



INVICTUS  
ENERGY LIMITED

# Mukuyu Prospective Resource Upgrade to 20 Tcf + 845 million barrels

05 July 2022

## HIGHLIGHTS

- **Mukuyu Updated Independent Prospective Resource of 20 trillion cubic feet + 845 million barrels<sup>#</sup> (4.3 billion boe) of conventional gas-condensate**
- **Mukuyu prospective resource estimate covers eight stacked targets**
- **New data incorporated from CB21 Seismic Survey results**
- **Resource potential determined by leading petroleum consultancy ERCE**

Invictus Energy Limited ("Invictus" or "the Company"), is pleased to provide an update on the activities of its 80% owned and operated Cabora Bassa project in Zimbabwe.

### **Mukuyu-1 prospective resource upgraded to 20 Tcf + 845 million barrels of conventional gas condensate (gross mean unrisks basis)**

Invictus has received an updated Independent Report from ERCE estimating substantial resource potential at its Cabora Bassa Project.

ERCE estimates the gross mean recoverable conventional potential of the Mukuyu prospect at a combined 20 Tcf and 845 million barrels of conventional gas condensate, or about 4.3 billion barrels of oil equivalent (boe) on a gross mean unrisks basis<sup>#</sup>.

*<sup>#</sup>Cautionary Statement: The estimated quantities of petroleum that may be potentially recovered by the application of a future development project relate to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration, appraisal and evaluation are required to determine the existence of a significant quantity of potentially movable hydrocarbons. Prospective Resources assessments in this release were estimated using probabilistic methods in accordance with SPE-PRMS standards.*

Based on the Company's 80% share in the Cabora Bassa project, Invictus' net share of this prospective resource would equate to 16 Tcf and 676 million barrels of conventional gas condensate, or about 3.44 billion boe<sup>#</sup>.

This marks a 2.7 fold increase on a barrel of oil equivalent basis to the 2019 independent assessment by Getech Group plc, which estimated Mukuyu (then named Mzarabani) to hold 8.2 Tcf and 247 million barrels (~1.6 billion boe) of conventional gas condensate, on a gross mean unrisks basis.

#### ABOUT INVICTUS ENERGY

Invictus Energy Ltd is an independent oil and gas exploration company focused on high impact energy resources in sub-Saharan Africa. Our asset portfolio consists of a highly prospective 250,000 acres within the Cabora Bassa Basin in Zimbabwe. Special Grant 4571 contains the world class multi-TCF Mukuyu (Muzarabani) and Msasa conventional gas-condensate

#### BOARD & MANAGEMENT

**Dr Stuart Lake**  
Non-executive Chairman

**Joe Mutizwa**  
Non-Executive &  
Deputy Chairman

**Scott Macmillan**  
Managing Director

**Gabriel Chiappini**  
Non-Executive Director  
& Company Secretary

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The ERCE prospective resource upgrade incorporates new data from the Cabora Bassa 2D Seismic Survey (“CB21 Survey”). The CB21 Survey firmed up the potential for multiple stacked hydrocarbon bearing zones in the Mukuyu Prospect, as announced in an [ASX release](#) on 12 May 2022.

A summary of the report’s findings for the Mukuyu prospect, as of 30 June 2022, is tabulated below.

SG 4571			Gross Unrisked Estimated Prospective Resources <sup>#</sup>							
			Source: ERCE as at 30 June 2022							
Cabora Bassa Project			Gas (Bcf) – 100% Gross				Condensate (mmbbl) – 100% Gross			
Prospect	Formation	Horizon	Low	Best	High	Mean	Low	Best	High	Mean
Mukuyu	Top Dande	200	152	828	4,252	1,871	4	28	174	77
	Intra Dande	250	83	465	2,488	1,075	2	16	104	44
	Intra Dande	350	273	1,498	7,951	3,387	7	51	315	137
	Forest	400	418	2,077	9,923	4,488	11	70	412	183
	Pebbly Arkose	500	169	1,014	5,635	2,469	5	35	239	102
	Upper Angwa	600	139	835	4,578	1,996	4	28	193	83
	Upper Angwa	650	172	929	4,886	2,135	5	37	228	99
	Lower Angwa	700	228	1,190	5,818	2,591	7	48	280	120
	<b>*Total gross (100%) Bcf</b>					<b>20,012</b>				<b>845</b>
Mukuyu	<b>*Total net IVZ (80%) Bcf</b>					<b>16,010</b>				<b>676</b>

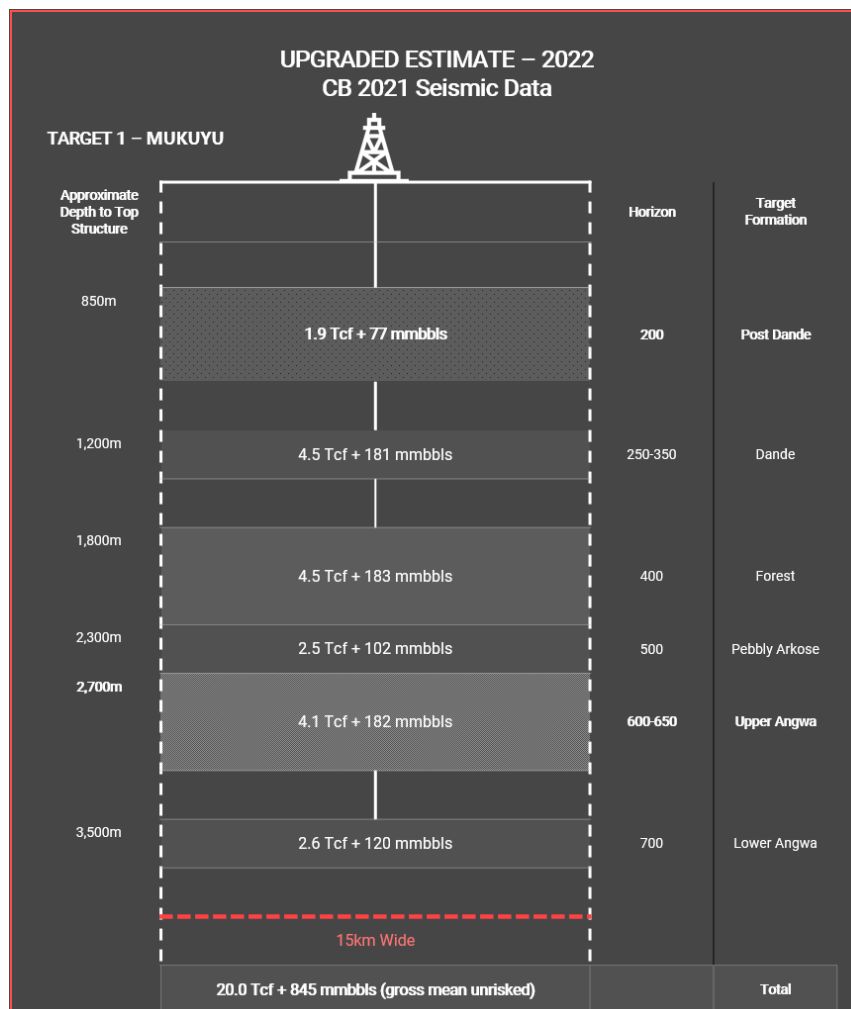


Figure 1 - Mukuyu-1 Drilling Targets and Well Schematic

## Mukuyu-1 wellpad completed & drilling schedule update

The Mukuyu-1 wellpad has been completed and handed over from the civils contractors.

The full rig arrival has been held up due to customs clearance delays in both Tanzania and Mozambique enroute to Zimbabwe, with drilling now expected to commence in August.

Exalo will commence rig up and then perform some additional maintenance work prior to the commencement of drilling the Mukuyu-1 well.

Mukuyu-1 will be drilled as a deviated well to test multiple stacked targets within the greater Mukuyu structure from the 200 to 650 horizons.



Figure 2 - Exalo Rig 202 Mud Pumps in Transit to Zimbabwe

## Managing Director Scott Macmillan commented

*"The Mukuyu prospect has grown significantly in its scale and now represents one of the largest conventional exploration targets globally.*

*"This updated estimate is the culmination of the excellent work from the Invictus technical team over the last 12-18 months to deliver this result in the lead up to our drilling program.*

*"The estimate for the newly identified 200 horizon in the Dande formation within Mukuyu is 1.9 Tcf + 77 mmbbl which provides us with a material first up target in the Mukuyu-1 well."*

*"The substantial work undertaken to plan, acquire, process and interpret the CB21 Seismic Survey and integrate it into our geological and basin modelling studies has enabled us to identify and quantify the additional prospectivity. This has not only materially enhanced the value of our acreage, but also de-risked it.*

*"The Mukuyu-1 well will test seven major targets from the 200 to 650 horizons, including the primary Upper Angwa targets, and provides the Company with multiple opportunities to make a material hydrocarbon discovery."*

## **About ERCE**

ERCE is an independent consultancy specialising in petroleum reservoir evaluation. The work has been supervised by Mr Stewart Easton, General Manager of ERCE's Asia Pacific office, a Professional Geologist registered as a Fellow of the Geological Society and a member of the Society of Petroleum Engineers with over 23 years of experience in the oil and gas industry.

**-Ends-**

Approved for release by the Board

## Questions and enquiries

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### About Invictus Energy Ltd (ASX: IVZ)

*Invictus Energy Ltd is an independent upstream oil and gas company listed on the Australian Securities Exchange (ASX: IVZ). The Company is headquartered in Perth, Australia and has offices in Harare, Zimbabwe. Invictus is opening one of the last untested large frontier rift basins in onshore Africa – the Cabora Bassa Basin – in northern Zimbabwe through a high impact exploration program.*

*The Company's principal asset is SG 4571 located in the Cabora Bassa Basin in Zimbabwe which contains the world class Mukuyu (Muzarabani) prospect – the largest undrilled prospect onshore Africa independently estimated to contain 20 Tcf and 845 million barrels of conventional gas condensate (gross mean unrisksed basis).*

*Invictus Energy is committed to operating in a safe, ethical and responsible manner, respecting the environment, our staff, contractors and the communities in which we work.*

**\*Cautionary Statement:** *The estimated quantities of petroleum that may be potentially recovered by the application of a future development project relate to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration, appraisal and evaluation are required to determine the existence of a significant quantity of potentially movable hydrocarbons. Prospective Resource assessments in this release were estimated using probabilistic methods in accordance with SPE-PRMS standards.*

## Notes

1. The estimated quantities of Prospective Resources stated above may potentially be recovered by the application of a future development project(s) relate to undiscovered accumulations. These estimates have both an associated risk of discovery and a risk of development. Further exploration appraisal and evaluation is required to determine the existence of a significant quantity of potentially moveable hydrocarbons.
2. The recoverable hydrocarbon volume estimates prepared by ERCE and the Company and stated in the tables above have been prepared in accordance with the definitions and guidelines set forth in the Petroleum Resources Management System, 2018, approved by the Society of Petroleum Engineers.
3. The Prospective resource estimates have been estimated using probabilistic methods using best estimates of all parameters. The gross / 100% basis refers to the total resource.
4. The Prospective Resources for gas has been determined probabilistically for Gas Initially In Place (GIIP) and then analogue gas recovery factors used to these probabilistically determined numbers to give the final prospective resource numbers. The condensate Prospective Resources were calculated using a low, mid and high condensate gas ratio (CGR) based on source rock analysis and applied to the low, mid and high case GIIP to determine Condensate Initially In Place (CIIP). Prospective Resource numbers for condensate were then calculated using analogue low, mid and high case recovery factors applied to the low, mid and high CIIP
5. Prospective Resources are reported on a low, best, high and mean estimates in the most specific category that reflects degree of uncertainty and have not been adjusted for risk.
6. The Best Estimates reported represent that there is a 50% probability that the actual resource volume will be in excess of the amounts reported. #Refer to cautionary statement above.
7. The estimates for unrisked Prospective Resources have not been adjusted for both an associated chance of discovery and a chance of development. The estimated chance of success (CoS) from ERCE and the Company are summarised in the table below:

Horizon	Formation	ERCE CoS	Invictus CoS (pre DHI uplift)	Invictus CoS (post DHI uplift <sup>1</sup> )
200	Top Dande	14%	14%	31%
250	Intra Dande		14%	31%
300	Intra Dande		14%	14%
400	Forest		14%	14%
500	Pebbly Arkose	12%	17%	30%
600	Upper Angwa		17%	21%
650	Upper Angwa		12%	15%
700	Lower Angwa		10%	10%

ERCE's risking methodology does not take into account seismic amplitude response or Direct Hydrocarbon Indicators (DHI) responses to increase the chance of success (CoS). Invictus has provided its internal estimates of CoS for each respective horizon which account for any

amplitude / DHI response for each individual horizon.

Westwood Global Energy Group have published an independent report on the impact of DHI response on exploration well performance for Technical Success rate (TSR) and Commercial Success Rates (CSR) in frontier basins for five of the most commonly reported DHIs. The study covers 536 wells drilled between 2008-2019 across 95 basins.

The success rates of exploration wells drilled which display DHI attributes is significantly higher than the global benchmark success rates in frontier basins.

The Mukuyu prospect has interpreted DHI responses in a number of horizons and the CoS ranges provided for the Mukuyu prospect reflect the quality and type of DHI response. The subsequent uplift to the estimated CoS for these horizons is within the range of potential outcomes.

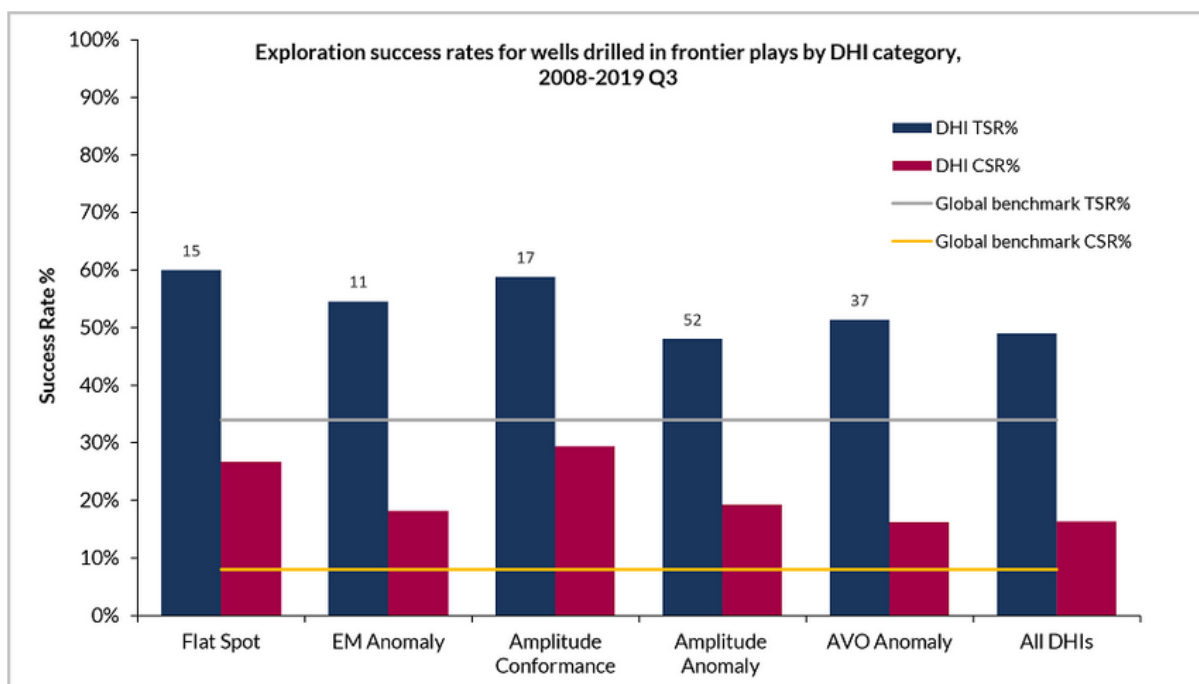


Figure 3 - Exploration success rates for frontier plays by DHI category (courtesy Westwood Global Energy Group)

A summary of the Westwood Global Energy Group report can be accessed here:

<https://www.westwoodenergy.com/reports/global-ea/the-impact-of-dhis-on-exploration-performance>

- The chance of development is estimated at greater than 50%. The chance of development is the chance that once discovered, an accumulation will be commercially developed. The sheer size of the Mukuyu Prospect, which is located onshore and in reasonable proximity to existing and future infrastructure, increases the chance of bringing future discoveries to commercial development.

The Company has also signed a Gas Sale Memorandum of Understanding (MOU) on 7 May 2019 with Sable Chemical Industries Limited for up to 70 mmscf/d for a 20-year period for a Maximum Contract Quantity of 510 Bcf. A further Gas Sale MOU was signed with Tatanga Energy for up to 100 mmscf/d for a 20-year period for a Gas to Power development in the event of a commercial

discovery. This would likely underpin the development of any commercial discovery.

9. The barrel of oil equivalent (BOE) is a unit of energy based on the approximate energy released by burning one barrel (42 U.S. gallons or 158.9873 litres) of crude. One BOE is roughly equivalent to 5,800 cubic feet (164 cubic meters) of typical natural gas, which is the conversion used in this analysis to calculate the BOE for the gas volumes. The value is necessarily approximate as various grades of oil and gas have slightly different heating values.
10. Prospective Resources means those quantities of petroleum which are estimated, as of a given date, to be potentially recoverable from undiscovered accumulations by application of future development projects. Prospective resources have both an associated chance of discovery and a chance of development.
11. Prospective Resource estimates prepared by ERCE have relied upon the integration of Invictus' current technical data and interpretation, as well as a compilation of data from previous licence operator Mobil, third party and other historical reports. The technical data included the newly acquired, processed and interpreted high resolution 2D infill seismic data from the CB21 Seismic Survey of 840-line km, and the reprocessed 1990 vintage 2D seismic data set acquired by Mobil. The two surveys were concurrently processed by EarthSignal to ensure consistency between the datasets.

## **New Data Sources & Information**

To complete ERCE's evaluation of the potential hydrocarbon resources in the Mukuyu prospect, Invictus allowed ERCE complete and open access to the current technical data and interpretation, as well as a compilation of Invictus' and Mobil's data and relevant public domain data.

The technical data included several compilations of field studies and progress reports by Invictus and Mobil. All uninterpreted original 2D seismic lines covering the prospect and Invictus' interpretations were available in an IHS Inc. Kingdom project, which were evaluated by ERCE.

The new CB21 and reprocessed Mobil 2D seismic datasets has resulted in improved imaging of the subsurface in the Cabora Bassa Basin and significant improvement in the reflector continuity and sharper definition of the fault geometries.

The infill spacing of the new CB21 Survey of ~1.7km line spacing (compared to 15-20km line spacing from the Mobil 1990 survey) provides greater structural definition and the identification of additional prospective horizons within the Greater Mukuyu structure. This has resulted in a material uplift in the estimated prospective resources for the Mukuyu prospect.

The seismic data was depth converted utilising Pre-Stack Depth Migration products, which were extracted for selected lines across the basin and used to create and depth-time function across the respective horizons in the Cabora Bassa Basin and applied to the Pre-Stack Time Migration data.

The proposed future work program in the current SG 4571 licence includes the drilling and evaluation of the Mukuyu-1 exploration well which is scheduled to take place over 2H 2022.



## Geology & Evaluation

The Cabora Bassa Basin started as a low relief sag basin filling with Palaeozoic glacial deposits. The first four Mesozoic rift phases occurred during the Permo-Triassic with the break-up of Gondwanaland and deposition of the Karoo sequence. The primary reservoir objective in the Mukuyu Prospect is the Upper Angwa (Alternations Member) sands.

The Upper Angwa sequence was deposited during the Early Triassic in alluvial, fluvial and possibly lacustrine depositional environments. The basin predominantly consists of sand rich terrestrial Mesozoic deposits. Additional reservoir objectives are stacked in the Mukuyu anticline and include the overlying, younger aeolian Pebbly Arkose, Forest and Dande sandstones.

Pulses of reservoir deposition coincide with episodic rift rejuvenation and an overall absence of fine-grained sealing intervals. Fluvial overbank and local lacustrine clay rich deposits in the Upper Angwa formation are interpreted to provide the most effective seals.

The trap at the Mukuyu Prospect consists of a very large four-way closure (~200km<sup>2</sup>) at the crest of a doubly plunging anticline. Potentially one of the largest undrilled structural traps in continental Africa, the timing of the initial folding is uncertain and may have started as early as the Middle Triassic. However, most interpreters agree, that major growth of the Mukuyu anticline occurred later during Middle Cretaceous uplift compression and uplift associated strike-slip movement.

Readjustment following Middle Cretaceous uplift caused the anticline to collapse, resulting in a series of closely spaced extensional faults forming a complex array of crestal fault blocks. From Late Cretaceous to present, the area has remained a passive high undergoing erosion and only minor deposition.

The anticline is elongated, and structural closure can be mapped at Top Kondo Pools, Top Mkanga, Top Lower Angwa, Top Upper Angwa, Top Pebbly Arkose, Top Forest and Dande.

ERCE independently set the P10 Gross Rock Volume (GRV) for each horizon up to a maximum hydrocarbon column height of 650m in the Lower Mukuyu horizons (Pebbly Arkose, Upper Angwa and Lower Angwa formations) and 500m in the Upper Mukuyu (Dande and Forest formations), which resulted

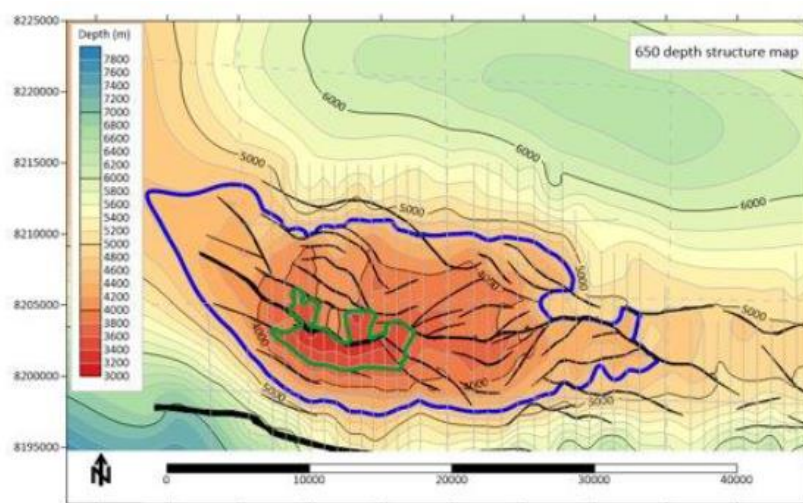


Figure 4 - ERCE Max Column Height vs. Structural Closure

in only a limited portion at the top of each respective horizon represented in the GRV output range and subsequent volumetric calculations. Figure 4 shows an example using the 650 horizon, which shows the limit of the GRV considered compared to the structural closure.

The P90 GRV was set as 5% of the P10 volume. distributions for each stratigraphic interval in the Mukuyu Prospect based on Invictus' interpretation of the seismic dataset.

The Net to Gross ranges were derived from interpretation of published field data and depositional environments of the respective units.

Porosity inputs were derived from interpretation of published field data and a porosity-depth function developed by Mobil for the Cabora Bassa Basin

Hydrocarbon saturation and formation volume factors inputs are based on analogues and empirical relationships.

The inputs and distributions were put into Crystal Ball to generate probabilistic P90, P50, P10 and mean estimate GIP volumes via Monte Carlo simulation. The Prospective Resource Estimates were generated through Crystal Ball utilising a range of recovery factors and liquids yield appropriate for the respective stratigraphic reservoir type, depth and likely source rock interval and maturity and were also calculated via Monte Carlo simulation.

The wide variance between the P10 and P90 volume estimates for the prospect is consistent with the geological uncertainties in the basin.

The presence of a large trap has been demonstrated and reservoirs and source rock have been identified through surface outcrop studies. The primary geological risks to hydrocarbon discovery are the presence and effectiveness of a seal and timing of hydrocarbon expulsion relative to trap formation.

## Abbreviations

**mmbbls** – millions of barrels of oil or condensate  
**mmboe** – millions of barrels of oil equivalent  
**scf** – standard cubic foot  
**mmscf** – thousands of standard cubic feet  
**mmscf** – millions of standard cubic feet  
**Bcf** – billion standard cubic feet  
**Tcf** – trillion standard cubic feet  
**PRMS** – Petroleum Resource Management System  
**SPE** – Society of Petroleum Engineers  
**SG** – Special Grant

## Conversions

1 BOE = 5,800 scf natural gas  
1 mmboe = 5.6 Bcf  
1 Tcf = 1,000 Bcf  
1 mmscf/d = 1.06 TJ/d  
1 Bcf = 1.06 PJ

## Disclaimer

**\*Cautionary Statement for Prospective Resource Estimates** - With respect to the Prospective Resource estimates contained within this report, it should be noted that the estimated quantities of Petroleum that may potentially be recovered by the future application of a development project may relate to undiscovered accumulations. These estimates have an associated risk of discovery and risk of development. Further exploration and appraisal may be required to determine the existence of a significant quantity of potentially moveable hydrocarbons.

**Hydrocarbon Resource Estimates** – The Prospective Resource estimates for Invictus' SG 4571 permit presented in this report are prepared as at 30 June 2022. The estimates have been prepared by the Company in accordance with the definitions and guidelines set forth in the Petroleum Resources Management System, 2018, approved by the Society of Petroleum Engineers and have been prepared using probabilistic methods. The Prospective Resource estimates are unrisks and have not been adjusted for both an associated chance of discovery and a chance of development.

**No New Information or Change in Assumptions** – Since the date of completion of this hydrocarbon resource study, the Company is not aware of any new information and that all material assumptions and technical parameters underpinning prospective resource estimate continue to apply and have not materially changed

**Competent Person Statement Information** – In this report information relating to hydrocarbon resource estimates has been independently prepared by ERCE. The work has been supervised by Mr Anthony Hughes, Principal Reservoir Engineer in ERCE's Perth office who has over 25 years of experience in the oil and gas industry. Mr Hughes is a member of the Society of Petroleum Engineers and Engineers Australia. Mr Hughes consents to the inclusion of the information in this report relating to hydrocarbon Prospective Resources in the form and context in which it appears.

**Forward looking statements** – This document may include forward looking statements. Forward looking statements include, are not necessarily limited to, statements concerning Invictus' planned operation program and other statements that are not historic facts. When used in this document, the words such as "could", "plan", "estimate", "expect", "intend", "may", "potential", "should" and similar expressions are forward looking statements. Although Invictus Energy Ltd believes its expectations reflected in these are reasonable, such statements involve risks and uncertainties, and no assurance can be given that actual results will be consistent with these forward-looking statements. The entity confirms that it is not aware of any new information or data that materially affects the information included in this announcement and that all material assumptions and technical parameters underpinning this announcement continue to apply and have not materially changed.