The injection myth: communicating science

Jane Munday, PhD candidate, Northern Institute, Charles Darwin University, Darwin.

Contentious environment issues are the ultimate 'wicked problem' (Hind, 2010). Social media fan protests (Hanna, 2016), causing delays and distractions to projects (Franks, et al., 2014), while cynicism about democratic systems (Hind, 2010) fuels a 'polluted public square' of polarised and combative debate where extremes define the issues (Hoggan, 2016) and no one wins the argument.

When it comes to impacts on people, a cynical and distrustful public expects developers to earn their social and not just regulatory, or legal, approvals (Preston, 2014).

Community acceptance is challenged, however, by the encroachment of projects on lives and livelihoods. Aboriginal people are demanding control over development on their lands (O'Faircheallaigh, 2009; Morrison, 2017) and highlighting the often contested land uses and values of mining and Aboriginal people (Lewis & Scambary, 2016). There are calls for cumulative impact assessments (Noble & Gunn, 2016); debates about the equitable distribution of costs and benefits (Preston, 2014) and expectations that impact assessment will deliver social sustainability and adaptive management of emerging issues (Vanclay et al., 2015).

Abstract and intangible 'dread' issues such as 'fracking', radiation and contamination, are particularly 'wicked' (Sandman, 2013).

While people expect better communication (Hawke, 2014), the response to community alarm is rarely found in 'facts' (Sandman, 2013) for two key reasons. Unlike plants and animals, humans are complex, emotional and unpredictable. They worry about issues, not science. And, while people are demanding earlier and better input to decisions, they are not particularly amenable to factual, quantitative, evidence-based arguments (National Academy of Sciences, Engineering and Medicine, 2017).

In fact, seeking to 'educate' may completely miss the point of what people are worried about, their 'lived experience' of impacts (Vanclay et al., 2015; Parkins & Mitchell, 2016), their aspirations and fears (O'Faircheallaigh, 2009), perceptions grounded in deeply held values (Sandman, 2013) and different worldviews and epistemologies (Lewis & Scambary, 2016).

'Education' assumes people process information in a rational and logical way, whereas empathy understands that attitudes and beliefs are influenced by emotional reactions, the degree of 'dread' (Sandman, 1993), heuristic processing of information (Kahneman, 2011), the credibility of information sources (Sandman, 2013) and whether various publics are even paying attention (Grunig & Repper, 1992).

As Sandman contends, pointing the finger at 'activists' is self-defeating. Communities know that activists sometimes exaggerate. But they also think companies exaggerate the benefits and downplay the consequences of projects (Sandman, 2013; Franks, 2015). So communities apply the precautionary principle, placing greater trust in their environmental 'watchdogs' (Sandman, 2013).

For communities to accept the benefits of contentious projects, they must feel safe and in control; have confidence that their social and ecological environments will be protected; trust Government's regulatory regime; and believe that industry is honest, transparent and technically competent (Sandman, 2013).

This is serious context for communicating science if it is to achieve goals such as changing behaviour, contributing solutions to societal problems and providing trusted information on issues that matter. As the National Academy of Sciences (NAS) suggests (2017) effective communication of science is a complex task and an acquired skill.

TEN KEY CHALLENGES:

1. 'WICKED PROBLEMS'

Social media campaigns, cashed up environmental groups, heightened public awareness of legacy issues and demands for input to decision-making highlight the importance of early and meaningful engagement based on identification of issues and stakeholders, proactively reaching out to marginalised and disadvantaged groups and giving people the time and resources to have influence. Engagement has missed the bus once people are angry.

2. PROTESTING CAN BE REWARDING

Protests may be a slow-burning fuse, sparked by growing awareness and fuelled by fear, self-interest, misinformation or perhaps a negative incident. Once the wave of protest gathers speed, it is hard to turn the tide. Groups of like-minded people will resist information disconfirming their beliefs.

3. RISK COMMUNICATION

Our brains are wired to react quickly to emotion and fear. People are more antagonistic to imposed risks than those they expose themselves to (Sandman, 2012). The best time to communicate on dread issues is before people are alarmed, when it may be possible to 'inoculate' against misinformation by addressing myths and fallacies to which people might later be exposed (Cook, 2017)

4. THE INJECTION MYTH

McKay describes the 'injection myth' as a presumption that we just need to pump people full of information to change their attitudes and behaviours. Similarly, a 'deficits' model regards non-scientists as the 'not yet informed' (NAS, 2017). But it's the receiver not the sender who shapes messages. Spam filters include being busy, distracted, angry or holding different values and beliefs.

5. PROFESSIONAL MISCOMMUNICATION

Communication is a social process that builds on relationships whereas scientists may be seen as 'gifted experts' offering abstract, technical, highly qualified statements that assume

all people are rational, attentive, open-minded and persuaded by facts (Hoggan, 2016). People communicate in narratives, not statistics, and heed information from friends, relatives or trusted opinion leaders (Rogers, 1995).

6. ARE THEY EVEN LISTENING?

'Active' publics seek information. 'Passive' publics have other things on their mind. It can take imagination to get their attention and explain the implications of a project. But watch for emerging 'latent' publics (Grunig & Repper, 1992).

7. POLARISED DEBATE

When people argue, they have wax in their ears. Debate polarises, whereas dialogue and deliberation bring people together to share information and collaborate on solutions (Parkins & Mitchell, 2005).

8. THE TRUST DEFICIT

Trust is the foundation of communication and a key barrier, given that research shows a lack of public trust in companies, governments and regulators (Boughen et al., 2010). Trust is earnt through performance, transparency, accountability and procedural fairness.

9. COGNITIVE LIMITS

When confronted with complexity people reduce mental effort with heuristics or mental shortcuts to make quick, often sub-conscious decisions. We dream of winning Tattslotto, think one plane crash makes travel dangerous and that good-looking people are smarter. We have an exaggerated faith in what can be learnt from small samples or salient events (Kahneman, 2011; NAS, 2017). Even scientists misjudge their own blind spots. A barrier to communication is confirmation bias, or seeking to confirm what we already know. Attacking beliefs just thickens the 'bars' of people's cognitive cages (McKay, 1994).

10. ROLE OF THE MEDIA

Media are criticised for sensationalism and 'setting the agenda' of what is topical through selective and adversarial coverage. However, the media knows the winning formula. To get attention requires drama, narrative, human interest and good visuals.

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The Injection Myth: Communicating science EIANZ November 2017

Jane Munday, PhD candidate, Northern Institute

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People. Policy. Place.

Facts – fall on rocky ground

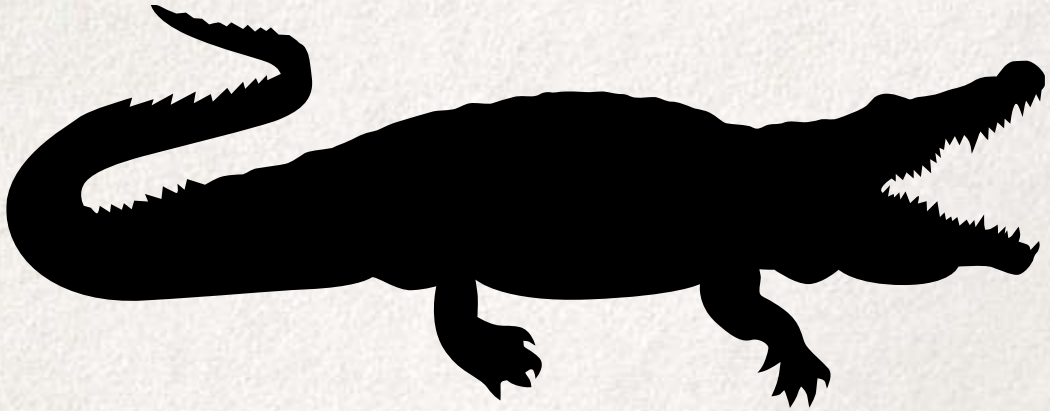
Facts are information

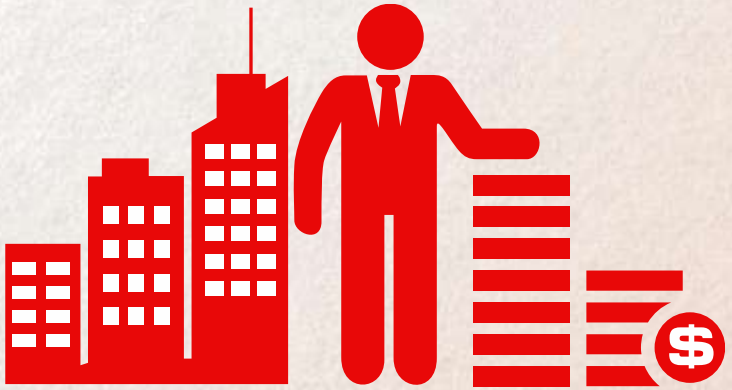
People need objective, factual information to make informed decisions

But information is not communication

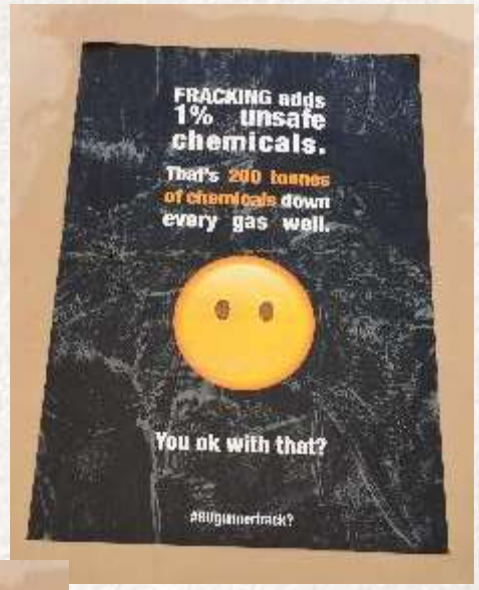
Facts alone do not change behaviour and attitudes

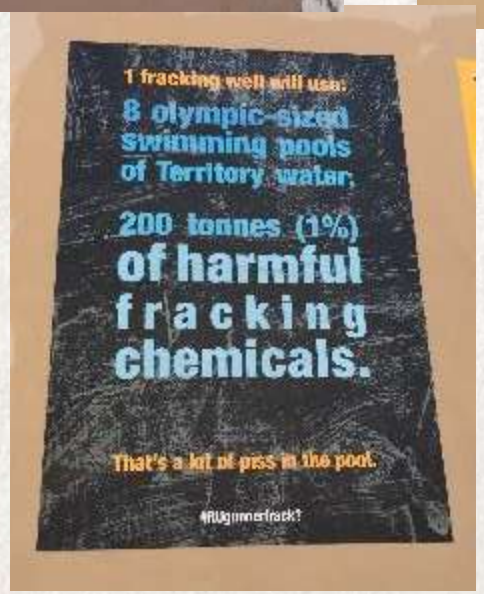
1. Wicked problems: fairness and justice





2. The trust deficit





3. The psychology of protest

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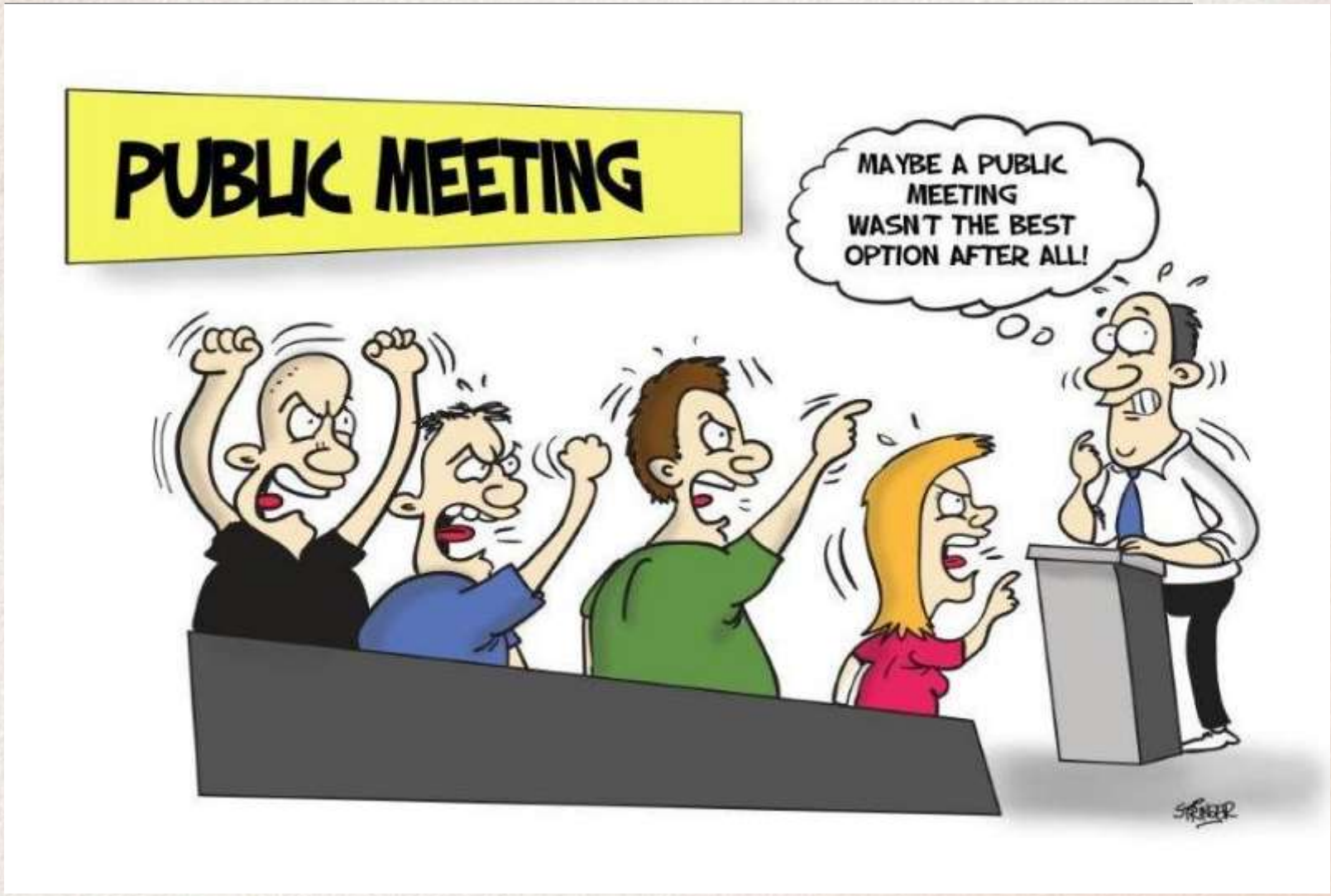
4. Polarised debate

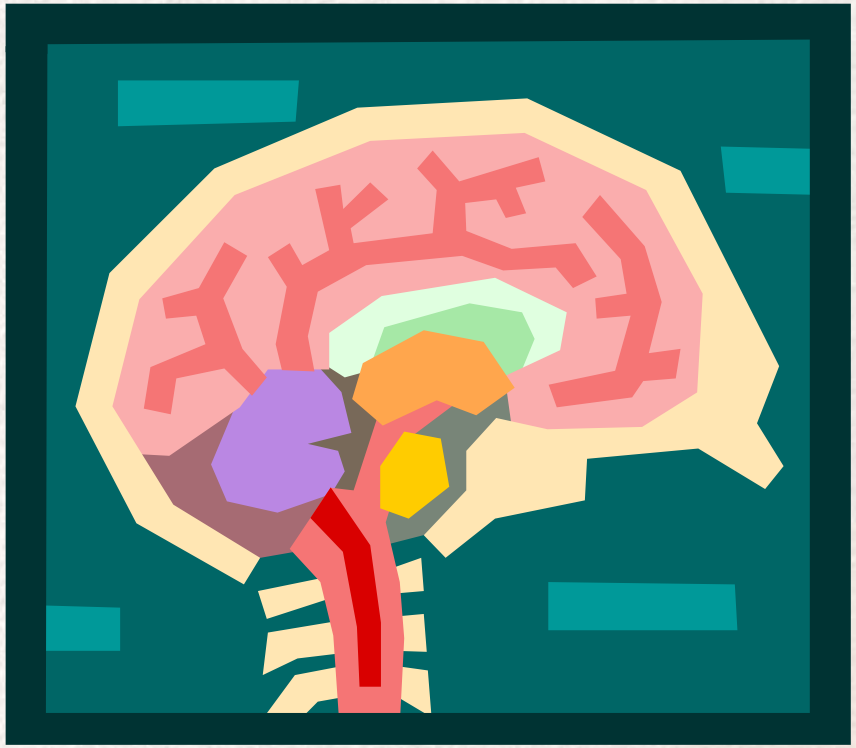
Polarised debate



5. Dread issues

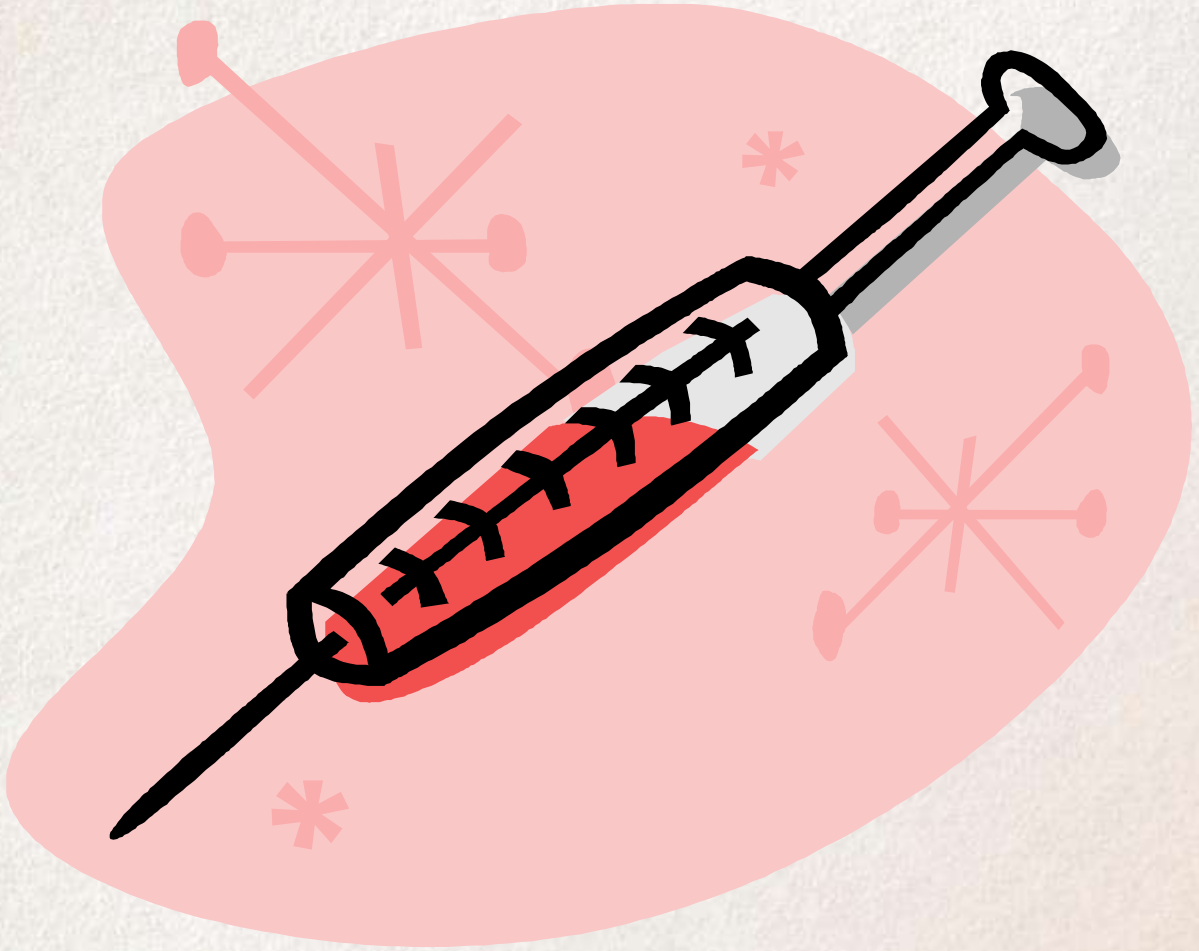
facts

education



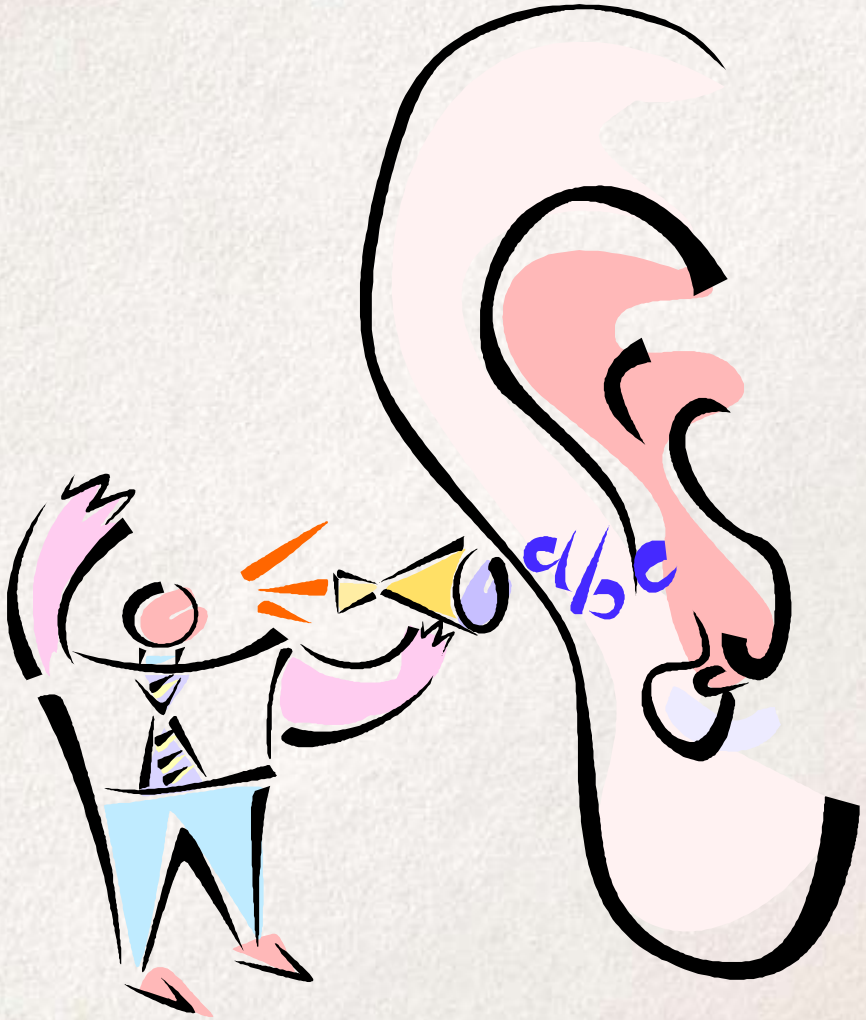
Intuitive toxicology

6. The injection myth*



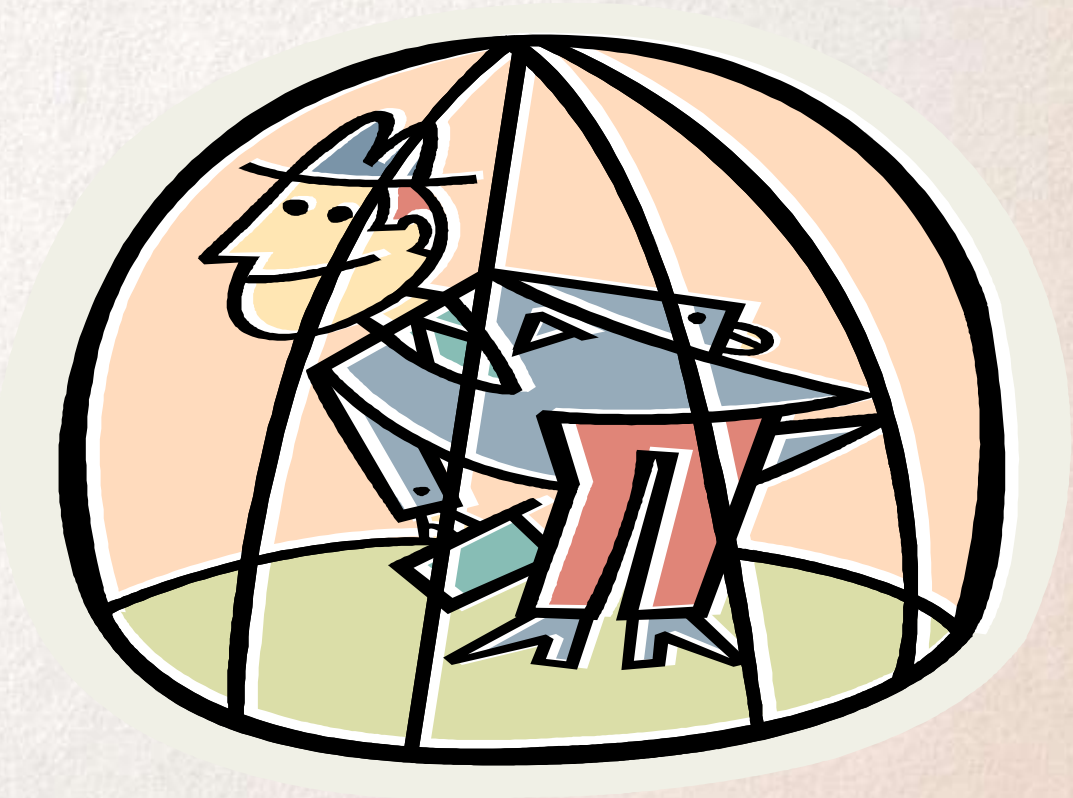
* Based on Hugh McKay

7. Are they even listening?



8. The culture of communication

9. Our cognitive limits



10. Sensationalism sells

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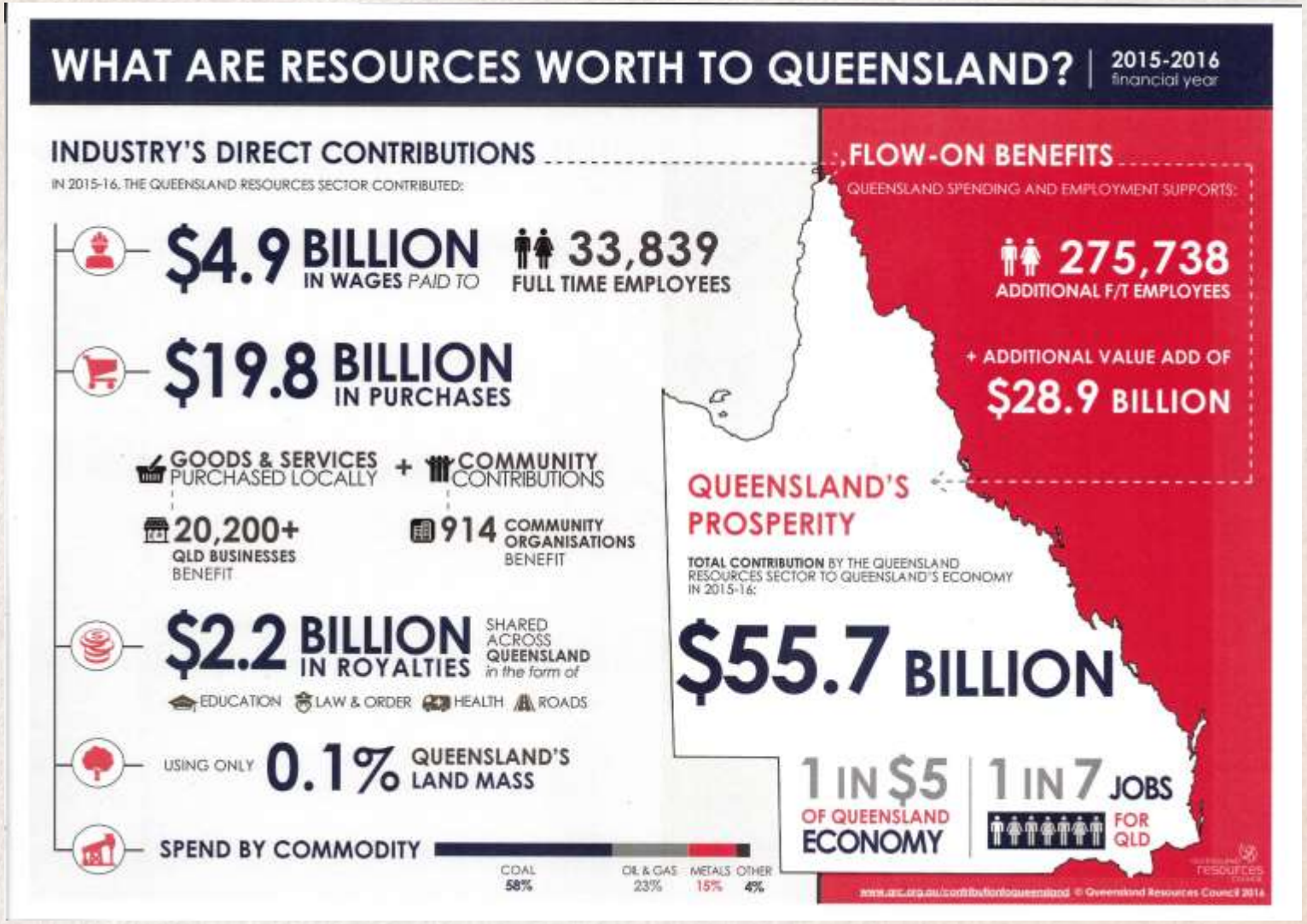
Facts


WHAT ARE RESOURCES WORTH TO QUEENSLAND?
2015-2016 financial year
INDUSTRY'S DIRECT CONTRIBUTIONS
IN 2015-16, THE QUEENSLAND RESOURCES SECTOR CONTRIBUTED:
$4.9 BILLION IN WAGES PAID TO
33,839 FULL TIME EMPLOYEES
$19.8 BILLION IN PURCHASES
GOODS & SERVICES PURCHASED LOCALLY
+
COMMUNITY CONTRIBUTIONS
20,200+ QLD BUSINESSES BENEFIT
914 COMMUNITY ORGANISATIONS BENEFIT
$2.2 BILLION IN ROYALTIES SHARED ACROSS QUEENSLAND in the form of
EDUCATION
LAW & ORDER
HEALTH
ROADS
USING ONLY 0.1% QUEENSLAND'S LAND MASS
SPEND BY COMMODITY
COAL 58%
OIL & GAS 23%
METALS 15%
OTHER 4%
FLOW-ON BENEFITS
QUEENSLAND SPENDING AND EMPLOYMENT SUPPORTS:
275,738 ADDITIONAL F/T EMPLOYEES
+ ADDITIONAL VALUE ADD OF
$28.9 BILLION
QUEENSLAND'S PROSPERITY
TOTAL CONTRIBUTION BY THE QUEENSLAND RESOURCES SECTOR TO QUEENSLAND'S ECONOMY IN 2015-16:
$55.7 BILLION
1 IN $5 OF QUEENSLAND ECONOMY
1 IN 7 JOBS FOR QLD
resources

Emotions

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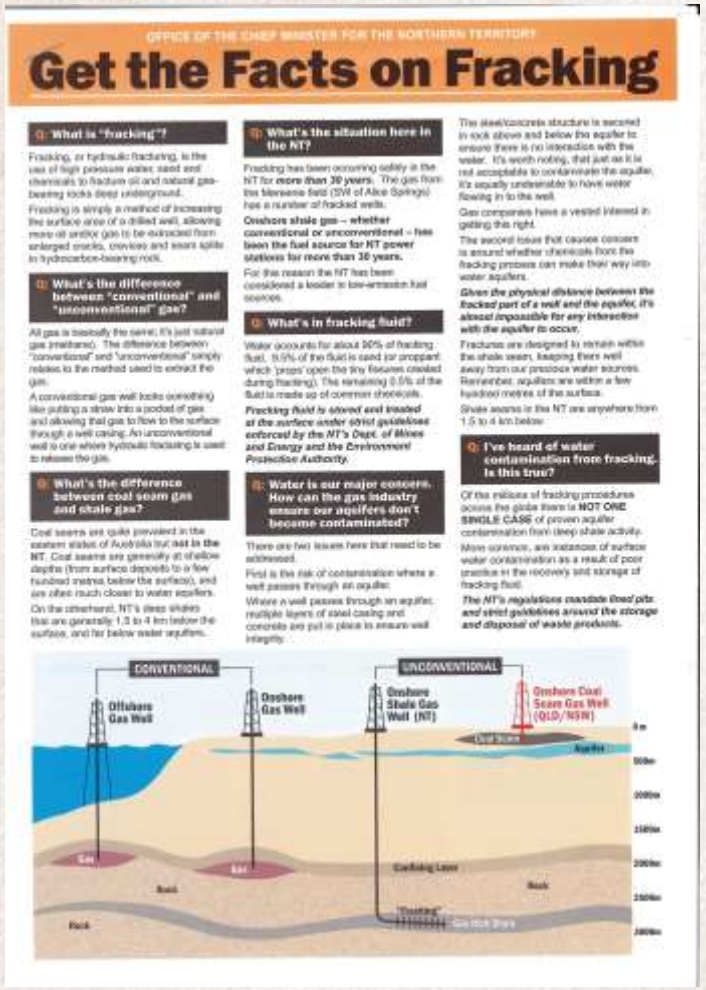
Fighting facts with facts



OFFICE OF THE CHIEF MINISTER FOR THE NORTHERN TERRITORY

Get the Facts on Fracking

Q: What is "fracking"?

Fracking, or hydraulic fracturing, is the use of high pressure water, sand and chemicals to fracture oil and natural gas-bearing rocks deep underground.

Fracking is simply a method of increasing the surface area of a drilled well, allowing more oil and/or gas to be extracted from enlarged cracks, crevices and seam splits in hydrocarbon-bearing rock.

Q: What's the difference between "conventional" and "unconventional" gas?

All gas is basically the same. It's just natural gas (methane). The difference between "conventional" and "unconventional" simply relates to the method used to extract the gas.

A conventional gas well looks something like putting a straw into a pocket of gas and allowing that gas to flow to the surface through a well casing. An unconventional well is one where hydraulic fracturing is used to release the gas.

Q: What's the difference between coal seam gas and shale gas?

Coal seams are quite prevalent in the eastern states of Australia but **not in the NT**. Coal seams are generally at shallow depths (from surface deposits to a few hundred metres below the surface), and are often much closer to water aquifers.

On the other hand, NT's deep shales that are generally 1.3 to 4 km below the surface, and far below water aquifers.

Q: What's the situation here in the NT?

Fracking has been occurring safely in the NT for **more than 30 years**. The gas from the Mereenie field (SW of Alice Springs) has a number of fracked wells.

Onshore shale gas – whether conventional or unconventional – has been the fuel source for NT power stations for more than 30 years.

For this reason the NT has been considered a leader in low-emission fuel sources.

Q: What's in fracking fluid?

Water accounts for about 90% of fracking fluid. 9.5% of the fluid is sand (or proppant which 'props' open the tiny fissures created during fracking). The remaining 0.5% of the fluid is made up of common chemicals.

Fracking fluid is stored and treated at the surface under strict guidelines enforced by the NT's Dept. of Mines and Energy and the Environment Protection Authority.

Q: Water is our major concern. How can the gas industry ensure our aquifers don't become contaminated?

There are two issues here that need to be addressed.

First is the risk of contamination where a well passes through an aquifer.

Where a well passes through an aquifer, multiple layers of steel casing and concrete are put in place to ensure well integrity.

The steel/concrete structure is secured in rock above and below the aquifer to ensure there is no interaction with the water. It's worth noting, that just as it is not acceptable to contaminate the aquifer, it's equally undesirable to have water flowing in to the well.

Gas companies have a vested interest in getting this right.

The second issue that causes concern is around whether chemicals from the fracking process can make their way into water aquifers.

Given the physical distance between the fracked part of a well and the aquifer, it's almost impossible for any interaction with the aquifer to occur.

Fractures are designed to remain within the shale seam, keeping them well away from our precious water sources. Remember, aquifers are within a few hundred metres of the surface.

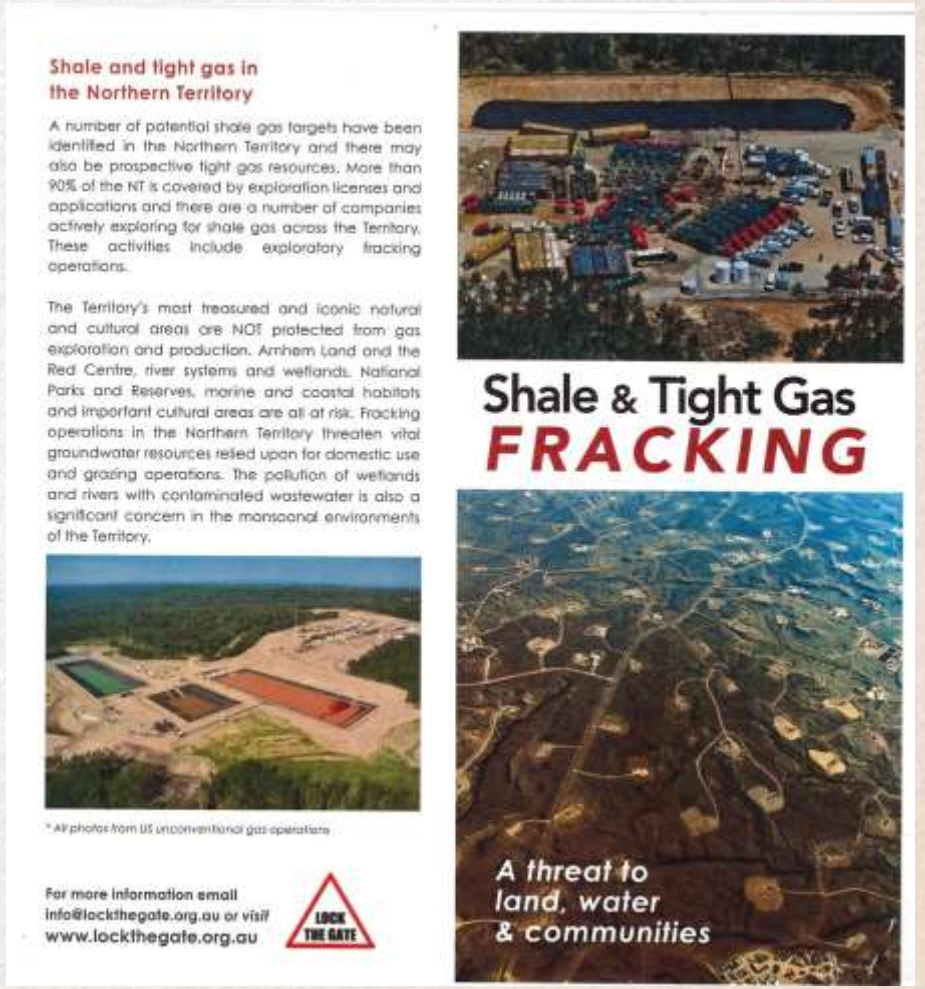
Shale seams in the NT are anywhere from 1.5 to 4 km below.

Q: I've heard of water contamination from fracking. Is this true?

Of the millions of fracking procedures across the globe there is **NOT ONE SINGLE CASE** of proven aquifer contamination from deep shale activity.

More common, are instances of surface water contamination as a result of poor practice in the recovery and storage of fracking fluid.

The NT's regulations mandate lined pits and strict guidelines around the storage and disposal of waste products.



Shale and tight gas in the Northern Territory

A number of potential shale gas targets have been identified in the Northern Territory and there may also be prospective tight gas resources. More than 90% of the NT is covered by exploration licenses and applications and there are a number of companies actively exploring for shale gas across the Territory. These activities include exploratory fracking operations.

The Territory's most treasured and iconic natural and cultural areas are NOT protected from gas exploration and production. Arnhem Land and the Red Centre, river systems and wetlands, National Parks and Reserves, marine and coastal habitats and important cultural areas are all at risk. Fracking operations in the Northern Territory threaten vital groundwater resources relied upon for domestic use and grazing operations. The pollution of wetlands and rivers with contaminated wastewater is also a significant concern in the monsoonal environments of the Territory.

* All photos from US unconventional gas operations

For more information email info@lockthegate.org.au or visit www.lockthegate.org.au

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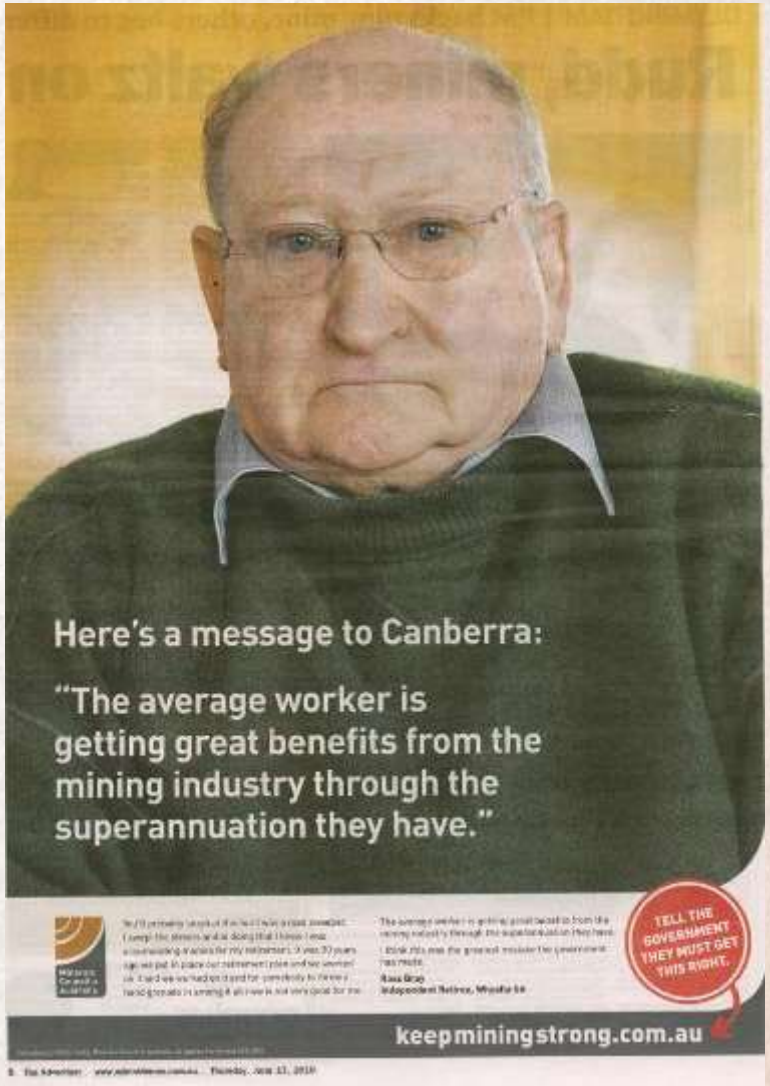
Shale & Tight Gas FRACKING

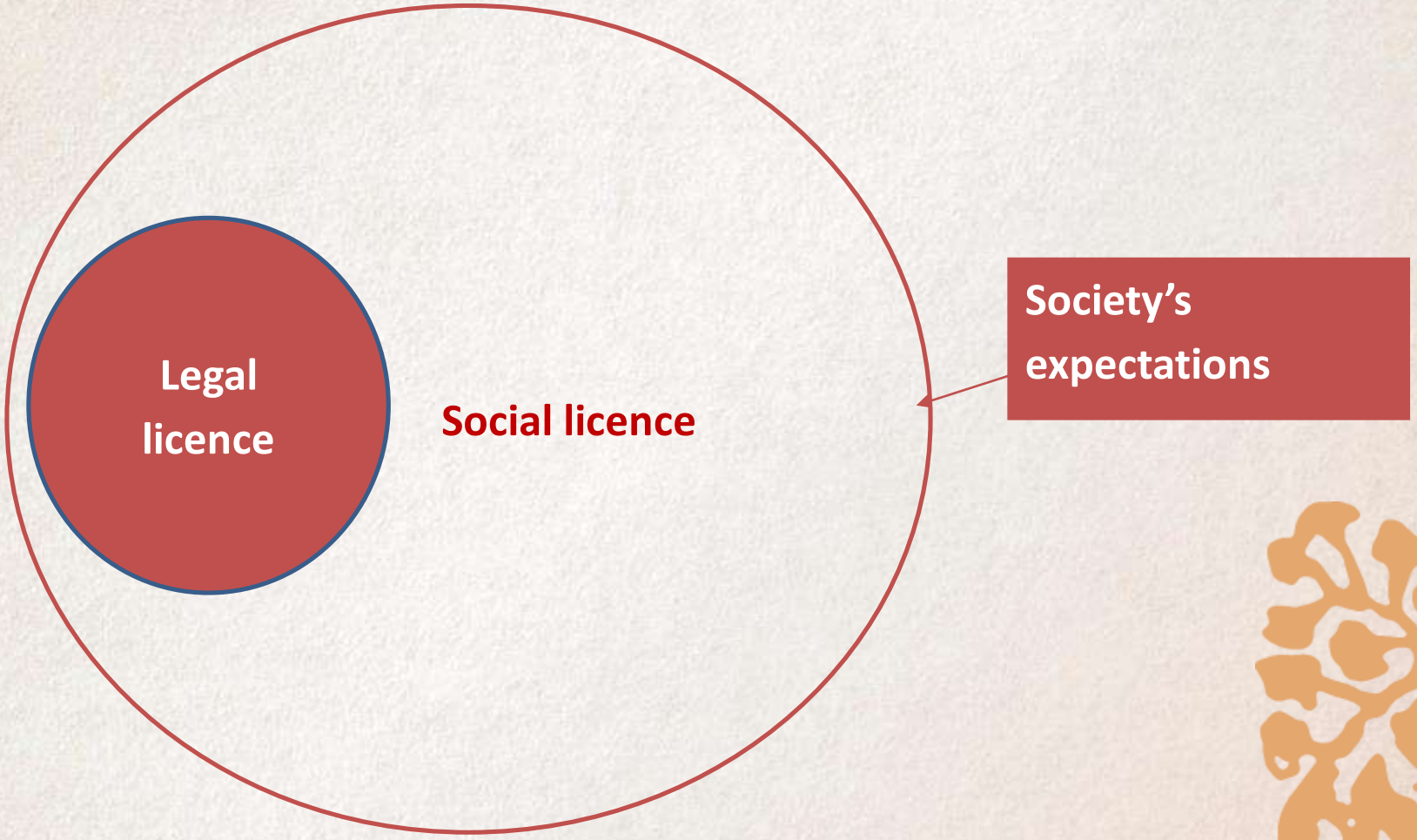
Narrative vs statistics

Resource Rent Tax (2010):

Government fought on facts, Minerals Council fought with the Whyalla street sweeper worried about his superannuation

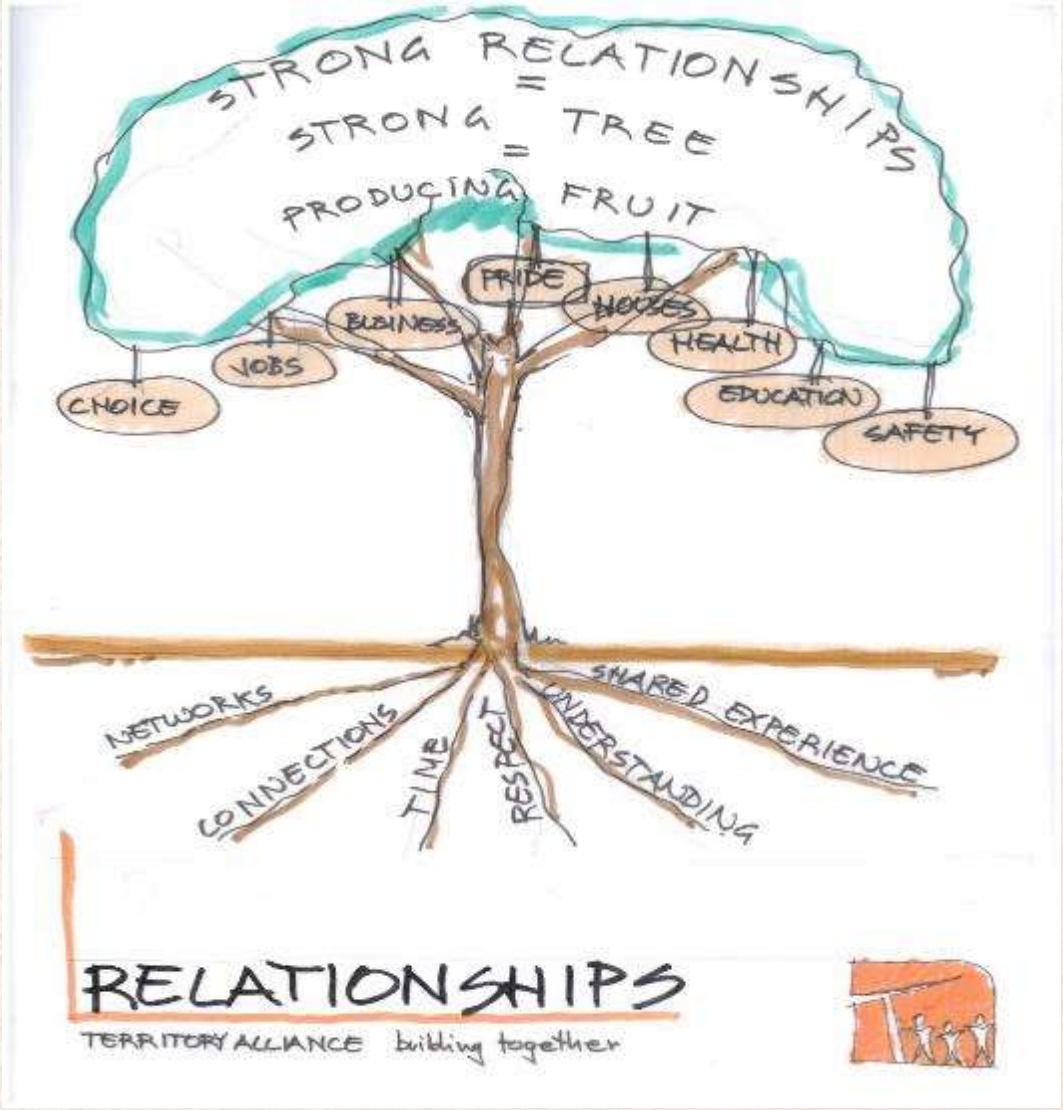


Social licence to operate



Based on speech by The Hon Justice Brian J Preston SC of the NSW Land Court 2014

Relationships, values and trust



Territory Alliance relationship tree ©

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Deliberation

Tell me, I forget
Show me, I remember
Involve me, I understand

Chinese proverb

The fundamentals

"Effective communication of science is a complex task and an acquired skill" *(National Academy of Sciences)*

listening and empathy

shared understanding

draws on the lessons of natural science and the insights of social science

= a boundary spanning role of teamwork across professional cultures

Jane Munday
PhD Candidate, Northern Institute, Darwin, Australia
Janemarianne.munday@cdu.edu.au

This research is supported by the Australian Government's Research Training Program Scholarship

Thank you

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Casuarina Campus | Yellow 1, Ellengowan Drive | Darwin, Northern Territory 0909 Australia
T: +61 8 8946 7468 | E: thenortherninstitute@cdu.edu.au | www.cdu.edu.au/northern-institute