GUIDANCE FOR COMMUNICATING ON GENE TECHNOLOGY 2025

This document was developed by the Gene Technology Ethics and Community Consultative Committee (GTECCC).[1]

The GTECCC is one of the two statutory committees established under the *Gene Technology Act 2000* (Cth) (the Act). As outlined in the Act, the Committee's function is to provide advice to the Gene Technology Regulator and to the Gene Technology Ministers' Meeting. Consistent with these functions, the GTECCC has developed this document entitled "Guidance for communicating on gene technology 2025" (Guidance).

1. CONTEXT

Gene technology can have far-reaching and complex effects on all living things – including people – and the environment. It is, therefore, important that we communicate about gene technology with clarity and integrity. This Guidance is intended to help people communicate about gene technology effectively. Its primary audience includes, but is not limited to, researchers, Institutional Biosafety Committees (IBCs), organisations and individuals regulated by the Act, companies, and media and communications professionals. Professional scientific communicators may also find this Guidance useful. In this way GTECCC hopes to contribute to the public's engagement with gene technology, and their ongoing confidence in the regulatory scheme.

2. AIMS OF THE GUIDANCE

The over-arching aim of the Guidance is to improve gene technology communication outcomes and to foster and support responsible communication about gene technology and the regulatory scheme. It is not intended as a technical 'how-to' guide, but as a tool for reflecting on what it means to communicate effectively and with integrity on new gene technology. More specifically, the:

- **guiding questions** aim to provide 'prompts' for those working with gene technology to consider when preparing for, and engaging in, communication about gene technology;
- **story-telling case studies** aim to illustrate how multiple questions can be relevant in different communications scenarios; and the
- **background paper** aims to facilitate scholarly reflection on questions about communication by drawing reader's attention to the relevant scholarly literature, including references that informed the development of the guiding questions.

[1] The Gene Technology Ethics and Community Consultative Committee (GTECCC) is a statutory advisory committee established under section 106 of the *Gene Technology Act 2000* (Cth) to advise the Gene Technology Regulator and the Gene Technology Ministerial Council. The opinions expressed in this discussion paper represent the views of the GTECCC and do not necessarily reflect those held by the Office of the Gene Technology Regulator (OGTR) that provides the Secretariat to the Committee.

3. GUIDANCE FOR COMMUNICATING

3.1 GUIDING QUESTIONS

The following questions aim to facilitate reflection on, and action towards, best practice when preparing to communicate about gene technology. They are based on a review of principles and global best practices for communicating about technical developments that can have far-reaching or complex effects on people, all living things and the environment.

1. What is your purpose or goal (i.e., why do you want to communicate) and on what time scale do you hope to achieve that goal?

2. With whom do you wish to engage—that is, who is your audience or target?

3. How can you ensure that your communication is transparent and that you are open about assumptions and uncertainties, benefits and risks?

4. Are you communicating based on your specific expertise, and what evidence will you use to ensure that your claims are accurate and can be externally fact checked?

5. How can you move away from simply giving people information — which assumes that the problem is their lack of knowledge and has been shown to rarely work — and instead, have two-way conversations and shared reflection between you and the target audience?

6. What forms of media and forums are the best for communicating your message and why?

7. What values, meanings, attitudes, beliefs, or other underlying considerations should be articulated when crafting your communication plan and the language used within it?

8. Given the rapid pace of developments in gene technology research, how can your communication strategy best ensure that the publics have knowledge of new technologies as they are being developed so that they can have a say in the developmental trajectory?

9. What are likely to be the most effective and ethical strategies for communicating about gene technology in the face of mis/disinformation and fake news?

3.2 THE STORY-TELLING CASE STUDIES

A series of story-telling case studies have been developed as examples of situations where consideration of multiple guiding questions is likely to be relevant. These provide worked examples of hypothetical responses to the guiding questions as a companion document to this Guidance.

Further development of the themes and literature that underpin the application of the guiding questions is provided in the background paper and further reading.

3.3 THE BACKGROUND PAPER INCLUDING FURTHER READING

This background paper articulates **themes in the science communication literature**. The development of these themes was in response to literature research that explored the following question: **What guiding principles govern global best practices for communicating about technical developments that will have far-reaching or complex effects on people or the environment?**

1. **The "why?" behind communication is often unclear (or problematic) making it difficult to determine best practice. But the literature does give alternative communication purposes to consider.**

    a. The literature frequently reported that one of the biggest issues with science communication is that the purpose of communication is often not stated and appears unclear even to those who are promoting communication or engaging in it. Institutional communicators in particular *assume* that communication is purposeful and beneficial without evidence that this is the case.

    b. We do not know how diverse these assumed benefits or purposes are, or whether the assumptions made by different sectors are in conflict (but suspect that they are). Unarticulated assumptions make it impossible to evaluate effectiveness of different approaches or determine best practice.

    c. When the purpose of communication is stated, it is often vague, and the connection between the communication activity and the desired outcome unclear. For example, "to raise public awareness" (with the purpose of doing so remaining unarticulated), "to promote" science or investment in a scientific field, "to educate the public," or "to avoid public controversy." We note that some of these objectives fall foul of, or are outside of, OGTR's mandate (see the recent review of the Gene Technology Act for more details).

    d. However, the literature also gives alternatives to consider when reflecting on the potential purposes of communications about technological developments. For example, facilitating resolution of public controversy; enabling mutual learning; building democratic capacity through deliberation; increasing representation of diverse voices in decision making; broadening input on debates associated with policy and values; and fostering responsible innovation and better policy.

    e. The literature emphasises the need to be clear about the goal(s) and purpose(s) of communication as best practices will differ significantly depending on this factor (Kappel & Holmen 2019).

2. **Many science communication efforts are guided by the faulty 'deficit model'. In contrast, robust approaches acknowledge the need to promote mutual bidirectional knowledge sharing and communication.**

    a. The 'deficit model' underlies many approaches to science communication. According to this model, the public is assumed or diagnosed as ignorant of, and lacking interest in, science. The key goal is to fill the public with clear and accurate information, and to foster more 'science literacy' (Nisbet & Scheufele 2009; Simis et al. 2016).

    b. The evidence shows that this approach is ineffectual either for fostering engagement with, or interest in science, let alone support for it.

    c. The most robust and up-to-date approaches to science communication rely on acknowledging and incorporating the knowledge, perspectives, experiences, and values that publics bring to their interactions with science and technology, and fostering conditions for and training that promotes mutual engagement and bidirectional communication (see e.g. Reincke et al. 2020).

3. **Approaches to 'communication' are often narrowly focused on the written word delivered via a website. But other types of media may work better.**

    a. Communication is often taken to mean the written word delivered digitally through a website or social media. There is often insufficient reflection on who is the target of communication, and ways in which diverse publics may require different approaches.

    b. Given the need to consider differing values, perspectives, experiences, and – importantly - goals, in connection to any science communication initiative, there are clearly problems with a one-size-fits-all approach (Nisbet & Scheufele 2009).

    c. Using digitally delivered text may be relatively easy or inexpensive but fail to generate the desired public engagement or participation.

    d. Other types of media may be more appropriate, such as forums, art or film, or citizen participatory events, to name just a few alternatives.

4. **Communicating 'post-normal' science is difficult. It requires a deeper awareness of differing values and meaning than communication of standard science.**

    a. Communication is particularly tricky in fields that are rapidly evolving, technical, and with uncertain impacts, such as gene technology. These attributes are shared by several scientific fields such as neuroscience, and computer and information science in relation to artificial intelligence. This domain is described as 'post-normal' science (see Brossard et al. 2019, which borrows the term from Ravetz 1999). Purely technical expertise is not enough to address the risks and benefits associated with post-normal science as there are also social, ethical, and legal dimensions.

    b. This need to engage multiple disciplines and publics should be reflected in communication about this type of science. Communication efforts should consider how, why, and when information can be shared with publics, including the critical question of how to engage publics about technologies that are in flux and have uncertain impacts (either negative or positive).

    c. Political, social, cultural, economic, and ethical concerns impact and are impacted by science communication: just as science is never 'value free,' so too is science communication infused with values and with decisions that depend on values.

    d. Science communication requires deeper awareness of how meaning is shaped at multiple levels not only by factors internal to the process but also those outside of it that are part of publics' interpretations (see Smith & Garramon Merkle 2021).

5. **Rapidly developing technologies create a new dilemma for science communication. Communication of these technologies requires careful curation and timing.**

    a. Rapidly developing technologies such as gene technologies create significant pressures to communicate at speed, and when outcomes are still in flux (Medvecky & Leach 2019).

    b. Those engaging in science communication must consider the impact of announcements, critical responses, and publications, and not simply engage or communicate because of external pressures. But it is also critical that publics can influence technology development, and do not only receive communication when technologies are well-developed and their use assumed or predetermined.

6. **Science communication is a hybrid field, and thus so are its norms. Identifying goals and target publics will help clarify the norms of a communication initiative.**

    a. Science communication draws on a mix of various fields, each of which have their own guiding ethical norms and principles (Medvecky & Leach 2019). These include the norms of science itself, journalistic ethics, public relations and business codes of ethics, and communication ethics, some of which are in direct tension with each other.

    b. Values such as truthfulness can be interpreted differently in these diverse contexts, particularly depending on to whom an individual or organisation has responsibilities or accountability (e.g., shareholders versus publics).

    c. What counts as 'ethical communication' clearly requires that communication be accurate. But some argue it should also consider how to use communication to create more good in the world and to foster greater human worth and dignity (e.g., NCA 1999). Some of these norms are echoed in the OGTR's own documents such as the National Framework of Ethical Principles in Gene Technology (2012).

    d. Framing – how different individuals or groups understand and communicate reality – also matters to public engagement (Bauer & Bogner 2020). Those seeking to engage in ethical and effective science communication about technology development must consider their assumptions. They must be careful not to use framing that imposes their assumptions on the publics, and to resist perpetuating unhelpful norms.

    e. In a domain as complex as gene technology, there are unlikely to be a simple set of rules or guidelines that can be provided to individuals, institutions, or groups about how, when, and to whom communication should occur. Conflicts will be faced depending on the different roles played by the entity trying to communicate (e.g., OGTR as regulator versus a university wishing to promote its research).

    f. To help provide clarity regarding the norms and principles governing a communication initiative, communication efforts should be curated with the overarching goals of the initiative and diverse target publics at which they are aimed in view (e.g., see AAAS Logic Model for Public Engagement with Science).

7. **One-way communication is not sufficient, particularly for certain complex sciences. Close consideration of models that involve end-users in deliberation and even decision making is also required.**

    a. There are growing trends toward involving end-users and publics in deliberation about technology not only when technologies have been developed but at the earliest stages of the processes, including in the planning and application of technologies. End-users and publics are involved, for example, through co-design, deliberative engagement, patient representatives (in medical research), *Responsible Research and Innovation* programs, and community-led scientific initiatives (see e.g. DIISRTE 2018, Nowak & Paton 2018).

    b. Outward communication to the publics is necessary for all these types of initiatives. But alone it is not sufficient, particularly in complex scientific domains that are expected to impact society and where values, experiences, and lay knowledge are critical, such as gene technologies.

c. Close consideration of models that involve end users in some type of bidirectional knowledge exchange is critical for deciding on an approach (see e.g. Scheufele et al 2021).

8. **Science communication is an immature discipline. This makes it difficult to determine best practice.**

a. As outlined in the themes above, there are many underlying assumptions and gaps associated with science communication, indicating that more research is required in this domain.

b. Key assumptions are that communication and engagement are in themselves 'good.' But the research shows that this is not the case, and that evaluation must be done in relation to the goals of the communication or engagement initiative, and with focus on the targeted publics and their involvement (for a review, see Kappel & Holmen 2019).

c. Similarly, science communication has tended to rely on one narrative - the march of progress toward discoveries and truth. This narrative leaves out certain publics. It also fails to recognise that science has sometimes caused harm, for instance to Indigenous communities and in developing countries (Leach & Medvecky 2019).

d. This lack of maturity makes it difficult to determine best practice.

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Glossary

Deficit model (also information deficit model) of science communication: This model attributes a public indifference or hostility to science to their lack of understanding or knowledge. It implies that science communication should focus on experts educating non-experts. The model has repeatedly been shown to be empirically incorrect and theoretically problematic.

Framing: Framing refers to how context and language can alter interpretation of information. For example, using the term "development" versus "advance" to describe research.

Narrative (or storytelling): An account of the interactions between people and events over time. In communication practice it can be used to improve engagement with, and recall of, embedded information. Narrative is frequently used in science communication, journalism, advertising, and public health messaging. Alternative techniques for information delivery include didactic or fact-based content, such as information sheets.

Science communication: Practices for sharing scientific knowledge.

Post-normal science: Science that is rapidly evolving, technical, and with highly uncertain impacts, and where purely technical expertise is insufficient to assess risks and benefits that have social, ethical, and legal dimensions.

Publics: Groups of people united by common ideas, hobbies, interests, etc. Used to emphasise that "the public" is not uniform, and that individuals are likely to belong to more than one group.

Public engagement or public participation: The practice of involving publics in policy formation, agenda setting and decision making.

Appendix 1

A: Development of this Guidance

In the Third Review of the National Gene Technology Scheme (October 2018), it was noted that there is a need to communicate appropriately with the public about gene technology including its applications and end products. The Review recommended that the Commonwealth Gene Technology Regulator continue to lead communication activities on topics related to the assessment of risk associated with gene technology. Soon after, GTECCC commenced work on the development of the Guidance.

June 2019 – The Committee:

- discussed the need for, and purpose of guidance – i.e., to provide a reference point for OGTR and others who communicate about gene technology
- discussed the values that would underpin guidance.

November 2019 – GTECCC agreed to refer work on 'guiding principles' to the next membership of the committee.

October 2021 – Following re-appointment of the Committee and changes in processes due to COVID-19, GTECCC resumed development of guiding principles. The Committee:

- discussed progress on guiding principles
- agreed to establish a phase I working party for the purposes of undertaking research to find key literature (literature review)
- agreed to consider next steps for guiding principles, following the literature review.

October 2021 to June 2022 – On behalf of GTECCC the phase I working party (Rachel Ankeny, Rachel Nowak, convenor Robert Sward[2]) conducted literature research and drafted a report on the literature. This work also articulated the themes identified in the background paper. For further information about the research process please see Part B of Appendix 1 (below).

June 2022 – The working party provided the Committee a preview of work to date on the literature review. The Committee:

- clarified the purpose and intent of guiding principles
- discussed who guiding principles would be aimed at and identified target audiences
- provided feedback on the literature review so far.

November 2022 – GTECCC was presented with a report on the literature by the phase I working party. GTECCC considered the report on the literature and discussed next steps. The Committee:

- clarified the target audience of guiding principles
- considered whether a workshop with stakeholders would be appropriate
- discussed developing case studies to assist with discussion at such a workshop
- agreed to consider next steps and discuss at the next meeting.

May 2023 – GTECCC discussed project timelines for guiding principles and agreed to hold a workshop with communication experts to inform further development. The Committee:

- added to the purpose of guiding principles, with the addition of "Improving gene technology communication outcomes and fostering or supporting responsible communication about gene technology"

[2] Where work is specifically attributed to multiple members, members are listed in alphabetical order.

- discussed the timeframe for the project, including potential exposure at the IBC Forum in 2024
- provided input into a plan for a workshop with external participants.

October 2023 – GTECCC undertook a workshop with external participants and formed a phase II working party. The Committee:

- engaged with academics and experts in the communications field to inform guiding principles
- discussed workshop outcomes and formed a phase II working party (Rachel Ankeny, convenor Jaden Hastings, Ainsley Newson, Robert Sward) to further develop guiding principles by formulating a set of questions
- GTECCC considered the intent of a second workshop, to test the questions prepared by the working group.

2024 – GTECCC continued development of guidance, in preparation for the IBC Forum. GTECCC phase II working party formulated questions and disseminated these to the Committee for comment.

May 2024 – GTECCC held an informal workshop (led by Rachel Ankeny) to consider the question-led approach devised by the Committee.

June to August 2024 – GTECCC undertook out-of-session revisions of the draft Guidance document (Rachel Ankeny, Paula Fitzgerald, Judith Jones, Ainsley Newson, Rachel Nowak, Gabrielle O'Sullivan, Kelly Pearce) in preparation for exposure of the document for public comment and presentation at the September 2024 IBC Forum.

September to November 2024 – presentation of the draft Guidance document at the IBC Forum on 16 September 2024 (Paula Fitzgerald, Rachel Nowak) coinciding with a period of eight weeks of public release and call for comment.

February to March 2025 – GTECCC considered how to address comments received in submissions, then undertook out-of-session revisions to develop hypothetical scenarios (Paula Fitzgerald, Rachel Nowak, Robert Sward, Lynn Woodward).

March to September 2025 – using the question-led approach devised by the Committee GTECCC members out-of-session drafted and finalised six (6) case study responses to a series of hypothetical scenarios involving communication about gene technology (Paula Fitzgerald, JJ Hastings, Judith Jones, Ainsley Newson, Gabrielle O'Sullivan, Kelly Pearce).

B: Approach to report on the literature for the Background Paper

The question the report on the literature sought to address:
What guiding principles govern global best practices for communicating about technical developments that will have far-reaching or complex effects on people or the environment?

The phase I working group took a broad scoping approach that included literatures and approaches associated with genetic modification (GM) and other types of technologies and developments. The word 'developments' was chosen so to take a value-neutral approach, as compared to 'advances' or 'innovations' which might be read as indicating endorsement or reinforcing positive narratives. The working group used the words 'far-reaching' and 'complex' to be inclusive. These words described what is important (and most difficult) to consider, regarding

the potential implications of gene technologies and how they are communicated, as compared to communication approaches associated with developments where impacts are more delimited and/or predictable.

Literature searches were extensive, but not exhaustive or strictly speaking systematic. There likely were additional worthwhile pieces of literature not identified in this review, particularly in languages other than English. The group used standard scholarly scientific and interdisciplinary databases including Medline, Scopus, PsychINFO, JSTOR, and Project MUSE, and identified grey literature available via the internet in English such as professional societies, research councils and institutes, science communication-related organisations, and GM-opposed organisations. They developed a standardised search strategy using keywords associated with science engagement and communication, and with the specific technologies of interest related to the OGTR's mandate. The latter search strings were borrowed from a previous project which Prof Ankeny recently performed for FSANZ on novel breeding techniques. The working group also used a snowballing technique and added relevant literature included in the bibliographies or references of the resources identified using our searches.

The working group considered searching for literature published over the previous 20 years, but as expectations regarding societal expectations and best communication practices had changed significantly during this period, searches were limited to the previous 10 years. The group screened the literature generated for relevance to the research question, analysed the relevant literature, and constructed a summary of the themes articulated through the analysis, as well as identifying some key references. On completion the working group noted that the total number of references identified was relatively small (less than 50 in total, combining the grey and scholarly literatures) and there were fewer than 20 references that were considered highly relevant to our focal question.

Gaps:

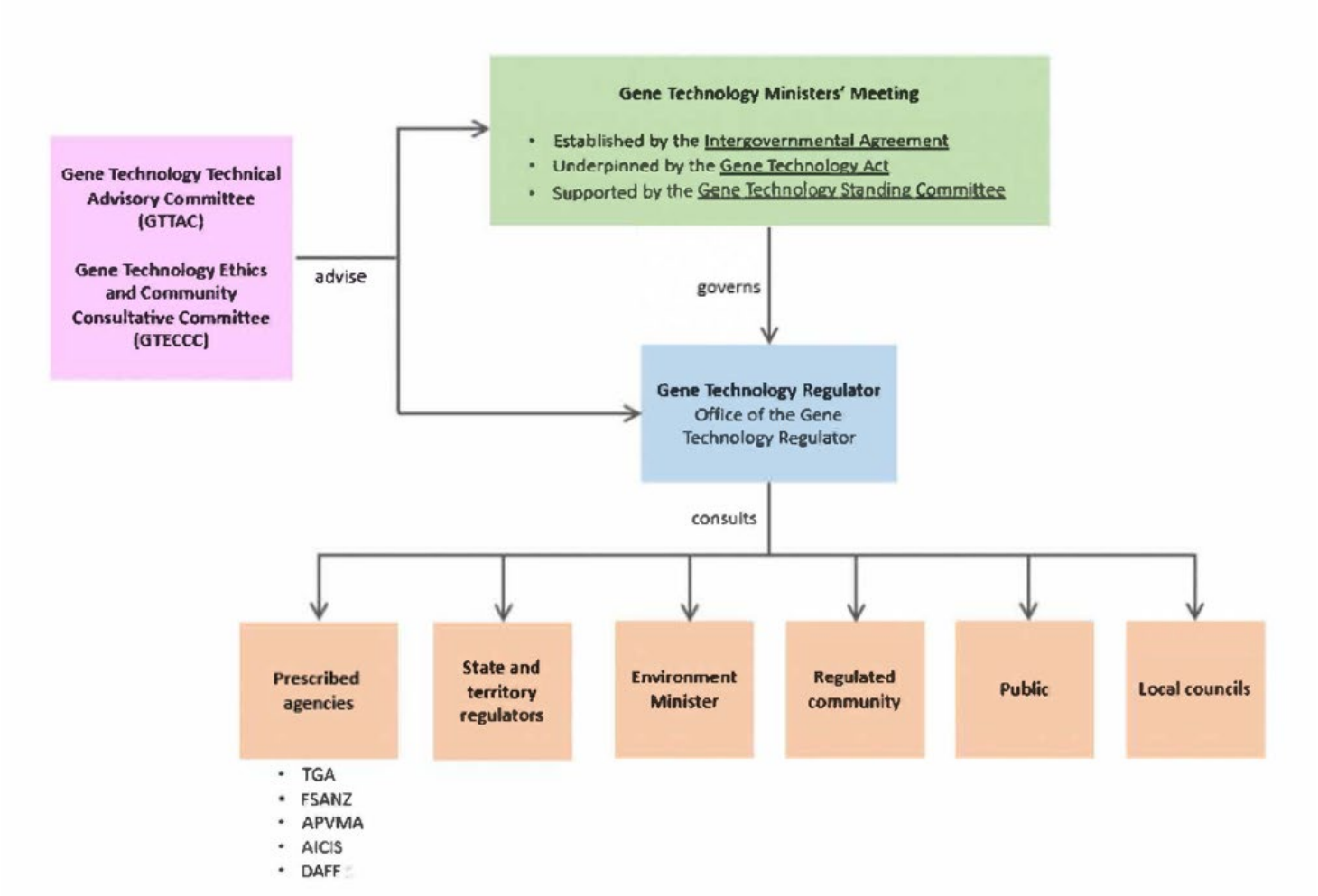
There was a dearth of formalised material and resources available even where it might have been expected to be found (e.g., in the grey literature from peak bodies focused in part on engaging or communicating with the public). The working group suspected that many think that answers to the question that was articulated for the background paper and identified themes are obvious, or perhaps that communication principles in other domains are directly applicable in this one. There is a considerable literature and resources about how to engage with the media, but this was not the primary focus of the literature review.

Appendix 2

THE NATIONAL REGULATORY CONTEXT

A. The National Gene Technology Scheme

The gene technology regulatory scheme is a national collaborative scheme involving the governments of all Australian jurisdictions and the Gene Technology Ministers' Meeting. Further information is available at: https://www.genetechnology.gov.au/



B. The Office of the Gene Technology Regulator

Under the *Gene Technology Act 2000* (Cwth), the Gene Technology Regulator (Regulator) is responsible for protecting the health and safety of people and the environment by identifying risks posed by, or as a result of gene technology and managing those risks through regulating certain dealings with genetically modified organisms. The Office of the Gene Technology Regulator (OGTR) assists the Regulator to administer the gene technology regulatory system and sits within the Commonwealth Department of Health and Aged Care.

C. The Gene Technology Ethics and Community Consultative Committee

The GTECCC provides advice to the Regulator and the Gene Technology Ministers' Meeting.

The *Gene Technology Act 2000* (Cth) establishes GTECCC. The Regulator and the Ministers' Meeting can request advice from the committee on:

- ethical issues relating to gene technology
- principles, guidelines and codes of practice for genetically modified organisms (GMOs) and genetically modified (GM) products
- community Consultative on the process for applications for licences covering dealings that involve the intentional release of a GMO into the environment (DIRs)
- risk communication matters for DIRs
- matters of general concern about GMOs
- matters identified by the Regulator.

Version Control Table:

Version	Author	Date	Changes
1.0	GTECCC	21/11/2025	Version 1.0 Final