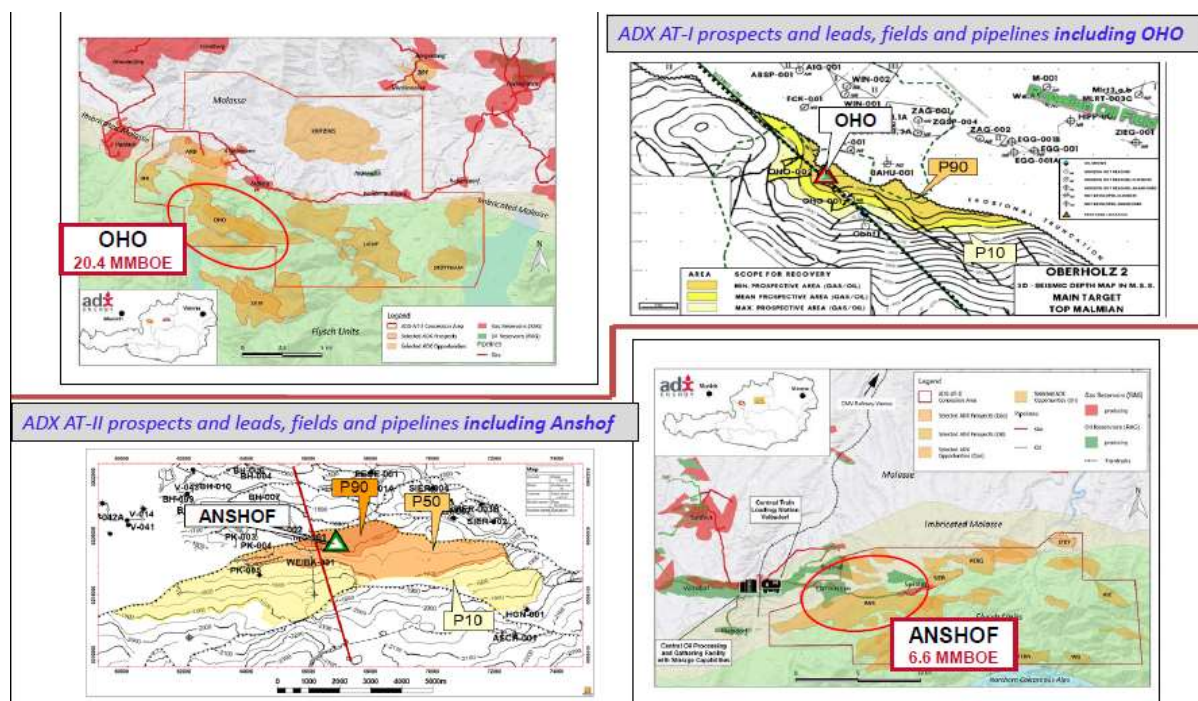
An ideal farm-out transaction for each prospect would consist in 50% being sold to a partner in return for 100% funding of an exploration well at each prospect. At Anshof, ADX would also be looking for the farm-in partner to fund a follow-on well should the first exploration well be success.

Figure 7. Prospect details

	PROSPECT NAME	fluid	Map Name	Best Technical Recoverable [mmboe]	well TD [m TVD]	Exploration Well Cost [MM Euro]
	Σ HIGH IMPACT EXPLORATION					
	OHO	gas (oil)	OHO	20,4	4 365	6,6
	ZELL AM MOOS	gas (oil)	ZAM	14,6	5 400	7,3
	Σ TREND EXPLORATION					
	LICHTENBERG	gas	LIC	2,7	3 010	3,6
	IRRSDORF	gas	IRR	3,0	2 950	2,9
	TERNBERG	oil	TER	3,2	2 890	5,0
	WOLFSGRUB	oil	WOL	2,2	3 150	5,1
	PERGERN	oil	PER	2,5	1 790	2,2
	ANSHOF	oil	ANS	6,6	2 250	1,8
	ARD (LP gas only)	gas	ARD-BR	2,2	2 700	2,1
	Σ APPRAISAL / SIDE TRACK					
	STEYR 3 (APPR)	gas	STE	0,5	1 270	1,5
	BAD HALL - LIND (appr.)	oil	LIN	0,8	2 150	1,8
	BAD HALL - STEIN (appr.)	oil	SGB	0,8	2 200	1,8
	BRUNN (sidetrack)	gas	ARD-BR	0,8	2 100	1,2
	KLE 1A (Sidetrack)	oil	KLE	0,6	2 260	1,3
	TOTAL EXPLORATION [mmboe]			58		
	TOTAL [mmboe]			62		

Source: Company

Figure 8. Oho and Anshof



Source: Company

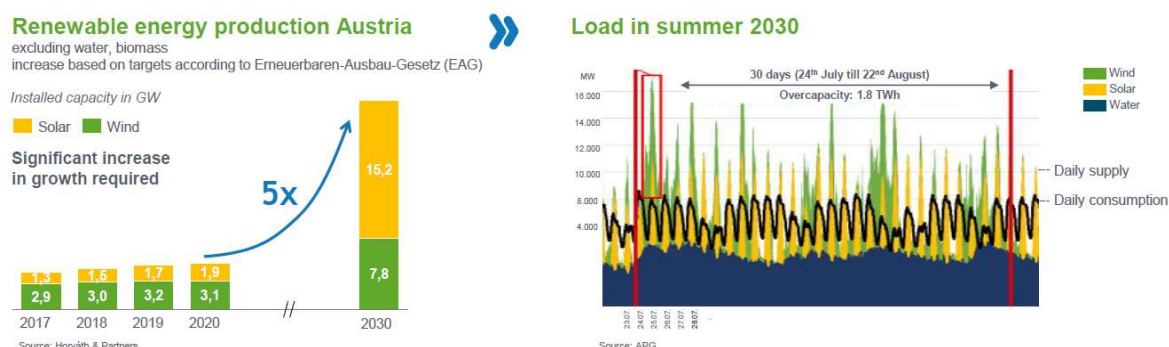
Leveraging existing depleted reservoirs and a specific context in Austria to develop a green H₂ business

ADX believes that it can utilise some of its >50 reservoirs at the Zistersdorf fields for hydrogen and energy storage. These are located next to the largest wind and solar parks in Austria.

The context of electricity supply/demand seasonal imbalance

Because of the seasonal nature of energy supply and demand (electricity and gas), there is an important structural oversupply of electricity during the summer (solar and wind) while demand is lower (no need for heating). This results in very low electricity prices during the summer and renewable electricity being “lost” due to curtailment. With Austria committed to multiplying by 5x its renewable energy generation capacity by 2030 (mostly through wind and solar), this imbalance will only grow. As an illustration, the supply imbalance is estimated to reach 1.8 TWh during the hottest period of the year (July to August) in 2030. This represents 3x the capacity of Austria largest hydro pump storage station.

Figure 9. Electricity imbalance in Austria



For this extra energy not to be lost (as it is the case today), it needs to be stored. Austria estimates that 10-30 TWh of energy yearly storage would be required by 2030. With the energy supply/balance being reversed during the winter (less solar and wind, more heating/electricity demand), the stored energy could be sold during the winter, when electricity/energy prices are much higher.

Figure 10. Seasonal storage requirement in Austria



Source: Company

Austria's specific context could address the challenges of hydrogen

ADX is studying the potential to take advantage of very low renewable electricity prices during the summer to generate green hydrogen with an electrolyser. The hydrogen would then be injected into the reservoirs within the licences.

One of the key issues with hydrogen is the very high cost of transportation to the end users. The cost structure to supply and deliver H₂ is often so high that it is difficult to see how this fuel would be competitive anytime soon. The fact that Austria is a substantial natural gas hub for Europe with an extensive natural gas pipeline system partly addresses this issue. The intention is to initially inject the hydrogen in the natural gas pipelines with a mixing ratio of hydrogen/natural gas of up to 10% (approved by the Austrian authorities in June 2021) that we understand the existing infrastructure can handle without modifications. ADX's Vienna basin licences are located in close proximity and connected to multiple pipelines. In that scenario, hydrogen would be initially sold to gas traders at the same price as natural gas (methane). While accessing pipelines can be complicated in some areas of the world, the push for hydrogen by European governments and financial institutions is likely to make the process much simpler. Traders buying the hydrogen would get the additional benefits of greener credentials.

Unlike most other H₂ initiatives around the world, given the low electricity prices, the absence of transportation issues, high realisation prices (=Methane) and very conservative assumptions for the carbon tax credits that the project would attract (H₂ is a carbon free fuel), ADX' green H₂ project is already expected to be profitable. The NPV10 of the project is already estimated to be >50% of the company market cap in the current environment at the recent methane winter prices.

Should an independent market for H₂ develop in line with expectations (EUR3-6/kg), the revenue of ADX' H₂ project could be multiplied by 2-4x with a very material impact on profitability and NPV. Assuming more aggressive growth in carbon prices (from EUR55/t to EUR300/t), the NPV10 of the project would double.

Figure 11. Natural gas pipelines and ADX licences in the Vienna Basin



Source: Company

Digging into (some of) the details

The Vienna Basin licence has no expiry date. This means that ADX has full flexibility with regards to the pace at which the company can progress its hydrogen activities. ADX also owns a substantial land area which enables further infrastructure development.

ADX has identified 10-20 reservoirs in the Vienna Basin that could be candidates for hydrogen or CO₂ storage. These reservoirs are located at 650-700 meters depth and have suitable geological characteristics having historically been gas filled. The main areas of technical uncertainty are the technical characteristics of the wells to handle the flow of hydrogen and ensure a perfect seal. However, several of the reservoirs have already been tested for hydrogen injection by RAG (the previous licence holder) several years ago. At the time, RAG was testing the possibility of generating green CH₄ by injecting H₂ and CO₂. H₂ can be corrosive in certain conditions and, at certain temperature and pressure, materials can become brittle when exposed to H₂. This problem was not encountered during the tests.

Because the area is covered by 3D seismic and the volumes of historic gas production is known, the size of the structures is well understood. A single reservoir could store 25 mm m³ of hydrogen at a pressure of 60 bar representing 75 GWh of energy. To put this in context, this (one reservoir) represents 500x the energy equivalent of the largest Tesla storage Mega-Pack. There is potential for ten further reservoirs in the field with 500-1,000 GWh of storage.

ADX has also already secured government authorisations to store hydrogen in the reservoirs.

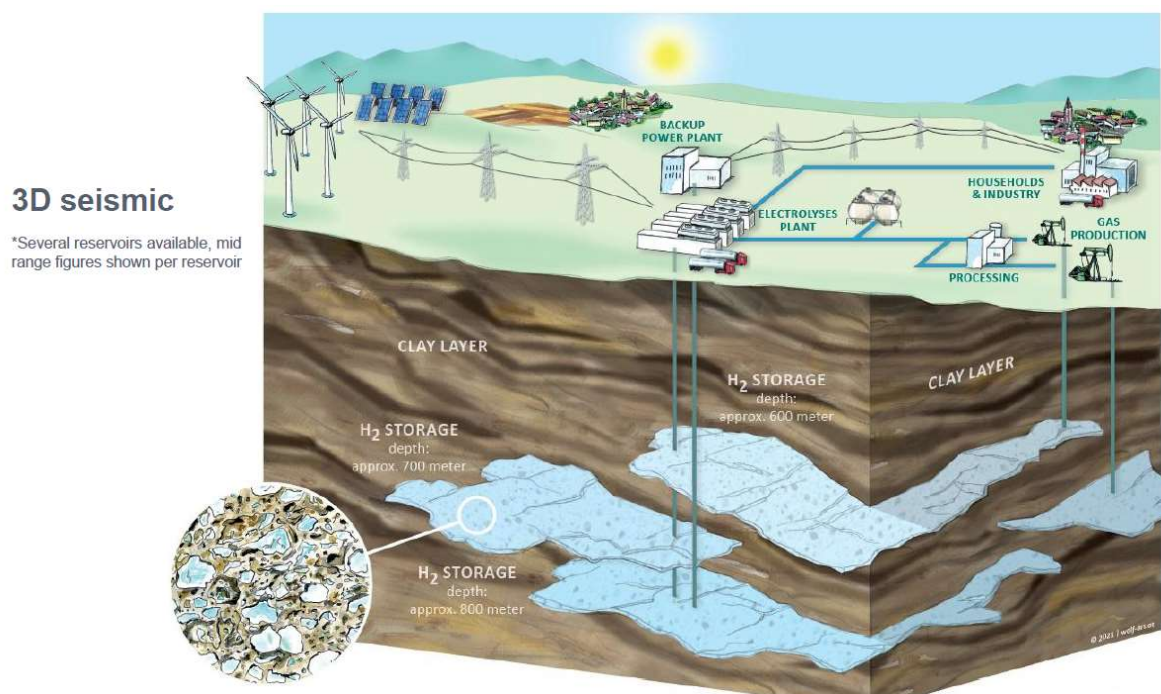
Figure 12. Storage specifications

Parameter*	Unit
Reservoir depth	660 meters
Geometric volume	0,5 MM m ³
Hydrogen storage volume	25 MM m ³
Hydrogen energy storage capacity	75 GWh (max)
Reservoir pressure	Around 60 bar
H ₂ max. flow rate	30 MWh/ h
H ₂ max. flow rate	0,2 MM m ³ /d
Electrolyser max. power	50 MW

Source: Company

ADX expects the cost of energy storage in depleted reservoir (EUR30/MWh) will be very competitive with other methods of energy storage (pump: EUR35-105/MWh, battery: EUR30-40/MWh). With the cost of electrolyzers dropping over time, the overall break-even costs are likely to reduce further.

Figure 13. Storage schematics

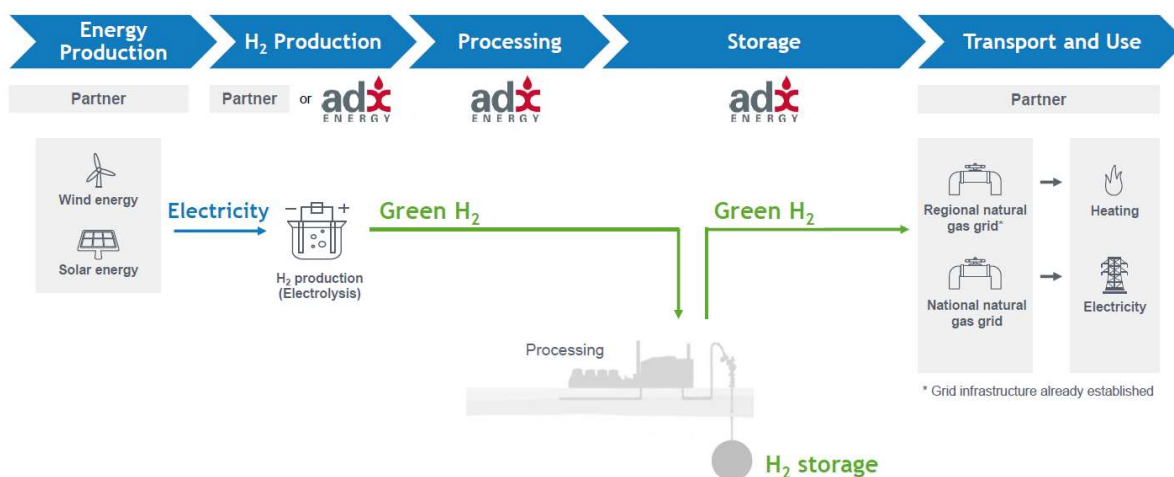


Source: Company

ADX has already commenced discussions with strategic partners for renewable energy production who are ideally positioned in close proximity to the Zistersdorf and Gaiselberg

fields. ADX is seeking to commence a pilot project utilising a 1 MW electrolyser to produce, store and sell green hydrogen in the local gas network. The intention of ADX is to focus on the processing and storage of green hydrogen rather than the rest of the value chain. The pilot would be operational in 2023-2024 with the goal to then sanction a 30 MW project.

Figure 14. ADX in the value chain



Source: Company

Economics and funding

The main economic variables of the project are (1) the cost of electricity, (2) the price of natural gas and H₂, (3) the expected volume that could be sold during the winter and (4) the number of wells required to produce these volumes.

We have considered three scenarios: (1) the initial 1MW pilot with H₂ sold as methane, (2) a 30 MW project with H₂ sold as methane (we have considered both a conservative and an aggressive outlook for carbon prices) and (3) a 30 MW project with H₂ sold on a specific market at much higher prices. The first two scenarios reflect the current situation and current prices while the third scenario is a representation of how the H₂ market could evolve.

In all scenarios, we have assumed that ADX would generate and store H₂ only during the four hottest, sunniest and windiest months of the year and sell H₂ during the 3 coldest months of the year. Under these circumstances, we have assumed that ADX would only pay 10% of electricity market prices during the summer. Under the "H₂ sold as methane" scenarios, ADX sells H₂ at US\$8.5/mcf (~US\$1.1.4/kg of H₂) during the winter. Under the "H₂ sold on a specific H₂ market", ADX gets US\$3.6-6.0/kg.

The O₂ generated during the electrolysis process (to generate H₂ with electricity) is also sold at current prices. This represents additional revenue. We have also assumed carbon credits of EUR55/t (=current levels) growing progressively to EUR100/t in the scenario

where H₂ is sold as methane. There are no credits in the scenario when an H₂ specific market has developed.

The costs of an 1MW electrolyser are ~EUR1.2 mm/MW.

For a 30 MW, project, we have assumed an improvement in cost per MW with an overall capex of EUR26 mm for the electrolyser. Overall cost per unit is also reduced given economies of scale.

We understand that there are various sources of funding for H₂ projects including grants. Austrian and EU grants could cover 70%-100% of the capex of the project. We have assumed 70% as a base case for the pilot and 50% for the 30 MW case.

Overall, we find that the cashflow for the pilot project covers opex, leaving the initial capex as the only financial exposure. With 70-100% grant this exposure would be limited to <US\$0.7 mm which is not material. At <5% cost of capital, the 30 MW project with H₂ sold as methane (and under the conservative assumption for carbon price) has a positive NPV without any grant. It would generate operating cash flow estimated at ~US\$1.6 per kg of H₂. With a 50% grant, the NPV10 of project is ~US\$8.5 mm (NPV5 of ~US\$19 mm).

The 30 MW project would become much more valuable and profitable under the specific H₂ market scenario (prices for H₂ of US\$3.6-6.0/kg) with NPV10 of US\$19-56 mm without any grants and US\$35-72 mm with 50% grant to cover the initial capex. The NPV of the project with a much more aggressive assumption for carbon price increase is equally very attractive.

Figure 15. H₂ project – Financials and valuation

	H2 sold as Methane			H2 Market		
	1 MW Pilot - Peak Carbon Price: US\$120/t	30 MW Project - Peak Carbon Price: US\$120/t	30 MW Project - Peak Carbon Price: US\$300/t	30 MW H2 price: US\$3.6/kg	30 MW H2 price: US\$4.8/kg	30 MW H2 price: US\$6.0/kg
Methane Winter Price (US\$/mcf)	8.51	8.51	8.51	N/A	N/A	N/A
Carbon Price (US\$/t)	65-120	65-120	65-300	0.00	0.00	0.00
O2 Sales Price (US\$/kg)	0.10	0.10	0.10	0.10	0.10	0.10
H2 Sales Price (US\$/kg)	1.14	1.14	1.14	3.60	4.80	6.00
Total Revenue (US\$/kg of H2)	2.63	2.69	3.45	4.34	5.54	6.74
Power price (US\$/MW)	72.00	72.00	72.00	72.00	72.00	72.00
Power Cost to ADX during Summer (US\$/MW) - 10% of Power price	7.20	7.20	7.20	7.20	7.20	7.20
=Power Cost to ADX (US\$/kg of H2)	0.39	0.34	0.34	0.34	0.34	0.34
+Other Opex (US\$/kg of H2)	1.88	0.76	0.76	0.76	0.76	0.76
=Total Opex (US\$/kg of H2)	2.28	1.10	1.10	1.10	1.10	1.10
Average Operating CF/kg of H2 (US\$)	0.35	1.59	2.35	3.24	4.44	5.64
Average Operating CF/y (US\$mm)	0.0	3.0	4.4	6.0	8.3	10.5
Initial Capex net of Capex (US\$ mm)	2.3	35.1	35.1	35.1	35.1	35.1
- 50-70% Grant (US\$ mm)	-1.6	-17.6	-17.6	-17.6	-17.6	-17.6
= Net Capex (US\$mm)	0.7	17.6	17.6	17.6	17.6	17.6
NPV10 (US\$ mm) with Grant	-0.6	8.5	15.7	34.6	53.4	72.1
NPV10 (US\$ mm) no Grant		-7.4	-0.2	18.7	37.4	56.2
NPV5 (US\$ mm) with Grant	0.0	18.9	32.5	56.4	83.5	110.6
NPV5 (US\$ mm) no Grant		2.2	15.8	39.7	66.7	93.8

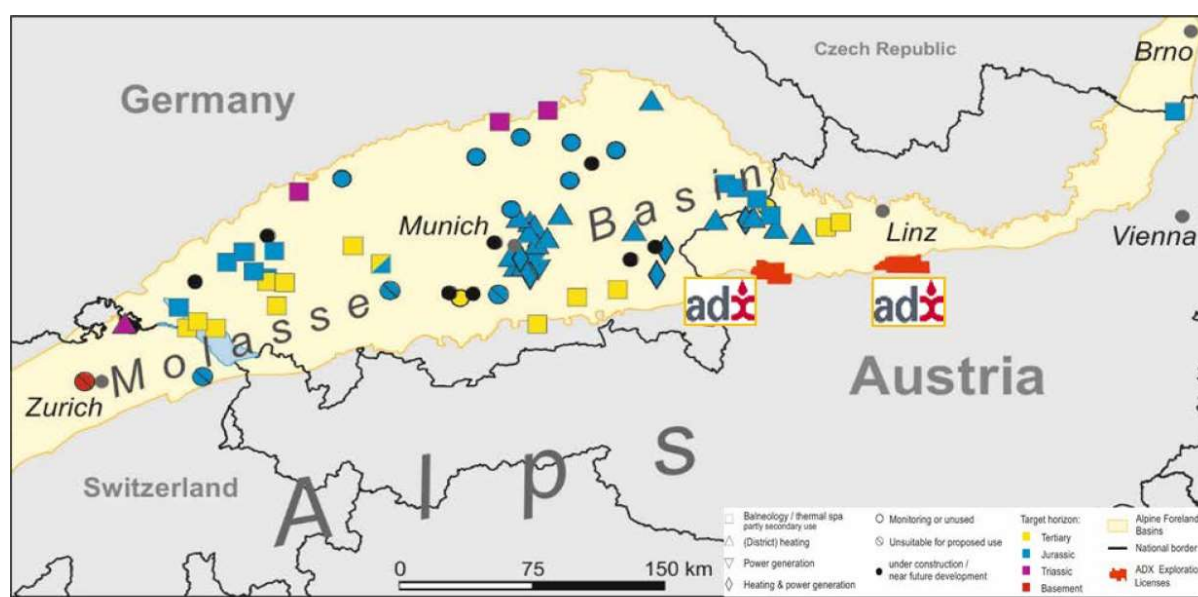
Source: Auctus

Geothermal potential in Upper Austria to deliver reliable electricity

Geothermal energy has caught the attention of the supermajors with Chevron investing US\$25 mm in Baseload Capital in February 2021. Baseload is focused on the development and operation of low-temperature geothermal and heat power assets. The same month, BP and Chevron headed a US\$40 mm investment round in Eavor, a Canadian firm dedicated to geothermal.

The Molasse basin in Upper Austria is a proven highly active geothermal growth area with 90% success rate for geothermal wells. Across the border in Germany, the area around Munich has seen exponential growth in for geothermal energy activity. The reservoirs are highly fractured and benefit from a Jurassic geothermal aquifer. The potential of geothermal in Austria is not yet exploited.

Figure 15. Geothermal map



Molasse Basin Geothermal Potential Map with blue symbols showing operating plants with highly productive Jurassic geothermal reservoirs used also for directly for electricity generation (source: Bavarian Ministry for Environment)

In July, ADX signed an LOI with Siemens Energy and RED Drilling & Services to run a pilot at a well test site in Upper Austria for a geothermal to power technology developed by Siemens Energy. This transformational technology is capable of providing carbon free **non-interruptible** electricity on a 24/7 basis in contrast to wind and solar based systems. The pilot is expected to start in 3Q21.

The objective of the planned pilot project is to demonstrate the viability of the technology for large scale commercialisation in a geothermal reservoir.

The pilot project is primarily funded by Siemens. Siemens Energy will provide thermodynamic engineering work for the evaluation of the power generation system. ADX role in the project will be to provide overall project management as well as responsibility for execution of all subsurface aspects of the project, including engineering, geological analysis, operational planning and implementation. Importantly, ADX had initial positive discussions with the relevant mining authorities in Austria with regards to necessary authorizations. RED will execute any required drilling, well workover (completion) operations and well performance monitoring.

Well test sites where existing wells can be reconfigured to implement the pilot project have already been identified.

Should the pilot project be successful, ADX expects that the technology could be deployed on a large scale under a joint venture with Siemens on ADX' Austrian licenses, as well as other countries in Central Europe where ADX has identified geothermal power generation opportunities.

Valuation and financials

Financials

We are using US\$65/bbl for Brent from 3Q21 to 1Q22 and US\$60/bbl thereafter. We are using strip pricing for gas prices in 2021 and 2022 and US\$8.50/mcf thereafter. ADX held A\$4.7 mm of cash at the end of 1Q21. The company carries two loans including loan notes for A\$3.5 mm (6% per annum interest) with A\$1.75 mm to be repaid semi-annually in 4 equal instalments over a period of 2 years starting from May 2021 and ending on November 2022; and a A\$1.75 mm bullet repayment in November 2022.

At ~300 boe/d production in 2021, we forecast after interest operating cashflow of ~US\$2 mm, which will allow for the servicing of the debt obligations. Given the flat production profile until 2023 with minimum capex, this leaves the company with its cash resources available for investments in growth projects.

With potential farm-in partners funding high impact drilling in Austria, ADX could focus its cash resources to progress the Energy Transition assets in its portfolio. We note that given the large amount of cheap green funding, the equity funding requirements for these projects is likely to be small.

Valuation

Our Core NAV of A\$0.003 per share for ADX reflects the NPV10 on a blow down on the company 2P reserves. We have also added the value of the low-risk infill drilling upside. We have then deducted net debt at the end of 2021 and a perpetuity of the company annual G&A (~A\$2.0 mm).

We carry fixed opex in Austria of ~US\$2.3 mm per year.

Oil produced on the Gaiselberg & Zistersdorf licences is sold at a 7.9% discount to Brent, reflecting quality and logistics. Government take consists of a 25% corporate tax. The fiscal terms are different in Upper Austria (15% to 22% royalties) but the wells have quicker pay back.

Our ReNAV assumes (1) the risked upside associated to the Flysch reservoir (risked at 30%) with an unrisked NAV of A\$0.025 per share and (2) the two exploration wells (Oho and Anshof) in the Upper Austria licences that ADX is looking to farm-down. We have assumed that ADX would have to sell 50% WI in each to secure funding for 100% of the drilling costs. We are therefore carrying only 50% of the estimated resources for each prospect in our valuation. We have applied the NPV per barrel we calculated for the Vienna basin reserves to estimate the unrisked value of the resources on the new licences. Our unrisked NAVs for Oho and Anshof are respectively C\$0.045 and A\$0.015. We have assumed a chance of success of only 45% for Anshof and 15% for Oho (vs 48% historically in the area). Overall our ReNAV is A\$0.029 per share.

The 10 prospects identified so far (total of 58 mmboe resources) have an aggregate unrisked NAV of ~A\$0.20 per share, representing ~25x the current share price.

We have not attributed any value to the H₂ business yet pending the results of the 1MW pilot. A success at the pilot would allow the company to sanction a 30 MW project. Assuming the H₂ is sold as substitute to methane, our NPV10 for the 30 MW project is A\$0.004 per share. This would increase to A\$0.023 per share if H₂ can be sold at U\$4.80 per kg. Using the lower cost of capital often applied to energy transition projects would have a positive impact on these figures. Note that this is just an initial project. There should be the opportunity to replicate it elsewhere on the licence.

We have not attributed any value in our ReNAV to Italy or Romania given the uncertain timing of future operations.

In October 2018, ADX signed a farmout agreement with SDP Services Limited to fund a EUR23 mm work programme for 50% of the Italian assets and we have kept that value for our unrisked NAV for these assets. Our Unrisked NAV for Romania reflects the last round of investment by Reabold Resources plc.

Value build-up

Our Core NAV for producing assets is A\$0.003 per share. The key near term event is the farm out of prospects in the Upper Austria basin to confirm drilling activities. We estimate that a successful transaction could add A\$0.019 per share.

A drilling success at Anshof and Oho would add to our Core NAV respectively A\$0.015 and A\$0.045.

It is difficult to quantify the potential value of the hydrogen project at this stage but given the very low cost of capital and investors interest for hydrogen activities, a successful pilot is likely to attract a lot of attention.

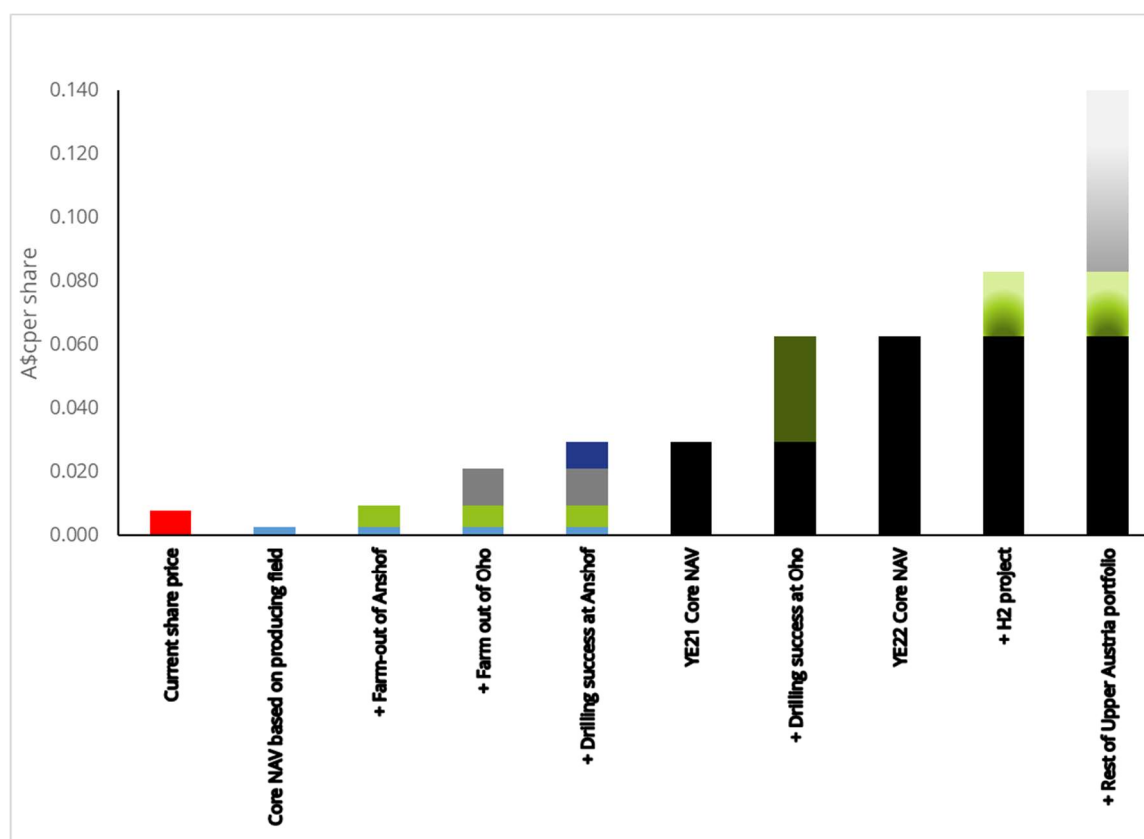
Overall with a farm-in partner at both Anshof and Oho and a discovery at Anshof, our Core NAV would be ~A\$0.030 per by around YE21, suggesting 4x potential upside from the current share price.

Figure 16. NAV Table

Asset Valuation	WI Reserves / Resources (mmboe)	Unrisked NAV (US\$ mm)	Unrisked NAV/sh A\$/Share	GCoS (%)	EMV (US\$ mm)	A\$/Share	% Total
Net Cash (YE21)		2	0.001		2	0.001	3%
G&A		-9	-0.004		-9	-0.004	-13%
Austria							
Zistersdorf 2P	1	9	0.004	100%	9	0.004	14%
Zistersdorf Infill and low risk appraisal	1	6	0.003	70%	4	0.002	6%
Total Core NAV		8	0.004		7	0.003	10%
Austria							
Zisterdorf Flysch Resources	6	59	0.025	30%	18	0.008	26%
Upper Austria Oho	10	105	0.045	15%	16	0.012	41%
Upper Austria Anshof	3	35	0.015	45%	16	0.007	23%
Remaining prospects	31	331	0.141	30%	0	0.000	0%
H2 30 MW CH4 Equivalent	0	9	0.004	0%	0	0.000	0%
Additional value - H2 30 MW H2 Market (US\$4/kg)	0	45	0.019	0%	0	0.000	0%
Romania							
Ilecea Mare	2	7	0.003	60%	0	0.000	0%
Italy							
Nilde Contingent Resources	34	23	0.010	10%	0	0.000	0%
Total Risked Appraisal & Exploration		614	0.262		49	0.026	90%
Total NAV		622.04	0.266		56	0.029	100%
Unrisked NAV						0.461	
P/Core NAV					284.0%		
P/NAV					27.8%		
P/Unrisked NAV					1.7%		

Source: Auctus, Company Disclosures

Figure 17. Value build-up



Source: Auctus

Appendix 1: Other assets

In Romania, ADX holds 49% interest in the Parta permit that covers an area of 1,106 sqkm in the Southern Pannonian basin area of Western Romania (adjacent to the border with Serbia). It surrounds the Iecea Mare production licence with a small discovery where an appraisal well has not yet managed to confirm a commercial flow rate.

In Italia, ADX was awarded a 100% interest in the d363 CR-AX petroleum exploration and exploitation permit off the coast of Sicily in 2014. The licence award has not been ratified by the government yet and the licence is in Force Majeure. The permit is located 53 km offshore to the South West of Sicily and contains:

- the Nilde oilfield discovered in 1973 in water depth of 90-100 m with STOIP of ~300 mmbbl.
- 2 oil discoveries, namely Norma and Naila, within tie-back distance to the Nilde oilfield.
- 5 exploration leads (Nilde play type) with 90 mmbbl of combined prospective resources.

The Nilde reservoir depth is circa 1,600 metres. The field was developed with a FPSO and brought in production in 1982 by AGIP-ENI. Production was suspended in 1989 after producing 20.5 mmbbl of light crude oil when Brent prices dropped to US\$12/bbl and water production started since it could not be handled by the FPSO's topside facilities.

Appendix 2: Capital structure and main shareholders

There is a total of 2.458 bn shares in issue with 513.8 mm options. The management and the board hold a total of 240.8 mm shares and options.

Figure 18. Main shareholders

Shareholders	%	Position (000)	Mkt Val (US\$mm)
JP Morgan Nominees Australia Pty Ltd	8.76	224,091	
Jetosea Pty Ltd	7.14	182,701	
Gillard Superannuation Pty Ltd	4.30	110,000	
Paul Fink	2.85	72,971	
Ian Tchacos	2.43	62,264	
Windmere International Ltd	2.14	54,749	
HSBC Custory Nominees Ltd	1.92	49,111	
Brian Thomas Clayton + Janet Clayton	1.30	33,333	
Ironside Pty Ltd	1.24	31,805	
Andrew Duncan Murdoch	1.08	27,505	

Source: Company

Appendix 3: Directors and Management

Ian Tchacos: Executive Chairman

Mr Tchacos has over 25 years international experience in corporate development and strategy, mergers and acquisitions, petroleum exploration, development and production operations, commercial negotiation, oil and gas marketing and energy finance. In his last appointment as Managing Director of Nexus Energy he was responsible for this company's development from an onshore micro cap explorer to an ASX top 200 offshore producer and operator. Ian's experience is ideally suited for the company's next phase of growth.

Paul Fink: Chief Executive Officer

Mr Fink has an engineering degree from the Mining University of Leoben, Austria. He has 18 years of diversified oil and gas exploration and producing experience in both technical and managerial positions. Paul's experience at OMV included exploration and producing assignments in Austria, Libya, United Kingdom, Bulgaria, Australia and Pakistan where he was the Exploration and Reservoir Manager. In India, as Vice President (Exploration) for Focus Energy Limited, Paul headed a highly successful exploration campaign that included the evaluation, negotiation, and acquisition of petroleum licenses and resulted in the drilling of two significant discoveries.

Andrew Childs: Non-Executive Director

Mr Childs is a Non Executive Director of Riedel Resources Limited, Managing Director of Petroleum Ventures Pty Ltd, Chairman of Sagcasco Limited (SGC.AX) and Non Executive Director of Timor Oil Ltd, Orion Energy Pty Ltd and Bombora Energy Pty Ltd. He is also Principal of Resource Recruitment and Managing Director of International Recruitment Services Pty Ltd.

Edouard Etienvre: Non-Executive Director

Mr Etienvre has 15 years of experience in commercial, business development, risk assessment, management and project management experience in the natural resources sector and expertise including deal sourcing, transaction structuring, commercial negotiations and financing including debt, equity, off-take finance, vendor finance and reverse take-overs with TSX-V and LSE listed companies.

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