

chapter 9

Recommendations

9.1 INTRODUCTION

The recommendations contained in this Roadmap are the culmination of actions listed in Table 9.1.

Caveat: The recommendations listed in Table 9.1 were posed and considered by members of the Roundtable but this does not imply universal support for any or all recommendations or rankings from every Roundtable member.

9.2 Development of Recommendations

A strength-weakness-opportunities-threat (SWOT analysis) was concluded by the Roundtable in November 2010 (Table 9.2). That informed subsequent engagement with stakeholders in the development of recommendations. To enable focussed discussions, prior to the 27th July 2012 meeting of the Roundtable recommendations were split into three broad categories: Economies of Scale, Investment Attraction; and Regulations.

Category	Recommendations to 27 July 2012	Recommendations post 27 July 2012
Economies of scale	46	67
Investment attraction	11	26
Regulation	28	48
Totals	86	141

In the Roundtable's 27th July meeting, three break-out groups focused separately on the above-stated three categories and then presented (for feedback) revised recommendations to the entire Roundtable (in attendance) to result in improved and added-to recommendations on 27th July 2012. The number of recommendations for each of these three broad categories increased as the result of discussions on 27th July 2012.

Following the 27th July Roundtable meeting, a detailed review merged equivalent entries, and a total of 125 unique recommendations were then established for ranking¹ by the Roundtable. All recommendations developed by the Roundtable for Unconventional Gas Projects in South Australia (Roundtable) are listed in Table 9.3

9.3 Ranking of Recommendations by Priority

The (post 27th July 2012) updated list of recommendations was circulated to get further comments and a sense of priorities (ranking for implementation) from the Roundtable. In this step, Roundtable

¹ In the total 129 recommendations developed by the Roundtable (to 27th July 2012), 4 recommendations have equivalents. Hence, there are 125 unique recommendations for ranking. Also, several ranked recommendations overlap in scope.

Table 9.1 Milestones in the development of this Roadmap for Unconventional Gas Projects in South Australia.

Date	Milestone
16 -19 May 2010	Discussions with industry during the APPEA conference concluded a roundtable (interest group) to develop a roadmap for unconventional gas projects would foster efficiency in associated environmentally sustainable land access and investment
13-17 July 2010	Draft Terms of Reference and Strength-Weakness-Opportunity-Threat analysis provided to peak petroleum industry groups (APPEA and APIA) for comment prior to convening 1 st meeting of the Roundtable
21 Sep 2010	Draft Terms of Reference and Strength-Weakness-Opportunity-Threat analysis sent to inaugural members of the Roundtable for comments and ranking prior to convening 1 st meeting of the Roundtable
25 Nov 2010	1st meeting of the Roundtable convened. Terms of reference, SWOT table, focus of working groups and timelines for progress were agreed
Jan-March 2011	Devised Roundtable / Roadmap web pages on DMITRE's website
28 Feb 2011	Supply chain working group met to progress agenda
28 March 2011	Working group focused on economic modelling met to progress agenda
18 April 2011	The Commonwealth Minister for Resources, Energy and Tourism states that his Department will join the Roundtable
In July 2011	Contracted for spreadsheet economic modelling for conventional sales gas, LNG and Gas-to-Liquids, and subsequently made this available to the Roundtable, and then to the public from DMITRE's website
20 July 2011	Infrastructure Demand Study Scenario Workshop for Transport/Logistics conducted by Parson Brinkerhoff (dual purpose being the State's Infrastructure Plan and the Roadmap for Unconventional Gas.
18 August 2011	Scan / inventory concludes that South Australian has >24 JVs chasing at least 9 distinct unconventional gas plays in the State
8 Sept 2011	2nd meeting of the Roundtable convened. Draft table of contents for the Roadmap agreed. Economic modelling presented by Core Energy. Work groups agreed on next steps so that the preliminary 1 st draft Roadmap could be concluded in March / April 2011, so that 1 st draft Roadmap could be released for public comment just prior to, or during the APPEA conference in Adelaide in 13-16 May 2012.
9 Sept 2011	Fracture stimulation symposium (attended by 110 people from 44 organisations)
10 Sept 2011	Abstract for APPEA 2012 paper submitted (<i>Regulatory Nirvana for Low Permeability Gas Reservoir Development</i>)

Date	Milestone
4 Nov 2011	Convened 1 st roundtable discussion with proponents coal gasification processes to inform state-based policies
29 Nov 2011	Convened 2 nd (last) roundtable discussion with proponents coal gasification processes to inform state-based policies
19 April 2012	Preliminary draft Roadmap circulated to leaders of Roundtable Working Groups for comments before broadcast to all members of the Roundtable (on 11 May 2012)
24 April 2012	Dispatched Note to Cabinet through Minister Koutsantonis of intention to release the Draft Roadmap for public comment
8 May 2012	DMITRE's FAQ - Unconventional gas in South Australia (Shale gas, tight gas, coal seam gas and regulation of activities) published. See web-page version by clicking here . Download by clicking here .
11 May 2012	Draft Roadmap circulated to the Roundtable for comments to 27 July 2012. All who asked for an extension of time to pose comments subsequently given an extension to end August 2012 to provide comments
14 May 2012	Premier Weatherill addressed the APPEA Conference and Minister Koutsantonis announced to release of the draft Roadmap for public comment. Notice in The Advertiser seeking comments from the public by 27 July 2012. Draft Roadmap posted on DMITRE's website. All who asked for an extension of time to pose comments subsequently given an extension to end August 2012 to provide comments
15-16 May 2012	DMITRE published/presented following at the APPEA Conference in Adelaide Regulatory Nirvana for Low Permeability Gas Reservoir Development (.PDF - 1.8 MB) <i>B. A. Goldstein et al (DMITRE) May 2012 APPEA</i> Emerging Continuous Gas Plays in the Cooper Basin, South Australia (.PDF - 5.15 MB) <i>S.A. Menpes (DMITRE) May 2012 APPEA</i> The Changing Face of the South Australian Cooper Basin (.PDF - 1.8 MB) <i>E.M. Alexander & A Sansome (DMITRE) May 2012 - APPEA</i> 2012 Petroleum Opportunities in South Australia (.PDF - 2.5 MB) <i>A. Sansome (DMITRE) May 2012 PESA Deal Day</i>
25 June 2012	Roundtable and the public given access to Core Energy financial analysis models for natural gas use in: (1) Liquefied Natural Gas (LNG) for export; (2) Gas to Liquids (GTL) for export and domestic use; (3) Natural and Synthetic Gas for power generation; and (3) Natural Gas for sale to traditional gas Residential and Commercial (R&C) and Industrial Markets. The models allow the user to determine break even gas price, Net Present Value (NPV), Internal Rate of Return (IRR), cash flow, and royalties, for a variety of scenarios based on numerous upstream, downstream and economic variables.
20 July 2012	Draft recommendations for the Roadmap circulated to the Roundtable for consideration ahead of discussions on 27 July 2012. Download by clicking here .
16-17 July 2012	DMITRE published/presented following at the Central Australian Basins Symposium: Unconventional hydrocarbon potential of the Arckaringa Basin, South Australia

Date	Milestone
27 July 2012	3rd meeting of the Roundtable convened. Draft recommendations reviewed, improved and added-to. Table of contents agreed adequate. Two presentations were: Progress Towards a Common Language for Estimating Unconventional Resources - Presentation by Creties Jenkins (DeGolyer McNaughton). Download by clicking here Unconventional Hydrocarbon Resources – Provided by Takehiko (Riko) Hashimoto (Geoscience Australia). Download by clicking here
10 August 2012	Final draft Roadmap recommendations posted on DMITRE's we-pages for download and ranking by the Roundtable
21 Sept 2012	2 nd Draft Roadmap covering all comments to 31 August dispatched to Roundtable for further comments by end October 2012
1 Nov 2012	Last comments from Roundtable received by DMITRE
5 Nov 2012	All comments accounted for and final proof-reading completed. Desk top publishing commenced on Executive Summary and Chapters 1 through 8, and Chapters 10 through 12 (while Chapter 9 Recommendations finalised)
8 Nov 2012	3 rd and final Draft Roadmap covering all comments to 1 November dispatched to Roundtable for final comments within 5 days (by 14 November)
29 Nov 2012	Final desktop published form with Cabinet Note to Minister Koutsantonis, and dispatched to other Government Agencies on the same day
10 Dec 2012	Cabinet to Consider for Publication
12 Dec 2012	Minister Koutsantonis to announce release via DMITRE website
January 2013 onwards	Convene Roundtable Working Groups to progress implementation of recommendations
July 2013 onwards	In consultation with the Roundtable – stock-take of: <ul style="list-style-type: none"> - Roadmap implementation; and - Incremental improvements to the Roadmap; and Then report on progress and any improvements for the Roadmap in 1Q 2013, for publication in 2Q 2014

members were asked to rate (on a zero to ten scale, where ten is the most favourable rating) all recommendations as to the “materiality” (e.g. value of the outcome) and the “do’ability” (e.g. perception of the chance to implement).

Average (consensus) Roundtable rankings of recommendations are displayed in Figure 9.1, a matrix of “materiality” and “do’ability”. Figure 9.2 is an expanded version of the populated part of the same illustration to allow for legible labels for rank as detailed in Table 9.3.

Table 9.3 lists the relative ranking of all recommendations on the basis of “materiality” and then “do’ability”. Table 9.3 also further categorises recommendations under one or more to the following nine generalised themes. The number of recommendations, including overlapping recommendations is noted in brackets.

1. Investor and public trust (41)
2. Subsurface knowledge (21)
3. Environmental protection (18)
4. Supply-chains (17)
5. Infrastructure (17)
6. Innovation in gas markets (16)
7. Efficiency (16)
8. Red tape reduction (8)
9. Fiscal framework (4)

In the 27th July meeting of the Roundtable, DMITRE undertook to compare the ranking of recommendations posed by industry with rankings posed by organisations principally focused on the conservation of the natural and social environments. No stark differences were identified in this comparison. The vast majority of recommendations ranked highest priority (materiality ranking greater than or equal to 5 and do’ability ranking greater than or equal to 5) were considered to be so by both development and environmental organisations. Likewise, based on relative rankings, the recommendations given lowest priority were considered to be so by both development and environmental organisations.

9.4 Implementation of Recommendations

The recommendations listed in Table 9.3 will be the subject of planning for implementation by focused working groups of the Roundtable from mid December 2012. The ranking of recommendations will guide priorities within resource capacity.

It is reasonable to expect a considerable advance on a number of recommendations in 2013 and successive years.

That progress will be made by industry, by government(s), and by public-private partnerships under the auspices of the Roundtable for Unconventional Gas Projects in South Australia.

To track that progress, in consultation with the Roundtable:

- a stock-take of the implementation of recommendations will be concluded by DMITRE in 4Q 2013;
- a report on progress (or otherwise) made with all recommendations will be published in 2Q 2014;
- the Roadmap will be sustained as a ‘living document’ updated at least once every other year, with its first update to be concluded in 2014; and
- consultation with stakeholders will continue with the overarching objective of environmentally sustainable development that meets community expectations for net outcomes.

9.5 Post- Roundtable Ranking Considerations

Leading practice engagement and consultation has no cut-off date. However, for practical purposes, the Roundtable's listing and ranking of recommendations (as presented in Table 9.3) for the above stated analysis closed on 1 November 2012. In this context, the following incremental recommendations summarise comments from Roundtable members since 1 November 2012, and will be the subject of discussions with the Roundtable in 1Q2013.

- This Roadmap for Unconventional Gas Projects in South Australia should be open to alignment with parallel policy objectives such as innovation and clean energy. For example – how might innovative technologies deployed locally in unconventional gas projects provide leverage for South Australian businesses become global leaders in water management and clean energy technologies?
- International and national standards for risk reduction to as low as reasonably practical (ALARP) while meeting community expectations for net outcomes is yet to catch-up to the aspirational IEA (2012) golden rules for the golden age of gas in relation to the elimination of venting and minimising flaring. A working group of the Roundtable should be formed to develop options to inform community expectations in relation to the source, composition, volume, and potential significant risks associated with gases vented and flared in the life-cycle of production and use of unconventional gas. That will inform future project and policy options.
- Regional employment opportunities, and in particular, the subset of local content that relates to sustainable employment for the first people of Australia should be a consideration in planning unconventional gas projects. In particular – the early provision of pre-qualification requirements for tenders and contracts can support regional enterprises directly and in partnerships for service delivery.

Table 9.2 Strength-weakness-opportunities-threat (SWOT analysis) concluded by the Roundtable through 25 November 2010

Strengths	Weaknesses
<ul style="list-style-type: none"> • SA jurisdiction highly regarded by resources sector as a “preferred place to do business” • SA has good track record with resource development • The Roundtable will foster early transparency to enable sensible planning • Synfuel offers prospect of transport fuel security (for Australia) • Multiple unconventional gas plays with enormous resource potential • Demand for energy, including gas, liquid fuels and power, is rising • Micro LNG and/ or GTL offers prospect of transport fuel security • Existing gas pipeline infrastructure and easements from Moomba/ Ballera to Adelaide/Iron Triangle (ownership is independent of producers and major end-use customers) • May be potential for the potentially higher value unconventional oil plays • Willingness of government to foster and encourage the evaluation of the unconventional gas business • The Cooper Basin is well positioned to meet multiple markets • Strong demand for liquids 	<ul style="list-style-type: none"> • Relatively high costs in Australia (potentially) • Uncertain timing for each project can impede planning to share facilities – experience elsewhere shows that commercial drivers are unlikely to create cooperation and collaboration between different proponents • Downside for the price of oil can hamper investment in synfuel manufacture • Considerable cost to deploy facilities, including requirement for large numbers of wells • Limited experience with unconventional gas in Australia • Limited availability of required drilling and fracturing equipment in Australia • Distance from export markets (LNG) • High costs, energy requirements and emissions for synfuel projects (compared to conventional oil and/or LNG) • No CNG market or proven infrastructure • Difficult to achieve economic scale for international competitiveness • Currently insufficient contractor resources to carry out the massive fracture stimulations that are required • Licence framework not yet aligned with inherent high costs and risks and long timeframes for defining unconventional reserves. • Long timeframes to build technical capability and technology to exploit unconventional reservoirs • Perception of surplus CSG in Queensland and NSW • Lack of firm cost estimates for syngas on world markets • There is little information regarding quality of resources • Potential funding issues • Inadequacy of port infrastructure
Opportunities	Threats
<ul style="list-style-type: none"> • Stimulate investment to prove up resource potential • Create environment that fosters collaboration and sharing of infrastructure • Stimulate competition in gas supplies • Potential beneficial use of produced water (e.g. agricultural or other uses) • Clarify full-cycle planning for the development of unconventional gas • Ascertain and make plain the optimum location(s) and timing for deployment of facilities • Co-ordinate and optimise supply lines and location and deployment of facilities, including production and transport hubs • Inform industry strategies • Inform government programs, policies and regulation to sustain supportive market frameworks while also protecting the natural, economic and social environment • Stimulate new industry and employment • Domestic gas market opportunities (e.g. increased electricity production from electricity, gas to liquids for transport, etc) • Synfuel manufacture for domestic use and export • Multiple-use wharf facilities • Use of low emissions technologies and renewables to run plant to meet legislated standards and provide a comparative marketing advantage • Joint marketing of gas for export 	<ul style="list-style-type: none"> • Land access conflicts • Inefficient infrastructure deployment • Warehousing resources • Competing LNG projects in Australia • International competition for export markets • Potential impact on groundwater systems (from subsurface and surface operations, e.g. disposal of produced water, etc) • Unconventional gas potential is so widespread that those now importing LNG may become net producers • High and/or sole carbon price regime in Australia • Domestic competitors for domestic supply and export • Unwillingness of parties to cooperate (impediments to sharing facilities) - leading to inefficiencies on sector-wide basis • Uncertain Government policies and/or tax/royalty settings that could impact gas demand and supply • Government intervention in markets to reserve gas for domestic supplies • Barriers to accessing infrastructure • Access to skilled people • Prescriptive and/or precautionary rather than objective (goal seeking) and risk management form of regulation

Table 9.3 List of recommendations in the order of ranking by the Roundtable. Rank order is first on the basis of “materiality” (e.g. value of the outcome) and then, “do’ability” (e.g. perception of the chance to implement). This listing also categorises recommendations under one or more of 9 generalised themes. The colour coding characterises recommendations in the **three categories** addressed by break-out groups in the

27th July 2012 meeting of the Roundtable for Unconventional Gas Projects e.g. Regulation (**R**), Economies of Scale (**E**); and Attract Investment (**A**) Colour coding reflects recommendation categories as follow: Economies of scale; Regulation; and Investment attraction;

Overall Ranking	Category and Comments	All Recommendations (sorted) and numbered by overall rank (materiality then do’ability)*	Reference Number in Category	Ranking within Category	Summary	Materiality	Do’ability	Generalised Themes (9 total)
1	R	Exploration, Retention and Production Licences need to have terms (in years), area and conditions that take account of the life-cycle for finding, appraising, developing and producing unconventional petroleum	39	1	Effective license terms	8.6	8.4	Investor and Public Trust
2	E	Manage the risk of a shortage of skills and people. Better training facilities and education programs for skilled trades people, para-professions and professionals. Need to establish realistic forecast demand to right-size the expansion of training facilities and educational programs. Suggest an industry forum for the forecast. This will also assist in forecast gaps to be filled with immigration targets and visas to bring in human resources necessary to keep projects on track. In short: fit for purpose training facilities and education resources/programs.	56	1	Manage skills shortages with education	8.4	6.0	Supply-chains
3	E – Economies of scale 22 and Regulation 20 overlap	Use of co-produced water for drilling and fracture stimulation fluids	22	2	Co-produced water for frac fluid	8.3	7.2	Environmental Protection
4	A	Develop a chrono-stratigraphic correlation chart for all identified prospective basins and highlight for the (a) stratigraphic range of each shale gas, shale oil, deep CSG, shallow CSG, tight gas and underground coal gasification target, and (2) the position of over-lying and under-lying and overlying aquifers. This will illustrate the stratigraphic (and with annotations) the vertical separation of petroleum development targets and water resources that are to be protected with appropriate well construction	1	1	Chrono-strat of gas & water reservoirs	8.3	8.0	Subsurface Knowledge
5	R – Regulation 7, 9, 22, 31, 42 and Economies of scale 35, 39, 52, 54, and 55 overlap	<p>Ensure legislation, regulation, policies and programs will provide for:</p> <ol style="list-style-type: none"> 1. Attractive licence tenure with expeditious land access for environmentally sustainable operations 2. Regulatory certainty and efficiency without taint of capture (of the regulator) by special interests; 3. Regulators and licensees with trustworthy capabilities (competence and capacity); 4. Effective (informative) stakeholder consultation by both project operators and regulators well-ahead of land access. This drives operators to establish terms for land access well before activity approvals are applied-for e.g. before any particular activity ‘gets personal’; 5. Public access to details of risks, reliable research to reduce key uncertainties and back-up risk management strategies so the basis for regulation is contestable anytime, everywhere; 6. Timely notice of entry with sufficient operational details to effectively inform stakeholders; 7. Potentially affected people and organizations can object to land access — while the regulator and prescribed dispute resolution processes do not support, and hence, minimise vexatious objections; 8. Fair and expeditious dispute resolution processes; 9. Fair compensation to affected land-users for costs, losses, and deprivation due to operations; 10. Reduction of risks to as low as reasonably practicable (ALARP), while also meeting community expectations for net outcomes; 11. Licensees monitor and report (to the regulator) on the efficacy of their risk management processes, and the regulator probes same; 12. Regulator can prevent and stop operations, require restitution, levy fines and cancel licences; 13. Industry compliance records are made public, so the efficacy of regulation is transparent; and 14. Regulations are reviewed by exception, and no less frequently than once every 5-years, to stay current and sustain trust with the public and investors 	9	2	Effective, trusted regulation	8.2	7.4	Investor and Public Trust

*Overall rank-wise overlaps: (7, 8, 9, 13 & 84) (3 & 23) (5, 11, 22, 28, 41, 46, 67, 68, & 97); (14, 25, 27, 34, 35, 36, 52, 53, 59, 72, 74 * 81); (5, 11, 21, 41, 97); (15, 38 & 65); (19, 32, 40 & 47); (70 & 78); (44 & 79); (82 & 39);(89,107 & 113); (16 & 35);(109 & 112); (102, 116, 117 & 122).

Overall rank-wise with a duplicate lesser ranked recommendation are: (16); (37); (123); and (115) Regulation (**R**), Economies of Scale (**E**); and Attract Investment (**A**) Colour coding reflects recommendation categories as follow: Economies of scale; Regulation; and Investment attraction.

6	R	Bolster public understanding (with reliable information) re: hazards and risk management via FAQ on web	3	3	Informed public	8.2	7.9	Investor and Public Trust
7	E - Economy of scale 28, 29, 30 59 and regulation 21 overlap	Paved lanes where now unpaved between Moomba and paved roads to east in Queensland	30	3	Paved roads	8.1	7.3	Infrastructure
8	E - Economy of scale 28, 29, 30 59 and regulation 21 overlap	Paved, 14ft wide lanes where now unpaved between southern ports and Moomba	29	4	14 ft lanes	8.1	6.7	Infrastructure
9	E - Economy of scale 28, 29, 30 59 and regulation 21 overlap	Water crossings made more passable year-round. Paved roads ex Ports to Moomba. Paved roads ex Moomba to Queensland	59	5	Weatherproof	8.0	7.0	Infrastructure
10	E	Streamline approval of imported equipment - especially road regulations – in SA and the whole of Australia	50	6	Reduce redtape to expand rig fleet	8.0	6.1	Reduce Red tape
11	R – Regulation 7, 9, 22, 31, 42 and Economies of scale 35, 39, 52, 54, and 55 overlap	<p>Regulation will abide by the following principles:</p> <ol style="list-style-type: none"> 1. Certainty. The rights conferred by licences are certain and will not be subject to unreasonable change or challenge. Also the regulatory objectives and obligations under the regulatory regime are uniform, clear and predictable to all licensees. 2. Openness. Decision-making processes are designed so the legal rights of all stakeholders are not unfairly compromised. This entails the need for fair and equitable processes for the <ul style="list-style-type: none"> • Allocation of title rights; • Managing of rights of other land owners with overlapping land rights; • Managing of rights of title holders to access land for the exploration and development of regulated resources; • Provision of access to natural resources governed by this legislation where surface access within the licence area may be restricted by the sensitivity of the natural environment or other previously established rights; • Stakeholder consultation on the establishment of the environmental protection objectives; and • Appeal rights to those affected by decisions made under the legislation. 3. Transparency. The objects and intent of the regulatory regime are clearly communicated and understood by all stakeholders. Also, stakeholders are provided with the opportunity to input into the development of these objects and intent. The decision-making processes are visible and comprehensible to all stakeholders and that industry performance in terms of compliance with the regulatory objectives is apparent to all stakeholders. 4. Flexibility. There is sufficient flexibility in the types of licences that can be granted so as to more adequately reflect the purpose of the activities to be undertaken and the stage of development of the resource under the licence. The level of intervention (including enforcement) needed to ensure compliance is determined on the basis of the individual company being regulated and the outcomes needed to be achieved. 5. Practicality. The regulatory objectives are achievable and measurable. 6. Efficiency. The compliance costs imposed on both government and the company by the regulatory requirements are minimized and justified. Negative impacts on communities are minimized and companies remain liable for the cost of their impacts. An appropriate rent is paid to the community of South Australia from the value realized from the development and production of its natural resources. 	7	4	Principled regulation	8.0	7.4	Investor and Public Trust
12	R - Regulation 6 and 37 are the same	A competent and capable one-stop-shop without taint of capture is to be sustained for the upstream petroleum industry	6	5	Trusted one-stop-shop for regulation	7.9	7.4	Investor and Public Trust

*Overall rank-wise overlaps: (7, 8, 9, 13 & 84) (3 & 23) (5, 11, 22, 28, 41, 46, 67, 68, & 97); (14, 25, 27, 34, 35, 36, 52, 53, 59, 72, 74 * 81); (5, 11, 21, 41, 97); (15, 38 & 65); (19, 32, 40 & 47); (70 & 78); (44 & 79); (82 & 39);(89,107 & 113); (16 & 35);(109 & 112); (102, 116, 117 & 122).

Overall rank-wise with a duplicate lesser ranked recommendation are: (16); (37); (123); and (115)
 Regulation (R), Economies of Scale (E); and Attract Investment (A)
 Colour coding reflects recommendation categories as follow: Economies of scale; Regulation; and Investment attraction.

13	E - Economy of scale 28, 29, 30 59 and regulation 21 overlap	Devise resilient ways to 'weatherproof' operations	28	7	Weatherproof operations	7.9	6.1	Infrastructure
14	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	Institute on-line access to data and information with regular announcements of additions to open-files	21	2	Better on-line Databases	7.8	8.2	Subsurface Knowledge
15	R – Regulation 1, 4 and 11 overlap	Foster consistent reporting of resource and reserve volumes (easy access to consensus definitions, pursuant to SPE/AAPG/etc)	2	6	Consistent reserves reporting	7.8	6.8	Investor and Public Trust
16	R	Set a program for basin-wide, base-line, water resource characterization	18	7	Regional water studies	7.8	6.8	Environmental Protection
17	E	Additional petroleum pipelines – fit for demand	2	8	Add'l Pipelines	7.8	5.8	Infrastructure
18	E	Fit-for-purpose air strips and air services in proximity to operations	46	9	Air services	7.7	7.2	Infrastructure
19	E – 23, 24, 47 and 58 overlap	Incentives to accelerate unconventional gas reserve bookings and gas deliverability via royalty and/or tax reductions or holidays at state and federal levels. Could limited to revenues associated with unconventional reservoir production. Could entail an R&D credit for the development of technologies e.g. high temperature tools for high temperature reservoirs. Could entail down-hole costs of fracture stimulation as a deduction against revenues on which royalties are calculated. Could be synched with the PRRT	47	10	Tax - Royalty Incentives	7.7	7.0	Fiscal framework
20	E	Additional petroleum processing plants – fit for demand	1	11	Add'l Processing	7.6	4.9	Infrastructure
21	R – Regulation 7, 9, 22, 31, 42 and Economies of scale 35, 39, 52, 54, and 55 overlap	Require regulators to be transparent in decision-making	42	8	Transparent regulation	7.6	6.4	Investor and Public Trust
22	E	CO2 gathering systems for use in CO2 floods (for enhanced petroleum recovery) and to reduce carbon intensity	21	12	CO2 for EOR	7.6	5.1	Efficiency
23	E – Economies of scale 22 and Regulation 20 overlap	Resolve leading practices for sustainable water use with minimum red tape	20	9	Leading practice water use	7.6	5.6	Environmental Protection / Reduce Red tape
24	A	Consider universities as a source of play mapping and play-by-play Original Hydrocarbons in Place (OHIP), Technically recoverable OHIP, probabilistic well productivity and production decline curves extending at least 10 years	13	3	Play & Field Statistics from Universities	7.5	8.0	Subsurface Knowledge
25	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	In cooperation with Geoscience Australia and other State and NT resource agencies, make calls for legacy information	23	4	Add legacy info to Databases	7.5	7.3	Subsurface Knowledge
26	E	Pad drilling to minimize footprint, capex and opex	27	13	Multi-well pads	7.3	6.9	Environmental Protection / Efficiency

*Overall rank-wise overlaps: (7, 8, 9, 13 & 84) (3 & 23) (5, 11, 22, 28, 41, 46, 67, 68, & 97); (14, 25, 27, 34, 35, 36, 52, 53, 59, 72, 74 * 81); (5, 11, 21, 41, 97); (15, 38 & 65); (19, 32, 40 & 47); (70 & 78); (44 & 79); (82 & 39);(89,107 & 113); (16 & 35);(109 & 112); (102, 116, 117 & 122).

Overall rank-wise with a duplicate lesser ranked recommendation are: (16); (37); (123); and (115)

Regulation (R), Economies of Scale (E); and Attract Investment (A)

Colour coding reflects recommendation categories as follow: Economies of scale; Regulation; and Investment attraction.

27	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	Work with Geoscience Australia to augment the ORGCHEM database and update the characterization of unconventional gas and unconventional oil resources with: 1. updated Van Krevelen diagrams (for example Rockeval S2/TOC on Y-axis and Tmax on x axis) 2. update Toc histograms 3. etc	8	5	Update ORGCHEM database	7.3	7.3	Subsurface Knowledge
28	E – Economies of scale 54, 55 and regulation 9 and 31 overlap	Areas where myriad, complex land holdings exist need a streamlined way to reach land access agreements	55	14	Streamline Land Access Agreements	7.2	6.5	Reduce Red tape
29	R	The approvals process for the construction of cross-border pipelines are streamlined by agreement between adjacent State/NT governments	12	10	Consistent regulation between jurisdictions	7.2	5.1	Reduce Red tape
30	R	Multiple Joint Ventures cooperate in basin-wide monitoring for environmental impacts (to reap economies of scale)	14	11	JVs for environmental monitoring	7.2	5.7	Environmental Protection / Efficiency
31	A	Develop state-wide maps (that can be extended into adjacent jurisdictions in cooperation with Geoscience Australia, the NT, Queensland, NSW, Victoria and WA) that delineate the following play-trend areas for shale gas, Shale Oil, Deep CSG, Shallow CSG, Tight Gas, and Coals prospective for mining and/or underground gasification	3	6	National play maps	7.2	7.7	Subsurface Knowledge
32	E 23, 24, 47 and 58 overlap	Applied R&D at the ASP to determine fracture patterns at target levels from 3D seismic (links to Item LVIII)	24	15	Detect fractures with 3D	7.2	6.8	Subsurface Knowledge
33	R	Annual public reports to demonstrate the efficacy (or otherwise) of risk management and regulation;	17	12	Rpt on the efficacy of risk management	7.2	7.4	Investor and Public Trust
34	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	Update a pressure-depth database (based on DST,s RFT,s FITs, MDTs, and production tests) for all plays	7	7	Database for pressure data	7.1	8.0	Subsurface Knowledge
35	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	For unconventional petroleum wells, consult with industry, within CoAG and with international fora that have established leading practice standards for sample and data acquisition; reporting (including formats) to government; archival methodologies and technologies; and terms for confidentiality (within government files). Types of records, samples, data and information in scope include but are not limited to: cores, side wall cores, cuttings, mud-logs, wire-line logs, fluid and gas samples, micro-seismicity; well seismic surveys, etc. In this process, devise fit-for-purpose data requirements suited to closely-spaced development and pad drilling	16	8	Leading practice data sampling & Reporting standards	7.1	7.4	Subsurface Knowledge
36	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	Develop effective delivery systems and formats for data and interpretations including but not limited to: stratigraphy, bio-stratigraphy, horizon structure-depth, unit thickness, temperature, pressure, organic geochemistry, gas composition, flow test measurements and interpretations, rock properties and interpretation, wireline log data and interpretation, fracture stimulation stage characterisation, spinner test, cement bond, etc	24	9	Database capacity and flexibility	7.1	6.6	Subsurface Knowledge
37	R	Take account of legislative and regulatory regimes in all States and the NT through CoAG – and freely adopt ever better legal frameworks for unconventional gas projects	40	13	Adaptive learning for regulation	7.1	6.2	Investor and Public Trust

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Overall rank-wise with a duplicate lesser ranked recommendation are: (16); (37); (123); and (115)

Regulation (R), Economies of Scale (E); and Attract Investment (A)

Colour coding reflects recommendation categories as follow: Economies of scale; Regulation; and Investment attraction.

38	R – Regulation 1, 4 and 11 overlap	Foster consistent reporting of exploration, appraisal and development results	1	14	Consistent reporting to markets	7.1	7.3	Investor and Public Trust
39	R	Clarify process for assessing threats to the environment with DEWNR (and all other co-regulators) – add to Chapter covering Regulation	30	15	Clarify standards for environmental threat assessment	7.1	6.6	Environmental Protection
Duplicate	Regulation 6 and 37 are the same	Regulators must have fit-for-purpose competence and capacity e.g. capabilities	37	16	Regulator competence and capacity	7.1	6.6	Investor and Public Trust
40	E – 23, 24, 47 and 58 overlap	Applied R&D at the ASP to use magnetotellurics (MT) to delineate the propagation of fractures created during hydraulic stimulation (links to Item LVIII)	23	16	MT R&D	7.0	6.6	Subsurface Knowledge
41	E – Regulation 7, 9, 22, 31, 42 and Economies of scale 35, 39, 52, 54, and 55 overlap	Transparency of rules (framework) and tolls for processing and transport (including pipelines and compression) of 3rd party gas and gas liquids in privately owned infrastructure to foster open access on commercial terms. (52	17	Transparency of tolls	7.0	5.6	Efficiency
42	E	Manage the risk of losing key skilled people due to remuneration or job conditions that fail to be nationally and internationally competitive, as relevant	57	18	Manage skills retention	7.0	5.3	Supply-chains
43	E	Drilling subsidies (10-15%) Re-mobilization subsidies (trialed in WA)	49	19	Drill Subsidies	7.0	4.8	Fiscal framework
44	R – Regulation 16 and 35 overlap	Effective probing for well integrity	16	17	Effective probing by regulators	6.9	6.1	Investor and Public Trust / Environmental Protection
45	A	Publications describing Unconventional gas plays (to attract domestic and international investment and gas sales)	10	10	Publications to attract investment	6.9	7.9	Subsurface Knowledge
46	R – Regulation 7, 9, 31, 42 and Economies of scale 35, 39, 52, 54, and 55 overlap	Clarify requirements for rigorous environmental assessments and requirements to inform stakeholders of findings with sufficient time for informed views to be established, and all ahead of land access approvals for associated activities	31	18	Enable Stakeholders being well informed	6.9	6.3	Investor and Public Trust / Environmental Protection
47	E - 23, 24, 47 and 58 overlap	R & D for fracture stimulation to make for more effective and therefore lower cost results. (Example: nano-technology).	58	20	Frac Stim R&D	6.9	6.0	Subsurface Knowledge
48	Economies of scale 10, 11, 12, 13, 14, 15, 53 and 61 overlap	Multiple Joint Ventures tender for equipment/services to reap economies of scale	14	21	JVs to share equip	6.9	4.2	Efficiency
49	R	Prepare a reference list of papers pertaining to impacts of unconventional gas projects so assessments most easily build-on pre-existing knowledge	28	19	Build on experience in project assessment	6.8	7.1	Investor and Public Trust / Environmental Protection
50	R	For all unconventional gas projects, pre-activity approval public consultation and intra-government will be undertaken on the basis of fit-for-purpose Environment Risk Reports and Statements of Environmental Objectives. Scope will cover all potentially significant location-specific hazards, associated leading practice risk mitigation strategies, and expected controlled risks.	13	20	Fit-for-purpose environmental performance standards	6.8	6.0	Investor and Public Trust / Environmental Protection

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Overall rank-wise with a duplicate lesser ranked recommendation are: (16); (37); (123); and (115)
 Regulation (R), Economies of Scale (E); and Attract Investment (A)
 Colour coding reflects recommendation categories as follow: Economies of scale; Regulation; and Investment attraction.

51	R	DMITRE regulators will gain accreditation to provide once-for-all (purposes) assessments for Commonwealth (for example – pursuant to the EPBC Act) and State co-regulation of upstream petroleum operations	11	21	SA Government regulators delegates for EPBC Act	6.8	5.3	Environmental Protection / Reduce Red tape
52	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	For each play – as practical - develop state-wide maps (that can be extended into adjacent jurisdictions in cooperation with Geoscience Australia, the NT, Queensland, NSW, Victoria and WA) that delineate the following play ingredients: 1. For key stratigraphic levels –structure in two-way seismic travel time and in depth below expressed datums 2. For relevant stratigraphic levels – CO2 % of Total Gas 3. For relevant stratigraphic levels – Ethane richness 4. For relevant stratigraphic levels – LPG richness 5. For relevant stratigraphic levels – Condensate richness 6. For key structural levels – mean Rv% at depth (for example – Rv% at top Patchawarra) 7. Semi-log cross plots of mean Rv% (+/- range) versus temperature at sample elevation 8. Temperature gradient maps ‘down to’ key structural levels 9. Temperature maps at key structural levels (based on multiplying temperature gradient x depth maps) 10. Using Rv% versus temperature correlation, convert temperature at key horizon maps to Rv% at key horizons (ex at top and base Patchawarra) to delineate relative prospectivity 11 In cooperation with Geoscience Australia’s national unconventional resource assessment, for each unconventional gas play, characterize and map Original Hydrocarbons in Place (OHIP), Technically recoverable OHIP, probabilistic well productivity and production decline curves extending at least 10 years	4	11	Gas composition, organic maturity and temperature maps	6.8	6.8	Subsurface Knowledge
53	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	Establish best practice / fit-for-purpose protocols and technologies for data and information sharing. This could underpin industry’s social license to operate. The website http://fracfocus.org/ is cited as an exemplar. Is this a facility that industry can run collectively (maybe through APPEA) or is a public-private partnership better? For introductory details – visit: http://fracfocus.org/welcome	65	22	Data sharing - Fracfocus	6.8	6.6	Subsurface Knowledge
54	E	Truck assembly in South Australia (fracture stimulation road trains, etc)	34	23	Build frac trucks in SA	6.8	6.7	Supply-chains
55	E	Find local supplier of proppant	64	24	Local proppant	6.8	4.9	Supply-chains
56	Regulation 32, 33 and 34 overlap	Post activity audits can attest to the efficacy (or otherwise) of environmental protection plans.	33	22	Post activity audits for environmental outcomes	6.7	6.2	Investor and Public Trust / Environmental Protection
57	R – Regulation 7, 9, 22, 31, 42 and Economies of scale 35, 39, 52, 54, and 55 overlap	Sustain effective regulation while minimize regulatory imposts	22	23	Minimise red tape	6.7	5.4	Investor and Public Trust / Reduce Red tape
58		Fund targeted environmental research in ways that build public trust in outputs	43	24	Targeted environmental research	6.6	5.9	Environmental Protection / Public and Investor Trust

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Regulation (R), Economies of Scale (E); and Attract Investment (A)

Colour coding reflects recommendation categories as follow: Economies of scale; Regulation; and Investment attraction.

59	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	Work with Geoscience Australia to upgrade national well and seismic databases in general	25	25	National Databases	6.6	8.3	Subsurface Knowledge
60	A	<p>Already a part of some play descriptions in the form of cross-sections – but good to determine a TYPE- section for each play (well logs, lithology log, seismic character, core analysis, special core analysis, etc) – create a web page for each. This can be extended to include well petrophysical studies to characterize relative quality of the following plays in an unconventional reservoir rock catalog a 'rock catalog'. Could expand to include petrophysical interpretation guidelines. This can be extended into adjacent jurisdictions in cooperation with Geoscience Australia, the NT, Queensland, NSW, Victoria and WA:</p> <ol style="list-style-type: none"> 1. Shale Gas 2. Shale Oil 3. Deep CSG 4. Shallow CSG 5. Tight Gas; and 6. Coals prospective for mining and/or underground gasification 	5	12	Web-based type sections for plays	6.6	6.7	Subsurface Knowledge
61	E – Economies of scale 4 and 20 overlap	CNG for transport and equipment (drilling/work-over rigs, etc) e.g. substitute gas for diesel in field operations and more generally for transport everywhere	4	26	Use CNG	6.6	5.3	Innovation / Gas Markets
62	E – Economies of scale 10, 11, 12, 13, 14, 15, 53 and 61 overlap	Large multi-client 3D surveys	12	27	Multi-client 3D	6.6	5.0	Efficiency
63	E	Rail transport options to the Cooper Basin	62	28	Rail	6.6	5.0	Infrastructure
64	E	3rd party tolled (on commercial terms) access to petroleum processing and transport facilities	16	29	tolls to share facilities	6.6	5.8	Infrastructure / Efficiency
65	R – Regulation 1, 4 and 11 overlap	Bolster investor understanding of resource and reserve definitions	4	25	Investor certainty for reserve estimates	6.6	7.7	Investor and Public Trust
66	A	Assess state-based, national and international analytical capabilities to enable quality control, economies of scale and foster local content in sample analysis	19	13	Gap analysis for lab capabilities	6.6	6.1	Supply-chains
67	R – Regulation 7, 9, 31, 42 and Economies of scale 35, 39, 52, 54, and 55 overlap E 35 = E39	Operators reveal forecast supply-chain requirements (equipment, materials, and services) to entice competitive suppliers e.g. well and fracture stimulation (spread) equipment, services and materials	35	30	Demand-side Supply Chain Co-Ops	6.6	4.1	Supply-chains

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Regulation (R), Economies of Scale (E); and Attract Investment (A)

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68	R – Regulation 7, 9, 31, 42 and Economies of scale 35, 39, 52, 54, and 55 overlap E 35 = E39	Update SA's online Petroleum (and geothermal) Services Directory	42	31	Services Directory	6.6	8.6	Supply-chains
69	A	Feature SA projects in government pronouncements	11	14	Market prospects in SA	6.6	8.3	Investor and Public Trust
70	R – Regulation 5 and 46 overlap	Benchmark SA approach to IEA 'golden rules'	5	26	Benchmark SA regulation to IEA Golden Rules	6.6	7.0	Investor and Public Trust
71	R- Regulation 39 & 57 overlap	Extract leading practice risk mitigation defined in various SEOs and associated EIRs for addition to DMITRE's website. This will be a ready reference to current leading practice without having to download and digest a number of SEOs and EIRs. This will be an expression of industry's current leading practice strategies to meet regulatory objectives.	47	27	Summarise leading practice in SEOs and EIRs	6.6	6.9	Investor and Public Trust / Efficiency
72	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	Consult with industry to establish priorities for pre-competitive data and interpretations	2	15	Set priorities for pre-competitive assessments	6.6	6.8	Subsurface Knowledge
73	R	Conjunctive ILUAs for operations and facilities (that are fair to aboriginal people and sustainable in relation to development)	40	28	Progress conjunctive ILUAs	6.6	6.4	Reduce Red tape
74	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	Cross reference Petroleum and Geothermal Energy Act 2000 Environmental Impact Research Reports and Statements for Environmental Objectives so cohesive state-wide risk management is most easily understood, and easily accessible. This could be accomplished either by Government, by Industry or by an Industry-Government partnership. It would create a single, readily accessible document or database of leading practice risk mitigation	66	32	Stock take of environmental risk management	6.5	7.3	Environmental Protection / Public and Investor Trust
75	A	Publicly accessible maps and lists of gas processing and transport infrastructure with details of facility capacity, gas composition limitations, rules for access, etc.	51	33	Transparency for infrastructure capacity	6.5	6.9	Supply-chains / Efficiency
76	R	Have the relevant sub-committee of the CoAG's Standing Council for Energy and Resources review the Commonwealth Energy White Paper to align associated initiatives with best practice harmonisation of legal frameworks for unconventional gas	45	29	Stock take vs. Energy White Paper	6.5	6.1	Investor and Public Trust
77	R	Require 'best practice' reporting of non-compliance e.g. unplanned and undesirable outcomes	44	30	Leading practice reporting for non-compliance	6.5	6.5	Investor and Public Trust
78	R – Regulation 5 and 46 overlap	Take account of lessons learnt nationally and internationally (USA, Canada, NZ, IEA Golden Rules, etc) –	46	31	Benchmark with international experience	6.4	7.2	Investor and Public Trust

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Regulation (R), Economies of Scale (E); and Attract Investment (A)

Colour coding reflects recommendation categories as follow: Economies of scale; Regulation; and Investment attraction.

79	R – Regulation 16 and 35 overlap	Best practice objective-based regulation requires management systems and operational plans to reduce risks to as low as reasonably practical and to meet community expectations for net outcomes, requires monitoring for the efficacy of risk management and operational plans, and entails probing of management systems and operations	35	32	Probe operator management systems for efficacy	6.4	6.7	Investor and Public Trust
80	A	Convene PESA-AAPG/SPE/ASEG-SEG workshops and conferences focused on unconventional gas in South Australia (with case studies a key focus)	26	34	Play Workshops	6.4	8.8	Subsurface Knowledge
81	A – Attract 2, 4, 6, 7, 8, 16, 21, 23, 24 and economies of scale 25, 65 and 66 overlap (databases)	Develop a leak-off test database that can help guide drilling, cementing, and fracture stimulation operations	6	16	Leak-off test Database	6.4	7.5	Subsurface Knowledge
82	R- Regulation 39 & 57 overlap	Extract guidelines from SEOs for: (1) cementing casing and (2) for plug and abandonment as a trend-by-trend guide to leading practices	39	33	Summarize leading practice for well integrity and abandonment	6.4	7.2	Environmental Protection / Public and Investor Trust
83	R	Add a section on leading practice engagement practices to this Chapter	10	34	Elaborate leading practices for engagement	6.4	7.4	Investor and Public Trust
84	E - Economy of scale 28, 29, 30 59 and regulation 21 overlap	Resolve leading practices for actions that 'weather-proof' operations (bridges / paved roads / etc)	21	35	Resolve leading practices to weatherproof transport	6.4	5.9	Infrastructure
85	A	Team – South Australia booths at peak events in Australia	9	17	SA booths at peak events	6.3	7.8	Investor and Public Trust
86	Regulation 32, 33 and 34 overlap	License holders should undertake sufficient post-activity environmental investigations of pilot and full-scale projects, and reported on by tenement holders	34	36	Operators post-activity audit for environmental outcomes	6.3	6.7	Investor and Public Trust
87	E	Telecommunications improved. Industry – Government forum to elaborate cost: benefit for such improvements	60	35	Telecom	6.3	6.6	Infrastructure
88	R	Align the Roadmap narrative on regulation with CoAG's narrative for harmonizing to leading practice regulation frameworks	8	37	Harmonize with CoAG CSG framework for regulation	6.3	6.6	Investor and Public Trust
89	E – Economies of Scale 17, Regulation 24 and Investment attraction 25 overlap	Sustain supply-side competition between multiple Joint Ventures	17	36	Supply-side competition	6.3	5.5	Gas Markets
90	R	A stick and carrot approach can be deployed to reward Operators who consistently demonstrate compliant operations that meet regulatory objectives, and more risk management controls are in place for all other Operators – to account for experience, and encourage exemplar operations	36	38	Reward exemplary compliance to drive compliance	6.3	6.0	Environmental Protection / Public and Investor Trust

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91	Economies of scale 10, 11, 12, 13, 14, 15, 53 and 61 overlap	Pooling of seismic crews	11	37	Pool Seismic Crews	6.3	4.9	Efficiency
92	R	Review paper - 'Conserving Nature' (First need to confirm if this is the CSIRO's publication in Nature or website http://www.hphpcentral.com/articles-research/conserving-nature or another source)	24	39	Review salient publications for benchmarking	6.3	7.9	Investor and Public Trust
93	A	For unconventional petroleum well information, consult with industry, within CoAG and with international fora that have established leading practice standards for sample handling and analysis to foster comparable measurements and reporting standards	18	18	Leading practice sample and data report standards	6.3	6.3	Subsurface Knowledge
94	A	Create / update (annually?) economic nomographs for quick-look analysis for web pages	27	40	Web-based information for project economics	6.2	6.2	Investor and Public Trust
95	R	Add a section on leading practice consultation processes to this Chapter	9	41	Elaborate leading practice for consultation	6.2	7.1	Investor and Public Trust
96		Assess supply depot capacities versus prospective, future activity	38	38	Supply Chain Depots	6.1	6.2	Supply Chains / Infrastructure
97	R – Regulation 7, 9, 22, 31, 42 and Economies of scale 35, 39, 52, 54, and 55 overlap	Clarify land access – look for ways to streamline. Seek a normalized, efficient, fair and transparent process for agreeing the terms for land access for all landowners, not just for the Right to Negotiate and Indigenous Land Use Agreement processes.	54	39	Streamline Land Access	6.0	6.7	Reduce Red tape
98	E	Additional LNG export facilities in the south, from South Australia, as / if market demand justifies that	33	40	LNG Plant in SA	6.0	4.3	Infrastructure / Efficiency
99	E	Tax rates tiered versus cost by field and/or reservoir to beget supply side competition	48	41	Minimize threshold economic reserves	6.0	4.0	Fiscal framework
100	R	Statements of Environmental Objectives need be open to change (adaptive learning) – and reviewed regularly to stay modern. Current SA requirements are for 5 – yearly reviews of SEOs or more frequently as determined by the regulator	38	42	Adaptive learning for ALARP	6.0	6.4	Environmental Protection / Public and Investor Trust
101	Economies of scale 10, 11, 12, 13, 14, 15, 53 and 61 overlap	Planning forums and cost sharing frameworks suited to most enterprises in the Cooper Basin	61	42	Cost sharing	5.8	6.4	Efficiency
102	E- Economies of scale 37, 43, 44 and 45 overlap	Industry Capability Network (ICN) to get involved to match local content capabilities to emerging supply-chain demand (pre-screen for demand-side)	43	43	ICT assist	5.8	5.9	Supply Chains / Infrastructure
103	A	Awareness of minimum economic threshold volume/rates for commercialization options	26	43	Elucidate break-even reserves	5.7	4.5	Investor and Public Trust
104	Economies of scale 10, 11, 12, 13, 14, 15, 53 and 61 overlap	Pooling of pipeline/flow line crews	13	44	Pool pipeliners	5.7	4.6	Supply-chains / Efficiency

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Regulation (R), Economies of Scale (E); and Attract Investment (A)

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105	E- Economies of scale 36, 43, 44 and 45 overlap	Cross-reference supply-chain demand (equipment, materials, and services) with enterprise capabilities and form supply-chain clusters	36	45	Supply-side Supply Chain clusters	5.7	3.8	Supply-chains / Efficiency
106	Economies of scale 10, 11, 12, 13, 14, 15, 53 and 61 overlap	Incentives for industry cooperation to reap economies of scale for gas development, production, processing and transport, without reducing supply-side competition	53	46	Incentives for Industry Co-Ops	5.7	4.4	Fiscal framework
107	R – Economies of Scale 17, Regulation 24 and Investment attraction 25 overlap	Protect public interest in sustaining upstream gas supply competition in domestic markets while also supportive of joint arrangements to compete internationally	25	44	Add to supply-side competition	5.6	4.3	Gas Markets
108	Economies of scale 10, 11, 12, 13, 14, 15, 53 and 61 overlap	Pooling of rigs	10	47	Pool rigs	5.6	4.6	Supply-chains / Efficiency
109	E – Economies of scale 32 and 31 overlap	Link Cooper gas with LNG export facilities in Gladstone	32	48	Moomba-Gladstone gas	5.6	4.9	Infrastructure / Gas Markets
110	E	LNG for transport	5	49	LNG Trucks	5.5	4.5	Innovation / Gas Markets
111	A	Generalize economic information – costs per GJ, etc will fall within a range	12	19	XII. Transparent economic information	5.4	6.1	Investor and Public Trust
112	E – Economies of scale 32 and 31 overlap	Link Cooper gas with LNG export facilities in Darwin, as / if market demand justifies that	31	50	Moomba-Darwin Gas	5.4	3.6	Infrastructure / Gas Markets
Duplicate	E – Regulation 7, 9, 42 and Economies of scale 39, 52, and 54 overlap	Provide caveat emptor transparency as to future development scenarios – to beget timely local content in supply chains	34	51	Supply Chain Forecasts	5.3	4.8	Supply Chains / Infrastructure
113	I (shifted from R) R Economies of Scale 17, Regulation 24 and Investment attraction 25 overlap	Attract exploration / appraisal investment so widely and by so many independent Joint Ventures / companies so that supply-side competition keeps gas prices competitive	24	45	Supply-side competition	5.3	4.5	Gas Markets
114	R – Regulation 32, 33 and 34 overlap	Clarify process to pay and lead to more environmental research relevant to unconventional gas operations, and in particular, well operations	32	46	Foster environmental research	5.3	5.6	Environmental Protection / Public and Investor Trust

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115	I – Investment attraction 6 and 8 are same	Gas – to – synfuel	8	52	GTL	5.0	3.5	Innovation / Gas Markets
116	E- Economies of scale 37, 43, 44 and 45 overlap	Convene a workshops that could band together enterprises into clusters worth IPO to start-up and get competitive	44	53	Workshops for Supply Chain Clusters	4.9	6.6	Supply Chains
117	E- Economies of scale 37, 43, 44 and 45 overlap	Work with Commonwealth Enterprise Connect (or similar) to foster shift of enterprises to petroleum supply chain purposes	45	54	C'wealth Enterprise Connect help	4.9	5.1	Supply Chains
118	E	Gas as feedstock for fertilizer	3	55	Gas-to-Fertilizer	4.9	5.1	Gas Markets
119	10, 11, 12, 13, 14, 15, 53 and 61 overlap	Basin-wide operator for drilling to reap economies of scale	15	56	Basin-wide operator	4.8	3.8	Efficiency
Duplicate	E – Economies of scale 6 and 8 are same	Gas to synfuel	6	57	GTL	4.8	3.4	Innovation / Gas Markets
120	E – Economies of scale 4 and 20 overlap	Use CNG vehicles in the field (links to Item IV)	20	58	CNG Use	4.8	3.1	Innovation / Gas Markets
121	Regulation 13 and Investment Attraction 9 are same	Entice large customers for gas into upstream investment	23	47	Add to supply-side competition	4.7	4.3	Gas Markets
Duplicate	Regulation 13 and Investment Attraction 9 are same	Entice large customers for gas into upstream investment	9	59	Demand-side explores	4.6	4.0	Gas Markets
122	E- Economies of scale 37, 43, 44 and 45 overlap	Equity capital raisings (IPOs) for supply chain clusters	37	60	Supply Chain IPOs	4.6	4.8	Supply Chains
123	E	Liquids stripping linked to gas storage where gas market demand < gas deliverability	19	61	Liquid stripping	4.6	4.5	Innovation / Gas Markets
124	E	Syngas to Power	7	62	Syngas to Power	4.1	3.5	Innovation / Gas Markets
125	E	Syngas to synfuel	8	63	Syngas to synfuel	3.9	3.5	Innovation / Gas Markets

*Overall rank-wise overlaps: (7, 8, 9, 13 & 84) (3 & 23) (5, 11, 22, 28, 41, 46, 67, 68, & 97); (14, 25, 27, 34, 35, 36, 52, 53, 59, 72, 74 * 81); (5, 11, 21, 41, 97); (15, 38 & 65); (19, 32, 40 & 47); (70 & 78); (44 & 79); (82 & 39);(89,107 & 113); (16 & 35);(109 & 112); (102, 116, 117 & 122).

Overall rank-wise with a duplicate lesser ranked recommendation are: (16); (37); (123); and (115)

Regulation (R), Economies of Scale (E); and Attract Investment (A)

Colour coding reflects recommendation categories as follow: Economies of scale; Regulation; and Investment attraction.

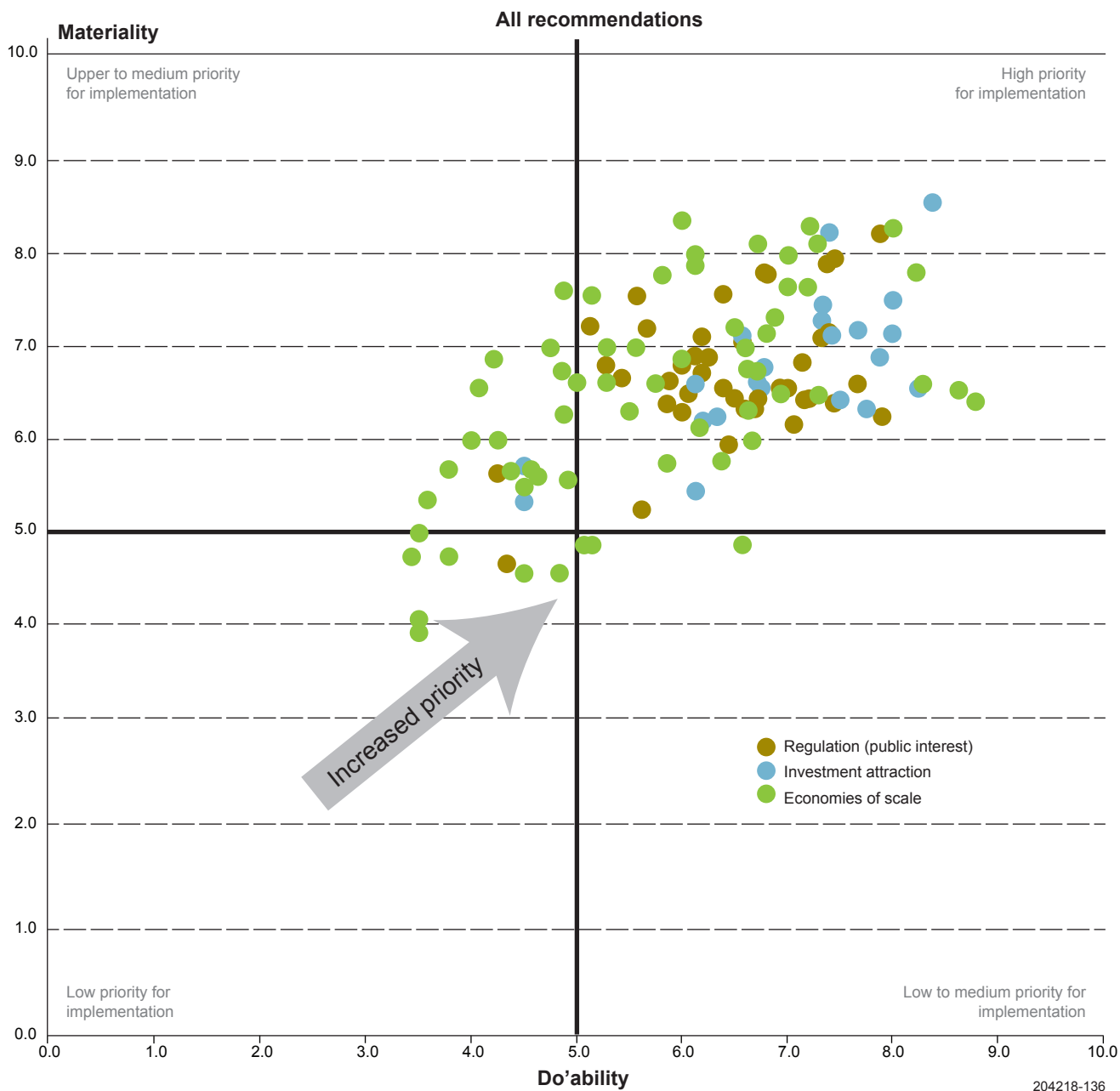


Figure 9.1. Roundtable's ranking of Roadmap recommendations in a matrix of "materiality" (e.g. value of the outcome) and "do'ability" (e.g. perception of the chance to implement) from lowest (zero) to highest (ten) ratings. Recommendations are numbered by rank as listed in Table 9.3.

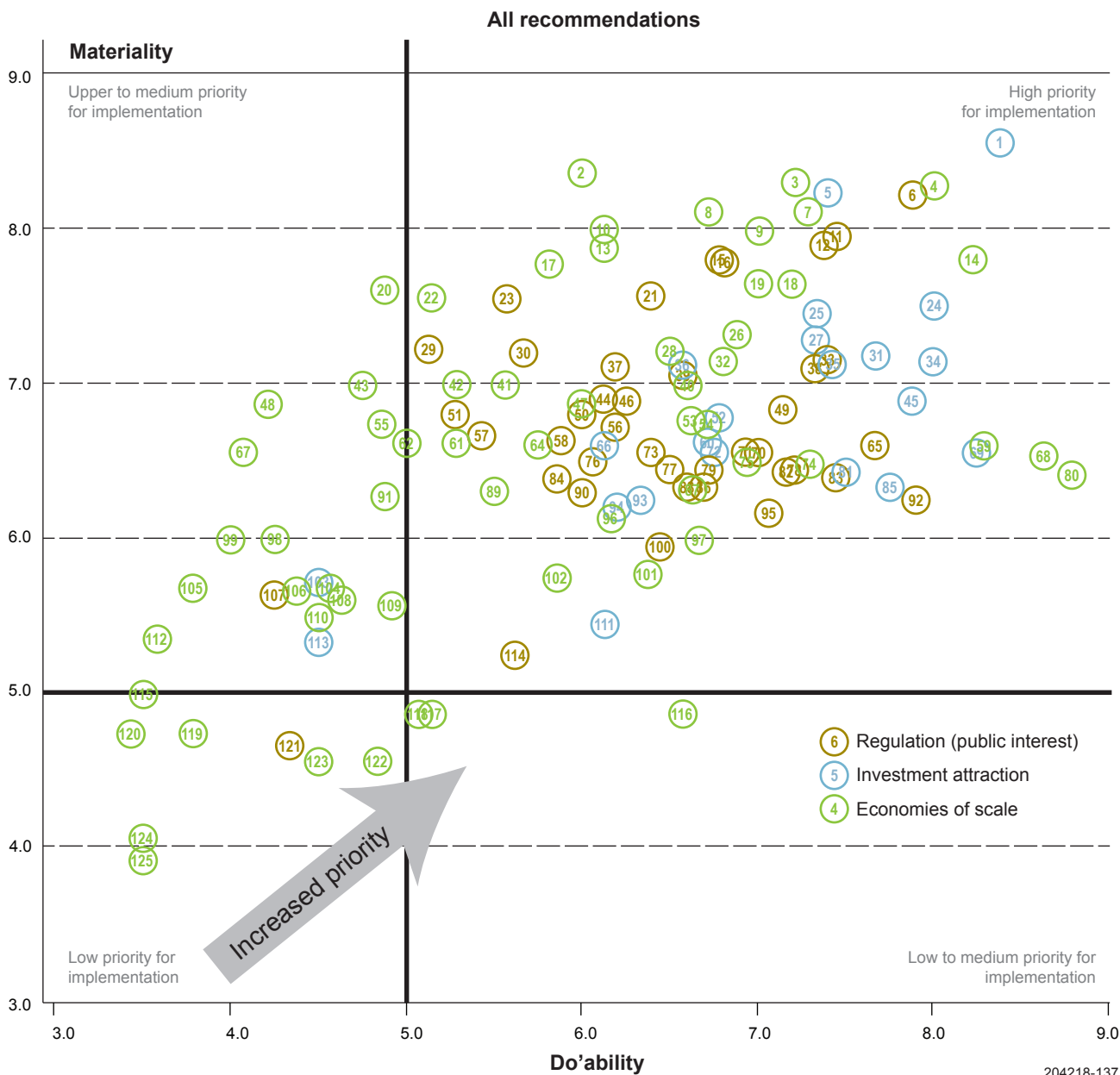


Figure 9.2. Roundtable's ranking of Roadmap recommendations in a matrix of "materiality" (e.g. value of the outcome) and the "do'ability" (e.g. perception of the chance to implement). Recommendations are numbered by rank as listed in Table 9.3. See a expanded version of the populated part (3 to 10 on both ranking scales) of the same illustration to allow for legible labels for rank as detailed in Table 9.3