

NOTICE OF FILING

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Details of Filing

Document Lodged:	Affidavit - Form 59 - Rule 29.02(1)
File Number:	NSD758/2021
File Title:	THE ENVIRONMENT CENTRE NT INC v MINISTER FOR RESOURCES AND WATER & ANOR
Registry:	NEW SOUTH WALES REGISTRY - FEDERAL COURT OF AUSTRALIA



Dated: 10/09/2021 9:17:01 PM AEST

Registrar

Important Information

As required by the Court's Rules, this Notice has been inserted as the first page of the document which has been accepted for electronic filing. It is now taken to be part of that document for the purposes of the proceeding in the Court and contains important information for all parties to that proceeding. It must be included in the document served on each of those parties.

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Form 59
Rule 29.02(1)

Affidavit

No. NSD758 of 2021

Federal Court of Australia
District Registry: New South Wales
Division: General

The Environment Centre NT Inc

Applicant

The Minister for Resources and Water and another
Respondents

Affidavit of: **Nicki Hutley**

Address:

Occupation: Independent Economist

Date: 10 September 2020

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Filed on behalf of (name & role of party) The Environment Centre NT Inc
 Prepared by (name of person/lawyer) Anna Gudkov
 Law firm (if applicable) Environmental Defenders Office Ltd (our ref: S1952)
 Tel (02) 9262 6989 Fax (02) 9264 2414
 Email Anna.Gudkov@edo.org.au
Address for service Level 5, 263 Clarence Street Sydney NSW 2000
 (include state and postcode)

I, Nicki Hutley, of 39 Burra Road Artarmon NSW 2064, affirm:

1. I am an expert witness retained by the Applicant in these Federal Court proceedings to prepare an expert report regarding the economic costs arising from anthropogenic climate change and potential greenhouse gas emissions arising from the exploration and exploitation of gas fields in the Beetaloo sub-basin.
2. All of the information in this affidavit is true and correct to the best of my knowledge or belief. Where information is not within my direct knowledge, I have stated the source of that information.

Training, experience and qualifications

3. I am an independent economist.
4. I hold a Bachelor of Economics (Honours) from the University of East Anglia.
5. I have acquired my specialised knowledge through fourteen years of practice as an economist with a focus on climate economics.
6. Currently I am:
 - (a) a Councillor (economics) for the Climate Council of Australia;
 - (b) an expert faculty member (Economics) of SingularityU Australia;
 - (c) President of the Economics Society of Australia (NSW) and past Chair of NSW Women in Economics Network; and
 - (d) a NSW executive board member of Australian Business Economists.
7. My previous experience includes:
 - (a) From 2018 to 2021, I was a partner of Deloitte Access Economics.
 - (b) From 2013 to 2018, I was a director of Economic and Social Advisory and the chief economist of Urbis
 - (c) From 2011 to 2013, I was a director of NSW Economic Advisory of KPMG and chief economist
 - (d) From 2006 to 2011, I was an associate director of Access Economics.
 - (e) From 1987 to 2006, I had various roles as a financial market and investment economist with Rothschild Asset Management, Deutschebank, Potter Warburg, Lloyds Bank, Bankers Trust.
 - (f) From 1985 to 1987, I was an employee of the Department of Foreign Affairs.

Engagement as an expert in these Proceedings

8. On 27 August 2021, I was briefed by the solicitors for the Applicant, the Environmental Defenders Office Ltd, to prepare a written report addressing the following questions considering information that was in the public domain as at 17 June 2021:

(a) In your opinion, what, if any, are the current economic costs arising from the impacts of anthropogenic climate change in respect of both Australia and the world?

(b) In your opinion, what, if any, are the likely future economic costs arising from the impacts of anthropogenic climate change in respect of both Australia and the world? In providing your response please consider:

i. warming scenarios consistent with meeting the targets of the Paris Agreement; and

ii. warming scenarios consistent with current greenhouse gas emissions trajectories.

(c) In your opinion, will any economic benefits purported to arise from the exploration and exploitation of gas in the Beetaloo sub-basin be impacted by risks associated with:

i. Countries and corporations implementing policies and activities to reduce greenhouse gas (GHG) emissions in line with the Paris Agreement or otherwise;

ii. Countries and corporations implementing policies and activities consistent with transitioning away from the use of fossil fuels and achieving net zero GHG emissions targets; and

iii. Any current or future introduction of carbon pricing (or related) measures in global markets?

If your view is that there would be such an impact, please explain the nature of that impact and give reasons for your view.

(d) In your opinion, and considering the anticipated development of the Beetaloo sub-basin as described in Beetaloo Strategic Basin Plan and the greenhouse gas emissions that would be generated by exploiting gas consistent with Beetaloo Strategic Basin Plan, is there likely to be an economic gain for Australia from the exploitation of the Beetaloo sub-basin gas fields when economic costs associated with climate change are considered.

9. Annexed to this Affidavit and marked "**NH1**" is a true copy of the Letter of Instruction.
10. I have prepared an expert report in response to the questions asked of me. Annexed to this Affidavit and marked "**NH2**" is a true copy of that report.
11. In preparing this Affidavit, I acknowledge that I have read and complied with the Federal Court of Australia Expert Evidence Practice Note (GPN-EXPT) General Practice Note and agree to be bound by it.
12. Annexed to this Affidavit and marked "**NH3**" is a true copy of my curriculum vitae.

Affirmed in counterpart and witnessed over
 audio visual link in accordance with section
 14G of the Electronic Transactions Act
 2000 (NSW)

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 Signature of deponent

Before me:

 Signature of witness

Name: Ruby Hamilton
 Date: 10 September 2021

Qualification: Solicitor

Certificate of Annexure NH1

No. NSD758 of 2021

Federal Court of Australia

District Registry: New South Wales

Division: General

Environment Centre NT Inc

Applicant

Minister for Resources and Water and another

Respondents

This and the following 26 pages form Annexure **NH1** to the Affidavit of Nicki Hutley affirmed on 10 September 2021 before me.

Signature of witness

Name: Anna Gudkov

Qualification: Solicitor



Environmental Defenders Office

27 August 2021

Nicki Hutley
Economist and economic adviser
Social Outcomes

By email: nicki.hutley@gmail.com

CONFIDENTIAL AND SUBJECT TO LEGAL PROFESSIONAL PRIVILEGE

Dear Ms Hutley

Environment Centre NT Inc v Minister for Resources and Water & Anor Federal Court of Australia Proceedings no. NSD758/2021

1. We act for the Environmental Centre NT Inc (**ECNT**), who is the peak community sector environmental organisation in the Northern Territory. ECNT engages in activities aimed at protecting and conserving the environment of the NT, including in relation to climate change.
2. Our client, ECNT, has commenced proceedings in the Federal Court of Australia (**Proceedings**) against the Minister for Resources and Water (**Minister**) and the Commonwealth of Australia (**Commonwealth**) alleging that:
 - a. the Minister's making of the *Industry Research and Development (Beetaloo Cooperative Drilling Program) Instrument 2021* (Cth) (the **Instrument**); and
 - b. the Minister's decision to award up to \$21 million in grants to Imperial Oil and Gas (**Imperial**) pursuant to the Beetaloo Cooperative Drilling Program (**the Program**) (the **Decision**)

were unlawful in circumstances where the Minister:

- a. breached s 71 (1) of the *Public Governance, Performance and Accountability Act 2013* (Cth) (**the PGPA Act**) by failing to make reasonable inquiries in respect of climate change risks. S 71(1) requires that the Minister must not approve a proposed expenditure of relevant money unless the Minister is satisfied, after making reasonable inquiries, that the expenditure is a "proper use" of relevant money, where "proper" is defined as a use that is "efficient, effective, economical and ethical"; and
- b. acted in a way that was legally unreasonable and/or illogical and/or irrational, by failing to have regard to and/or failing to have adequate regard to, climate change risks.

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3. We are instructed to engage you to act as an expert witness under Part 23 (rules 23.01-23.15) of the *Federal Court Rules 2011* (Cth) (**FC Rules**) and the Expert Evidence Practice Note (GPN-EXPT) (**Expert Evidence Practice Note**), including the Harmonised Expert Witness Code of Conduct (**Code of Conduct**). Part 23 of the FC Rules and the Expert Evidence Practice Note is set out in **Annexure A** to this letter.
4. Your role as an expert witness is to assist the Court impartially on matters relevant to your area of expertise. You are not to act as an advocate for our clients and any opinion expressed must be genuinely held by you based on your professional training, knowledge, or experience.
5. Please read those documents carefully before you commence the work requested. **Your expert report must contain an acknowledgment that you have read the Code of Conduct and that you agree to be bound by it.** Otherwise your report will be inadmissible as evidence. Your role as an expert witness is to assist the Court impartially on matters relevant to your area of expertise. You are not to act as an advocate for our clients and any opinion expressed must be genuinely held by you based on your professional training, knowledge, or experience.

Overview of the Work Required

6. The work we require involves the following:
 - a. reviewing the relevant documentation;
 - b. preparing a written expert report that conforms with the Code of Conduct and addresses our questions (questions located at **Annexure B**);
 - c. reviewing the Respondent's expert report(s) (if necessary);
 - d. conferring with the Respondent's expert(s) at a joint conference(s) and prepare a joint report, which sets out the matters agreed, matters disagreed, and the reasons for agreement and disagreement as a result of the joint conference(s) (if necessary); and
 - e. appearance as an expert witness in the Court (if required).
7. We request that you provide us with a draft of your expert report for review before finalising it. The purpose of this is not to influence the conclusions or recommendations you make but to ensure that the report is clear and addresses the issues adequately to inform the Court.

Background

8. The following information is provided to assist your consideration of the matters on which are you asked to provide expert advice. Please note that you are not permitted to express an opinion on any question of law in your report and your report should confine itself to the relevant issues of fact within your area of expertise.
9. The independent *Scientific Inquiry into Hydraulic Fracturing of Onshore Unconventional Reservoirs in the Northern Territory* (**Fracking Inquiry**) was commissioned by the Northern Territory Government under the *Inquires Act 1945* (NT) and its Terms of Reference required it to investigate the environmental, social and economic risks and impacts of hydraulic fracturing (commonly known as fracking) of onshore unconventional gas reservoirs and associated activities in the Northern Territory.

10. The Fracking Inquiry handed down its Final Report to the Northern Territory Government on Tuesday 27 March 2018. Amongst other things, the Fracking Inquiry identified that a best estimate indicative later development scenario for the exploitation of a new shale gasfield or gasfields in the Beetaloo sub-basin would equate to gas production of 1,240 petajoules per year (**PJ/y**).¹
11. The Fracking Inquiry further noted that in this later development scenario, it is assumed that 2,740 TJ/day is used for liquid natural gas (**LNG**) export and 660 terajoules per day (**TJ/day**) is used for domestic gas consumption.²
12. On 15 September 2020, the Prime Minister of Australia, the Minister for Energy and Emissions Reduction, and the Minister for Resources and Water (**Minister**) announced that Australia will be pursuing a “Gas-led recovery.”³ One of the elements of the Gas-led Recovery was the unlocking of five key gas basins, starting with the Beetaloo basin in the Northern Territory.⁴
13. On 17 December 2020, the Minister announced a \$50 million subsidy program for Beetaloo exploration to “fast-track drilling by providing grants to cover 25% of eligible exploration costs, capped at \$7.5 million per well and 3 wells per exploration venture.”⁵ The Minister further announced that it was estimated that the Beetaloo sub-basin could hold more than 200,000 petajoules of gas.⁶
14. In or about January 2021, the Minister issued the Beetaloo Strategic Basin Plan entitled ‘Unlocking the Beetaloo,’ which set out some details of the Program.
15. On 22 February 2021, Empire Energy Group Ltd (**Empire**), the Australian Stock Exchange (**ASX**) listed parent company of Imperial, published an announcement to the ASX relating to a Material Beetaloo Resource Upgrade. This statement included, amongst other things, the information that Empire has:
 - a. a best estimate prospective gas resource of 3,446 billion cubic feet (**BCF**); and
 - b. a best estimate of prospective condensate resource of 27 million barrels of petroleum liquids (**MMBL**).
16. On 18 March 2021, the Department of Industry, Science, Energy and Resources (**DISER**) issued the ‘Beetaloo Cooperative Drilling Program – Grant Opportunity Guidelines’ (**Guidelines**) and a standard Grant Agreement (**Standard Grant Agreement**). The Guidelines govern the provision of grants under the Program.
17. On 7 April 2021 Imperial submitted three applications seeking a total of \$21,806,453 of funding under the Program, comprising of:
 - a. Application BCD000001, seeking \$7,314,081 in funding in respect of a project entitled ‘Carpentaria-2 Horizontal Well’;

¹ Fracking Inquiry, p 227.

² Fracking Inquiry, p 227.

³ <https://www.pm.gov.au/media/gas-fired-recovery>

⁴ Ibid.

⁵ <https://www.minister.industry.gov.au/ministers/pitt/media-releases/beetaloo-strategic-plan-will-unlock-gas-jobs-and-development>

⁶ Ibid.

- b. Application BCDP000002, seeking \$6,992,372 in funding in respect of a project entitled 'Carpentaria-3 Horizontal Well'; and
- c. Application BCDP000003, seeking \$7,500,000 in funding in respect of a project entitled 'Carpentaria-4 and 3D Seismic'

(together, **the Applications**).

- 18. Between 7 May and 8 May 2021 the Applications were the subject of DISER review.
- 19. On 11 May 2021, the Minister made the Instrument and purported to prescribe the Program as a program under s 33 of the *Industry Research and Development Act 1986* (Cth) (the **IRD Act**).
- 20. On 28 May 2021 and 1 June 2021 an Assessment Committee in respect of the Program (**Assessment Committee**) met to consider the Applications.
- 21. On 1 June 2021 the Assessment Committee resolved that the Applications were satisfactory (subject to some limitations/conditions ⁷) and resolved to recommend to the Minister that they be approved for funding under the Program.
- 22. On 17 June 2021, following receipt of a DISER brief recommending that the Minister approve the three Applications (subject to the conditions set out by the Assessment Committee⁸), the Minister approved the Applications. On 7 July 2021, the Minister announced the Decision, by way of publication of a Media Release (**Announcement**).
- 23. On 8 July 2021, Empire Energy Group Ltd, the Australian Stock Exchange (**ASX**) listed parent company of Imperial, published an announcement to the ASX relating to the Decision and Announcement.

Expert Brief

- 24. We will provide, by way of separate email, a link to an electronic a brief of documents for your review. **Annexure C** contains an index to these documents.

Timeframe

- 25. Under the current Court orders, your expert report will be due to be filed and served by 10 September 2021. We therefore request a draft of your advice by no later than Monday **6 September 2021**.
- 26. We will notify you of further relevant dates in the Proceedings as they become available.

Fees and Terms

- 27. Thank you for agreeing to provide this advice at a discounted rate of \$1,000 per day, with a capped of \$6,000 (plus GST).

⁷ Conditions set out on page 5 to 7 of the Meeting Minutes of the Beetaloo Cooperative Drilling Program Assessment Committee (**Assessment Committee**) Meeting on 1 June 2021 – At tab 19 of the Brief.

⁸See Annexure A to Ministerial Recommendation – BCDP Recommended Projects – At tab 29 of the Brief.

28. Please note the following terms:

- a. Your work will only be used by EDO in relation to this matter;
- b. EDO will take all reasonable steps to prevent your work being used for purposes other than that mentioned above, but we accept no responsibility for the actions of third parties;
- c. Regardless of the above points, EDO may choose not to use your work;
- d. You will not be covered by EDO's insurance while undertaking the above tasks.

Duty of Confidentiality

29. Please treat your work as strictly confidential, unless authorised by us.

If you would like to discuss this retainer further, please contact us at anna.gudkov@edo.org.au.

Yours sincerely,

Environmental Defenders Office

Anna Gudkov

Senior Lawyer (Gas/Corporate)

Ref: s1952

Part 23—Experts

Division 23.1—Court experts

23.01 Appointment of Court expert

- (1) A party may apply to the Court for an order:
- (a) that an expert be appointed (a ***Court expert***) to inquire into and report on any question or on any facts relevant to any question arising in a proceeding; and
 - (b) fixing the Court expert's remuneration, including the cost of preparing the expert's report; and
 - (c) for the Court expert's attendance before the Court; and
 - (d) terminating the liability to pay the Court expert's remuneration.

Note 1: ***Expert*** is defined in the Dictionary.

Note 2: The Court may give instructions relating to the inquiry and report including the carrying out of an experiment or test.

Note 3: The Court may make an order of its own motion—see rule 1.40.

- (2) If the Court makes an order under paragraph (1)(b), the expert's remuneration is payable jointly and severally by the parties.

23.02 Court expert's report

- (1) The Court expert must provide the report to the Court within the time fixed by the Court.

Note: A Registrar will provide a copy of the report to any party interested in the question.

- (2) The Court expert's report must:
- (a) be signed by the Court expert; and
 - (b) contain particulars of the training, study or experience by which the Court expert has acquired specialised knowledge; and
 - (c) identify the questions that the Court expert was asked to address; and
 - (d) set out separately each of the factual findings or assumptions on which the Court expert's opinion is based; and
 - (e) set out separately from the factual findings or assumptions each of the Court expert's opinions; and
 - (f) set out the reasons for those opinions; and
 - (g) contain an acknowledgement that the opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (b).

23.03 Court expert's report—use at trial

- (1) A report that complies with rule 23.02 will be admissible at trial as the evidence of the Court expert.

Note: Section 177 of the *Evidence Act 1995* deals with the tender of an expert's report.

- (2) A party may apply to the Court for an order:
- (a) to cross-examine a Court expert before or at trial; and
 - (b) if the cross-examination is to take place before trial—that the cross-examination take place before a Registrar or an examiner.

Note: *Examiner* is defined in the Dictionary.

23.04 Other expert's reports on the question

A party who has delivered to another party interested in the question a copy of another expert's report that complies with Division 23.2 may apply to the Court for leave to adduce the evidence of the other expert on the question.

Note: The question is referred to in rule 23.02.

Rules 23.05–23.10 left blank

Rule 23.11

Division 23.2—Parties' expert witnesses and expert reports

23.11 Calling expert evidence at trial

A party may call an expert to give expert evidence at a trial only if the party has:

- (a) delivered an expert report that complies with rule 23.13 to all other parties; and
- (b) otherwise complied with this Division.

Note: *Expert* and *expert report* are defined in the Dictionary.

23.12 Provision of guidelines to an expert

If a party intends to retain an expert to give an expert report or to give expert evidence, the party must first give the expert any practice note dealing with guidelines for expert witnesses in proceedings in the Court (the *Practice Note*).

Note: A copy of any practice notes may be obtained from the District Registry or downloaded from the Court's website at <http://www.fedcourt.gov.au>.

23.13 Contents of an expert report

- (1) An expert report must:
 - (a) be signed by the expert who prepared the report; and
 - (b) contain an acknowledgement at the beginning of the report that the expert has read, understood and complied with the Practice Note; and
 - (c) contain particulars of the training, study or experience by which the expert has acquired specialised knowledge; and
 - (d) identify the questions that the expert was asked to address; and
 - (e) set out separately each of the factual findings or assumptions on which the expert's opinion is based; and
 - (f) set out separately from the factual findings or assumptions each of the expert's opinions; and
 - (g) set out the reasons for each of the expert's opinions; and
 - (ga) contain an acknowledgement that the expert's opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (c); and
 - (h) comply with the Practice Note.
- (2) Any subsequent expert report of the same expert on the same question need not contain the information in paragraphs (1)(b) and (c).

23.14 Application for expert report

A party may apply to the Court for an order that another party provide copies of that other party's expert report.

23.15 Evidence of experts

If 2 or more parties to a proceeding intend to call experts to give opinion evidence about a similar question, any of those parties may apply to the Court for one or more of the following orders:

- (a) that the experts confer, either before or after writing their expert reports;
- (b) that the experts produce to the Court a document identifying where the expert opinions agree or differ;
- (c) that the expert's evidence in chief be limited to the contents of the expert's expert report;
- (d) that all factual evidence relevant to any expert's opinions be adduced before the expert is called to give evidence;
- (e) that on the completion of the factual evidence mentioned in paragraph (d), each expert swear an affidavit stating:
 - (i) whether the expert adheres to the previously expressed opinion; or
 - (ii) if the expert holds a different opinion;
 - (A) the opinion; and
 - (B) the factual evidence on which the opinion is based.
- (f) that the experts give evidence one after another;
- (g) that each expert be sworn at the same time and that the cross-examination and re-examination be conducted by putting to each expert in turn each question relevant to one subject or issue at a time, until the cross-examination or re-examination is completed;
- (h) that each expert gives an opinion about the other expert's opinion;
- (i) that the experts be cross-examined and re-examined in any particular manner or sequence.

Note 1: For the directions a Court may make before trial about expert reports and expert evidence, see rule 5.04 (items 14 to 19).

Note 2: The Court may dispense with compliance with the Rules and may make orders inconsistent with the Rules—see rules 1.34 and 1.35.

EXPERT EVIDENCE PRACTICE NOTE (GPN-EXPT)

General Practice Note

1. INTRODUCTION

- 1.1 This practice note, including the *Harmonised Expert Witness Code of Conduct* (“**Code**”) (see **Annexure A**) and the *Concurrent Expert Evidence Guidelines* (“**Concurrent Evidence Guidelines**”) (see **Annexure B**), applies to any proceeding involving the use of expert evidence and must be read together with:
- (a) the Central Practice Note (CPN-1), which sets out the fundamental principles concerning the National Court Framework (“**NCF**”) of the Federal Court and key principles of case management procedure;
 - (b) the Federal Court of Australia Act 1976 (Cth) (“**Federal Court Act**”);
 - (c) the *Evidence Act 1995* (Cth) (“**Evidence Act**”), including Part 3.3 of the Evidence Act;
 - (d) Part 23 of the *Federal Court Rules 2011* (Cth) (“**Federal Court Rules**”); and
 - (e) where applicable, the Survey Evidence Practice Note (GPN-SURV).
- 1.2 This practice note takes effect from the date it is issued and, to the extent practicable, applies to proceedings whether filed before, or after, the date of issuing.

2. APPROACH TO EXPERT EVIDENCE

- 2.1 An expert witness may be retained to give opinion evidence in the proceeding, or, in certain circumstances, to express an opinion that may be relied upon in alternative dispute resolution procedures such as mediation or a conference of experts. In some circumstances an expert may be appointed as an independent adviser to the Court.
- 2.2 The purpose of the use of expert evidence in proceedings, often in relation to complex subject matter, is for the Court to receive the benefit of the objective and impartial assessment of an issue from a witness with specialised knowledge (based on training, study or experience - see generally s 79 of the *Evidence Act*).
- 2.3 However, the use or admissibility of expert evidence remains subject to the overriding requirements that:
- (a) to be admissible in a proceeding, any such evidence must be relevant (s 56 of the *Evidence Act*); and
 - (b) even if relevant, any such evidence, may be refused to be admitted by the Court if its probative value is outweighed by other considerations such as the evidence

being unfairly prejudicial, misleading or will result in an undue waste of time (s 135 of the Evidence Act).

- 2.4 An expert witness' opinion evidence may have little or no value unless the assumptions adopted by the expert (ie. the facts or grounds relied upon) and his or her reasoning are expressly stated in any written report or oral evidence given.
- 2.5 The Court will ensure that, in the interests of justice, parties are given a reasonable opportunity to adduce and test relevant expert opinion evidence. However, the Court expects parties and any legal representatives acting on their behalf, when dealing with expert witnesses and expert evidence, to at all times comply with their duties associated with the overarching purpose in the Federal Court Act (see ss 37M and 37N).

3. INTERACTION WITH EXPERT WITNESSES

- 3.1 Parties and their legal representatives should never view an expert witness retained (or partly retained) by them as that party's advocate or "hired gun". Equally, they should never attempt to pressure or influence an expert into conforming his or her views with the party's interests.
- 3.2 A party or legal representative should be cautious not to have inappropriate communications when retaining or instructing an independent expert, or assisting an independent expert in the preparation of his or her evidence. However, it is important to note that there is no principle of law or practice and there is nothing in this practice note that obliges a party to embark on the costly task of engaging a "consulting expert" in order to avoid "contamination" of the expert who will give evidence. Indeed the Court would generally discourage such costly duplication.
- 3.3 Any witness retained by a party for the purpose of preparing a report or giving evidence in a proceeding as to an opinion held by the witness that is wholly or substantially based in the specialised knowledge of the witness¹ should, at the earliest opportunity, be provided with:
 - (a) a copy of this practice note, including the Code (see Annexure A); and
 - (b) all relevant information (whether helpful or harmful to that party's case) so as to enable the expert to prepare a report of a truly independent nature.
- 3.4 Any questions or assumptions provided to an expert should be provided in an unbiased manner and in such a way that the expert is not confined to addressing selective, irrelevant or immaterial issues.

¹ Such a witness includes a "Court expert" as defined in r 23.01 of the Federal Court Rules. For the definition of "expert", "expert evidence" and "expert report" see the Dictionary, in Schedule 1 of the Federal Court Rules.

4. ROLE AND DUTIES OF THE EXPERT WITNESS

- 4.1 The role of the expert witness is to provide relevant and impartial evidence in his or her area of expertise. An expert should never mislead the Court or become an advocate for the cause of the party that has retained the expert.
- 4.2 It should be emphasised that there is nothing inherently wrong with experts disagreeing or failing to reach the same conclusion. The Court will, with the assistance of the evidence of the experts, reach its own conclusion.
- 4.3 However, experts should willingly be prepared to change their opinion or make concessions when it is necessary or appropriate to do so, even if doing so would be contrary to any previously held or expressed view of that expert.

Harmonised Expert Witness Code of Conduct

- 4.4 Every expert witness giving evidence in this Court must read the *Harmonised Expert Witness Code of Conduct* (attached in Annexure A) and agree to be bound by it.
- 4.5 The Code is not intended to address all aspects of an expert witness' duties, but is intended to facilitate the admission of opinion evidence, and to assist experts to understand in general terms what the Court expects of them. Additionally, it is expected that compliance with the Code will assist individual expert witnesses to avoid criticism (rightly or wrongly) that they lack objectivity or are partisan.

5. CONTENTS OF AN EXPERT'S REPORT AND RELATED MATERIAL

- 5.1 The contents of an expert's report must conform with the requirements set out in the Code (including clauses 3 to 5 of the Code).
- 5.2 In addition, the contents of such a report must also comply with r 23.13 of the *Federal Court Rules*. Given that the requirements of that rule significantly overlap with the requirements in the Code, an expert, unless otherwise directed by the Court, will be taken to have complied with the requirements of r 23.13 if that expert has complied with the requirements in the Code and has complied with the additional following requirements. The expert shall:
 - (a) acknowledge in the report that:
 - (i) the expert has read and complied with this practice note and agrees to be bound by it; and
 - (ii) the expert's opinions are based wholly or substantially on specialised knowledge arising from the expert's training, study or experience;
 - (b) identify in the report the questions that the expert was asked to address;
 - (c) sign the report and attach or exhibit to it copies of:
 - (i) documents that record any instructions given to the expert; and

- (ii) documents and other materials that the expert has been instructed to consider.

5.3 Where an expert's report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter, these must be provided to the other parties at the same time as the expert's report.

6. CASE MANAGEMENT CONSIDERATIONS

6.1 Parties intending to rely on expert evidence at trial are expected to consider between them and inform the Court at the earliest opportunity of their views on the following:

- (a) whether a party should adduce evidence from more than one expert in any single discipline;
- (b) whether a common expert is appropriate for all or any part of the evidence;
- (c) the nature and extent of expert reports, including any in reply;
- (d) the identity of each expert witness that a party intends to call, their area(s) of expertise and availability during the proposed hearing;
- (e) the issues that it is proposed each expert will address;
- (f) the arrangements for a conference of experts to prepare a joint-report (see Part 7 of this practice note);
- (g) whether the evidence is to be given concurrently and, if so, how (see Part 8 of this practice note); and
- (h) whether any of the evidence in chief can be given orally.

6.2 It will often be desirable, before any expert is retained, for the parties to attempt to agree on the question or questions proposed to be the subject of expert evidence as well as the relevant facts and assumptions. The Court may make orders to that effect where it considers it appropriate to do so.

7. CONFERENCE OF EXPERTS AND JOINT-REPORT

7.1 Parties, their legal representatives and experts should be familiar with aspects of the Code relating to conferences of experts and joint-reports (see clauses 6 and 7 of the Code attached in [Annexure A](#)).

7.2 In order to facilitate the proper understanding of issues arising in expert evidence and to manage expert evidence in accordance with the overarching purpose, the Court may require experts who are to give evidence or who have produced reports to meet for the purpose of identifying and addressing the issues not agreed between them with a view to reaching agreement where this is possible ("**conference of experts**"). In an appropriate case, the Court may appoint a registrar of the Court or some other suitably qualified person ("**Conference Facilitator**") to act as a facilitator at the conference of experts.

- 7.3 It is expected that where expert evidence may be relied on in any proceeding, at the earliest opportunity, parties will discuss and then inform the Court whether a conference of experts and/or a joint-report by the experts may be desirable to assist with or simplify the giving of expert evidence in the proceeding. The parties should discuss the necessary arrangements for any conference and/or joint-report. The arrangements discussed between the parties should address:
- (a) who should prepare any joint-report;
 - (b) whether a list of issues is needed to assist the experts in the conference and, if so, whether the Court, the parties or the experts should assist in preparing such a list;
 - (c) the agenda for the conference of experts; and
 - (d) arrangements for the provision, to the parties and the Court, of any joint-report or any other report as to the outcomes of the conference ("**conference report**").

Conference of Experts

- 7.4 The purpose of the conference of experts is for the experts to have a comprehensive discussion of issues relating to their field of expertise, with a view to identifying matters and issues in a proceeding about which the experts agree, partly agree or disagree and why. For this reason the conference is attended only by the experts and any Conference Facilitator. Unless the Court orders otherwise, the parties' lawyers will not attend the conference but will be provided with a copy of any conference report.
- 7.5 The Court may order that a conference of experts occur in a variety of circumstances, depending on the views of the judge and the parties and the needs of the case, including:
- (a) while a case is in mediation. When this occurs the Court may also order that the outcome of the conference or any document disclosing or summarising the experts' opinions be confidential to the parties while the mediation is occurring;
 - (b) before the experts have reached a final opinion on a relevant question or the facts involved in a case. When this occurs the Court may order that the parties exchange draft expert reports and that a conference report be prepared for the use of the experts in finalising their reports;
 - (c) after the experts' reports have been provided to the Court but before the hearing of the experts' evidence. When this occurs the Court may also order that a conference report be prepared (jointly or otherwise) to ensure the efficient hearing of the experts' evidence.
- 7.6 Subject to any other order or direction of the Court, the parties and their lawyers must not involve themselves in the conference of experts process. In particular, they must not seek to encourage an expert not to agree with another expert or otherwise seek to influence the outcome of the conference of experts. The experts should raise any queries they may have in relation to the process with the Conference Facilitator (if one has been appointed) or in

accordance with a protocol agreed between the lawyers prior to the conference of experts taking place (if no Conference Facilitator has been appointed).

- 7.7 Any list of issues prepared for the consideration of the experts as part of the conference of experts process should be prepared using non-tendentious language.
- 7.8 The timing and location of the conference of experts will be decided by the judge or a registrar who will take into account the location and availability of the experts and the Court's case management timetable. The conference may take place at the Court and will usually be conducted in-person. However, if not considered a hindrance to the process, the conference may also be conducted with the assistance of visual or audio technology (such as via the internet, video link and/or by telephone).
- 7.9 Experts should prepare for a conference of experts by ensuring that they are familiar with all of the material upon which they base their opinions. Where expert reports in draft or final form have been exchanged prior to the conference, experts should attend the conference familiar with the reports of the other experts. Prior to the conference, experts should also consider where they believe the differences of opinion lie between them and what processes and discussions may assist to identify and refine those areas of difference.

Joint-report

- 7.10 At the conclusion of the conference of experts, unless the Court considers it unnecessary to do so, it is expected that the experts will have narrowed the issues in respect of which they agree, partly agree or disagree in a joint-report. The joint-report should be clear, plain and concise and should summarise the views of the experts on the identified issues, including a succinct explanation for any differences of opinion, and otherwise be structured in the manner requested by the judge or registrar.
- 7.11 In some cases (and most particularly in some native title cases), depending on the nature, volume and complexity of the expert evidence a judge may direct a registrar to draft part, or all, of a conference report. If so, the registrar will usually provide the draft conference report to the relevant experts and seek their confirmation that the conference report accurately reflects the opinions of the experts expressed at the conference. Once that confirmation has been received the registrar will finalise the conference report and provide it to the intended recipient(s).

8. CONCURRENT EXPERT EVIDENCE

- 8.1 The Court may determine that it is appropriate, depending on the nature of the expert evidence and the proceeding generally, for experts to give some or all of their evidence concurrently at the final (or other) hearing.
- 8.2 Parties should familiarise themselves with the *Concurrent Expert Evidence Guidelines* (attached in Annexure B). The Concurrent Evidence Guidelines are not intended to be exhaustive but indicate the circumstances when the Court might consider it appropriate for

concurrent expert evidence to take place, outline how that process may be undertaken, and assist experts to understand in general terms what the Court expects of them.

- 8.3 If an order is made for concurrent expert evidence to be given at a hearing, any expert to give such evidence should be provided with the Concurrent Evidence Guidelines well in advance of the hearing and should be familiar with those guidelines before giving evidence.

9. FURTHER PRACTICE INFORMATION AND RESOURCES

- 9.1 Further information regarding Expert Evidence and Expert Witnesses is available on the Court's website.
- 9.2 Further information to assist litigants, including a range of helpful guides, is also available on the Court's website. This information may be particularly helpful for litigants who are representing themselves.

J L B ALLSOP
Chief Justice
25 October 2016

HARMONISED EXPERT WITNESS CODE OF CONDUCT²

APPLICATION OF CODE

1. This Code of Conduct applies to any expert witness engaged or appointed:
 - (a) to provide an expert's report for use as evidence in proceedings or proposed proceedings; or
 - (b) to give opinion evidence in proceedings or proposed proceedings.

GENERAL DUTIES TO THE COURT

2. An expert witness is not an advocate for a party and has a paramount duty, overriding any duty to the party to the proceedings or other person retaining the expert witness, to assist the Court impartially on matters relevant to the area of expertise of the witness.

CONTENT OF REPORT

3. Every report prepared by an expert witness for use in Court shall clearly state the opinion or opinions of the expert and shall state, specify or provide:
 - (a) the name and address of the expert;
 - (b) an acknowledgment that the expert has read this code and agrees to be bound by it;
 - (c) the qualifications of the expert to prepare the report;
 - (d) the assumptions and material facts on which each opinion expressed in the report is based [a letter of instructions may be annexed];
 - (e) the reasons for and any literature or other materials utilised in support of such opinion;
 - (f) (if applicable) that a particular question, issue or matter falls outside the expert's field of expertise;
 - (g) any examinations, tests or other investigations on which the expert has relied, identifying the person who carried them out and that person's qualifications;
 - (h) the extent to which any opinion which the expert has expressed involves the acceptance of another person's opinion, the identification of that other person and the opinion expressed by that other person;
 - (i) a declaration that the expert has made all the inquiries which the expert believes are desirable and appropriate (save for any matters identified explicitly in the report), and that no matters of significance which the expert regards as relevant have, to the

² Approved by the Council of Chief Justices' Rules Harmonisation Committee

- knowledge of the expert, been withheld from the Court;
- (j) any qualifications on an opinion expressed in the report without which the report is or may be incomplete or inaccurate;
 - (k) whether any opinion expressed in the report is not a concluded opinion because of insufficient research or insufficient data or for any other reason; and
 - (l) where the report is lengthy or complex, a brief summary of the report at the beginning of the report.

SUPPLEMENTARY REPORT FOLLOWING CHANGE OF OPINION

- 4. Where an expert witness has provided to a party (or that party's legal representative) a report for use in Court, and the expert thereafter changes his or her opinion on a material matter, the expert shall forthwith provide to the party (or that party's legal representative) a supplementary report which shall state, specify or provide the information referred to in paragraphs (a), (d), (e), (g), (h), (i), (j), (k) and (l) of clause 3 of this code and, if applicable, paragraph (f) of that clause.
- 5. In any subsequent report (whether prepared in accordance with clause 4 or not) the expert may refer to material contained in the earlier report without repeating it.

DUTY TO COMPLY WITH THE COURT'S DIRECTIONS

- 6. If directed to do so by the Court, an expert witness shall:
 - (a) confer with any other expert witness;
 - (b) provide the Court with a joint-report specifying (as the case requires) matters agreed and matters not agreed and the reasons for the experts not agreeing; and
 - (c) abide in a timely way by any direction of the Court.

CONFERENCE OF EXPERTS

- 7. Each expert witness shall:
 - (a) exercise his or her independent judgment in relation to every conference in which the expert participates pursuant to a direction of the Court and in relation to each report thereafter provided, and shall not act on any instruction or request to withhold or avoid agreement; and
 - (b) endeavour to reach agreement with the other expert witness (or witnesses) on any issue in dispute between them, or failing agreement, endeavour to identify and clarify the basis of disagreement on the issues which are in dispute.

ANNEXURE B

CONCURRENT EXPERT EVIDENCE GUIDELINES

APPLICATION OF THE COURT'S GUIDELINES

1. The Court's Concurrent Expert Evidence Guidelines ("**Concurrent Evidence Guidelines**") are intended to inform parties, practitioners and experts of the Court's general approach to concurrent expert evidence, the circumstances in which the Court might consider expert witnesses giving evidence concurrently and, if so, the procedures by which their evidence may be taken.

OBJECTIVES OF CONCURRENT EXPERT EVIDENCE TECHNIQUE

2. The use of concurrent evidence for the giving of expert evidence at hearings as a case management technique³ will be utilised by the Court in appropriate circumstances (see r 23.15 of the *Federal Court Rules 2011* (Cth)). Not all cases will suit the process. For instance, in some patent cases, where the entire case revolves around conflicts within fields of expertise, concurrent evidence may not assist a judge. However, patent cases should not be excluded from concurrent expert evidence processes.
3. In many cases the use of concurrent expert evidence is a technique that can reduce the partisan or confrontational nature of conventional hearing processes and minimises the risk that experts become "opposing experts" rather than independent experts assisting the Court. It can elicit more precise and accurate expert evidence with greater input and assistance from the experts themselves.
4. When properly and flexibly applied, with efficiency and discipline during the hearing process, the technique may also allow the experts to more effectively focus on the critical points of disagreement between them, identify or resolve those issues more quickly, and narrow the issues in dispute. This can also allow for the key evidence to be given at the same time (rather than being spread across many days of hearing); permit the judge to assess an expert more readily, whilst allowing each party a genuine opportunity to put and test expert evidence. This can reduce the chance of the experts, lawyers and the judge misunderstanding the opinions being expressed by the experts.
5. It is essential that such a process has the full cooperation and support of all of the individuals involved, including the experts and counsel involved in the questioning process. Without that cooperation and support the process may fail in its objectives and even hinder the case management process.

³ Also known as the "hot tub" or as "expert panels".

CASE MANAGEMENT

6. Parties should expect that, the Court will give careful consideration to whether concurrent evidence is appropriate in circumstances where there is more than one expert witness having the same expertise who is to give evidence on the same or related topics. Whether experts should give evidence concurrently is a matter for the Court, and will depend on the circumstances of each individual case, including the character of the proceeding, the nature of the expert evidence, and the views of the parties.
7. Although this consideration may take place at any time, including the commencement of the hearing, if not raised earlier, parties should raise the issue of concurrent evidence at the first appropriate case management hearing, and no later than any pre-trial case management hearing, so that orders can be made in advance, if necessary. To that end, prior to the hearing at which expert evidence may be given concurrently, parties and their lawyers should confer and give general consideration as to:
 - (a) the agenda;
 - (b) the order and manner in which questions will be asked; and
 - (c) whether cross-examination will take place within the context of the concurrent evidence or after its conclusion.
8. At the same time, and before any hearing date is fixed, the identity of all experts proposed to be called and their areas of expertise is to be notified to the Court by all parties.
9. The lack of any concurrent evidence orders does not mean that the Court will not consider using concurrent evidence without prior notice to the parties, if appropriate.

CONFERENCE OF EXPERTS & JOINT-REPORT OR LIST OF ISSUES

10. The process of giving concurrent evidence at hearings may be assisted by the preparation of a joint-report or list of issues prepared as part of a conference of experts.
11. Parties should expect that, where concurrent evidence is appropriate, the Court may make orders requiring a conference of experts to take place or for documents such as a joint-report to be prepared to facilitate the concurrent expert evidence process at a hearing (see Part 7 of the Expert Evidence Practice Note).

PROCEDURE AT HEARING

12. Concurrent expert evidence may be taken at any convenient time during the hearing, although it will often occur at the conclusion of both parties' lay evidence.
13. At the hearing itself, the way in which concurrent expert evidence is taken must be applied flexibly and having regard to the characteristics of the case and the nature of the evidence to be given.
14. Without intending to be prescriptive of the procedure, parties should expect that, when evidence is given by experts in concurrent session:

- (a) the judge will explain to the experts the procedure that will be followed and that the nature of the process may be different to their previous experiences of giving expert evidence;
 - (b) the experts will be grouped and called to give evidence together in their respective fields of expertise;
 - (c) the experts will take the oath or affirmation together, as appropriate;
 - (d) the experts will sit together with convenient access to their materials for their ease of reference, either in the witness box or in some other location in the courtroom, including (if necessary) at the bar table;
 - (e) each expert may be given the opportunity to provide a summary overview of their current opinions and explain what they consider to be the principal issues of disagreement between the experts, as they see them, in their own words;
 - (f) the judge will guide the process by which evidence is given, including, where appropriate:
 - (i) using any joint-report or list of issues as a guide for all the experts to be asked questions by the judge and counsel, about each issue on an issue-by-issue basis;
 - (ii) ensuring that each expert is given an adequate opportunity to deal with each issue and the exposition given by other experts including, where considered appropriate, each expert asking questions of other experts or supplementing the evidence given by other experts;
 - (iii) inviting legal representatives to identify the topics upon which they will cross-examine;
 - (iv) ensuring that legal representatives have an adequate opportunity to ask all experts questions about each issue. Legal representatives may also seek responses or contributions from one or more experts in response to the evidence given by a different expert; and
 - (v) allowing the experts an opportunity to summarise their views at the end of the process where opinions may have been changed or clarifications are needed.
15. The fact that the experts may have been provided with a list of issues for consideration does not confine the scope of any cross-examination of any expert. The process of cross-examination remains subject to the overall control of the judge.
16. The concurrent session should allow for a sensible and orderly series of exchanges between expert and expert, and between expert and lawyer. Where appropriate, the judge may allow for more traditional cross-examination to be pursued by a legal representative on a particular issue exclusively with one expert. Where that occurs, other experts may be asked to comment on the evidence given.
17. Where any issue involves only one expert, the party wishing to ask questions about that issue should let the judge know in advance so that consideration can be given to whether

arrangements should be made for that issue to be dealt with after the completion of the concurrent session. Otherwise, as far as practicable, questions (including in the form of cross-examination) will usually be dealt with in the concurrent session.

18. Throughout the concurrent evidence process the judge will ensure that the process is fair and effective (for the parties and the experts), balanced (including not permitting one expert to overwhelm or overshadow any other expert), and does not become a protracted or inefficient process.

ANNEXURE B– QUESTIONS TO EXPERT

In providing your response to the following questions, please consider information that was in the public domain as at 17 June 2021:

1. In your opinion, what, if any, are the current economic costs arising from the impacts of anthropogenic climate change in respect of both Australia and the world?
2. In your opinion, what, if any, are the likely future economic costs arising from the impacts of anthropogenic climate change in respect of both Australia and the world? In providing your response please consider:
 - a. warming scenarios consistent with meeting the targets of the Paris Agreement; and
 - b. warming scenarios consistent with current greenhouse gas emissions trajectories.
3. In your opinion, will any economic benefits purported to arise from the exploration and exploitation of gas in the Beetaloo sub-basin be impacted by risks associated with:
 - a. Countries and corporations implementing policies and activities to reduce greenhouse gas (**GHG**) emissions in line with the Paris Agreement or otherwise;
 - b. Countries and corporations implementing policies and activities consistent with transitioning away from the use of fossil fuels and achieving net zero GHG emissions targets; and
 - c. Any current or future introduction of carbon pricing (or related) measures in global markets?

If your view is that there would be such an impact, please explain the nature of that impact and give reasons for your view.

4. In your opinion, and considering the anticipated development of the Beetaloo sub-basin as described in Beetaloo Strategic Basin Plan and the greenhouse gas emissions that would be generated by exploiting gas consistent with Beetaloo Strategic Basin Plan, is there likely to be an economic gain for Australia from the exploitation of the Beetaloo sub-basin gas fields when economic costs associated with climate change are considered?

ANNEXURE C – INDEX TO BRIEF

No.	Document	Date
PLEADINGS		
1.	Originating Application	28 July 2021
2.	Concise Statement	16 August 2021
LEGISLATION		
3.	<i>Industry Research and Development (Beetaloo Cooperative Drilling Program) Instrument 2021 (the Instrument)</i>	11 May 2021
4.	Explanatory Statement to the Instrument	13 May 2021
DOCUMENTS BEFORE THE MINISTER WHEN MAKING THE INSTRUMENT		
5.	Ministerial Submission issued by the Department of Industry of Industry, Science, Energy and Resources to the Minister for Resources, Water and Northern Australia making recommendations in respect of the making of the Instrument (Ministerial Recommendation)– MLO version	23 April 2021
6.	Attachment A to the Ministerial Recommendation – <i>Industry Research and Development (Beetaloo Cooperative Drilling Program) Instrument 2021 (Draft)</i>	23 April 2021
7.	Attachment B to the Ministerial Recommendation – Explanatory Statement	23 April 2021
8.	Attachment C to the Ministerial Recommendation – Background Brief	23 April 2021
9.	Signed Ministerial Recommendation approving the making of the Instrument	11 May 2021
EMPIRE APPLICATION FOR FUNDING		
10.	Imperial Application for Beetaloo Grant – Empire Beetaloo Acceleration Program Carpentaria-2 Horizontal Well (BCP00001)	7 April 2021
11.	BCP00001 Application Annexure A – Project Budget	7 April 2021
12.	Imperial Application for Beetaloo Grant – Empire Beetaloo Acceleration Program Carpentaria-3 Horizontal Well’ (BCP00002)	7 April 2021
13.	BCP00002 Application Annexure A – Project Budget	7 April 2021
14.	Imperial Application for Beetaloo Grant – Empire Beetaloo Acceleration Program Carpentaria-4 and 3D Seismic (BCP00003)	7 April 2021
15.	BCP00003 Application Annexure A – Project Budget	7 April 2021
DOCUMENTS RELATING TO APPROVAL OF THE APPLICATIONS		
16.	DISER Eligibility and Completeness Checklist for BCP00001 completed by Mario Pricone (Assessor) and Janet Lau (QA Officer)	7 -8 May 2021
17.	DISER Eligibility and Completeness Checklist for BCP00002 completed by Mario Pricone (Assessor) and Janet Lau (QA Officer)	7 -8 May 2021

18.	DISER Eligibility and Completeness Checklist for BCP00003 completed by Mario Pricone (Assessor) and Janet Lau (QA Officer)	7 -8 May 2021
19.	Meeting Minutes of the Beetaloo Cooperative Drilling Program Assessment Committee (Assessment Committee) Meeting on 27 May 2021 and 1 June 2021	1 June 2021 and 7 June 2021
20.	Attachment A to the Meeting Minutes of Assessment Committee Meeting– Excel spreadsheet of all Program applications	27 May 2021
21.	Attachment C to the Meeting Minutes of the Assessment Committee Meeting – Questions from Committee to Imperial and Imperial's responses	1 June 2021
22.	Scorecard (Summary)- Assessment Committee member Daniel Quin	
23.	Scorecard (Summary)- Assessment Committee member Merrie-Ellen Gunning	
24.	Scorecard for BCDP000001 - Assessment Committee member Louis Gomatos	
25.	Scorecard for BCDP000002 - Assessment Committee member Louis Gomatos	
26.	Scorecard for BCDP000003 - Assessment Committee member Louis Gomatos	
DOCUMENTS BEFORE THE MINISTER WHEN MAKING THE DECISION		
27.	Ministerial Submission issued by the Department of Industry of Industry, Science, Energy and Resources to the Minister for Resources, Water and Northern Australia making recommendations in respect of the Decision (Ministerial Recommendation)– MLO version	16 June 2021
28.	Minister's signed Decision approving Ministerial Recommendation	17 June 2021
29.	Annexure A to Ministerial Recommendation – BCDP Recommended Projects	17 June 2021
30.	Annexure B to Ministerial Recommendation – Program Guidelines	17 June 2021
31.	Annexure C to Ministerial Recommendation – Governance and Program Background	17 June 2021
32.	Annexure D to Ministerial Recommendation – Legal Advice (Redacted – Subject to LPP)	17 June 2021
DECISION ANNOUNCEMENTS		
33.	Minister's Media Release on the Decision	7 July 2021
34.	Empire Energy ASX Announcement on the Decision	8 July 2021
RELEVANT OTHER DOCUMENTS		
35.	'Unlocking the Beetaloo – The Beetaloo Strategic Basin Plan'	Jan 2021
36.	Commonwealth Grants Rules and Guidelines 2017	Current

37.	Final Report of the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory	April 2018
RELEVANT IMPERIAL DOCUMENTS		
38.	Empire Energy ASX announcement entitled “Material Beetaloo Resource Upgrade”	22 February 2021
39.	Morgans report entitled “Backing the Beetaloo” published on Empire Energy’s ‘Investors’ section of website	26 November 2020
ENVIRONMENTAL MANAGEMENT PLANS (EMPS) FOR EP187		
IMP2-04 – Imperial 2019 Drilling Program NT Exploration Permit 187 - APPROVED		
40.	Imperial Environmental Management Plan IMP2-04	Submitted 22 August 2019
41.	Attachment to Imperial EMP IMP2-04 – Emergency Response Plan	Submitted 22 August 2019
42.	NT Government EPA advice in respect of IMP2-04	6 January 2020
43.	NT Government – Approval Notice and Statement of Reasons	2 March 2020
IMP2-6.1 – Imperial 2020-21 Drilling Program NT Exploration Permit 187 - APPROVED		
44.	Imperial Environmental Management Plan IMP2-6.1	Submitted 30 June 2020
45.	Attachments to EMP IMP2-6.1	Submitted 30 June 2020
46.	NT Government EPA advice in respect of IMP2-6.1	9 September 2020
47.	NT Government – Approval Notice and Statement of Reasons	30 September 2020
48.	EP187 Groundwater monitoring results	25 March - 22 October 2020
49.	Imperial Drilling Fluid waste water analysis from the Carpentaria-1 Well site	28 October 2020
IMP3-4 – Hydraulic fracturing and extended production testing of the existing Carpentaria-1 Vertical exploration well on EP187 – APPROVED		
50.	Imperial Environmental Management Plan IMP3-4	Submitted 17 November 2020
51.	Appendices to IMP3-4	Submitted 17 November 2020
52.	NT Government EPA advice in respect of IMP3-4	5 February 2021
53.	NT Government – Approval Notice and Statement of Reasons	15 February 2021

Certificate of Annexure NH2

No. NSD758 of 2021

Federal Court of Australia

District Registry: New South Wales

Division: General

Environment Centre NT Inc

Applicant

Minister for Resources and Water and another

Respondents

This and the following 59 pages form Annexure **NH2** to the Affidavit of Nicki Hutley affirmed on 10 September 2021 before me.

Signature of witness

Name: Anna Gudkov

Qualification: Solicitor



Expert Witness Report

**Prepared for Environmental Defenders
Office acting on behalf of Environment
Centre NT**

By Nicki Hutley, Rovingstone Advisory Pty Ltd

10 September 2021

Introduction

1. I, Nicki Hutley, have read, understood, complied and agree to be bound by all provisions of the Expert Evidence Practice Note, including the Harmonised Expert Witness Code of Conduct and the Concurrent Expert Evidence Guidelines.
2. I have acquired my specialised knowledge through fourteen years of practice as an economist with a focus on climate economics. I am currently a Councillor (economics) for the Climate Council of Australia. My current CV is set out in **Appendix A** to this report.
3. The opinions provided are based wholly or substantially on my specialised knowledge arising from my training, study or experience.
4. This report was prepared in response to an expert brief dated 27 August 2021 provided to me by the Environmental Defenders Office Ltd (EDO), acting on behalf of the Environment Centre Northern Territory (ECNT). A copy of my expert letter of instruction is at **Appendix B** to this report.
5. I have been asked to address the following questions, considering only information that was in the public domain as at 17 June 2021:

1. In your opinion, what, if any, are the current economic costs arising from the impacts of anthropogenic climate change in respect of both Australia and the world?

2. In your opinion, what, if any, are the likely future economic costs arising from the impacts of anthropogenic climate change in respect of both Australia and the world? In providing your response please consider:

a. warming scenarios consistent with meeting the targets of the Paris Agreement; and

b. warming scenarios consistent with current greenhouse gas emissions trajectories.

3. In your opinion, will any economic benefits purported to arise from the exploration and exploitation of gas in the Beetaloo sub-basin be impacted by risks associated with:

a) Countries and corporations implementing policies and activities to reduce greenhouse gas (GHG) emissions in line with the Paris Agreement or otherwise;

b) Countries and corporations implementing policies and activities consistent with transitioning away from the use of fossil fuels and achieving net zero GHG emissions targets; and

c) Any current or future introduction of carbon pricing (or related) measures in global markets?

If your view is that there would be such an impact, please explain the nature of that impact and give reasons for your view.

4. In your opinion, and considering the anticipated development of the Beetaloo sub-basin as described in Beetaloo Strategic Basin Plan and the greenhouse gas emissions that would be generated by exploiting gas consistent with Beetaloo Strategic Basin Plan, is there likely to be an economic gain for Australia from the exploitation of the Beetaloo sub-basin gas fields when economic costs associated with climate change are considered?

10 September 2021

Question 1: In your opinion, what, if any, are the current economic costs arising from the impacts of anthropogenic climate change in respect of both Australia and the world?

Introduction

6. Increased physical impacts that are the direct result of anthropogenic climate change are producing significant economic, social and environmental costs in both Australia and globally, with a pronounced acceleration over the past two decades in particular.¹
7. These physical impacts can be categorized as chronic or acute:
 - a. **chronic risks** occur over a prolonged period of time and include changes in average precipitation rates, drought, ocean acidification, rising sea levels and rising average temperatures;
 - b. **acute risks** are typically short-term but severe and include heatwaves, floods, landslides, bushfires (wildfires), cyclones and storms, torrential rains – all occurring with increased frequency and intensity.
8. Interactions between acute risks, commonly referred to as ‘extreme events’, and chronic risks can exacerbate economic damages such as when there are rising sea levels accompanied by storms.²
9. The economic impacts of both chronic and acute climate-related events are increasing as a direct result of both increased event frequency and intensity as well population growth, which means greater numbers of people are exposed to these events.
10. In addition to the cost of physical damages associated with climate change, which are reflected to some extent through insurance claims reporting, other damages that lead to economic losses include shocks to economic activity (loss of productivity and disruptions to production), increased mortality and morbidity, reduced mental health and well-being, increased displacement and migration, increased transfer payments³ which incur a deadweight loss,⁴ and adaptation costs.⁵
11. Greenhouse gas (GHG) emissions produced by any one country affect the global environment, society and economy. For example, it is estimated that for every tonne of carbon dioxide (CO₂) emitted in the US, 85% of the damages to property, economy, and people due to the resulting climate events occur externally.⁶

¹ Australian Academy of Sciences, (2021) The risks to Australia of a 3° warmer world

², Lindsey, R. (2021), Climate Change: Global Sea Level, National Oceanic and Atmospheric Administration

³ Transfer payments refers to government support such as bushfire recovery payments, which is funded by additional tax collection.

⁴ A ‘deadweight’ loss, or loss of economic efficiency and consumer welfare, occurs because the taxes needed to fund payments distort consumer and producer behaviour. There are also collection and compliance costs that erode the efficiency of the tax dollars collected.

⁵ Ranson, M et al (2016), Modeling the Impact of Climate Change on Extreme Weather Losses, National Center for Environmental Economics, Working Paper # 16-02 May, 2016

⁶ Wagner, G et al (2021), Eight priorities for calculating the social cost of carbon at <https://www.nature.com/articles/d41586-021-00441-0> accessed 16 February 2021

Global costs of climate change

12. Climate change is increasing the frequency and intensity of natural disasters such as wildfires, drought, cyclones and hurricanes, and flooding. These are separate to geophysical disasters such as earthquakes and volcanic eruptions. Each of these events has occurred in the absence of climate change, but with far less frequency and severity and associated economic costs.
13. By way of example, the frequency of disaster events in the US with an impact of more than US\$1 billion increased between 2015 and 2020, with an average of 14 events per year (as compared to 6.3 events per year between 2000 and 2009 and just 2.9 events per year between 1980 and 1989). The total cost of disasters from 2010 to 2019 was US\$844.7 billion with 2017 the worst year at US\$306.2 billion. This compares to total damages of US\$184.4 billion for 1980-1989.⁷ There were a record 22 events in 2020, with a loss value of \$98.9 billion.⁸
14. Climate-related disasters including floods, cyclones and wildfires, are estimated to have caused global economic losses of A\$272 billion in 2020, according to Munich Re research.⁹ The Chief Climate and Geo Scientist of Munich Re has commented that the extreme values of insurance claims for natural disasters over the past five years:

*“fit[s] with the expected consequences of a decades-long warming trend for the atmosphere and oceans that is influencing risks. An increasing number of heatwaves and droughts are fueling wildfires, and severe tropical cyclones and thunderstorms are becoming more frequent. Research shows that events such as this year’s heatwaves in northern Siberia are 600 times more likely to occur than previously.”*¹⁰
15. Climate-related disasters are estimated to have resulted in global economic losses of US\$650 billion in the three years 2016-2018 (0.8% of Gross Domestic Product (GDP)). Two-thirds of the cost, or US\$415 billion (0.66% of GDP), has been incurred by North America as a result of wildfires and hurricanes.¹¹
16. A 2009 study of 225 major disasters between 1960 and 2005 estimated GDP growth to be on average 2% below where it would have been in the absence of the disaster, with a median deviation of 4% below where it would have been in the absence of the disaster.¹² Each climate-related disaster has the potential to damage GDP to this extent.

⁷ <https://www.ncdc.noaa.gov/billions/summary-stats>

⁸ Ibid.

⁹ Climate Council of Australia (2012) Hitting home: the compounding impact of climate inaction

¹⁰ <https://www.munichre.com/en/company/media-relations/media-information-and-corporate-news/media-information/2021/2020-natural-disasters-balance.html>

¹¹ <https://riskandinsurance.com/cost-of-climate-change/>

¹² Hochrainer, S. (2009) Assessing the Macroeconomic Impacts of Natural Disasters: Are there Any? Policy Research working paper; no. WPS 4968. World Bank.

17. In 2017, according to Morgan Stanley research, property and infrastructure damage from climate-related natural disasters accounted for an estimated \$220 billion, or two-thirds, of \$330 billion in global economic losses.¹³
18. A 2021 US study of the **health costs of air pollution** that are a direct result of the burning of fossil fuels, together with climate change events such as heat waves and wildfire smoke, estimated those costs to be US\$800 million per annum. This study is based only on data that are recorded and made publicly available, indicating that more comprehensive data availability (such as surveys of households where health impacts were felt but not reported, together with the release of data held by private health providers) would lead to a much higher estimate of damages. This study also notes that the economic burden of health-related climate costs is unevenly distributed, with the greater burden falling on vulnerable communities.¹⁴
19. Widespread **drought** in New Zealand during 2007–2009, the direct result of warming global temperatures, reduced direct and indirect agricultural output by about NZ\$3.6 billion. The 2012–2013 drought in New Zealand is estimated to have reduced national GDP by 0.3% to 0.6% and contributed to a significant rise in global dairy prices.¹⁵
20. **Insured losses¹⁶ for catastrophic weather events** in Canada amounted to more than C\$18 billion between 2010 and 2019, with the number of catastrophic events over three times higher than in the 1980s, indicating the climate change is leading to greater numbers of these events over time. Losses per catastrophic event have risen from an average of C\$8.3 million per event in the 1970s to an average C\$122 million in the decade to 2019, reflecting increased severity of events as well as larger populations affected.¹⁷
21. **Rising numbers of extreme heat events** caused by climate change have had significant economic costs across the globe:
 - a. The 2003 European heatwave, which lasted for close to three weeks, is estimated to have cost the UK £41 million in health-related costs and productivity losses, with more than 70,000 excess deaths across Europe due to the heat.¹⁸

¹³ Morgan Stanley (2019) Weathering the Storm: Integrating Climate Resilience into Real Assets Investing https://www.morganstanley.com/im/publication/insights/investment-insights/ii_weatheringthestorm_us.pdf

¹⁴ De Alwis, D. and Limaye, VS (2021), The Costs of Inaction: The Economic Burden of Fossil Fuels and Climate Change on Health in the United States, Natural Resources Defense Council

¹⁵ https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap25_FINAL.pdf

¹⁶ It is important to note that insured losses only represent a portion of total losses as many properties, businesses and people are either not insured or are underinsured. Munich Re estimates 60% of natural disaster impacts globally were uninsured in 2020

¹⁷ Canadian Institute for Climate Choices, (2020), Tip of the iceberg Navigating the known and unknown costs of climate change for Canada

¹⁸ Robine, J.M., et al. (2008) Death toll exceeded 70,000 in Europe during the summer of 2003. *Comptes Rendus Biologies*, Volume 331, Issue 2 at <https://www.sciencedirect.com/science/article/pii/S1631069107003770>

- b. A two-week heatwave in California in 2006 is estimated to have led to 655 excess deaths, 1,620 hospitalisations, and more than 16,000 additional emergency room visits, costing almost US\$5.4 billion.¹⁹
 - c. Heatwaves lead to increased absenteeism in Canadian schools, with potential impacts on educational attainment, lifetime earnings, tax receipts and welfare payments, and physical and mental well-being. Only 128 of the 583 schools in the Toronto District School Board have air conditioning, exposing students and workers to significant heat stress which has led to parents keeping children home from school.²⁰
- 22. In respect of the **impact of climate change on wildfires**:
 - a. The direct cost to the Canadian forest sector for wildland fire protection has increased by around \$120 million per decade since the 1970s and now costs more than \$1 billion annually.²¹
 - b. Indonesia's 2015 wildfires, the worst on record, burned 2.6 million hectares and cost the economy more than US\$16 billion.²²
- 23. **Increasing frequency of tropical cyclones** in the Pacific region has had severe economic impacts:
 - a. In 2015, category five Tropical Cyclone Pam caused damage equivalent to 64 per cent (%) of Vanuatu's GDP.
 - b. In 2016, Tropical Cyclone Winston, caused a loss in Fiji's GDP of 31%.
 - c. In 2018, Tropical Cyclone Gita hit Tonga, causing losses of 38% of GDP.
 - d. In 2020, Tropical Cyclone Harold severely affected Vanuatu, Solomon Islands, Fiji and Tonga, compounding the economic impact of COVID-19.²³
- 24. While yet to be fully quantified, **biodiversity loss** comes with likely very large economic costs. Current extinction rates are approximately 100 to 1,000 times higher than the baseline (without climate change).²⁴ Loss of biodiversity leads to economic losses in use, non-use and option (future use) values.²⁵
- 25. An example of biodiversity loss costs is the decline in bee populations due to climate change (heat impacts, increased disease).²⁶ In the US, bees contribute US\$15-30 billion in agricultural production per year. Pollination is critical to production of at least 90 commercial crops,

¹⁹ Natural Resources Defense Council (2011), Health and Climate Change: Accounting for costs at <https://www.nrdc.org/sites/default/files/accountingcosts.pdf>

²⁰ Canadian Institute for Climate Choices, (2020), Tip of the iceberg Navigating the known and unknown costs of climate change for Canada

²¹ Ibid.

²² Climate Council of Australia (2021) Hitting home: the compounding costs of climate inaction

²³ Climate Council of Australia (2020) Tropical cyclones and climate change: fact sheet

²⁴ Dasgupta, P. (2021), The Economics of Biodiversity: The Dasgupta Review. (London: HM Treasury)

²⁵ Ibid.

²⁶ <https://www.sciencedaily.com/releases/2021/01/210112085357.htm>

including almonds which have an annual value of more than US\$4.8 billion.²⁷ The direct economic impact of winter honeybee colony losses in 2016-2017 is estimated to be about €32 million in Austria, €21 million in Czechia, and €3 million in Macedonia.²⁸

Costs of acute climate change events in Australia

26. Australia is one of the most vulnerable countries in terms of climate change impacts which in turn create economic losses through damages to people, businesses and property as well as the environment.²⁹
27. There is no single source of the total costs of climate change in Australia but a wide body of evidence quantifies the costs associated with different types of extreme weather events which are occurring with increasing frequency and severity.³⁰
28. As is seen globally, the cost of weather-related disasters has risen dramatically in the 2010s, at more than two and a half times the average of the preceding four decades, indicating the impact of climate change.³¹
29. One estimate of the economic and social costs of natural disasters³² in Australia which attempted to include economic losses due to climate event impacts on infrastructure, property damage, flow-on disruptions to businesses and mortality and health costs, put the cost at \$18.2 billion per year on average over the decade to 2016, representing 1.2% of GDP.³³

Heat waves

30. Climate change is increasing the frequency and severity of heat waves in Australia.
31. The Bureau of Meteorology (BoM) defines a heatwave as three or more consecutive days when day- and night-time temperatures are “unusually hot” relative to past weather in a region. This persistent heat creates the conditions for heat stress that can affect human health, the economy, agriculture and ecosystems³⁴ as well as the effective operation of infrastructure (energy, water, transport and communications).³⁵

²⁷ Sadler, Amelia. (2016) Colony Collapse Disorder: The Economics of Decline <https://cmr.berkeley.edu/2016/10/colony-collapse-disorder/>

²⁸ Popovska Stojanov, D. et al. (2021) Direct Economic Impact Assessment of Winter Honeybee Colony Losses in Three European Countries. *Agriculture* 2021, 11, 398. <https://doi.org/10.3390/agriculture11050398>

²⁹ IPCC (2014) Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

³⁰ Ibid.

³¹ Climate Council of Australia (2012) Hitting home: the compounding impact of climate inaction

³² Disasters covered by the study are floods, cyclones, hail, storms, bushfires and earthquakes. Earthquakes are not related to climate change and the very small impacts of these are not included in the above figures.

³³ Deloitte Access Economics (2017) Building resilience to natural disasters in our states and territories, Australian Business Roundtable for Disaster Resilience & Safer Communities

³⁴ Trancoso, R. et al (2020) Heatwaves intensification in Australia: A consistent trajectory across past, present and future, *Science of the Total Environment*, Volume 742 November 2020 at <https://www.sciencedirect.com/science/article/pii/S0048969720340432> accessed 23 February 2021

³⁵ <http://www.bom.gov.au/australia/heatwave/knowledge-centre/understanding.shtml>

32. While there is no single temperature threshold for a heatwave in Australia, temperatures at or above 35°C are generally considered the benchmark. The BoM classifies heatwaves into three categories: low-intensity, severe and extreme. Severe heatwaves are likely to affect vulnerable groups such as the elderly and those with existing medical conditions while extreme heatwaves present a problem for all people, especially those who work outside.
33. Australia's climate has warmed on average by 1.44 ± 0.24 °C since national records began in 1910, which has led to an increase in the frequency of extreme heat events³⁶ and heatwaves in Australia over the last two decades have increased in frequency, intensity and duration.³⁷ Since 1890, heatwaves have killed more Australians than bushfires, cyclones, earthquakes, floods, and severe storms combined.³⁸
34. The economic consequences of increased heatwaves include:
 - a. **Reduction of worker productivity**, particularly in outdoor work such as construction and agriculture. Globally, it is estimated that 2% of total working hours are lost each year, because it is too hot to work or because workers have to work at a slower pace.³⁹ Victoria expects economic losses of \$179 million by 2030 due to reduced worker productivity, with roughly one third of this loss occurring in Melbourne.⁴⁰
 - b. **Reduction in agricultural output and production** as crops and livestock are pushed past their physiological heat and drought tolerances, leading to loss of output, higher consumer prices and loss of farm incomes. Between 1964 and 2007, drought and heat waves destroyed one-tenth of the world's cereal production.⁴¹
 - c. **Increased hospitalization rates:** Extreme heat events have also been consistently associated with an increased risk of hospitalisation, raising health costs and lowering worker productivity and individual well-being and quality of life, and mortality (leading to loss of economic production).⁴²

³⁶ CSIRO and Australian Bureau of Meteorology (2020), State of the Climate 2020

³⁷ Trancoso, R. et al (2020) Heatwaves intensification in Australia: A consistent trajectory across past, present and future, Science of the Total Environment, Volume 742 November 2020 at <https://www.sciencedirect.com/science/article/pii/S0048969720340432> accessed 23 February 2021

³⁸ Coates et al. (2014) Exploring 167 years of vulnerability: An examination of extreme heat events in Australia 1844–2010 at www.sciencedirect.com/science/article/pii/S1462901114000999

³⁹ <https://futureearth.org/publications/issue-briefs-2/heatwaves/#:~:text=Economic%20impacts%3A%20Multiple%20areas%20of,work%20at%20a%20slower%20pace>, accessed 22 February 2021

⁴⁰ Victorian Department of Environment, Land, Water and Planning, (2019), The economic impact of heatwaves on Victoria

⁴¹ Lesk, C., Rowhani, P. and Ramankutty, N. (2016) "Influence of Extreme Weather Disasters on Global Crop Production." Nature 529. Accessed 22 February 2021.

⁴² McElroy, S. et al (2020) Defining heat waves and extreme heat events using sub-regional meteorological data to maximize benefits of early warning systems to population health, Science of the Total Environment, Volume 721 June 2020 at <https://www.sciencedirect.com/science/article/abs/pii/S004896972031189X>, accessed 22 February

- d. **Rising Emergency Department (ED) admissions:** In Perth, a 10°C increase in maximum temperature above threshold has been found to be associated with a 9.8% increase in daily mortality, together with a 4.4% increase in total ED admissions, with renal-related ED presentations increasing by 10.2%.⁴³ The average cost of ED presentations per person is \$705: admitted presentations cost \$1,030 and non-admitted presentations \$561, on average.⁴⁴
- e. **Rising Mortality:** Additional recent research indicates that reporting of heat-related mortality in Australia (around 0.1% of total deaths) is grossly underestimated, and that the figure is likely closer to 5% of total deaths.⁴⁵ The economic cost of loss of life is estimated variously, but the estimate recommended by the Department of Prime Minister and Cabinet for all policy making decisions is \$4.2 million per person.⁴⁶

Drought

- 35. Climate change has increased the severity and intensity of drought, leading to loss of economic output, most notably in the agricultural sector.
- 36. The economic costs of drought in Australia are well-documented:
 - a. Between 2006 and 2009, Australian GDP fell by approximately 0.75% as a result of drought.⁴⁷
 - b. Between 2007 and 2008, drought led to a 5.7% fall below forecast in regional GDP in the southern Murray Darling Basin and was accompanied by the temporary loss of 6,000 jobs.⁴⁸
 - c. Farm profits were on average 22% lower due to drought conditions over the period 2000 to 2019, representing a loss of approximately \$1.1 billion per annum. This includes a 65% decline in NSW crop production in 2018-19.⁴⁹
 - d. In October 2019, the Australian Government was funding \$7.4 billion across 21 programs for drought assistance.⁵⁰
 - e. In addition to the health impacts associated with extreme heat conditions often associated with periods of drought (see paragraph 34c, d, and e), other outcomes

⁴³ Williams, S. et al (2011) The impact of summer temperatures and heatwaves on mortality and morbidity in Perth, Australia 1994–2008, *Environment International*, Volume 40, April 2012 at <https://www.sciencedirect.com/science/article/pii/S0160412011002686>, accessed 18 February 2021

⁴⁴ National Hospital Cost Data Collection

https://www.ihsa.gov.au/sites/default/files/publications/round_22_nhcdc_infographics_emergency.pdf

⁴⁵ Longden T. (2019) The impact of temperature on mortality across different climate zones. *Climatic Change* Volume 157

⁴⁶ Australian Department of Prime Minister and Cabinet (2014), Value of statistical life, Best Practice Regulation Guidance Note

⁴⁷ IPCC (2014) Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

⁴⁸ Ibid.

⁴⁹ <https://www.agriculture.gov.au/abares/products/insights/effects-of-drought-and-climate-variability-on-Australian-farms#changes-in-climate-are-affecting-australian-farms>

⁵⁰ <https://www.anao.gov.au/work/request/federal-government-drought-funding-measures>

include a deterioration in mental health associated with financial stress from lost production and from watching damage to livestock and the environment, population decline, and social disruption in rural and regional communities including loss of access to services.⁵¹ Loss of mental health has an economic value associated with outcomes such as absenteeism, presenteeism, and loss of well-being, but such values have not been quantified to date.

Bushfires

37. Rising average temperatures, extreme heat, and increasing frequency of drought as a result of climate change has led to an increase in extreme fire weather and the length of the fire season in Australia since the 1950s, including the number of the most dangerous 10% of fire weather days.⁵²
38. Until quite recently, the focus around the impact of bushfires has been on loss of life and property directly associated with the fires. However, more recent research in the wake of severe bushfires in Australia and the US in 2019 and 2020 is focusing on the broader health impacts of bushfires, including smoke impacts that affect people many kilometers away from the fires.
39. Measured economic impacts of bushfires in Australia include:
 - a. The 2009 Black Saturday bushfires are estimated to have resulted in direct economic losses of \$3.1 billion, while the intangible impact (including health outcomes) is estimated at \$3.9 billion, taking the total cost to \$7 billion.⁵³
 - b. The Royal Commission into National Natural Disaster Arrangements estimated the national financial impact of the 2019-20 bushfires at more than \$10 billion.⁵⁴
 - i. Additional analysis of the cost of the 2019-20 Australian bushfires recovery, including health and environmental costs, is almost \$100 billion.⁵⁵
 - ii. The Insurance Council of Australia estimated insurance losses of \$2.3 billion, covering more than 38,000 claims.⁵⁶
 - iii. The Australian Government has allocated \$2.8 billion for bushfire recovery,⁵⁷ with additional funding from state and local governments.⁵⁸

⁵¹ Edwards, B. et al. (2018) The social and economic impacts of drought, ANU Centre for Social research and Methods Working Paper No. 5/2018

⁵² Australian Bureau of Meteorology (2020), Special Climate Statement 73—extreme heat and fire weather in December 2019 and January 2020 at <http://www.bom.gov.au/climate/current/statements/scs73.pdf>

⁵³ Deloitte Access Economics (2017) Building resilience to natural disasters in our states and territories, Australian Business Roundtable for Disaster Resilience & Safer Communities

⁵⁴ Royal Commission into National Natural Disaster Arrangements (2020) Royal Commission into National Natural Disaster Arrangements Report. Commonwealth of Australia, Canberra

⁵⁵ <https://edition.cnn.com/2020/01/10/perspectives/australia-fires-cost/index.html> accessed 23 February 2021

⁵⁶ https://www.insurancecouncil.com.au/media_release/plain/575 accessed 23 February 2021

⁵⁷ <https://recovery.gov.au/progress-date/funding>

⁵⁸ <https://www.bushfirerecovery.gov.au/local-recovery-projects>

- iv. The tourism sector alone is estimated to have lost \$4.5 billion.⁵⁹
- c. Health costs associated with bushfire smoke are becoming increasingly understood to be very significant. Health studies correlate deaths and hospital admissions with days where smoke particulate concentrations (particularly PM2.5, referring to the size of particles that cause damage when inhaled) exceed the 95th per centile of historical averages. One study estimated there were more than 400 deaths, more than 4,000 hospitalisations and nearly \$2 billion in healthcare costs, from the Black Summer bushfires alone.⁶⁰ The economic cost of loss of life is estimated variously, but the estimate recommended by the Department of Prime Minister and Cabinet for all policy making decisions is \$4.2 million.⁶¹
- d. The longer-term effects of exposure to bushfire smoke are not well understood at present but have been linked to increased risk of stroke, respiratory disorders, heart disease and cancers, in a similar vein to smoking cigarettes.⁶² This has significant implications for health costs into the future.

Cyclones

40. Climate change is leading to increasing intensity and reach of cyclones in Australia, leading to widespread property damage, loss of life, economic disruption and adverse health impacts due to physical injuries).⁶³
41. The frequency of tropical cyclones crossing land in Australia has declined slightly this century - however, the intensity of the cyclones and ensuing damages has increased. Warming oceans also mean cyclones can reach further inland. As a result, economic and insured losses arising from such cyclones are doubling every 15 years.⁶⁴
42. Tropical cyclones in Australia have caused significant economic damage over the decade to 2019, although this is typically measured only in direct insured losses and is therefore an underestimate of the true cost:
- a. In 2011, insured property damage associated with Tropical Cyclone (TC) Yasi was \$1.5 billion. Further economic costs to the agricultural and tourism industries associated with TC Yasi were estimated at \$1.6 billion and \$600 million respectively.⁶⁵

⁵⁹ Hughes, L. et al (2020) Summer of crisis. Climate Council of Australia, Canberra

⁶⁰ Arriagada, N.B. et al (2020) Unprecedented smoke - related health burden associated with the 2019–20 bushfires in eastern Australia, Medical journal of Australia, Volume 213, Issue 6, September 2020

⁶¹ Australian Department of Prime Minister and Cabinet (2014), Value of statistical life, Best Practice Regulation Guidance Note

⁶² <https://www.hri.org.au/health/your-health/lifestyle/bushfire-smoke-affects-our-health>

⁶³ Climate Council of Australia (2020) Tropical cyclones and climate change: fact sheet

⁶⁴ Bruyère, C. et al (2020) Severe weather in a changing climate 2nd edition, National Centre for Atmospheric Research, Insurance Group Australia and Cyclone Testing Station at James Cook University

⁶⁵ Deloitte Access Economics (2017) Building resilience to natural disasters in our states and territories, Australian Business Roundtable for Disaster Resilience & Safer Communities

- b. In 2013, TC Oswald incurred \$1.5 billion in insurance claims for property damage, loss of business and health impacts.⁶⁶
- c. In 2015, TC Marcia and several extra-tropical cyclones incurred \$2.9 billion in insurance claims.⁶⁷
- d. In 2017, Cyclone Debbie caused at least \$1.5 billion in insurance claims.⁶⁸

Flooding

- 43. Increased flooding is associated with climate change-induced increase in intensity of rainfall.⁶⁹ Heavy and extended rainfall in northern Queensland in 2019 caused economic and social damages of \$5.7 billion, equal to 14% of regional economic output.⁷⁰
- 44. A once in a century level flood in NSW and South- East Queensland in March 2021 resulted in more than 25,000 insurance claims at an estimate cost of \$385 million.⁷¹

Hailstorms

- 45. Climate change is increasing the frequency of hailstorms and the size of hailstones in Australia.⁷²
- 46. Hailstorms can cause widespread property damage to cars, buildings, crops and livestock.
- 47. The Insurance Council of Australia estimates insured losses due to hailstorms on 19 January 2020 across the ACT, Victoria, NSW and Queensland of \$1.5 billion, with almost 125,000 claims lodged.⁷³ A hailstorm in south-east Queensland on 17 November 2019 created insured losses of \$451 million, with 28,642 claims.⁷⁴

⁶⁶ Ibid.

⁶⁷ Ibid.

⁶⁸ Ibid.

⁶⁹ <https://theconversation.com/yes-australia-is-a-land-of-flooding-rains-but-climate-change-could-be-making-it-worse-157586>

⁷⁰ Ibid.

⁷¹ <https://www.insurancenews.com.au/daily/flooding-loss-estimate-rises-to-385-million>

⁷² Raupach, T.H., Martius, O., Allen, J.T. et al. (2021) The effects of climate change on hailstorms. *Nat Rev Earth Environ* 2, 213–226. <https://doi.org/10.1038/s43017-020-00133-9>

⁷³ https://www.insurancecouncil.com.au/media_release/plain/575

⁷⁴ Ibid.

Question 2: In your opinion, what, if any, are the likely future economic costs arising from the impacts of anthropogenic climate change in respect of both Australia and the world? In providing your response please consider:

- a. warming scenarios consistent with meeting the targets of the Paris Agreement; and
- b. warming scenarios consistent with current greenhouse gas emissions trajectories.

Modelling parameters

- 48. Current and expected GHG pathways used in economic modelling are based on UN IPCC Representative Concentration Pathways (RCPs) and the associated expected changes in global warming. Models referenced here are based on UN IPCC data published prior to 17 June 2021.
- 49. Estimating the comprehensive future costs of climate change under any scenario poses some challenges for modellers, given the multiple parameters used in integrated assessment models (IAMs) which include climate risk projections, damages curves, socio-economic projections, and land use models as well as assumptions regarding future climate policies, and discount rates.
- 50. Nonetheless, based on historical costs together with a high confidence level that climate change impacts are increasing as surface and ocean temperatures rise, there is no doubt the costs of climate change are increasing – it is only the order of magnitude of that increase that is in question.
- 51. It is widely recognised that most estimates of economic damages are severe underestimates. This is because, as observed in IPCC AR5, the omission of various potential physical and social damages (such as widespread population displacement as a result of rising seas levels) from IAMs means that damage estimates are too low, and current model outcomes for economic costs represent an underestimate.⁷⁵
- 52. Models take into account both costs and benefits of climate change. That is, the aim is to identify the **net impact**.
- 53. The **costs of climate change** are projected to increase exponentially over multiple generations. Economic models typically project costs out to at least 2100 and even as far as 2300.
- 54. Given long time frames, the choice of discount rate⁷⁶ used can lead to significant variations in estimates of cost. In a survey of 197 expert climate economists, the average long-term discount rate preferred was 2.25%. The survey found that the vast majority of survey participants accepted a rate of between 1% and 3%, with only a few favouring higher rates.⁷⁷

⁷⁵ Kolstad, C. et al (2014) Social, economic and ethical concepts and methods. IPCC 5th Assessment report, Working Group III, Ch. 3

⁷⁶ A discount rate is used in economic and financial analysis to adjust future dollar values into current dollar terms, recognising that individuals tend to place a higher value on a monetary unit today than in the future. Because IAMs estimate the impacts of climate change over almost three centuries to 2300, the impact of discounting on social cost of carbon values chosen will be profound.

⁷⁷ Howard, P. and Sylvan, D. (2015) Expert Consensus on the economics of climate change, Institute for Policy Integrity, New York University School of Law

Computable General Equilibrium modelling

55. The most recent, comprehensive, global modelling of the impacts of climate change, uses a dynamic Computable General Equilibrium (CGE) model,⁷⁸ which includes impacts such as loss of agricultural production, sea level rise and health effects as well as acute events.⁷⁹
56. The CGE model shows the difference between different IPCC emissions concentration pathways across 139 countries. The three pathways modelled are:
 - a. **RCP 4.5** – consistent with 2°C, and considered by the modellers as most consistent with the Paris Agreement target of “*well below 2°C above preindustrial levels and pursuing efforts to limit the temperature increase to 1.5°C*”.⁸⁰
 - b. **RCP 6** – consistent with 3°C warming and reflecting the likely current pathway based on international commitments to date (which are insufficient to meet the Paris Agreement).
 - c. **RCP 8.5** – consistent with 4°C and likely in the absence of any further action on GHGs i.e., current commitments to net zero are not met.
57. Differences in GDP under these emissions scenarios are:
 - a. The global economic cost differential between warming of 2°C and 3°C over the long run to 2100 is US\$3,934.25 billion a year.
 - b. The global economic cost differential between warming of 2°C and 4°C over the long run to 2100 is US\$17,5489 billion per year.
58. Estimates comparing outcomes by scenario are presented in Table 1 below, based on UN IPCC RCPs and associated warming by degrees.

Table 1 Estimation of Long-Term GDP Loss per Year Under Global Warming Scenarios (US\$ Billion/Year) by 2100

Region	4°C (RCP 8.5) (Current trajectory – no further action)	3°C (RCP 6) (Current trajectory – with standing net zero commitments)	2°C (RCP4.5) (Toward Paris)
World total	23,149.18	9,593.71	5,659.47
Australia	117.42	36.87	23.72

Source: Kompas et al (2018)

⁷⁸ CGE models fit economic data to a set of equations which aim to capture the structure of the economy and behavioural response of firms, households, and government. This provides a framework to simulate policy changes and trace the impact on key economic variables, including income and GDP.

⁷⁹ Kompas, T., Pham, V. H., and Che, T. N. (2018) The effects of climate change on GDP by country and the global economic gains from complying with the Paris Climate Accord. *Earth's Future*, 6, 1153–1173. <https://doi.org/10.1029/2018EF000922>

⁸⁰ <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

59. Other CGE-based models suggest similar levels of damages.
60. IPCC research indicates the **mean⁸¹ net present value of the costs of damages from warming in 2100** (including costs associated with climate change-induced market and non-market impacts, impacts due to sea level rise, and impacts associated with large-scale discontinuities) are estimated to be US\$54 trillion for 1.5°C and US\$69 trillion for 2°C warming, relative to 1961–1990.⁸² Estimates for 3°C and 4°C were not provided, but are non-linear and larger than for 2°C.
61. The Stern Review, a leading analysis of the economics of climate change undertaken on behalf of the UK Government, reports that, under a 3°C to 4°C warming trajectory, the costs of extreme weather alone (that is, excluding chronic climate risks) could reach 0.5% - 1% of world GDP by the middle of the century, and will keep rising after that time. This is due to increased flooding, cyclone speeds, and heatwaves affecting larger populations.

Modelling in relation to Australia

62. Until recently, there has been limited economic modelling undertaken of the economic impacts of climate change. Recent modelling, while still highly complex, has been enabled because of the increasing availability of evidence on and understanding of climate-induced economic damages and the ability of economists to incorporate these into economy-level economic models.
63. Financial institutions are increasingly using in-house modelling capabilities to model the economic and financial risks of increases in climate change associated with their lending portfolios. Private sector companies are also increasingly looking to specialist consultants to help them understand the economic and financial risks to their business from climate change. This modelling is not publicly available and is focused on individual business and sector level impacts rather than economy wide. My work in this field leads me to be confident that the economic costs of climate change are increasing and substantial.
64. **At the economy-wide level for Australia**, one estimate by leading environmental economist, Professor Tom Kompas of the University of Melbourne, of **potential cumulative damages from 2019 until 2100**, based on current emissions pathways, was put at more than \$5 trillion which is more than double the current size of the entire economy. Damages will reach \$584.5 billion in 2030 and \$762 billion in 2050.⁸³ I believe this to be a reasonable estimate of damages, with a strong probability that the figure is higher, as the author notes that not all aspects of climate change were included in this model, only those for which there is a high degree of confidence and evidence at present.

⁸¹ Averaged across different discount rates and socio-economic and climate scenarios.

⁸² Hoegh-Guldberg, O. et al (2018) Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

⁸³ Kompas, T., Witte, E. and Keegan, M. 2019, Australia's Clean Energy Future: Costs and Benefits, MSSI Issues Paper 12, Melbourne Sustainable Society Institute, The University of Melbourne.

65. **An alternative estimate of economy-wide economic costs of climate change** by Deloitte Access Economics puts the damage to Australia of failing to act on climate change at \$3.4 trillion dollars by 2070, with job losses of 880,000.⁸⁴ This was work that I reviewed at the time of modelling. Again, the model focused on areas of risk and damages for which there is a relatively high degree of confidence and evidence such as the agricultural and tourism sectors and loss of labour productivity.
66. The Deloitte Access Economics paper also suggests that, **if we act to meet Paris Agreement targets and transition the economy towards net zero, by 2070 an additional \$680 billion in economic benefits** could be generated with 250,000 new jobs.

⁸⁴ Deloitte Access Economics (2020) A new choice Australia's climate for growth

Question 3: In your opinion, will any economic benefits purported to arise from the exploration and exploitation of gas in the Beetaloo sub-basin be impacted by risks associated with:

- a) Countries and corporations implementing policies and activities to reduce greenhouse gas (GHG) emissions in line with the Paris Agreement or otherwise;
- b) Countries and corporations implementing policies and activities consistent with transitioning away from the use of fossil fuels and achieving net zero GHG emissions targets; and
- c) Any current or future introduction of carbon pricing (or related) measures in global markets?

67. There are a significant number of investment risks (i.e. risks that the investment will fail to meet the desired, or hurdle, rate of return) and sovereign risks (risks to government debt as a result of actual or perceived concern about aspects of the economy) associated with development of the Beetaloo sub-basin that could significantly diminish any economic benefits and even potentially lead to economic losses for any shareholders and/or Australian taxpayers if Government funding is used to support fossil fuel development of the Beetaloo sub-basin, for which exploration is being undertaken.
68. These risks stem from accelerating country and corporate level commitments to, and action on, climate change and in particular net zero commitments.
69. In my opinion, the **key economic risks** facing exploration and exploitation of gas in the Beetaloo sub-basin are:
- a. **policies and practices, including obligations to meet Paris Agreement targets**, on the part of countries and corporations, lead to loss of international and domestic demand for gas over the medium term (from 2030), leaving a “stranded asset” that has failed to deliver a return on investment to shareholders and, potentially, taxpayers; and
 - b. **policies and practices, including commitments to meet net zero emissions targets**, on the part of countries and corporations, lead to loss of international and domestic demand for gas over the medium term, leaving a “stranded asset” that has failed to deliver a return on investment to shareholders and, potentially, taxpayers; and
 - c. the **imposition of carbon prices**, either in individual jurisdictions or in cross-border schemes, will result in the investment becoming uneconomic due to both reduced demand and lack of price competitiveness, leaving a “stranded asset” that has failed to deliver a return on investment to shareholders and, potentially, taxpayers.

Meeting Paris Agreement targets and/or Net Zero emissions targets

70. The risks for all fossil fuels associated with country- and corporate- level action in relation to the Paris Agreement and net zero targets has risen significantly in 2021.
71. The United Nations Framework Convention on Climate Change (UNFCCC) Paris Climate Conference (COP21, or Paris Agreement) was adopted by 196 parties in 2015. The Paris Agreement’s central aim is to:

“Strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.”

72. In 2018, the IPCC warned that net zero emissions by 2050 was essential to have even a 50% chance of limiting temperature rises.⁸⁵

Country level action

73. Jurisdictions with net zero targets now represent at least 61% of global emissions and 68% of GDP.⁸⁶
74. Over 80% of Australia’s 20 largest trading partners currently have a net zero commitment by 2050 or earlier in some cases.⁸⁷
75. Australia’s three largest gas markets - Japan, China and South Korea - which account for around 90% of gas exports, all announced net zero commitments in 2020. China introduced a 2060 target,⁸⁸ whilst South Korea and Japan have 2050 targets, with South Korea also announcing a 40% reduction target by 2030.
76. In January 2021, US President Biden signed an executive order targeting net zero by 2050. The President is placing increased pressure on other countries to do the same, both directly⁸⁹ and through G7 initiatives (see paragraph 78).
77. Of the 137 country-level commitments made under the global Carbon Neutrality Commitment,⁹⁰ six are enshrined in law,⁹¹ five have developed proposed legislation (including Canada, which has a similar economic profile to Australia), and 24 have adopted targets as official policy.⁹² In addition to country-level commitments, 449 cities, 22 states and regions, 1,101 businesses and 45 investors have also committed to reach carbon neutrality by 2050 under the Race to Zero campaign.⁹³ In February 2020, analysis by the Energy and Climate Intelligence Unit showed that more than US\$39 trillion in economic activity — or just under half

⁸⁵ Hoegh-Guldberg, O. et al (2018) Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty

⁸⁶ Black, R. et al (2021) Taking Stock: A global assessment of net zero targets, Energy & Climate Intelligence Unit and Oxford net zero

⁸⁷ <https://cpd.org.au/2021/02/toby-phillips-global-climate-action-will-reshape-australias-trade/>

⁸⁸ <https://www.nytimes.com/live/2021/04/22/us/biden-earth-day-climate-summit#chinas-leader-xi-jinping-promises-to-strictly-limit-coal>

⁸⁹ <https://www.whitehouse.gov/briefing-room/statements-releases/2021/04/23/fact-sheet-president-bidens-leaders-summit-on-climate/>

⁹⁰ The Carbon Neutrality Coalition is a group of 137 countries that agreed in 2017 to develop ambitious climate strategies to meet the long-term objectives of the Paris Agreement.

⁹¹ Denmark, France, Hungary, New Zealand, and the UK.

⁹² <https://www.visualcapitalist.com/race-to-net-zero-carbon-neutral-goals-by-country/>

⁹³ <https://carbon-neutrality.global/members>

of annual global GDP — is generated by nations, regions and cities with an actual or intended net-zero targets.⁹⁴

78. Of key importance is the acceleration in urgency in the language of many global leaders since the inauguration of U.S. President Biden in January 2021:

- a. The U.S. Climate Summit in April 2021, U.S. President Biden appealed to countries to either accelerate carbon neutral commitments or to commit to them in the first place.
- b. Net zero will be a major theme of the COP26 talks in Glasgow in November, with a focus on accelerated action towards achieving that goal.⁹⁵
- c. A meeting of Group of Seven (G7) leaders in early June 2021 committed to more ambitious carbon reduction plans, including ending new funding for coal and providing financial support to developing nations to accelerate their climate action. Importantly, 2030 emissions reduction or net zero targets are now increasingly in focus.⁹⁶
- d. The G7 communique also noted that “Recent assessments by the Intergovernmental Panel on Climate Change (IPCC), the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), the International Resource Panel (IRP), and the UN Environment Programme (UNEP) have documented that rapid and far-reaching transformations across all sectors of society and the economy are necessary to tackle climate change, environmental degradation and biodiversity loss.”⁹⁷ In response, the G7 launched its Industrial Decarbonization Agenda, a platform to “accelerate innovation, deploy decarbonization technology, and harmonize standards.”⁹⁸

Corporate level action

79. Globally, 21% of the world’s 2,000 largest public companies, with a market value of US\$14 trillion, are committed to net zero targets.⁹⁹

80. In Australia, Climate Works and Monash University’s net zero trackers, assessing Australian companies, report that:

- a. 18% of organisations were assessed have 2050 net zero commitments, with a further 45% reducing emissions.¹⁰⁰
- b. All 22 of Australia’s largest emitters across the resource sector are taking steps towards reducing emissions, with half committed to net zero by 2050.¹⁰¹

⁹⁴ <https://eciu.net/netzerotracker>

⁹⁵ <https://ukcop26.org/>

⁹⁶ UK Government G7 Climate and Environment: Ministers’ Communiqué, Policy paper London, Published 21 May 2021

⁹⁷ Ibid.

⁹⁸ <https://www.whitehouse.gov/briefing-room/statements-releases/2021/06/12/fact-sheet-g7-to-announce-joint-actions-to-end-public-support-for-overseas-unabated-coal-generation-by-end-of-2021/>

⁹⁹ Black, R. et al (2021) Taking Stock: A global assessment of net zero targets, Energy & Climate Intelligence Unit and Oxford net zero

¹⁰⁰ <https://www.climateworksaustralia.org/net-zero/>

¹⁰¹ Climate Works Australia (2020) net zero Momentum Tracker Resources Sector

- c. The four biggest electricity sector emitters in Australia have emissions reductions commitments.¹⁰²
 - d. 43% of Australia's largest listed property companies have made commitments that closely align with the Paris Climate Agreement, aiming to achieve net zero greenhouse emissions before 2050 for their owned and managed assets. The six companies with the most ambitious net zero targets, including a 2030 target, represent 36% of the ASX 200 property sector.
 - e. Australian superannuation funds are accelerating climate action. 20% of superfunds assessed have targets, or have expressed an aspiration, to achieve net zero emissions by 2050 for their investment portfolios.¹⁰³
81. In addition to country level economic risk, climate change poses a key financial risk for the corporate sector. Reflecting this risk, and the potential economic losses faced by shareholders, in 2015 the Financial Stability Board created the Task Force on Climate-related Financial Disclosures (TCFD) to develop consistent climate-related financial risk disclosures for use by companies, banks, and investors in providing information to stakeholders.¹⁰⁴ In 2020, 58 percent of Australia's top 100 companies were following the TCFD – up from 16% in 2017.¹⁰⁵
82. Companies are at increasing risk of legal action for failing to consider climate risk or take action on climate change contributions, with potential for large economic losses including the loss of shareholder value as a result of damages awarded.
- a. Approximately 1,375 lawsuits seeking relief from climate change have been filed in U.S. courts, and 425 in other countries.¹⁰⁶
 - b. In May 2021, Royal Dutch Shell was ordered by a Dutch court to cut planned GHGs 45% by 2030 from 2019 levels.¹⁰⁷
 - c. In 2018, the Retail Employees Superannuation Trust (REST) was sued for failing to provide adequate information about climate change business risks or REST's plans to address those risks. The matter was settled out of court in November 2020.¹⁰⁸

¹⁰² Climate Works Australia (2020) net zero Momentum Tracker Energy Sector

¹⁰³ Climate Works Australia (2020) net zero Momentum Tracker Superannuation Sector

¹⁰⁴ <https://www.unepfi.org/climate-change/tcf/>

¹⁰⁵ KPMG (2020) Towards net zero How the world's largest companies report on climate risk and net zero transition KPMG Impact

¹⁰⁶ <https://www.reuters.com/business/sustainable-business/eyes-us-climate-lawsuits-after-landmark-dutch-ruling-2021-05-26/>

¹⁰⁷ <https://www.forbes.com/sites/davidrvetter/2021/05/26/shell-oil-verdict-could-trigger-a-wave-of-climate-litigation-against-big-polluters/?sh=7670166a1a79>

¹⁰⁸ <https://www.afr.com/companies/financial-services/companies-directors-governments-face-wave-of-climate-change-lawfare-20201228-p56qf9>
<https://www.afr.com/companies/financial-services/companies-directors-governments-face-wave-of-climate-change-lawfare-20201228-p56qf9>

Demand for gas and the Beetaloo sub-basin

83. In light of the above trends and given the long lead time to potential production from the Beetaloo sub-basin, which is likely to be exacerbated by COVID-19 related delays,¹⁰⁹ there is a meaningful risk that demand for gas from the Beetaloo sub-basin will either not exist, or will be significantly below current projections for supply, as outlined in the Fracking Inquiry. This would further undermine financial feasibility of development of the sub-basin, which is the ultimate aim of the Beetaloo Cooperative Drilling Program, to the extent that such feasibility exists.
84. Based on the level of commitments to net zero across countries in 2020 (referred to as the “Sustainable Development Scenario”), the International Energy Agency (IEA) forecast global demand for natural gas to return to 2020 levels (4,000 billion cubic metres (bcm)) by 2030, with demand falling after a peak reached in 2024.¹¹⁰
85. Assuming additional country-level commitments will be made at COP26, including tougher net zero 2030 targets, it is reasonable to assume that this forecast could well overstate global gas demand in 2030 and that this might be lower than 4,000 bcm.
86. More recently in its May 2021 report entitled “Net Zero by 2050” (IEA Net Zero Report), the IEA has set out a pathway to achieve net zero by 2050. Under that pathway, gas demand would decline to 3,700bcm in 2030 and to 1,750 bcm in 2050, after reaching a peak in the mid-2020s. Global natural gas production would then decline during the 2030s by more than 5% per annum, leading to premature closure of some fields.¹¹¹
87. While the pathway sees some¹¹² gas demand beyond 2050, this is primarily for use by heavy industry which relies on new investment in blue hydrogen and carbon capture, use and storage (CCUS) technologies. However, demand for this gas is expected to be concentrated in a small number of low-cost producers (typically less than \$4/GJ)¹¹³ which will create sufficient supply to meet demand.¹¹⁴
88. In November 2020, Deloitte issued a report, commissioned by the Commonwealth Department of Industry, Science, Energy and Resources, assessing the steps needed to develop the Beetaloo sub-basin gas resources including key steps, risks and constraints, and economic, strategic and financial impacts (Beetaloo Deloitte Report). The Beetaloo Deloitte Report estimates that Beetaloo sub-basin gas will be produced at a high cost at \$4 to \$7/GJ. In my view, gas at this price is unlikely to be competitive.¹¹⁵

¹⁰⁹ Deloitte Touche Tohmatsu (2020) Report on the Development of the Beetaloo Sub-basin

¹¹⁰ IEA, (2020) Global natural gas demand by scenario, 2010-2030, IEA, Paris <https://www.iea.org/data-and-statistics/charts/global-natural-gas-demand-by-scenario-2010-2030>

¹¹¹ IEA (2021) net zero by 2050 A Roadmap for the Global Energy Sector, First Edition, May 2021

¹¹² “Some” is not quantified in the IEA Net Zero Report.

¹¹³ Zhang, J. et al (2019) Comprehensive Review of Current Natural Gas Liquefaction Processes on Technical and Economic Performance. Applied Thermal Engineering. 166. 114736. 10.1016/j.applthermaleng.2019.114736.

¹¹⁴ Ibid

¹¹⁵ Deloitte Touche Tohmatsu (2020) Report on the Development of the Beetaloo Sub-basin

89. Under its net zero pathway set out in the IEA Net Zero Report, the IEA sees no need for investment in new fossil fuel supply and no new gas fields should be approved beyond those already approved in 2021 which would come on stream by 2030 at the latest. The Beetaloo sub-basin is not due to reach peak production until 2030.

Carbon pricing

90. A price on carbon – in other words, a price that a producer must pay for emitting carbon, or other GHGs - is set by and payable to the government operating the scheme. This is considered by economists, such as Professor Ross Garnaut, the most efficient and effective means of reducing GHGs, by sending a price signal that reduces both consumption and production.¹¹⁶
91. Carbon prices are implemented either under an Emissions Trading Scheme (ETS) or as a fixed price (a carbon tax).
92. Globally, there is increasing adoption of carbon pricing mechanisms as a means of accelerating the achievement of net zero ambitions, posing an increased risk for future gas demand and other carbon-intensive products.
93. There are currently 64 carbon pricing instruments in place with a further three scheduled for implementation. These schemes cover 45 national jurisdictions and 35 sub-national jurisdictions responsible for 21.5% of GHG emissions, up from 15% in 2020. The increase in coverage comes chiefly from the launching of China's national scheme in February 2021, which is now the largest carbon market in the world.¹¹⁷ The World Bank has also launched a Partnership for Market Implementation, to support countries wanting to implement a carbon price scheme.¹¹⁸
94. In 2020, more than 850 companies globally are using an internal carbon price to assess climate risk and strategy. This is a 20% increase over the previous year.¹¹⁹
95. To ensure a level playing field for economies that have implemented, or that are planning to implement, carbon pricing schemes, there is increased consideration being given to carbon border adjustment mechanisms (CBAMs) including in the US, UK, Canada, Japan and the EU.
96. A CBAM acts as a de facto carbon pricing scheme in countries without such a mechanism. Any emissions-intensive product or sector could potentially be covered by a CBAM. If such schemes were to include fossil fuels, this would likely add further downward pressure on demand for gas. Recent developments in respect of CBAMs include:

¹¹⁶ OECD (2016) Effective Carbon Rates: Pricing CO₂ through Taxes and Emissions Trading Systems, OECD Publishing, Paris, <https://doi.org/10.1787/9789264260115-en>.

¹¹⁷ World Bank. 2021. State and Trends of Carbon Pricing 2021. Washington, DC: World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/35620> License: CC BY 3.0 IGO

¹¹⁸ Ibid.

¹¹⁹ Ibid.

- a. In December 2019, the EU formally proposed the introduction of a CBAM, as part of the European Green Deal. Investigations of a CBAM have been underway for several years but accelerated throughout the first half of 2021.¹²⁰
- b. The Canadian Government has committed to explore the potential of a CBAM with like-minded economies.¹²¹
- c. In the US, President Biden is considering a border adjustment tax on countries that fail to meet climate obligations, although conscious of potential downstream costs to US companies.¹²²

¹²⁰ https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12228-EU-Green-Deal-carbon-border-adjustment-mechanism-_en

¹²¹ World Bank. 2021. State and Trends of Carbon Pricing 2021. Washington, DC: World Bank. © World Bank. <https://openknowledge.worldbank.org/handle/10986/35620> License: CC BY 3.0 IGO

¹²² <https://apnews.com/article/europe-environment-and-nature-business-government-and-politics-6a020cd7bb93a639e7445cf4999276a2>

Question 4: In your opinion, and considering the anticipated development of the Beetaloo sub-basin as described in Beetaloo Strategic Basin Plan and the greenhouse gas emissions that would be generated by exploiting gas consistent with Beetaloo Strategic Basin Plan, is there likely to be an economic gain for Australia from the exploitation of the Beetaloo sub-basin gas fields when economic costs associated with climate change are considered?

97. The NT Fracking Inquiry estimated that full life-cycle GHG emissions associated with the forecast level of production provided an “unacceptable” risk for Australian and global emissions.¹²³
98. Numerous risks associated with investment in the Beetaloo Basin are laid out clearly in the Beetaloo Deloitte Report.¹²⁴ These risks include:
 - a. commercial and market risks;
 - b. significant delays due to the COVID-19 pandemic;
 - c. fragmentation of related infrastructure; and
 - d. environmental risks identified by the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory (NT Fracking Inquiry). These environmental risks include, but are not limited to water, greenhouse gas emissions, public, social impacts, economic and aboriginal people and their culture.¹²⁵
99. The Beetaloo Deloitte Report specifically states *“that a critical area of regulatory uncertainty of particular importance to the Beetaloo Sub-basin development is greenhouse gas emissions policy and recommendation 9.8 from the NT Fracking Inquiry.”*¹²⁶
100. The NT Fracking Inquiry recommendation 9.8 states that

“That the NT and Australian governments seek to ensure that there is no net increase in the life cycle GHG emissions emitted in Australia from any onshore shale gas produced in the NT”.
101. Recommendation 9.8 is supported by the NT Government.¹²⁷
102. No firm commitment or method of management of lifecycle GHGs (including any offsets) associated with the proposed development of the sub-basin has yet been made.¹²⁸ Estimating the costs of offsets is beyond the scope of this report but can reasonably be expected to carry a large economic cost.

¹²³ Scientific Inquiry into Hydraulic Fracturing in the Northern Territory 2018 at <https://frackinginquiry.nt.gov.au/inquiry-reports?a=494286>

¹²⁴ Deloitte Touche Tohmatsu (2020) Report on the Development of the Beetaloo Sub-basin

¹²⁵ Ibid.

¹²⁶ Ibid.

¹²⁷ https://hydraulicfracturing.nt.gov.au/__data/assets/pdf_file/0008/673082/government_responses_to_recommendations.pdf

¹²⁸ Ibid.

103. While the Commonwealth Government does not yet have a formal net zero target for GHGs, all state and territory governments do, with transition policy and planning at various stages of development.¹²⁹
104. The Beetaloo Deloitte Report estimated the economic benefit, in terms of **industry value added** (or contribution to GDP by an industry) specifically associated with the gas industry to Australia from capital expenditure and operations in the Beetaloo sub-basin to be \$2.4 billion.¹³⁰ This represents the central case scenario, being “*where the Sub-basin is developed and reaches peak production in 2035 (1,562 TJ per day). Gas is sold principally to the LNG export market, and the NT and east coast markets*”. The estimate is derived using standard CGE modelling and based on estimates on construction activity commencing from 2026 with production levels reaching peak in 2032.
105. In addition to the industry value of \$2.4 billion, Deloitte have estimated further additions to GDP from “**spillover effects**” (or flow-on GDP impacts in non-gas sectors directly due to the growth in the gas sector) to other industries of \$1.2bn. Offsetting these positive spillover effects are negative “**crowding out effects**” (or economic activity that is taken from other sectors as a result of the gas sector investment) of minus \$735 million. When these two effects are added to the **industry value added**, Deloitte concludes that a total of \$2.9 billion in economic value is added by development activities by 2040.¹³¹
106. This Deloitte analysis is problematic for three reasons:
 - a. First, there is no detail (other than to note the services sector benefits) on how the quantum of spillover effects has been calculated.
 - b. Second, GDP uplift in Australia by 2040 for the mid-case is also variously reported as \$3.1 billion¹³² and \$3.0 billion.¹³³ However, **this estimate does not include the economic costs of environmental losses**, including losses caused by and/or exacerbated by climate change, some of which have been identified by Fracking Inquiry. In other words, gross economic benefits have been calculated in the Beetaloo Deloitte Report without regard to economic losses caused by the development of fossil fuels in the Beetaloo. In particular, the economic costs of GHG emissions associated with development of the sub-basin have not been calculated.
 - c. Third, the estimate of economic gain provided by the Beetaloo Deloitte Report also ignores the fact that there is an **opportunity cost of capital** associated with the economic gains. That is, and critically, the economic activity generated by capital investment in gas production could alternatively be realised through an alternative investment. For example, similar economic gains would arise if the capital were invested

¹²⁹ Clean Energy Council (2021) Clean Energy Australia Report 2021, March

¹³⁰ Deloitte Touche Tohmatsu (2020) Report on the Development of the Beetaloo Sub-basin p.91

¹³¹ Ibid.

¹³² Deloitte Touche Tohmatsu (2020) Report on the Development of the Beetaloo Sub-basin p.90

¹³³ Deloitte Touche Tohmatsu (2020) Report on the Development of the Beetaloo Sub-basin p.93

in renewable energy, or many other options, with potentially higher returns on investment than gas, and without the adverse environmental impacts.

107. **As a result of the issues identified above, it is my expert view that it would be incorrect to say that investment in gas in the Beetaloo sub-basin is the only way to deliver economic activity of \$2.9 billion.**
108. In fact, investing in renewables could deliver both superior economic and financial returns without the environmental harm associated with gas:
- a. Economic returns will be higher due to avoided externality costs associated with water and GHG economic losses resulting from gas development.
 - b. Financial returns are also higher. Over the past decade, renewable power has generated returns of 422.7% compared with 59% for fossil fuels. Over five years, the returns for renewables were lower than the aforementioned 422.7%, but still more than three times higher than for fossil fuels.¹³⁴
109. The better assessment therefore is to understand the total economic, social and environmental costs associated with development of Beetaloo sub-basin compared with investment in renewable energy, or any other investment. Economic benefits in terms of GDP and employment should not be considered without understanding all the costs associated with the investment including environmental harm from land degradation, water loss, impacts on biodiversity and GHG emissions. The NT Fracking Inquiry identified all of these negative outcomes if development of the sub-basin were to proceed.
110. I have explained at paragraphs 48-66 above, that various estimates have been made as to the costs of climate change by reference to different emissions pathways in the future. Further emissions, whether from the Beetaloo sub-basin or otherwise, will (if they are not captured or offset) increase the risk of these very large costs being incurred.
111. Beyond this I have performed further calculations of the specific cost of additional GHG emissions from the Beetaloo sub-basin using a range of emissions scenarios provided to me by EDO (Saddler estimates, which use combustion emission factors from the National Greenhouse Accounts Factors and excluding fugitive emissions)¹³⁵ and available from the NT Fracking Inquiry.
112. Five scenarios have been assessed:
- c. **Scenario 1** – combustion of 200,000 petajoules (PJ) of gas in total produces 10,000 Mt CO₂ equivalent (CO₂-e).
 - d. **Scenario 2** – A lifetime total of 10% of the estimated 200,000 PJ of gas being combusted, equivalent to 1,000 Mt CO₂-e.

¹³⁴ IEA (2021) Clean Energy Investing: Global Comparison of Investment Returns, IEA, Paris <https://www.iea.org/reports/clean-energy-investing-global-comparison-of-investment-returns>

¹³⁵ I was briefed with the expert advice of Dr Hugh Saddler titled “Potential Greenhouse Gas Emissions from Estimated Gas Resources in the Beetaloo Basin”, dated 4 September 2021.

- e. **Scenario 3** – Combustion of 1,240 PJ/year of shale gas resulting in 64 Mt CO₂-e per year (Saddler estimate).
 - f. **Scenario 4** – Combustion of 3,447 BCF of gas and 27 million barrels of condensate (using energy combustion emission factors from the National Greenhouse Accounts Factors and excluding fugitive emissions), causing total emissions of 200 Mt CO₂-e (Saddler estimate).
 - g. **Scenario 5** –NT Fracking Inquiry estimates for shale gas production levels of 1,240 PJ/year, which the Inquiry estimated would produce 98.9 Mt CO₂-e per year after combustion (38.9 Mt CO₂-e on-shore together with a further 60 Mt CO₂-e produced offshore as a result of LNG exports).¹³⁶
113. The cost of climate change damages arising from these emissions can be modelled using GHG emissions and an appropriate price of carbon. There are two key methods to pricing carbon:
- a. a market price; or
 - b. the Social Cost of Carbon (SCC), sometimes also referred to a “damages” price.

Market price of carbon

114. The value of damages caused by GHGs associated with the Beetaloo sub-basin development can be estimated by multiplying the total number of GHGs emitted (measured as tonnes of CO₂-e) by the market price of carbon, as represented by a unit price from an emissions trading scheme.
115. Governments around Australia provide little formal guidance on pricing carbon in economic analysis. NSW Treasury CBA Guidelines are the most prescriptive, stating that “market prices should be used as a basis for valuing the costs of carbon emissions, *where reliable evidence can demonstrate that those market prices are not significantly biased as a direct consequence of scheme design.*” Where a market price cannot be reliably determined, estimates of damages (the social cost) may be used.¹³⁷
116. The most frequently cited carbon (permit) price, because of its size and longevity, is that associated with the European Union Emissions Trading Scheme (EU ETS). This is the benchmark recommended by the NSW Government for mining and coal seam gas appraisals.¹³⁸ Because of the design of the EU ETS, including the issue of free permits which artificially increased supply and lowered prices for a prolonged period, **the current price of EU ETS units is artificially lowered and does not reflect the true cost of carbon abatement.**

¹³⁶ Scientific Inquiry into Hydraulic Fracturing in the Northern Territory 2018 at <https://frackinginquiry.nt.gov.au/inquiry-reports?a=494286>

¹³⁷ NSW Treasury (2017) NSW Government Guide to Cost benefit Analysis, TPP17-03; author’s emphasis

¹³⁸ NSW Department of Planning and Environment, 2018, Technical Notes supporting the Guidelines for the Economic Assessment of Mining and Coal Seam Gas Proposals

117. The United Nations Intergovernmental Panel on Climate Change (IPCC) states that a carbon concentration no higher than 430 parts per million (ppm) is consistent with 1.5°C warming.¹³⁹ Achieving this would require higher carbon prices than are currently seen in markets to sufficiently reduce carbon demand to achieve limiting warming to 1.5°C.¹⁴⁰

Social Cost of Carbon (SCC)

118. A measure preferred by economists and numerous governments around the world, including the, US, Canada and Germany, is the SCC, which reflects the marginal cost of damages of each additional tonne of CO₂-e emitted. That is, the SCC is calculated based on the estimated economic, social and environmental damage caused by a global level of emissions based on models similar to those discussed in paragraphs 55 to 61 above. From these models, a level of damage for each additional tonne of CO₂-e can be determined.
119. In the US alone, regulations have been adopted that have led to a reduction in GHG emissions across a wide range of industries that have been valued at more than US\$1 trillion, based on economic analysis that uses a SCC.¹⁴¹
120. However, measuring the SCC is fraught with complexity and subject to much debate among economists. IAMs (as discussed in paragraph 48 above) incorporate scientific and economic models, which reflect expectations around emissions pathways, climate-related damages, abatement costs, and socio-demographic and economic parameters. IAMs allow us to seek to understand the net total cost of climate change along different pathways, from which the marginal cost of any unit of CO₂-e can be determined. The assumptions underpinning these models, however, are subject to debate, reflecting both uncertainty in climate risk outcomes, as well as debate over economic theory and practice.
121. The SCC may be calculated in numerous ways, but the most common reference point until recently has been the US Environmental Planning Agency (EPA) estimates. The US EPA SCC was calculated by a US Government Interagency Working Group (IWG) on the Social Cost of Carbon, drawing on three separate IAMs. The IWG averages outcomes across the models each with some 50,000 estimates across socio economic and emissions scenarios to produce SCC estimates.
122. Since its introduction, the SCC has been updated three times (2013, 2015 and 2016) to reflect increased knowledge, particularly relating to climate pathways and damages estimates. The Trump administration called a halt to all work on the SCC and so updates were not provided after 2016. The Biden administration reinstated the working group in January 2021 and the SCC will be updated to reflect updated IPCC inputs in the coming year. The results are expected to be higher than the 2016 estimates, although these are still currently used as reference points in both the US and other countries.

¹³⁹ IPCC (2014) Summary for Policymakers in: Climate Change 2014: Mitigation of Climate Change. Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change

¹⁴⁰ IPCC (2018) Global Warming of 1.5°C – Special Report chapter 2 at <https://www.ipcc.ch/sr15/chapter/chapter-2/>

¹⁴¹ Nordhaus, W. (2017) PNAS February 14, 2017 114 (7) 1518-1523; at <https://doi.org/10.1073/pnas.1609244114>

123. The EPA uses four estimates based on different discount rates (2.5%, 3% and 5%) and risk weighting (95th per centile at 3% discount rate).
124. In a survey of 197 expert climate economists, the average long-term discount rate preferred was 2.25%. The survey found that the vast majority of survey participants accepted a rate of between 1 and 3%, with only a few favouring higher rates.¹⁴² After a review of relevant scientific literature, the IPCC stated that there is no justification for applying discount rates as high as 5% p.a. for climate change analysis.¹⁴³ I therefore have tested the 2.5% rate values.
125. However, as I have noted above, these US EPA values have not been updated since 2016. There is now copious research¹⁴⁴ which suggests that the values estimated by the IWG are likely to be unrepresentative of the true costs of carbon damages, as not all parameters are included in the IAMs used to calculate the SCCs. I have therefore also included German Environmental Agency estimates, to ensure that our cost of GHG estimates reflect a wide range of available SCC estimates, from low to high. The German values are higher because they use country equity weightings to adjust damages according to a country's wealth. The higher SCC reflects the fact that the greatest impacts of climate change fall on lower income countries.¹⁴⁵
126. Current prices of carbon I have used in estimating the cost of Beetaloo sub-basin GHGs are presented in Table 2.

Table 2 Carbon price forecasts as at 4 January 2021, \$A

EU ETS	US EPA 2.5%*	US EPA 95 th per centile*^	Germany 95 th per centile*^
76	92	282	1,135

**Average of forecast for decade 2030 to 2040. ^At 3% discount rate*

US and German forecasts converted using five-year average A\$ exchange rates.

Sources: Standard and Poors, US EPA, RBA

127. The cost of GHG emissions in terms of climate damages are shown in Table 3. Where the scenario in question refers to annual emissions, these are modelled for the years 2030 to 2040 to match the timeline of expected production in the Beetaloo Deloitte Report and on which economic benefits were calculated.

¹⁴² Howard, P. and Sylvan, D (2015) Expert Consensus on the economics of climate change, Institute for Policy Integrity, New York University School of Law

¹⁴³ Kolstad, C. et al (2014) Social, economic and ethical concepts and methods. IPCC 5th Assessment report, Working Group III, Chapter 3

¹⁴⁴ For example, Kolstad, C. et al (2014), Social, economic and ethical concepts and methods. IPCC 5th Assessment report, Working Group III, Chapter 3

¹⁴⁵ Eckstein, D. et al (2021) Global Climate Risk Index 2021, Briefing Paper, at <https://www.germanwatch.org/en/crisis>

Table 3 Cost of Beetaloo sub-basin GHG emissions under differing carbon price and emissions profile assumptions (A\$ million)

Carbon price	Scenario 1	Scenario 2	Scenario 3*	Scenario 4	Scenario 5*
EU ETS	758.0	75.8	53.4	15.2	82.4
US EPA 2.5%	1,314.0	131.4	92.5	26.3	142.8
US EPA 95th per centile	2,815.4	281.5	198.2	56.3	305.9
Germany 95th per centile	11,349.3	1,134.9	799.0	227.0	1,233.4

**Emissions calculated based on production from 2030 to 2040 inclusive. Other scenarios reflect lifetime estimates for total reserves.*

Source: Author's calculations

Conclusion – Economic impact of fossil fuel development of the Beetaloo Sub-basin

128. Based on the above, and in light of the alternate opportunities for use of both private and public capital that would be used for development of the Beetaloo sub-basin, as set out in paragraph 108 above, **it is considered that climate risk from developing gas in the sub-basin will result in significant net economic losses to Australia.**

Appendix A: Nicki Hutley CV

Mobile: + 61 410 587 586

Email: nicki.hutley@gmail.com

Profile

Nicki Hutley is a highly experienced economist, with broad-based expertise in both macroeconomic forecasting and analysis as well as microeconomic policy, gained over more than three decades in financial and investment markets and in economic consulting. After many years in the corporate world, including most recently as a partner with Deloitte Access Economics, Nicki is now an independent economist. Nicki works with government and private sector clients across Australia, using triple bottom line and strategic analysis, to provide an evidence base for investments in projects, policies and programs.

Academic qualifications and positions

- BEc (Honours), University of East Anglia
- Expert Faculty (Economics), SingularityU Australia
- Councillor (economics), Climate Council
- NSW President, Economics Society of Australia
- NSW Executive Committee member, Australian Business Economists
- Non-executive Board Member, 1 Million Women
- Financy Women's Economic Index, Advisory Committee
-

Skills & expertise

- Economic modelling, policy and strategic analysis, applied across a wide range of investment and policy areas, focussed on social impact and environmental economics
- Triple bottom line cost benefit analysis, evaluations, social impact analysis
- Stakeholder engagement
- Communication skills, including the ability to present complex ideas to both sophisticated and lay audiences.

Previous roles

- January 2021 – current, independent economist
- 2018 – 2021, Partner, Deloitte Access Economics
- 2013 – 2018, Director, Economic and Social Advisory, and Chief Economist, Urbis

- 2011 -2013, Director, NSW Economic Advisory, KPMG
- 2006 - 2011, Associate Director, Access Economics
- 1987 – 2006, various roles as a financial market and investment economist with Rothschild Asset Management, Deutschebank, Potter Warburg, Lloyds Bank, Bankers Trust
- 1985 – 1987 Department of Foreign Affairs

Key Clients

- ACT Government Environment Directorate, Austrade, Australian Department of Social Services, Australian Department of Industry, Science, Energy and Resources, Infrastructure Australia, NSW Department of Premier and Cabinet, NSW Department of Planning, Industry and Environment, Department of Regional NSW, NSW Office of Environment and Heritage, NSW Department of Family and Community Services, NSW Treasury, NSW Ministry of Health, Victorian Department of Economic Development, Jobs, Transport and Resources, Victorian Department of Education and Training, Invest Canberra, Desert Knowledge Australia, Indigenous Business Australia, University of Technology, Sydney, Property Council of Australia, Urban Development Institute Australia, Australian Property Institute, Commonwealth Department of Social Services, Benevolent Society.

Work Examples

- Modelling the impact of climate change on company financial risk exposures. Used CGE modelling to understand changes in economic variables and impact on company portfolio assets, responding to damage curves (confidential private sector clients, financial and property sectors)
- Modelling the economic impact of a Carbon Border Adjustment Mechanism, based on the Eu Fit for 55 proposal, extended to other economies (current, for Climate Council)
- Resilience for Real Assets – understanding the means to measure climate risks on commercial buildings and infrastructure in major cities across Australia and Asia (Investor Group on Climate Change)
- Provision of advice on an appropriate cost of carbon for Government Investment projects and analysis, drawing on an international literature review. (ACT Environment Directorate)
- Cost benefit analysis of Carbon Capture and Storage potential in NSW, including assessing a range of storage locations and the economic impacts on coal-intensive communities. (NSW Department of Planning, Industry and Environment)
- An evaluation of the Low Emissions technology Fund for Fossil Fuels (Australian Department of Industry, Science, Energy and Resources)
- Developed a Benefit-Cost model of cyclone damage mitigation strategies for a major Australian insurer, working with James Cook University, based on four different wind models, and industry and ABS data sets. This work led to the implementation of new insurance policy pricing to incentivise households to adopt cyclone risk mitigation measures. (Suncorp)
- Modelled costs and benefits of flood mitigation investments, using case studies of the regional Queensland towns of Roma and St George, and the New South Wales town of Grafton. Cost benefit

ratios for the three levee systems were in the order of 2.2-5.4 indicating a robust economic return on investment for the community. (Suncorp)

- Cost Benefit Analysis of Broome Town Beach Revetment. Included quantification of the potential losses of land due to cliff erosion in the absence of investment, impacting future development, tourism activity, and social and cultural activities. (Broome Shire Council)
- Review, co-design and cost benefit analysis of Energy Upgrade Agreements (EUAs). Intensive stakeholder workshops were conducted to understand the barriers and incentives to using EUAs to finance building upgrades. A series of recommendations were then assessed using Cost-Benefit modelling. (NSW OEH)
- Multiple benefits assessment of a range of NSW Government's support schemes to address energy efficiency in low-income households. Primary data was collected through interviews, industry data, and surveys to understand the potential range of environmental, economic and social outcomes for households within the schemes. (NSW OEH)
- Co-author of *Infrastructure Interdependencies and Business-Level Impacts* (2013). Modelled the potential economic impacts of five consecutive extreme heat days in Melbourne. (The Climate Institute)
- Project lead for review of NSW Government Waste Levy. Project involved extensive stakeholder consultations and desktop review to identify key challenges and make recommendation to improve operation of the levy and support investment in the sector. (NSW OEH)
- Project lead for review of NSW Government Dam Safety Act. Extensive stakeholder engagement, including with dam owners and operators across the state, helped to identify recommendations for improved efficiency. (NSW Department of Industry)
- Modelled costs and benefits of NSW Biodiversity Banking scheme for Aboriginal landholders in different regions across the state, on behalf of the NSW Aboriginal Land Council) Project involved modelling costs of land management and impacts on communities, drawing on stakeholder consultations.
- **Extensive modelling from 2007 -2011 of the impacts of the proposed CPRS, RET and Feed-in Tariff Schemes, undertaken over several years on behalf of Government, private sector, industry and peak body clients.**



27 August 2021

Nicki Hutley
Economist and economic adviser
Social Outcomes

By email: nicki.hutley@gmail.com

CONFIDENTIAL AND SUBJECT TO LEGAL PROFESSIONAL PRIVILEGE

Dear Ms Hutley

**Environment Centre NT Inc v Minister for Resources and Water & Anor
Federal Court of Australia Proceedings no. NSD758/2021**

1. We act for the Environmental Centre NT Inc (**ECNT**), who is the peak community sector environmental organisation in the Northern Territory. ECNT engages in activities aimed at protecting and conserving the environment of the NT, including in relation to climate change.
2. Our client, ECNT, has commenced proceedings in the Federal Court of Australia (**Proceedings**) against the Minister for Resources and Water (**Minister**) and the Commonwealth of Australia (**Commonwealth**) alleging that:
 - a. the Minister's making of the *Industry Research and Development (Beetaloo Cooperative Drilling Program) Instrument 2021* (Cth) (the **Instrument**); and
 - b. the Minister's decision to award up to \$21 million in grants to Imperial Oil and Gas (**Imperial**) pursuant to the Beetaloo Cooperative Drilling Program (**the Program**) (the **Decision**)

were unlawful in circumstances where the Minister:

- a. breached s 71 (1) of the *Public Governance, Performance and Accountability Act 2013* (Cth) (**the PGPA Act**) by failing to make reasonable inquiries in respect of climate change risks. S 71(1) requires that the Minister must not approve a proposed expenditure of relevant money unless the Minister is satisfied, after making reasonable inquiries, that the expenditure is a "proper use" of relevant money, where "proper" is defined as a use that is "efficient, effective, economical and ethical"; and
- b. acted in a way that was legally unreasonable and/or illogical and/or irrational, by failing to have regard to and/or failing to have adequate regard to, climate change risks.

3. We are instructed to engage you to act as an expert witness under Part 23 (rules 23.01-23.15) of the *Federal Court Rules 2011* (Cth) (**FC Rules**) and the Expert Evidence Practice Note (GPN-EXPT) (**Expert Evidence Practice Note**), including the Harmonised Expert Witness Code of Conduct (**Code of Conduct**). Part 23 of the FC Rules and the Expert Evidence Practice Note is set out in **Annexure A** to this letter.
4. Your role as an expert witness is to assist the Court impartially on matters relevant to your area of expertise. You are not to act as an advocate for our clients and any opinion expressed must be genuinely held by you based on your professional training, knowledge, or experience.
5. Please read those documents carefully before you commence the work requested. **Your expert report must contain an acknowledgment that you have read the Code of Conduct and that you agree to be bound by it.** Otherwise your report will be inadmissible as evidence. Your role as an expert witness is to assist the Court impartially on matters relevant to your area of expertise. You are not to act as an advocate for our clients and any opinion expressed must be genuinely held by you based on your professional training, knowledge, or experience.

Overview of the Work Required

6. The work we require involves the following:
 - a. reviewing the relevant documentation;
 - b. preparing a written expert report that conforms with the Code of Conduct and addresses our questions (questions located at **Annexure B**);
 - c. reviewing the Respondent's expert report(s) (if necessary);
 - d. conferring with the Respondent's expert(s) at a joint conference(s) and prepare a joint report, which sets out the matters agreed, matters disagreed, and the reasons for agreement and disagreement as a result of the joint conference(s) (if necessary); and
 - e. appearance as an expert witness in the Court (if required).
7. We request that you provide us with a draft of your expert report for review before finalising it. The purpose of this is not to influence the conclusions or recommendations you make but to ensure that the report is clear and addresses the issues adequately to inform the Court.

Background

8. The following information is provided to assist your consideration of the matters on which are you asked to provide expert advice. Please note that you are not permitted to express an opinion on any question of law in your report and your report should confine itself to the relevant issues of fact within your area of expertise.
9. The independent *Scientific Inquiry into Hydraulic Fracturing of Onshore Unconventional Reservoirs in the Northern Territory* (**Fracking Inquiry**) was commissioned by the Northern Territory Government under the *Inquires Act 1945* (NT) and its Terms of Reference required it to investigate the environmental, social and economic risks and impacts of hydraulic fracturing (commonly known as fracking) of onshore unconventional gas reservoirs and associated activities in the Northern Territory.

10. The Fracking Inquiry handed down its Final Report to the Northern Territory Government on Tuesday 27 March 2018. Amongst other things, the Fracking Inquiry identified that a best estimate indicative later development scenario for the exploitation of a new shale gasfield or gasfields in the Beetaloo sub-basin would equate to gas production of 1,240 petajoules per year (**PJ/y**).¹
11. The Fracking Inquiry further noted that in this later development scenario, it is assumed that 2,740 TJ/day is used for liquid natural gas (**LNG**) export and 660 terajoules per day (**TJ/day**) is used for domestic gas consumption.²
12. On 15 September 2020, the Prime Minister of Australia, the Minister for Energy and Emissions Reduction, and the Minister for Resources and Water (**Minister**) announced that Australia will be pursuing a “Gas-led recovery.”³ One of the elements of the Gas-led Recovery was the unlocking of five key gas basins, starting with the Beetaloo basin in the Northern Territory.⁴
13. On 17 December 2020, the Minister announced a \$50 million subsidy program for Beetaloo exploration to “fast-track drilling by providing grants to cover 25% of eligible exploration costs, capped at \$7.5 million per well and 3 wells per exploration venture.”⁵ The Minister further announced that it was estimated that the Beetaloo sub-basin could hold more than 200,000 petajoules of gas.⁶
14. In or about January 2021, the Minister issued the Beetaloo Strategic Basin Plan entitled ‘Unlocking the Beetaloo,’ which set out some details of the Program.
15. On 22 February 2021, Empire Energy Group Ltd (**Empire**), the Australian Stock Exchange (**ASX**) listed parent company of Imperial, published an announcement to the ASX relating to a Material Beetaloo Resource Upgrade. This statement included, amongst other things, the information that Empire has:
 - a. a best estimate prospective gas resource of 3,446 billion cubic feet (**BCF**); and
 - b. a best estimate of prospective condensate resource of 27 million barrels of petroleum liquids (**MMBL**).
16. On 18 March 2021, the Department of Industry, Science, Energy and Resources (**DISER**) issued the ‘Beetaloo Cooperative Drilling Program – Grant Opportunity Guidelines’ (**Guidelines**) and a standard Grant Agreement (**Standard Grant Agreement**). The Guidelines govern the provision of grants under the Program.
17. On 7 April 2021 Imperial submitted three applications seeking a total of \$21,806,453 of funding under the Program, comprising of:
 - a. Application BCD000001, seeking \$7,314,081 in funding in respect of a project entitled ‘Carpentaria-2 Horizontal Well’;

¹ Fracking Inquiry, p 227.

² Fracking Inquiry, p 227.

³ <https://www.pm.gov.au/media/gas-fired-recovery>

⁴ Ibid.

⁵ <https://www.minister.industry.gov.au/ministers/pitt/media-releases/beetaloo-strategic-plan-will-unlock-gas-jobs-and-development>

⁶ Ibid.

- b. Application BCDP000002, seeking \$6,992,372 in funding in respect of a project entitled 'Carpentaria-3 Horizontal Well'; and
- c. Application BCDP000003, seeking \$7,500,000 in funding in respect of a project entitled 'Carpentaria-4 and 3D Seismic'

(together, **the Applications**).

- 18. Between 7 May and 8 May 2021 the Applications were the subject of DISER review.
- 19. On 11 May 2021, the Minister made the Instrument and purported to prescribe the Program as a program under s 33 of the *Industry Research and Development Act 1986* (Cth) (the **IRD Act**).
- 20. On 28 May 2021 and 1 June 2021 an Assessment Committee in respect of the Program (**Assessment Committee**) met to consider the Applications.
- 21. On 1 June 2021 the Assessment Committee resolved that the Applications were satisfactory (subject to some limitations/conditions ⁷) and resolved to recommend to the Minister that they be approved for funding under the Program.
- 22. On 17 June 2021, following receipt of a DISER brief recommending that the Minister approve the three Applications (subject to the conditions set out by the Assessment Committee⁸), the Minister approved the Applications. On 7 July 2021, the Minister announced the Decision, by way of publication of a Media Release (**Announcement**).
- 23. On 8 July 2021, Empire Energy Group Ltd, the Australian Stock Exchange (**ASX**) listed parent company of Imperial, published an announcement to the ASX relating to the Decision and Announcement.

Expert Brief

- 24. We will provide, by way of separate email, a link to an electronic a brief of documents for your review. **Annexure C** contains an index to these documents.

Timeframe

- 25. Under the current Court orders, your expert report will be due to be filed and served by 10 September 2021. We therefore request a draft of your advice by no later than Monday **6 September 2021**.
- 26. We will notify you of further relevant dates in the Proceedings as they become available.

Fees and Terms

- 27. Thank you for agreeing to provide this advice at a discounted rate of \$1,000 per day, with a capped of \$6,000 (plus GST).

⁷ Conditions set out on page 5 to 7 of the Meeting Minutes of the Beetaloo Cooperative Drilling Program Assessment Committee (**Assessment Committee**) Meeting on 1 June 2021 – At tab 19 of the Brief.

⁸See Annexure A to Ministerial Recommendation – BCDP Recommended Projects – At tab 29 of the Brief.

28. Please note the following terms:

- a. Your work will only be used by EDO in relation to this matter;
- b. EDO will take all reasonable steps to prevent your work being used for purposes other than that mentioned above, but we accept no responsibility for the actions of third parties;
- c. Regardless of the above points, EDO may choose not to use your work;
- d. You will not be covered by EDO's insurance while undertaking the above tasks.

Duty of Confidentiality

29. Please treat your work as strictly confidential, unless authorised by us.

If you would like to discuss this retainer further, please contact us at anna.gudkov@edo.org.au.

Yours sincerely,

Environmental Defenders Office

Anna Gudkov

Senior Lawyer (Gas/Corporate)

Ref: s1952

Part 23—Experts

Division 23.1—Court experts

23.01 Appointment of Court expert

- (1) A party may apply to the Court for an order:
- (a) that an expert be appointed (a ***Court expert***) to inquire into and report on any question or on any facts relevant to any question arising in a proceeding; and
 - (b) fixing the Court expert's remuneration, including the cost of preparing the expert's report; and
 - (c) for the Court expert's attendance before the Court; and
 - (d) terminating the liability to pay the Court expert's remuneration.

Note 1: ***Expert*** is defined in the Dictionary.

Note 2: The Court may give instructions relating to the inquiry and report including the carrying out of an experiment or test.

Note 3: The Court may make an order of its own motion—see rule 1.40.

- (2) If the Court makes an order under paragraph (1)(b), the expert's remuneration is payable jointly and severally by the parties.

23.02 Court expert's report

- (1) The Court expert must provide the report to the Court within the time fixed by the Court.

Note: A Registrar will provide a copy of the report to any party interested in the question.

- (2) The Court expert's report must:
- (a) be signed by the Court expert; and
 - (b) contain particulars of the training, study or experience by which the Court expert has acquired specialised knowledge; and
 - (c) identify the questions that the Court expert was asked to address; and
 - (d) set out separately each of the factual findings or assumptions on which the Court expert's opinion is based; and
 - (e) set out separately from the factual findings or assumptions each of the Court expert's opinions; and
 - (f) set out the reasons for those opinions; and
 - (g) contain an acknowledgement that the opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (b).

23.03 Court expert's report—use at trial

- (1) A report that complies with rule 23.02 will be admissible at trial as the evidence of the Court expert.

Rule 23.04

Note: Section 177 of the *Evidence Act 1995* deals with the tender of an expert's report.

- (2) A party may apply to the Court for an order:
- (a) to cross-examine a Court expert before or at trial; and
 - (b) if the cross-examination is to take place before trial—that the cross-examination take place before a Registrar or an examiner.

Note: *Examiner* is defined in the Dictionary.

23.04 Other expert's reports on the question

A party who has delivered to another party interested in the question a copy of another expert's report that complies with Division 23.2 may apply to the Court for leave to adduce the evidence of the other expert on the question.

Note: The question is referred to in rule 23.02.

Rules 23.05–23.10 left blank

Rule 23.11

Division 23.2—Parties' expert witnesses and expert reports

23.11 Calling expert evidence at trial

A party may call an expert to give expert evidence at a trial only if the party has:

- (a) delivered an expert report that complies with rule 23.13 to all other parties; and
- (b) otherwise complied with this Division.

Note: *Expert* and *expert report* are defined in the Dictionary.

23.12 Provision of guidelines to an expert

If a party intends to retain an expert to give an expert report or to give expert evidence, the party must first give the expert any practice note dealing with guidelines for expert witnesses in proceedings in the Court (the *Practice Note*).

Note: A copy of any practice notes may be obtained from the District Registry or downloaded from the Court's website at <http://www.fedcourt.gov.au>.

23.13 Contents of an expert report

- (1) An expert report must:
 - (a) be signed by the expert who prepared the report; and
 - (b) contain an acknowledgement at the beginning of the report that the expert has read, understood and complied with the Practice Note; and
 - (c) contain particulars of the training, study or experience by which the expert has acquired specialised knowledge; and
 - (d) identify the questions that the expert was asked to address; and
 - (e) set out separately each of the factual findings or assumptions on which the expert's opinion is based; and
 - (f) set out separately from the factual findings or assumptions each of the expert's opinions; and
 - (g) set out the reasons for each of the expert's opinions; and
 - (ga) contain an acknowledgement that the expert's opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (c); and
 - (h) comply with the Practice Note.
- (2) Any subsequent expert report of the same expert on the same question need not contain the information in paragraphs (1)(b) and (c).

23.14 Application for expert report

A party may apply to the Court for an order that another party provide copies of that other party's expert report.

23.15 Evidence of experts

If 2 or more parties to a proceeding intend to call experts to give opinion evidence about a similar question, any of those parties may apply to the Court for one or more of the following orders:

- (a) that the experts confer, either before or after writing their expert reports;
- (b) that the experts produce to the Court a document identifying where the expert opinions agree or differ;
- (c) that the expert's evidence in chief be limited to the contents of the expert's expert report;
- (d) that all factual evidence relevant to any expert's opinions be adduced before the expert is called to give evidence;
- (e) that on the completion of the factual evidence mentioned in paragraph (d), each expert swear an affidavit stating:
 - (i) whether the expert adheres to the previously expressed opinion; or
 - (ii) if the expert holds a different opinion;
 - (A) the opinion; and
 - (B) the factual evidence on which the opinion is based.
- (f) that the experts give evidence one after another;
- (g) that each expert be sworn at the same time and that the cross-examination and re-examination be conducted by putting to each expert in turn each question relevant to one subject or issue at a time, until the cross-examination or re-examination is completed;
- (h) that each expert gives an opinion about the other expert's opinion;
- (i) that the experts be cross-examined and re-examined in any particular manner or sequence.

Note 1: For the directions a Court may make before trial about expert reports and expert evidence, see rule 5.04 (items 14 to 19).

Note 2: The Court may dispense with compliance with the Rules and may make orders inconsistent with the Rules—see rules 1.34 and 1.35.

EXPERT EVIDENCE PRACTICE NOTE (GPN-EXPT)

General Practice Note

1. INTRODUCTION

- 1.1 This practice note, including the *Harmonised Expert Witness Code of Conduct* (“**Code**”) (see **Annexure A**) and the *Concurrent Expert Evidence Guidelines* (“**Concurrent Evidence Guidelines**”) (see **Annexure B**), applies to any proceeding involving the use of expert evidence and must be read together with:
- (a) the Central Practice Note (CPN-1), which sets out the fundamental principles concerning the National Court Framework (“**NCF**”) of the Federal Court and key principles of case management procedure;
 - (b) the Federal Court of Australia Act 1976 (Cth) (“**Federal Court Act**”);
 - (c) the *Evidence Act 1995* (Cth) (“**Evidence Act**”), including Part 3.3 of the Evidence Act;
 - (d) Part 23 of the *Federal Court Rules 2011* (Cth) (“**Federal Court Rules**”); and
 - (e) where applicable, the Survey Evidence Practice Note (GPN-SURV).
- 1.2 This practice note takes effect from the date it is issued and, to the extent practicable, applies to proceedings whether filed before, or after, the date of issuing.

2. APPROACH TO EXPERT EVIDENCE

- 2.1 An expert witness may be retained to give opinion evidence in the proceeding, or, in certain circumstances, to express an opinion that may be relied upon in alternative dispute resolution procedures such as mediation or a conference of experts. In some circumstances an expert may be appointed as an independent adviser to the Court.
- 2.2 The purpose of the use of expert evidence in proceedings, often in relation to complex subject matter, is for the Court to receive the benefit of the objective and impartial assessment of an issue from a witness with specialised knowledge (based on training, study or experience - see generally s 79 of the *Evidence Act*).
- 2.3 However, the use or admissibility of expert evidence remains subject to the overriding requirements that:
- (a) to be admissible in a proceeding, any such evidence must be relevant (s 56 of the *Evidence Act*); and
 - (b) even if relevant, any such evidence, may be refused to be admitted by the Court if its probative value is outweighed by other considerations such as the evidence

being unfairly prejudicial, misleading or will result in an undue waste of time (s 135 of the Evidence Act).

- 2.4 An expert witness' opinion evidence may have little or no value unless the assumptions adopted by the expert (ie. the facts or grounds relied upon) and his or her reasoning are expressly stated in any written report or oral evidence given.
- 2.5 The Court will ensure that, in the interests of justice, parties are given a reasonable opportunity to adduce and test relevant expert opinion evidence. However, the Court expects parties and any legal representatives acting on their behalf, when dealing with expert witnesses and expert evidence, to at all times comply with their duties associated with the overarching purpose in the Federal Court Act (see ss 37M and 37N).

3. INTERACTION WITH EXPERT WITNESSES

- 3.1 Parties and their legal representatives should never view an expert witness retained (or partly retained) by them as that party's advocate or "hired gun". Equally, they should never attempt to pressure or influence an expert into conforming his or her views with the party's interests.
- 3.2 A party or legal representative should be cautious not to have inappropriate communications when retaining or instructing an independent expert, or assisting an independent expert in the preparation of his or her evidence. However, it is important to note that there is no principle of law or practice and there is nothing in this practice note that obliges a party to embark on the costly task of engaging a "consulting expert" in order to avoid "contamination" of the expert who will give evidence. Indeed the Court would generally discourage such costly duplication.
- 3.3 Any witness retained by a party for the purpose of preparing a report or giving evidence in a proceeding as to an opinion held by the witness that is wholly or substantially based in the specialised knowledge of the witness¹ should, at the earliest opportunity, be provided with:
 - (a) a copy of this practice note, including the Code (see Annexure A); and
 - (b) all relevant information (whether helpful or harmful to that party's case) so as to enable the expert to prepare a report of a truly independent nature.
- 3.4 Any questions or assumptions provided to an expert should be provided in an unbiased manner and in such a way that the expert is not confined to addressing selective, irrelevant or immaterial issues.

¹ Such a witness includes a "Court expert" as defined in r 23.01 of the Federal Court Rules. For the definition of "expert", "expert evidence" and "expert report" see the Dictionary, in Schedule 1 of the Federal Court Rules.

4. ROLE AND DUTIES OF THE EXPERT WITNESS

- 4.1 The role of the expert witness is to provide relevant and impartial evidence in his or her area of expertise. An expert should never mislead the Court or become an advocate for the cause of the party that has retained the expert.
- 4.2 It should be emphasised that there is nothing inherently wrong with experts disagreeing or failing to reach the same conclusion. The Court will, with the assistance of the evidence of the experts, reach its own conclusion.
- 4.3 However, experts should willingly be prepared to change their opinion or make concessions when it is necessary or appropriate to do so, even if doing so would be contrary to any previously held or expressed view of that expert.

Harmonised Expert Witness Code of Conduct

- 4.4 Every expert witness giving evidence in this Court must read the *Harmonised Expert Witness Code of Conduct* (attached in Annexure A) and agree to be bound by it.
- 4.5 The Code is not intended to address all aspects of an expert witness' duties, but is intended to facilitate the admission of opinion evidence, and to assist experts to understand in general terms what the Court expects of them. Additionally, it is expected that compliance with the Code will assist individual expert witnesses to avoid criticism (rightly or wrongly) that they lack objectivity or are partisan.

5. CONTENTS OF AN EXPERT'S REPORT AND RELATED MATERIAL

- 5.1 The contents of an expert's report must conform with the requirements set out in the Code (including clauses 3 to 5 of the Code).
- 5.2 In addition, the contents of such a report must also comply with r 23.13 of the *Federal Court Rules*. Given that the requirements of that rule significantly overlap with the requirements in the Code, an expert, unless otherwise directed by the Court, will be taken to have complied with the requirements of r 23.13 if that expert has complied with the requirements in the Code and has complied with the additional following requirements. The expert shall:
 - (a) acknowledge in the report that:
 - (i) the expert has read and complied with this practice note and agrees to be bound by it; and
 - (ii) the expert's opinions are based wholly or substantially on specialised knowledge arising from the expert's training, study or experience;
 - (b) identify in the report the questions that the expert was asked to address;
 - (c) sign the report and attach or exhibit to it copies of:
 - (i) documents that record any instructions given to the expert; and

- (ii) documents and other materials that the expert has been instructed to consider.

5.3 Where an expert's report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter, these must be provided to the other parties at the same time as the expert's report.

6. CASE MANAGEMENT CONSIDERATIONS

6.1 Parties intending to rely on expert evidence at trial are expected to consider between them and inform the Court at the earliest opportunity of their views on the following:

- (a) whether a party should adduce evidence from more than one expert in any single discipline;
- (b) whether a common expert is appropriate for all or any part of the evidence;
- (c) the nature and extent of expert reports, including any in reply;
- (d) the identity of each expert witness that a party intends to call, their area(s) of expertise and availability during the proposed hearing;
- (e) the issues that it is proposed each expert will address;
- (f) the arrangements for a conference of experts to prepare a joint-report (see Part 7 of this practice note);
- (g) whether the evidence is to be given concurrently and, if so, how (see Part 8 of this practice note); and
- (h) whether any of the evidence in chief can be given orally.

6.2 It will often be desirable, before any expert is retained, for the parties to attempt to agree on the question or questions proposed to be the subject of expert evidence as well as the relevant facts and assumptions. The Court may make orders to that effect where it considers it appropriate to do so.

7. CONFERENCE OF EXPERTS AND JOINT-REPORT

7.1 Parties, their legal representatives and experts should be familiar with aspects of the Code relating to conferences of experts and joint-reports (see clauses 6 and 7 of the Code attached in [Annexure A](#)).

7.2 In order to facilitate the proper understanding of issues arising in expert evidence and to manage expert evidence in accordance with the overarching purpose, the Court may require experts who are to give evidence or who have produced reports to meet for the purpose of identifying and addressing the issues not agreed between them with a view to reaching agreement where this is possible ("**conference of experts**"). In an appropriate case, the Court may appoint a registrar of the Court or some other suitably qualified person ("**Conference Facilitator**") to act as a facilitator at the conference of experts.

- 7.3 It is expected that where expert evidence may be relied on in any proceeding, at the earliest opportunity, parties will discuss and then inform the Court whether a conference of experts and/or a joint-report by the experts may be desirable to assist with or simplify the giving of expert evidence in the proceeding. The parties should discuss the necessary arrangements for any conference and/or joint-report. The arrangements discussed between the parties should address:
- (a) who should prepare any joint-report;
 - (b) whether a list of issues is needed to assist the experts in the conference and, if so, whether the Court, the parties or the experts should assist in preparing such a list;
 - (c) the agenda for the conference of experts; and
 - (d) arrangements for the provision, to the parties and the Court, of any joint-report or any other report as to the outcomes of the conference ("**conference report**").

Conference of Experts

- 7.4 The purpose of the conference of experts is for the experts to have a comprehensive discussion of issues relating to their field of expertise, with a view to identifying matters and issues in a proceeding about which the experts agree, partly agree or disagree and why. For this reason the conference is attended only by the experts and any Conference Facilitator. Unless the Court orders otherwise, the parties' lawyers will not attend the conference but will be provided with a copy of any conference report.
- 7.5 The Court may order that a conference of experts occur in a variety of circumstances, depending on the views of the judge and the parties and the needs of the case, including:
- (a) while a case is in mediation. When this occurs the Court may also order that the outcome of the conference or any document disclosing or summarising the experts' opinions be confidential to the parties while the mediation is occurring;
 - (b) before the experts have reached a final opinion on a relevant question or the facts involved in a case. When this occurs the Court may order that the parties exchange draft expert reports and that a conference report be prepared for the use of the experts in finalising their reports;
 - (c) after the experts' reports have been provided to the Court but before the hearing of the experts' evidence. When this occurs the Court may also order that a conference report be prepared (jointly or otherwise) to ensure the efficient hearing of the experts' evidence.
- 7.6 Subject to any other order or direction of the Court, the parties and their lawyers must not involve themselves in the conference of experts process. In particular, they must not seek to encourage an expert not to agree with another expert or otherwise seek to influence the outcome of the conference of experts. The experts should raise any queries they may have in relation to the process with the Conference Facilitator (if one has been appointed) or in

accordance with a protocol agreed between the lawyers prior to the conference of experts taking place (if no Conference Facilitator has been appointed).

- 7.7 Any list of issues prepared for the consideration of the experts as part of the conference of experts process should be prepared using non-tendentious language.
- 7.8 The timing and location of the conference of experts will be decided by the judge or a registrar who will take into account the location and availability of the experts and the Court's case management timetable. The conference may take place at the Court and will usually be conducted in-person. However, if not considered a hindrance to the process, the conference may also be conducted with the assistance of visual or audio technology (such as via the internet, video link and/or by telephone).
- 7.9 Experts should prepare for a conference of experts by ensuring that they are familiar with all of the material upon which they base their opinions. Where expert reports in draft or final form have been exchanged prior to the conference, experts should attend the conference familiar with the reports of the other experts. Prior to the conference, experts should also consider where they believe the differences of opinion lie between them and what processes and discussions may assist to identify and refine those areas of difference.

Joint-report

- 7.10 At the conclusion of the conference of experts, unless the Court considers it unnecessary to do so, it is expected that the experts will have narrowed the issues in respect of which they agree, partly agree or disagree in a joint-report. The joint-report should be clear, plain and concise and should summarise the views of the experts on the identified issues, including a succinct explanation for any differences of opinion, and otherwise be structured in the manner requested by the judge or registrar.
- 7.11 In some cases (and most particularly in some native title cases), depending on the nature, volume and complexity of the expert evidence a judge may direct a registrar to draft part, or all, of a conference report. If so, the registrar will usually provide the draft conference report to the relevant experts and seek their confirmation that the conference report accurately reflects the opinions of the experts expressed at the conference. Once that confirmation has been received the registrar will finalise the conference report and provide it to the intended recipient(s).

8. CONCURRENT EXPERT EVIDENCE

- 8.1 The Court may determine that it is appropriate, depending on the nature of the expert evidence and the proceeding generally, for experts to give some or all of their evidence concurrently at the final (or other) hearing.
- 8.2 Parties should familiarise themselves with the *Concurrent Expert Evidence Guidelines* (attached in Annexure B). The Concurrent Evidence Guidelines are not intended to be exhaustive but indicate the circumstances when the Court might consider it appropriate for

concurrent expert evidence to take place, outline how that process may be undertaken, and assist experts to understand in general terms what the Court expects of them.

- 8.3 If an order is made for concurrent expert evidence to be given at a hearing, any expert to give such evidence should be provided with the Concurrent Evidence Guidelines well in advance of the hearing and should be familiar with those guidelines before giving evidence.

9. FURTHER PRACTICE INFORMATION AND RESOURCES

- 9.1 Further information regarding Expert Evidence and Expert Witnesses is available on the Court's website.
- 9.2 Further information to assist litigants, including a range of helpful guides, is also available on the Court's website. This information may be particularly helpful for litigants who are representing themselves.

J L B ALLSOP
Chief Justice
25 October 2016

HARMONISED EXPERT WITNESS CODE OF CONDUCT²

APPLICATION OF CODE

1. This Code of Conduct applies to any expert witness engaged or appointed:
 - (a) to provide an expert's report for use as evidence in proceedings or proposed proceedings; or
 - (b) to give opinion evidence in proceedings or proposed proceedings.

GENERAL DUTIES TO THE COURT

2. An expert witness is not an advocate for a party and has a paramount duty, overriding any duty to the party to the proceedings or other person retaining the expert witness, to assist the Court impartially on matters relevant to the area of expertise of the witness.

CONTENT OF REPORT

3. Every report prepared by an expert witness for use in Court shall clearly state the opinion or opinions of the expert and shall state, specify or provide:
 - (a) the name and address of the expert;
 - (b) an acknowledgment that the expert has read this code and agrees to be bound by it;
 - (c) the qualifications of the expert to prepare the report;
 - (d) the assumptions and material facts on which each opinion expressed in the report is based [a letter of instructions may be annexed];
 - (e) the reasons for and any literature or other materials utilised in support of such opinion;
 - (f) (if applicable) that a particular question, issue or matter falls outside the expert's field of expertise;
 - (g) any examinations, tests or other investigations on which the expert has relied, identifying the person who carried them out and that person's qualifications;
 - (h) the extent to which any opinion which the expert has expressed involves the acceptance of another person's opinion, the identification of that other person and the opinion expressed by that other person;
 - (i) a declaration that the expert has made all the inquiries which the expert believes are desirable and appropriate (save for any matters identified explicitly in the report), and that no matters of significance which the expert regards as relevant have, to the

² Approved by the Council of Chief Justices' Rules Harmonisation Committee

- knowledge of the expert, been withheld from the Court;
- (j) any qualifications on an opinion expressed in the report without which the report is or may be incomplete or inaccurate;
 - (k) whether any opinion expressed in the report is not a concluded opinion because of insufficient research or insufficient data or for any other reason; and
 - (l) where the report is lengthy or complex, a brief summary of the report at the beginning of the report.

SUPPLEMENTARY REPORT FOLLOWING CHANGE OF OPINION

- 4. Where an expert witness has provided to a party (or that party's legal representative) a report for use in Court, and the expert thereafter changes his or her opinion on a material matter, the expert shall forthwith provide to the party (or that party's legal representative) a supplementary report which shall state, specify or provide the information referred to in paragraphs (a), (d), (e), (g), (h), (i), (j), (k) and (l) of clause 3 of this code and, if applicable, paragraph (f) of that clause.
- 5. In any subsequent report (whether prepared in accordance with clause 4 or not) the expert may refer to material contained in the earlier report without repeating it.

DUTY TO COMPLY WITH THE COURT'S DIRECTIONS

- 6. If directed to do so by the Court, an expert witness shall:
 - (a) confer with any other expert witness;
 - (b) provide the Court with a joint-report specifying (as the case requires) matters agreed and matters not agreed and the reasons for the experts not agreeing; and
 - (c) abide in a timely way by any direction of the Court.

CONFERENCE OF EXPERTS

- 7. Each expert witness shall:
 - (a) exercise his or her independent judgment in relation to every conference in which the expert participates pursuant to a direction of the Court and in relation to each report thereafter provided, and shall not act on any instruction or request to withhold or avoid agreement; and
 - (b) endeavour to reach agreement with the other expert witness (or witnesses) on any issue in dispute between them, or failing agreement, endeavour to identify and clarify the basis of disagreement on the issues which are in dispute.

CONCURRENT EXPERT EVIDENCE GUIDELINES

APPLICATION OF THE COURT'S GUIDELINES

1. The Court's Concurrent Expert Evidence Guidelines ("**Concurrent Evidence Guidelines**") are intended to inform parties, practitioners and experts of the Court's general approach to concurrent expert evidence, the circumstances in which the Court might consider expert witnesses giving evidence concurrently and, if so, the procedures by which their evidence may be taken.

OBJECTIVES OF CONCURRENT EXPERT EVIDENCE TECHNIQUE

2. The use of concurrent evidence for the giving of expert evidence at hearings as a case management technique³ will be utilised by the Court in appropriate circumstances (see r 23.15 of the *Federal Court Rules 2011* (Cth)). Not all cases will suit the process. For instance, in some patent cases, where the entire case revolves around conflicts within fields of expertise, concurrent evidence may not assist a judge. However, patent cases should not be excluded from concurrent expert evidence processes.
3. In many cases the use of concurrent expert evidence is a technique that can reduce the partisan or confrontational nature of conventional hearing processes and minimises the risk that experts become "opposing experts" rather than independent experts assisting the Court. It can elicit more precise and accurate expert evidence with greater input and assistance from the experts themselves.
4. When properly and flexibly applied, with efficiency and discipline during the hearing process, the technique may also allow the experts to more effectively focus on the critical points of disagreement between them, identify or resolve those issues more quickly, and narrow the issues in dispute. This can also allow for the key evidence to be given at the same time (rather than being spread across many days of hearing); permit the judge to assess an expert more readily, whilst allowing each party a genuine opportunity to put and test expert evidence. This can reduce the chance of the experts, lawyers and the judge misunderstanding the opinions being expressed by the experts.
5. It is essential that such a process has the full cooperation and support of all of the individuals involved, including the experts and counsel involved in the questioning process. Without that cooperation and support the process may fail in its objectives and even hinder the case management process.

³ Also known as the "hot tub" or as "expert panels".

CASE MANAGEMENT

6. Parties should expect that, the Court will give careful consideration to whether concurrent evidence is appropriate in circumstances where there is more than one expert witness having the same expertise who is to give evidence on the same or related topics. Whether experts should give evidence concurrently is a matter for the Court, and will depend on the circumstances of each individual case, including the character of the proceeding, the nature of the expert evidence, and the views of the parties.
7. Although this consideration may take place at any time, including the commencement of the hearing, if not raised earlier, parties should raise the issue of concurrent evidence at the first appropriate case management hearing, and no later than any pre-trial case management hearing, so that orders can be made in advance, if necessary. To that end, prior to the hearing at which expert evidence may be given concurrently, parties and their lawyers should confer and give general consideration as to:
 - (a) the agenda;
 - (b) the order and manner in which questions will be asked; and
 - (c) whether cross-examination will take place within the context of the concurrent evidence or after its conclusion.
8. At the same time, and before any hearing date is fixed, the identity of all experts proposed to be called and their areas of expertise is to be notified to the Court by all parties.
9. The lack of any concurrent evidence orders does not mean that the Court will not consider using concurrent evidence without prior notice to the parties, if appropriate.

CONFERENCE OF EXPERTS & JOINT-REPORT OR LIST OF ISSUES

10. The process of giving concurrent evidence at hearings may be assisted by the preparation of a joint-report or list of issues prepared as part of a conference of experts.
11. Parties should expect that, where concurrent evidence is appropriate, the Court may make orders requiring a conference of experts to take place or for documents such as a joint-report to be prepared to facilitate the concurrent expert evidence process at a hearing (see Part 7 of the Expert Evidence Practice Note).

PROCEDURE AT HEARING

12. Concurrent expert evidence may be taken at any convenient time during the hearing, although it will often occur at the conclusion of both parties' lay evidence.
13. At the hearing itself, the way in which concurrent expert evidence is taken must be applied flexibly and having regard to the characteristics of the case and the nature of the evidence to be given.
14. Without intending to be prescriptive of the procedure, parties should expect that, when evidence is given by experts in concurrent session:

- (a) the judge will explain to the experts the procedure that will be followed and that the nature of the process may be different to their previous experiences of giving expert evidence;
 - (b) the experts will be grouped and called to give evidence together in their respective fields of expertise;
 - (c) the experts will take the oath or affirmation together, as appropriate;
 - (d) the experts will sit together with convenient access to their materials for their ease of reference, either in the witness box or in some other location in the courtroom, including (if necessary) at the bar table;
 - (e) each expert may be given the opportunity to provide a summary overview of their current opinions and explain what they consider to be the principal issues of disagreement between the experts, as they see them, in their own words;
 - (f) the judge will guide the process by which evidence is given, including, where appropriate:
 - (i) using any joint-report or list of issues as a guide for all the experts to be asked questions by the judge and counsel, about each issue on an issue-by-issue basis;
 - (ii) ensuring that each expert is given an adequate opportunity to deal with each issue and the exposition given by other experts including, where considered appropriate, each expert asking questions of other experts or supplementing the evidence given by other experts;
 - (iii) inviting legal representatives to identify the topics upon which they will cross-examine;
 - (iv) ensuring that legal representatives have an adequate opportunity to ask all experts questions about each issue. Legal representatives may also seek responses or contributions from one or more experts in response to the evidence given by a different expert; and
 - (v) allowing the experts an opportunity to summarise their views at the end of the process where opinions may have been changed or clarifications are needed.
15. The fact that the experts may have been provided with a list of issues for consideration does not confine the scope of any cross-examination of any expert. The process of cross-examination remains subject to the overall control of the judge.
16. The concurrent session should allow for a sensible and orderly series of exchanges between expert and expert, and between expert and lawyer. Where appropriate, the judge may allow for more traditional cross-examination to be pursued by a legal representative on a particular issue exclusively with one expert. Where that occurs, other experts may be asked to comment on the evidence given.
17. Where any issue involves only one expert, the party wishing to ask questions about that issue should let the judge know in advance so that consideration can be given to whether

arrangements should be made for that issue to be dealt with after the completion of the concurrent session. Otherwise, as far as practicable, questions (including in the form of cross-examination) will usually be dealt with in the concurrent session.

18. Throughout the concurrent evidence process the judge will ensure that the process is fair and effective (for the parties and the experts), balanced (including not permitting one expert to overwhelm or overshadow any other expert), and does not become a protracted or inefficient process.

ANNEXURE B- QUESTIONS TO EXPERT

In providing your response to the following questions, please consider information that was in the public domain as at 17 June 2021:

1. In your opinion, what, if any, are the current economic costs arising from the impacts of anthropogenic climate change in respect of both Australia and the world?
2. In your opinion, what, if any, are the likely future economic costs arising from the impacts of anthropogenic climate change in respect of both Australia and the world? In providing your response please consider:
 - a. warming scenarios consistent with meeting the targets of the Paris Agreement; and
 - b. warming scenarios consistent with current greenhouse gas emissions trajectories.
3. In your opinion, will any economic benefits purported to arise from the exploration and exploitation of gas in the Beetaloo sub-basin be impacted by risks associated with:
 - a. Countries and corporations implementing policies and activities to reduce greenhouse gas (**GHG**) emissions in line with the Paris Agreement or otherwise;
 - b. Countries and corporations implementing policies and activities consistent with transitioning away from the use of fossil fuels and achieving net zero GHG emissions targets; and
 - c. Any current or future introduction of carbon pricing (or related) measures in global markets?

If your view is that there would be such an impact, please explain the nature of that impact and give reasons for your view.

4. In your opinion, and considering the anticipated development of the Beetaloo sub-basin as described in Beetaloo Strategic Basin Plan and the greenhouse gas emissions that would be generated by exploiting gas consistent with Beetaloo Strategic Basin Plan, is there likely to be an economic gain for Australia from the exploitation of the Beetaloo sub-basin gas fields when economic costs associated with climate change are considered?

ANNEXURE C – INDEX TO BRIEF

No.	Document	Date
PLEADINGS		
1.	Originating Application	28 July 2021
2.	Concise Statement	16 August 2021
LEGISLATION		
3.	<i>Industry Research and Development (Beetaloo Cooperative Drilling Program) Instrument 2021 (the Instrument)</i>	11 May 2021
4.	Explanatory Statement to the Instrument	13 May 2021
DOCUMENTS BEFORE THE MINISTER WHEN MAKING THE INSTRUMENT		
5.	Ministerial Submission issued by the Department of Industry of Industry, Science, Energy and Resources to the Minister for Resources, Water and Northern Australia making recommendations in respect of the making of the Instrument (Ministerial Recommendation)– MLO version	23 April 2021
6.	Attachment A to the Ministerial Recommendation – <i>Industry Research and Development (Beetaloo Cooperative Drilling Program) Instrument 2021 (Draft)</i>	23 April 2021
7.	Attachment B to the Ministerial Recommendation – Explanatory Statement	23 April 2021
8.	Attachment C to the Ministerial Recommendation – Background Brief	23 April 2021
9.	Signed Ministerial Recommendation approving the making of the Instrument	11 May 2021
EMPIRE APPLICATION FOR FUNDING		
10.	Imperial Application for Beetaloo Grant – Empire Beetaloo Acceleration Program Carpentaria-2 Horizontal Well (BCP00001)	7 April 2021
11.	BCP00001 Application Annexure A – Project Budget	7 April 2021
12.	Imperial Application for Beetaloo Grant – Empire Beetaloo Acceleration Program Carpentaria-3 Horizontal Well’ (BCP00002)	7 April 2021
13.	BCP00002 Application Annexure A – Project Budget	7 April 2021
14.	Imperial Application for Beetaloo Grant – Empire Beetaloo Acceleration Program Carpentaria-4 and 3D Seismic (BCP00003)	7 April 2021
15.	BCP00003 Application Annexure A – Project Budget	7 April 2021
DOCUMENTS RELATING TO APPROVAL OF THE APPLICATIONS		
16.	DISER Eligibility and Completeness Checklist for BCP00001 completed by Mario Pricone (Assessor) and Janet Lau (QA Officer)	7 -8 May 2021
17.	DISER Eligibility and Completeness Checklist for BCP00002 completed by Mario Pricone (Assessor) and Janet Lau (QA Officer)	7 -8 May 2021

18.	DISER Eligibility and Completeness Checklist for BCP00003 completed by Mario Pricone (Assessor) and Janet Lau (QA Officer)	7 -8 May 2021
19.	Meeting Minutes of the Beetaloo Cooperative Drilling Program Assessment Committee (Assessment Committee) Meeting on 27 May 2021 and 1 June 2021	1 June 2021 and 7 June 2021
20.	Attachment A to the Meeting Minutes of Assessment Committee Meeting– Excel spreadsheet of all Program applications	27 May 2021
21.	Attachment C to the Meeting Minutes of the Assessment Committee Meeting – Questions from Committee to Imperial and Imperial's responses	1 June 2021
22.	Scorecard (Summary)- Assessment Committee member Daniel Quin	
23.	Scorecard (Summary)- Assessment Committee member Merrie-Ellen Gunning	
24.	Scorecard for BCDP000001 - Assessment Committee member Louis Gomas	
25.	Scorecard for BCDP000002 - Assessment Committee member Louis Gomas	
26.	Scorecard for BCDP000003 - Assessment Committee member Louis Gomas	
DOCUMENTS BEFORE THE MINISTER WHEN MAKING THE DECISION		
27.	Ministerial Submission issued by the Department of Industry of Industry, Science, Energy and Resources to the Minister for Resources, Water and Northern Australia making recommendations in respect of the Decision (Ministerial Recommendation)– MLO version	16 June 2021
28.	Minister's signed Decision approving Ministerial Recommendation	17 June 2021
29.	Annexure A to Ministerial Recommendation – BCDP Recommended Projects	17 June 2021
30.	Annexure B to Ministerial Recommendation – Program Guidelines	17 June 2021
31.	Annexure C to Ministerial Recommendation – Governance and Program Background	17 June 2021
32.	Annexure D to Ministerial Recommendation – Legal Advice (Redacted – Subject to LPP)	17 June 2021
DECISION ANNOUNCEMENTS		
33.	Minister's Media Release on the Decision	7 July 2021
34.	Empire Energy ASX Announcement on the Decision	8 July 2021
RELEVANT OTHER DOCUMENTS		
35.	'Unlocking the Beetaloo – The Beetaloo Strategic Basin Plan'	Jan 2021
36.	Commonwealth Grants Rules and Guidelines 2017	Current

37.	Final Report of the Scientific Inquiry into Hydraulic Fracturing in the Northern Territory	April 2018
RELEVANT IMPERIAL DOCUMENTS		
38.	Empire Energy ASX announcement entitled “Material Beetaloo Resource Upgrade”	22 February 2021
39.	Morgans report entitled “Backing the Beetaloo” published on Empire Energy’s ‘Investors’ section of website	26 November 2020
ENVIRONMENTAL MANAGEMENT PLANS (EMPS) FOR EP187		
IMP2-04 – Imperial 2019 Drilling Program NT Exploration Permit 187 - APPROVED		
40.	Imperial Environmental Management Plan IMP2-04	Submitted 22 August 2019
41.	Attachment to Imperial EMP IMP2-04 – Emergency Response Plan	Submitted 22 August 2019
42.	NT Government EPA advice in respect of IMP2-04	6 January 2020
43.	NT Government – Approval Notice and Statement of Reasons	2 March 2020
IMP2-6.1 – Imperial 2020-21 Drilling Program NT Exploration Permit 187 - APPROVED		
44.	Imperial Environmental Management Plan IMP2-6.1	Submitted 30 June 2020
45.	Attachments to EMP IMP2-6.1	Submitted 30 June 2020
46.	NT Government EPA advice in respect of IMP2-6.1	9 September 2020
47.	NT Government – Approval Notice and Statement of Reasons	30 September 2020
48.	EP187 Groundwater monitoring results	25 March - 22 October 2020
49.	Imperial Drilling Fluid waste water analysis from the Carpentaria-1 Well site	28 October 2020
IMP3-4 – Hydraulic fracturing and extended production testing of the existing Carpentaria-1 Vertical exploration well on EP187 – APPROVED		
50.	Imperial Environmental Management Plan IMP3-4	Submitted 17 November 2020
51.	Appendices to IMP3-4	Submitted 17 November 2020
52.	NT Government EPA advice in respect of IMP3-4	5 February 2021
53.	NT Government – Approval Notice and Statement of Reasons	15 February 2021

Certificate of Annexure NH3

No. NSD758 of 2021

Federal Court of Australia

District Registry: New South Wales

Division: General

Environment Centre NT Inc

Applicant

Minister for Resources and Water and another

Respondents

This and the following 3 pages form Annexure **NH3** to the Affidavit of Nicki Hutley affirmed on 10 September 2021 before me.

Signature of witness

Name: Anna Gudkov

Qualification: Solicitor

Nicki Hutley CV

Mobile: + 61 410 587 586

Email: nicki.hutley@gmail.com

Profile

Nicki Hutley is a highly experienced economist, with broad-based expertise in both macroeconomic forecasting and analysis as well as microeconomic policy, gained over more than three decades in financial and investment markets and in economic consulting. After many years in the corporate world, including most recently as a partner with Deloitte Access Economics, Nicki is now an independent economist. Nicki works with government and private sector clients across Australia, using triple bottom line and strategic analysis, to provide an evidence base for investments in projects, policies and programs.

Academic qualifications and positions

- BEc (Honours), University of East Anglia
- Expert Faculty (Economics), SingularityU Australia
- Councillor (economics), Climate Council
- NSW President, Economics Society of Australia
- NSW Executive Committee member, Australian Business Economists
- Non-executive Board Member, 1 Million Women
- Financy Women's Economic Index, Advisory Committee
-

Skills & expertise

- Economic modelling, policy and strategic analysis, applied across a wide range of investment and policy areas, focussed on social impact and environmental economics
- Triple bottom line cost benefit analysis, evaluations, social impact analysis
- Stakeholder engagement
- Communication skills, including the ability to present complex ideas to both sophisticated and lay audiences.

Previous roles

- January 2021 – current, independent economist
- 2018 – 2021, Partner, Deloitte Access Economics
- 2013 – 2018, Director, Economic and Social Advisory, and Chief Economist, Urbis
- 2011 -2013, Director, NSW Economic Advisory, KPMG

- 2006 - 2011, Associate Director, Access Economics
- 1987 – 2006, various roles as a financial market and investment economist with Rothschild Asset Management, Deutschebank, Potter Warburg, Lloyds Bank, Bankers Trust
- 1985 – 1987 Department of Foreign Affairs

Key Clients

- ACT Government Environment Directorate, Austrade, Australian Department of Social Services, Australian Department of Industry, Science, Energy and Resources, Infrastructure Australia, NSW Department of Premier and Cabinet, NSW Department of Planning, Industry and Environment, Department of Regional NSW, NSW Office of Environment and Heritage, NSW Department of Family and Community Services, NSW Treasury, NSW Ministry of Health, Victorian Department of Economic Development, Jobs, Transport and Resources, Victorian Department of Education and Training, Invest Canberra, Desert Knowledge Australia, Indigenous Business Australia, University of Technology, Sydney, Property Council of Australia, Urban Development Institute Australia, Australian Property Institute, Commonwealth Department of Social Services, Benevolent Society.

Work Examples

- Modelling the impact of climate change on company financial risk exposures. Used CGE modelling to understand changes in economic variables and impact on company portfolio assets, responding to damage curves (confidential private sector clients, financial and property sectors)
- Modelling the economic impact of a Carbon Border Adjustment Mechanism, based on the Eu Fit for 55 proposal, extended to other economies (current, for Climate Council)
- Resilience for Real Assets – understanding the means to measure climate risks on commercial buildings and infrastructure in major cities across Australia and Asia (Investor Group on Climate Change)
- Provision of advice on an appropriate cost of carbon for Government Investment projects and analysis, drawing on an international literature review. (ACT Environment Directorate)
- Cost benefit analysis of Carbon Capture and Storage potential in NSW, including assessing a range of storage locations and the economic impacts on coal-intensive communities. (NSW Department of Planning, Industry and Environment)
- An evaluation of the Low Emissions technology Fund for Fossil Fuels (Australian Department of Industry, Science, Energy and Resources)
- Developed a Benefit-Cost model of cyclone damage mitigation strategies for a major Australian insurer, working with James Cook University, based on four different wind models, and industry and ABS data sets. This work led to the implementation of new insurance policy pricing to incentivise households to adopt cyclone risk mitigation measures. (Suncorp)
- Modelled costs and benefits of flood mitigation investments, using case studies of the regional Queensland towns of Roma and St George, and the New South Wales town of Grafton. Cost benefit ratios for the three levee systems were in the order of 2.2-5.4 indicating a robust economic return on investment for the community. (Suncorp)
- Cost Benefit Analysis of Broome Town Beach Revetment. Included quantification of the potential losses of land due to cliff erosion in the absence of investment, impacting future development, tourism activity, and social and cultural activities. (Broome Shire Council)

- Review, co-design and cost benefit analysis of Energy Upgrade Agreements (EUAs). Intensive stakeholder workshops were conducted to understand the barriers and incentives to using EUAs to finance building upgrades. A series of recommendations were then assessed using Cost-Benefit modelling. (NSW OEH)
- Multiple benefits assessment of a range of NSW Government's support schemes to address energy efficiency in low-income households. Primary data was collected through interviews, industry data, and surveys to understand the potential range of environmental, economic and social outcomes for households within the schemes. (NSW OEH)
- Co-author of *Infrastructure Interdependencies and Business-Level Impacts* (2013). Modelled the potential economic impacts of five consecutive extreme heat days in Melbourne. (The Climate Institute)
- Project lead for review of NSW Government Waste Levy. Project involved extensive stakeholder consultations and desktop review to identify key challenges and make recommendation to improve operation of the levy and support investment in the sector. (NSW OEH)
- Project lead for review of NSW Government Dam Safety Act. Extensive stakeholder engagement, including with dam owners and operators across the state, helped to identify recommendations for improved efficiency. (NSW Department of Industry)
- Modelled costs and benefits of NSW Biodiversity Banking scheme for Aboriginal landholders in different regions across the state, on behalf of the NSW Aboriginal Land Council) Project involved modelling costs of land management and impacts on communities, drawing on stakeholder consultations.
- **Extensive modelling from 2007 -2011 of the impacts of the proposed CPRS, RET and Feed-in Tariff Schemes, undertaken over several years on behalf of Government, private sector, industry and peak body clients.**