MidCoast Rural Strategy

Mining and Energy Background Report

Version 5 / Date: April 2021

Version	Purpose of Document	Reviewed by	Date
1	CPSD Working Draft for MCC and agency review	A Wetzel	February 2019
2	CPSD Working Draft	A Wetzel	October 2019
3	MCC Consolidation	M Griffith	January 2020
4	MCC Final Draft for Exhibition	A Macvean	August 2020
5	Review and incorporate Rocky Hill judgement and new State energy policy	A Kelly & A Macvean	April 2021

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1 Introduction

This Technical Report has been prepared by MidCoast Council with assistance from City Plan Strategy and Development, in partnership with Aurora Research and Development and MJD Environmental as part of the MidCoast Rural Strategy Project ('the Project') to assist with the formulation of the MidCoast Rural Strategy ('the Rural Strategy').

This Report presents the findings resulting from a review of land use and development planning considerations relating to the mining of extractive resources and energy production industries occurring within the MidCoast Local Government Area ('LGA').

This Report presents the findings of the consultant team's review of land use and development planning considerations relating to extraction of mineral resources and energy resources within the rural areas of the MidCoast Local Government Area ('LGA').

This review is intended to identify the existing and potential for mining of extractive resources and energy production activities within the MidCoast; consider any potential links to climate change considerations; and develop a planning framework to guide their management.

This Report should be considered in conjunction with other Background Reports prepared as part of the Project. At the time of writing, these include Reports focusing on the following topics as relevant to rural areas:

1. Housing and Accommodation
2. Agriculture and rural-based industries
3. Land based conservation
4. Marine activities
5. **Mining & Energy (this Report)**
6. Tourism
7. Transport
8. Rural Waterways

The conclusions and recommended planning framework described in all Background Reports are presented for consideration and, once finalised, will form part of the Rural Strategy information presented for public exhibition.

2 Context

The varying nature of Extractive resources operations and the material being extracted means that each operation may be different in terms of their lifecycle, approvals, licences and legislative framework requirements.

Many extractive industries such as coal and petroleum mining have clearly defined lifecycles with associated approval milestones, must abide by strict frameworks which provide guidance to operators, communities and government.

Smaller quarries and mineral mines may operate at a reduced scale and timeframe with contrasting legislative framework. A road base quarry for example may have intermittent operation and only be utilised for specific road work programs near the resource. Other quarries either in roadside environments or in state forests provide another contrasting legislative framework, to the extent that some of these works are exempt from the planning approvals process.

Likewise, the emerging renewable energy production industries have evolving production and legislative frameworks and may have the capacity to operate in a complementary manner to the residential, commercial and industrial users of the energy produced. In this regard, this paper does not relate to roof-top solar or small-scale wind turbines commonly associated with individual premises; instead the focus is on the potential for large and/or community scale production facilities and infrastructure.

This paper therefore considers the nature and location of underground energy resources (thermal coal and coal seam gas/petroleum), mineral resources (coking coal, construction, industrial, metallic, gemstone) and renewable energy resources (solar, wind, thermal, hydroelectric) that are known, suspected or to have opportunity to occur within the MidCoast LGA.

This paper will also consider the current and potential impacts of these activities on, and actions being undertaken to address, climate change.

3 Evidence base

The review underpinning this Report considered publicly available information contained in a range of State, Regional and Local strategies, plans and guidelines as relevant to extractive resources, energy and climate change.

This review predominantly focused on identifying potential and existing mineral resources identified in the MidCoast using a range of information including a state-based mineral resources audit and other information gained from mineral exploration activities or known mineral deposits.

The review also considers current and emerging energy sources and climate change across the rural landscape.

Where relevant, reference is made to specific government and industry related data and mapping. A full list of references is appended to this Report.

Views from selected stakeholders and the general community have been provided through the following initiatives undertaken as part of the Rural Strategy Project:

- Telephone interviews conducted by the consultant team between May 2018 and January 2019. In total, 60 interviews were conducted with several participants representing larger groups or peak organisations. Individuals with an interest in tourism (e.g. business owners and operators) were a targeted cohort of these interviews, representing 39 (65%) of the 60 interviewees.
- A Public Workshop focusing on Tourism ('Tourism Workshop') in the MidCoast, facilitated by the consultant team on 14 June 2018 in Gloucester. This was attended by over 30 people, with a focused discussion on how the planning framework regulates tourism in rural areas, and issues currently considered most relevant to the MidCoast.
- A public survey ('Rural Strategy survey'), conducted by Council with inputs from the consultant team. This was made available online and in hard copy and was open to the public between September and November 2018. In total, 63 surveys were returned.

Where relevant, views raised by participants have been incorporated into this Report for discussion.

The review has also identified the following data gaps, which limited the extent to which higher-level assessments could be completed:

- Much information on significant resources is publicly available through the NSW State Government and NSW Resources and Geoscience. Council does not have up to date and accurate information on mineral resource production and extraction which are available through various State departments and private organisations at this time.
- The petroleum (CSG) exploration licence PEL 285 is still in effect for the whole of the Gloucester Basin but was relinquished back the NSW Government and was due to expire 4 August 2020. As of the time of writing, a renewal application has not been lodged and the status is unknown.
- Limited information is available on the sources of energy generated throughout the MidCoast LGA electricity network which are generally part of agreements set out in the National Energy Market (NEM) where electricity is bought and sold. Council is not privy to such market information.
- Advancements in technology and developments for energy generation are constantly changing. For this reason, significant data gaps exist for the mapping and identification of possible energy sources.

- Council' Climate Change Policy and Strategy, will resulting in production of:
    - Climate Change Resilience and Adaptation Plan – to integrate actions in coastal management programs, floodplain risk management plans, and land use planning.
    - Climate Change Mitigation Plan – to invest in renewable energy, efficiency measures and set emission reduction targets for all Council assets.

  Insufficient information is available at this time to document how they will inform and influence Council environmental planning instruments and controls. Therefore, as these plans are progressed the implications for land use and management need greater consideration and integration where possible.

4 Strategic planning considerations

This section sets out the basis for local strategic planning in relation to extractive industries and energy sources within the MidCoast. It addresses the policy directions for plan-making in NSW, including the following Ministerial Directions issued under section 9.1 of the Environmental Planning and Assessment Act 1979:

- **Direction 1.3: Mining, Petroleum and Extractive Industries.** The intention of this direction is to ensure the future extraction of coal, minerals, petroleum and extractive materials is not compromised by inappropriate development. It relies on the identification of State or regionally significant reserves and existing mining and extractive operations as a basis for assessment.
- **Direction 5.10: Implementation of Regional Plans.** Within the MidCoast, this direction gives legal effect to the Hunter Regional Plan, requiring any amendments to planning controls to be consistent with its vision, land use strategy, goals, directions and actions.

Discussion predominantly focuses on Government-endorsed policy directions described in long-term strategies and plan at national, state, regional and local-levels. Where relevant, reference is also made to other technical studies or reports.

4.1 National Level Considerations

4.1.1 COAG Energy Council

The Council of Australian Governments ('COAG') Energy Council is a Ministerial forum for the Commonwealth, states and territories and New Zealand. The COAG's Geoscience Working Group released the National Mineral Exploration Strategy 2017-2022 in 2017.[1] This seeks to promote Australia as the preferred destination for investment in mineral exploration. It is currently in the process of updating the Mineral Investment Attraction Plan (previously released in 2012) to identify the sectors and locations of target investment markets.

COAG's overall strategy recognises that the mineral resources sector plays a vital role in Australia's ongoing economic prosperity as the nation's dominant export sector. It is expected to continue driving State-level policy decisions in relation to sector growth, particularly for resources with a high export value. Within the MidCoast, this predominantly relates to coal-based resources.

In 2015 the COAG Energy Council also released the National Energy Productivity Plan (NEPP)[2]. The NEPP is an agreed package of measures to improve Australia's energy productivity by 40% between 2015 and 2030.

The Council agreed that improving our national energy productivity would be important in delivering greater value from the energy that Australians use. Better energy productivity will boost Australia's competitiveness, help consumers manage their energy costs and reduce Australia's greenhouse gas emissions.

The NEPP provides a framework and an initial economy-wide work plan designed to accelerate action to deliver a 40 per cent improvement in Australia's energy productivity by 2030. In better coordinating energy efficiency, energy market reform and climate policy, it

[1] COAG Energy Council 2017
[2] COAG Energy Council 2015

brings together new and existing measures from across the COAG Energy Council's work program, as well as from the Commonwealth and industry.

4.1.2 Renewable Energy Target Schemes

The Federal Government's Renewable Energy Target Scheme encourages the additional generation of renewable electricity to reduce greenhouse gas emissions. The Scheme achieves this by legislating demand for certificates that can be bought and surrendered to the Clean Energy Regulator to achieve annual set targets. There are large-scale and small-scale renewable energy targets which can be briefly summarised below:

- Large-scale renewable energy targets (LRET) that incentivise investment in renewable energy power stations where a large-scale generation certificate (LGC) can be created for every megawatt hour of renewable electricity produced.
- Small-scale energy targets (SRES) incentivise households for eligible small-scale renewable systems where a small-scale technology certificate (STC) can be created where usually installers of these private systems offer discounts for the price of installation.[3]

4.2 State Level Considerations

4.2.1 NSW Gas Plan 2014

The NSW Government released the NSW Gas Plan in 2014[4]. This introduced regulatory changes for the gas industry that provided a higher level of Government oversight in the release of land for CSG exploration and development. Action 4 of the NSW Gas Plan established a buy-back scheme for petroleum licenses across NSW. The petroleum (CSG) exploration license currently applying in the MidCoast, due to expire in 2020, is eligible for this scheme.

4.2.2 NSW Strategic Release Framework for Coal and Petroleum Exploration 2015

The NSW Government introduced a Strategic Release Framework for Coal and Petroleum Exploration in 2015[5] to provide greater transparency over the decision-making process. Under this framework, the Government committed to consider environmental, social and economic factors and community views prior to releasing and area for exploration[6].

The entirety of the coal resource in the MidCoast has already been released for exploration. However, as part of the Strategic Release Framework, the Government's policy on renewal of exploration licenses for coal is currently under review. This review is likely to affect three coal exploration licenses that are currently expired and pending renewal, with the remaining three licenses due for renewal in 2020. Renewal applications are expected to be subject to stricter criteria, in line with the intention of the Strategic Release Framework.

[3] Australian Government Department of Industry, Science Energy and Resources 2020

[4] NSW DPE R&G 2014

[5] https://www.resourcesandgeoscience.nsw.gov.au/miners-and-explorers/programs-and-initiatives/strategic-release-framework-for-coal-and-petroleum-exploration

[6] NSW DPE R&G 2015

4.2.3 NSW Mining Policy

The NSW Department of Planning and Environment finalised its Integrated Mining Policy in 2018[7]. This policy applies to development applications for major projects e.g. new mines or major expansions to existing mines. As part of this policy, the Government has released guidelines to provide a common understanding of how various economic and environmental matters will be assessed. Additional compliance measures have also been introduced to monitor and report on impacts over time.

4.2.4 Strategic Statement on Coal Exploration and Mining in NSW

By Judgment dated 8 February 2019, the NSWQ Land and Environment Court rejected a State Significant Development Application for an open cut coal mine known as the Rocky Hill coal mine adjacent to the township of Gloucester.

In summarising the judgment, the honourable Judge Preston noted that:

"……an open cut coal mine in this part of the Gloucester valley would be in the wrong place at the wrong time. Wrong place because an open cut coal mine in this scenic and cultural landscape, proximate to many people's homes and farms, will cause significant planning, amenity, visual and social impacts. Wrong time because the GHG emissions of the coal mine and its coal product will increase global total concentrations of GHGs at a time when what is now urgently needed, in order to meet generally agreed climate targets, is a rapid and deep decrease in GHG emissions. These dire consequences should be avoided. The Project should be refused."[8]

In response to this judgement the NSW Government released a Strategic Statement on coal exploration and mining in NSW to take a balanced approach to the effects of reducing carbon emissions in the coal mining sector.

The Strategic statement consists of a 4-point plans as follows:

- Improving certainty about where coal mining should not occur
- Supporting responsible coal production
- Reducing the impact of coal mining
- Supporting diversification of coal-reliant regional economies to assist with the phase-out of thermal coal mining. [9]

To support these actions, the government has ruled out considering a significant proportion of the state's coal regions for proactive release under the Strategic Release Framework for Coal and Petroleum Exploration and have mapped areas in NSW coal regions that are excluded from future coal exploration and mining.

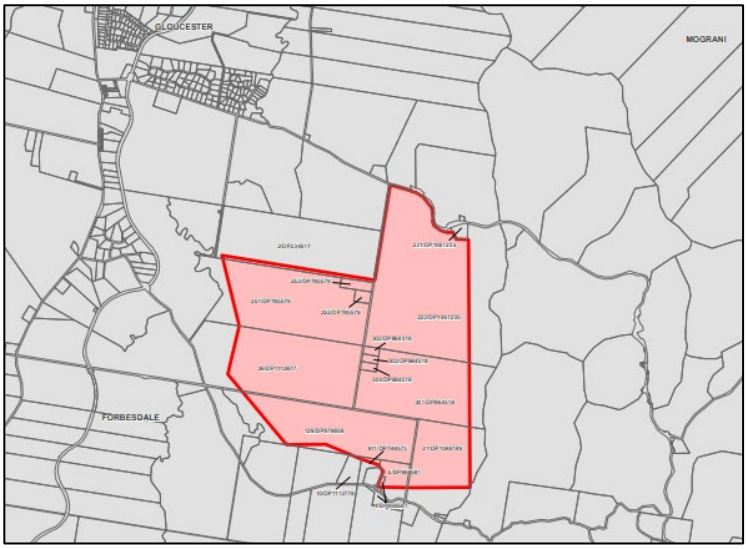
Figure 1 below indicates that extension of the Rocky Hill mine towards the town of Gloucester is now prohibited under State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.

[7] NSW DPE 2018

[8] https://www.caselaw.nsw.gov.au/decision/5c59012ce4b02a5a800be47f#_Toc431221

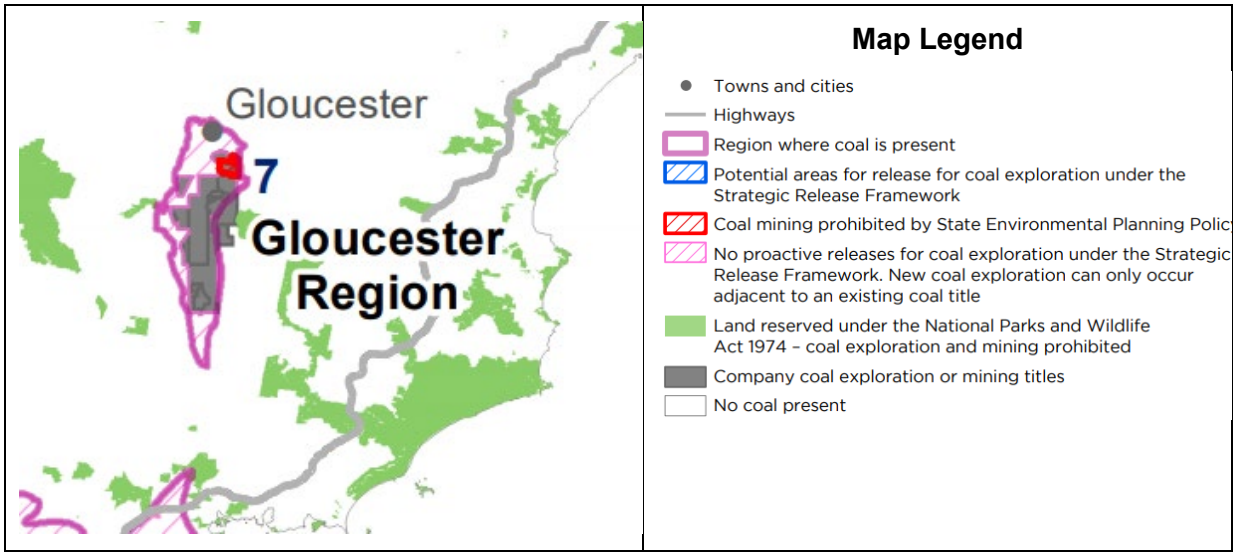
[9] NSW Resources and Geoscience 2020

Figure 1. Location where open cut mining is prohibited - Rocky Hill[10]



In addition to the Rocky Hill prohibition, the broader State map indicates that there are no proactive releases for coal exploration in the MidCoast under the strategic release framework, unless they are adjacent to existing coal titles, in this instance the Stratford and Duralie Mining Leases, as shown in Figure 2.

Figure 2. Locations where coal exploration and mining are available and excluded in MidCoast[11]



4.2.5 NSW Strategic Regional Land Use Policy 2012

In 2012 the NSW Government introduced the Strategic Land Use Policy to better manage the conflicts arising from the proximity of mining and coal seam gas projects to agricultural land considered to be high value. As a part of the Policy it was provided that all exploration activities that required a Review of Environmental Factors (REF) would require an Agricultural Impact Statement to be prepared.[12]

[10] SEPP 2c3044d7-ac88-43cf-a817-76cd475c315c (nsw.gov.au)
[11] Areas in NSW coal regions available and excluded from future coal exploration and mining
[12] AIS_Fact_Sheet_Nov_12 (nsw.gov.au)

Noting the Policy was published in 2012, the intention was for Strategic Agricultural Land to be identified and mapped across NSW, for inclusion into Regional Strategies and the State Environmental Planning Policy (Mining, Petroleum Production and Extractive industries) 2007 (the Mining SEPP).

> *The purpose of an AIS is to ensure a focused assessment of the potential impacts of mining and petroleum (including coal seam gas) projects and exploration activities on agricultural resources or industries.*[13]

Agricultural Impact Statement (AIS) Statement would be prepared to determine: the value of the agricultural resources and associated enterprises; the impact of the project on these resources and activities; and whether the impacts are unacceptable and should be avoided. In order to assess these impacts, the AIS will include:

- Detailed assessment of the agricultural resources and agricultural production of the project site and region;
- Identification of the agricultural resources and current agricultural enterprises within the surrounding locality of the project area;
- Identification and assessment of the impacts of the project on agricultural resources or industries, including those areas identified for conservation as environmental off-sets;
- Account for any physical movement of water away from agriculture and the requirements of the Aquifer Interference Policy;
- Assessment of socio-economic impacts, including visual amenity, landscape values and tourism infrastructure relied upon by local and regional agricultural enterprises;
- Identification of options for minimising adverse impacts on agricultural resources, including agricultural lands, enterprises and infrastructure at the local and regional level;
- Document consultation with adjoining land users and Government Departments.

Despite the age of the policy, the key requirements remain relevant and appropriate for all extractive industry and exploration. Similar requirements may be appropriate for consideration with future energy production proposals on rural and agricultural land to ensure consistent assessment of potential impacts on existing or potential agricultural activities in the MidCoast.

While these provisions may not be documented within future environmental planning instruments specific to the MidCoast, it will be important for Council to continue to engage with: the Department of Primary Industries as the ongoing Strategic/Important Agricultural Land Mapping projects progress; and the Department of Planning, Industry & Environment Regional Strategic Plan review programs, to ensure balanced and responsive outcomes for agriculture, mining and energy production industries that benefit the MidCoast community.

4.2.6 NSW Electricity Strategy

The NSW Electricity Strategy follows from a Memorandum of understanding (MOU) between the NSW and Commonwealth Governments which sets out clear and long-term paths to assist NSW to meet its target of zero emissions by 2050.

The strategy foremost recognises that a reliable, affordable and sustainable electrical infrastructure and supply is required to support future growth. The strategy intends to meet the electricity generation needs and emission reduction target in the following ways:

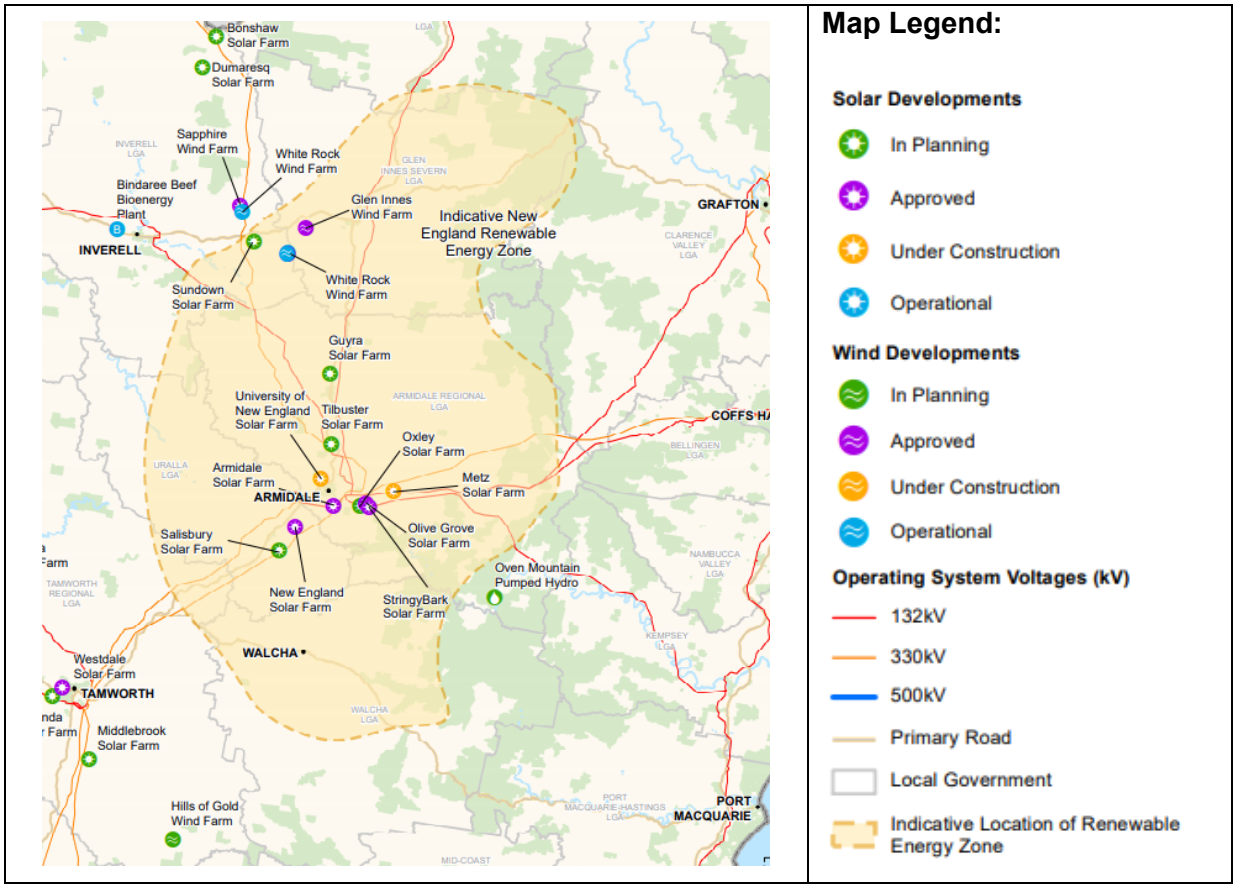
[13] AIS_Fact_Sheet_Nov_12 (nsw.gov.au)

- *Delivering Australia's first coordinated renewable energy zone (REZ) - essentially a cluster of renewable energy generation such as wind, solar together with storage such as batteries and associated high-voltage poles and wires.*
- *saving energy, especially at times of peak demand*
- *supporting the development of new electricity generators*
- *setting a target to bolster the state's energy resilience*
- *making it easier to do energy business in NSW.*[14]

The first pilot renewable energy zone was the Central-West Orana REZ in the Dubbo region.

Since then, a second REZ has been developed in the New England Region as shown in Figure 3 below, which illustrates a concentration of solar, wind, bioenergy and pumped hydro electricity generating developments either in planning, approved, under construction or operational within the New England REZ. This also illustrates how the REZ takes advantage of its proximity to existing high voltage powerlines to the east coast, which connects to the MidCoast LGA.[15]

Figure 3. New England Renewable Energy Zone (REZ)[16]



[14] NSW Department Energy 2020

[15] NSW Department Energy 2020

[16] New England Renewable Energy Zone (nsw.gov.au)

4.2.7 NSW Net Zero Plan Stage 1: 2020-2030

The NSW Government has developed a Net Zero Plan Stage 1:2020-2030 with the following precis:

> *The Net Zero Plan Stage 1: 2020-2030 is the foundation for NSW's action on climate change and goal to reach net zero emissions by 2050. It outlines the NSW Government's plan to grow the economy, create jobs and reduce emissions over the next decade.*
>
> *The plan aims to enhance the prosperity and quality of life of the people of NSW, while helping the state to deliver a 35% cut in emissions by 2030 compared to 2005 levels. The plan will support a range of initiatives targeting electricity and energy efficiency, electric vehicles, hydrogen, primary industries, coal innovation, organic waste and carbon financing.*
>
> *Under the plan, businesses will be supported to modernise their plant and increase productivity, while farmers will have access to new markets and technologies. The plan will also help to drive down the cost of living and provide consumers with more information to help them make more environmentally and financially sustainable choices.*
>
> *The implementation of the Net Zero Plan, together with the NSW Energy Strategy, will result in more than $11.6 billion of new investment for NSW, including $7 billion in regional NSW. This will support the creation of almost 2400 new jobs, including 1700 jobs located in the regions.*[17]

Of relevance to the MidCoast, the Plan specifically identifies the need to recognise and capitalise on the opportunities afforded to regional communities with:

- the manufacture and distribution of solar panels, wind turbines and associated infrastructure components, as well as the emerging battery storage industry; and
- potential to integrate 'low carbon technologies' with existing industries to reduce costs and create new commercial income or ancillary goods and services.

The priorities outlined within the Plan provide opportunities for funding and investment within the MidCoast and have the potential to improve productivity and profitability of agricultural lands through innovation and investment. Some of these priorities and associated initiatives area outlined below:

Priority 1 – Drive uptake of proven emissions reduction technologies

- Emissions Intensity Reduction Program – NSW Government funding to support businesses to transition their plant, equipment and processes to low emissions alternatives
- Climate Solutions Fund – Commonwealth funding to support Australian businesses, farms and land managers to take practical, low-cost actions to reduce emissions.
- Fast-tracking the delivery of NSW's first Renewable Energy Zone – to connect investors with communities that are looking to diversify their local industries into renewable energy.
- Primary Industries Climate Change Research Strategy – identified primary industry opportunities to reduce emissions through breeding and feed innovation; and secure new income via revegetation for carbon sequestration.

In its early years, the Primary Industries Productivity and Abatement Program will prioritise:

- *commercialising low emissions technology in the dairy, wool and red meat industries, such as those technologies identified through the CSIRO-MLA partnership*
- *connecting small landholders, including Aboriginal landowners, to carbon markets*

[17] Net Zero Plan Stage 1: 2020-2030 | NSW Environment, Energy and Science

- *underwriting project risks from trialling new approaches to carbon sequestration*
- *developing premium land-based carbon markets that deliver stronger environmental and social outcomes compared to traditional low-cost abatement programs.*

Currently farmed livestock in Australia is worth more than $30 billion per year and global demand for meat, dairy and eggs out to 2050 is projected to grow by 50–70%, according to the Food and Agriculture Organisation. According to the CSIRO, meeting the increasing demand for sustainable products will be critical to future growth of the agricultural sector. The Primary Industries Productivity and Abatement Program will help NSW farmers meet this growing demand and ensure the productivity of the State's primary industries is not tied to emissions intensity in the global transition to a net zero economy.[18]

Figure 4. NSW DPIE Net Zero Plan – Case Studies

Case study:
Capturing carbon from cement

Over half the carbon emissions from making cement come from the use of limestone. An Australian company, Calix, is piloting a breakthrough technology to capture the carbon emissions from making cement at Heidelberg Cement's Lixhe plant in Belgium. With €12 million of funding from the European Union's Horizon 2020 Research and Innovation program, they have been able to show that the technology works and are now looking to scale-up its use across the sector.

Because the technology involves minimal changes to the conventional process for cement manufacture and no significant additional energy or capital costs, it has tremendous potential for deployment in cement, lime and similar mineral processing applications in New South Wales and around the world.

Case study:
Switching from diesel to solar-diesel irrigation systems

For many years a family-run cotton business in Moree NSW relied heavily on a diesel powered irrigation pump when rainfall was low during spring and summer.

With NSW Government support, the business upgraded their system to an off-grid solar-diesel hybrid power plant, allowing the pump to use solar power during the day and diesel at night. This reduced their diesel consumption by more than 60%, saving them over $45,000 a year. The system is also more water efficient, allowing the farm to reduce its water use during peak periods.

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[18] Net Zero Plan Stage 1: 2020-2030 | NSW Environment, Energy and Science
[19] Net Zero Plan Stage 1: 2020-2030 | NSW Environment, Energy and Science

4.2.8 Renewable Energy Action Plan

The NSW Energy Action Plan was released in 2013. It has 24 actions under 3 goals that detail the Government's intention to work closely with NSW communities and the renewable energy industry to increase renewable energy generation in the state at the least cost to the consumer. The Plan was implemented alongside a separate Energy Efficiency Action Plan.[20]

The broad goals and actions of the plan have been implemented and provide the following guidance and information relevant to energy production industries within the MidCoast:

- *Released planning guidelines, strategic options of ownership and benefit-sharing models for wind energy production and solar energy production*
- *Launched the Hunter Energy Transition Alliance between government, industry, and the community to attract new investment and achieve economic diversity for the Upper Hunter Region.*
- *Supported the Australian Biomass for Bioenergy Assessment to help build investment in the bioenergy industry.*

Critically, for land use planning and assessment the planning guidelines provided by the NSW Government confirm:

All new proposals are subject to appropriate government planning controls and assessment criteria. Both the total capital value and the electrical power output of the project determine which authoritative body will approve the development application.

In general, projects with a capital value of:

- less than $5 million are assessed and approved by council(s)
- $5-30 million are assessed by the host council(s) but approved by a Joint Regional Planning Panel
- wind farms of more than $30 million (or $10 million in an environmentally sensitive area) are classified as State Significant Developments (SSD). The NSW Department of Planning and Environment (DPE) assesses these projects, which are then approved by the Minister or NSW Planning Assessment Commission. Developers proposing to build a wind farm classified as SSD must apply to the Secretary of DPE to obtain a list of environmental assessment requirements.[21]
- large-scale solar projects of more than $30 million (or $10 million if in an environmentally sensitive area) are classified as State Significant Developments and assessed by the NSW Department of Planning and Environment. The planning process requires an Environmental Impact Statement (EIS) that details impacts and proposed management and mitigation measures. For solar farms, the main impacts occur during the construction phase.[22]

Therefore, Council must include locally appropriate planning controls within the local environmental plan and development control plan, to ensure small-scale energy production proposals can be assessed, constructed and operate in a consistent manner within the MidCoast LGA.

[20] Renewable Energy Action Plan | Energy NSW
[21] Wind energy in NSW | Energy NSW
[22] Solar energy | Energy NSW

4.3 Regional Level Considerations

4.3.1 Hunter Regional Plan 2036

The Hunter Regional Plan (the Plan) recognises the importance of the Hunter as a major source of coal and petroleum resources in Australia as outlined in Ministerial Direction 1.3 and this is evidenced by the vision and introduction of this document.

Vision: The leading regional economy in Australia with a vibrant new metropolitan city at its heart.

The Hunter is the leading regional economy in Australia, with thriving communities and a biodiversity-rich natural environment. The Hunter is home to more than 860,000 people and is still growing due to its reputation as one of the great places to live and work.

Beyond Greater Newcastle are vibrant centres, towns and villages, many of which have benefited from emerging job opportunities in the health, agriculture, tourism, defence, energy and transport sectors. Faster inter-regional transport and digital technology are making it easier for residents and businesses to interact and do business.

The Port of Newcastle is a vital hub for exporting agricultural produce (including prized beef, lamb, dairy and oilseed) and coal to new markets throughout Asia. Productive agricultural land and natural resources are the foundations of the region's gross domestic product.

Ministerial Direction 5.10 also requires future changes to planning controls to be consistent with Hunter Regional Plan 2036.

Therefore, the vision, land use strategy, goals, directions and actions described in the Hunter Regional Plan are considered generally reflective of current Government policy directions at National and State levels. On that basis, the Hunter Regional Plan was used as a platform for identifying top-down considerations for local strategic planning.

The Plan recognises the importance of managing the ongoing use of natural resources and the following goals, directions and actions are particularly relevant to high-level planning for mining of extractive resources and energy production within the MidCoast:

Goal 1 - The leading regional economy in Australia

The Hunter is the largest regional economy in Australia, ranking above Tasmania, the Northern Territory and the Australian Capital Territory in terms of economic output. It drives around 28 per cent of regional NSW's total economic output and is the largest regional contributor to the State's gross domestic product.

The region has an estimated 322,000 jobs and this is projected to increase to 384,000 by 2036. There is potential to achieve higher jobs growth by planning for more diversified use of employment land.

The Plan aims to strengthen the region's economic resilience, protect its well-established economic and employment bases and build on its existing strengths to foster greater market and industry diversification.

The Upper Hunter will undergo a transition in the context of a changing industry environment, particularly in mining and power generation, and emerging trends in agribusiness.

Emerging industries

Regional Development Australia's Smart Specialisation Strategy for the Hunter Region (2016) identified the following growth areas: advanced manufacturing; creative industries; defence;

food and agribusiness; mining equipment, technology and services; medical technologies and pharmaceuticals; and oil, gas and energy resources.

Direction 11: Manage the ongoing use of natural resources

There are competing uses for land in this region and there is a need to balance these interests in order to deliver the vision for this region. As part of the process to achieve balanced outcomes, the NSW Government has introduced a Strategic Release Framework for Coal and Petroleum. This is a mechanism to review and define which lands may constitute new exploration release areas. New exploration licences will only be issued in areas released by the Minister for Resources and Energy after an assessment of resource potential and economic, environmental and social factors. Community consultation and an upfront assessment of social, environmental and economic matters will occur through a preliminary regional issues assessment.

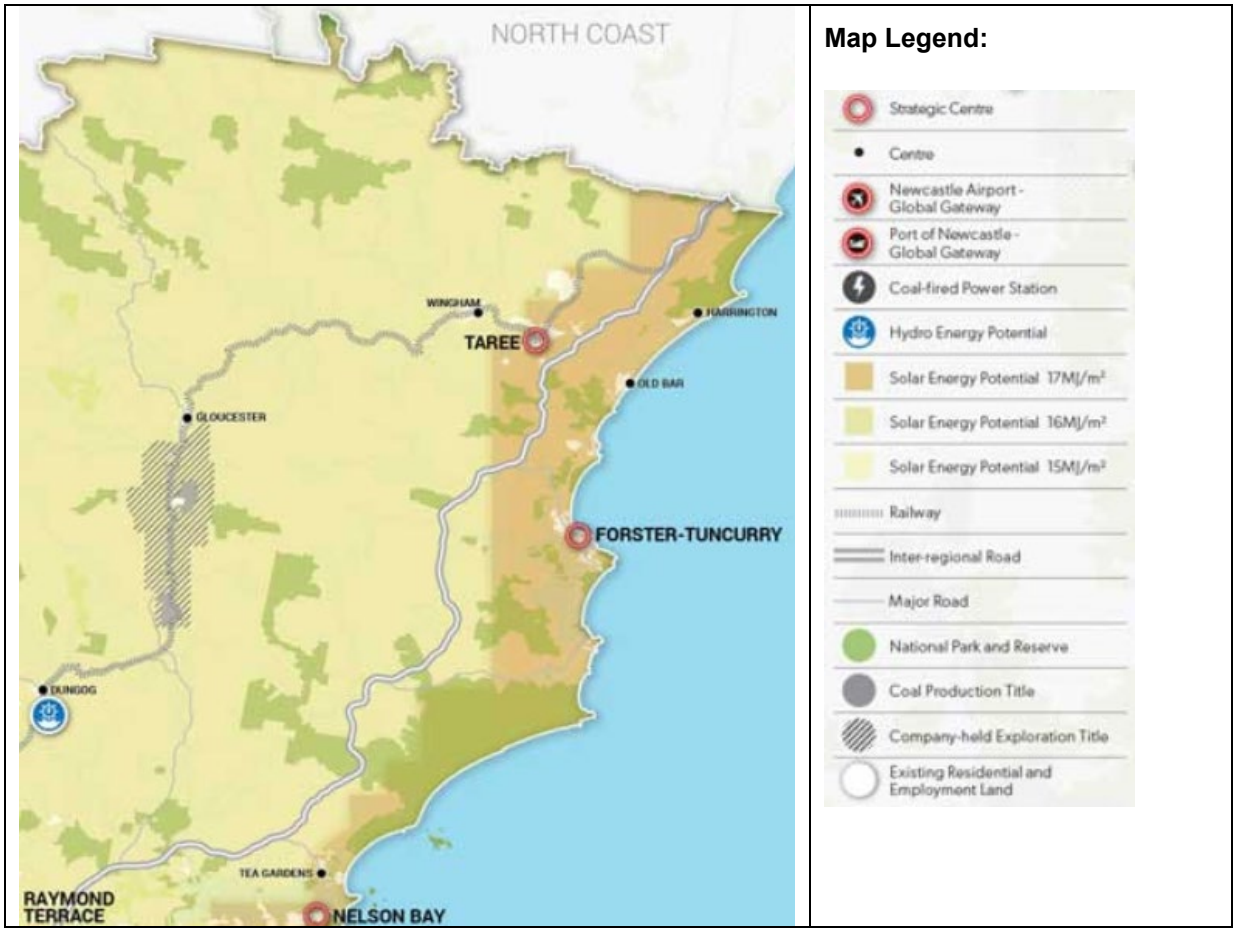
This new framework is transparent, informed and consistent with the NSW Government's broader mineral and energy resource strategies. Coal mining will remain significant in the region.

The combination of undeveloped coal resources in the Hunter and Newcastle coalfields and the export capability of the Port of Newcastle provide significant opportunities for growth.

Mining activities have specific operational needs that can compete with other sensitive uses, however they are also temporary and depend on the productive life of the facility or resource. Once extractive resource lands have been identified, there may be opportunities to identify interim activities that can occur without sterilising the underlying resource.

Developing land use plans that respond to the lifecycle of the extractive resource area provides all stakeholders with certainty around the long-term use and productive value of the land.

Figure 5. Coal mining and renewable energy map



Actions

11.1 Manage the ongoing use of mineral resources and provide access to up-to-date information about these resources through the Department of Industry's Common Ground website and its Geoscientific Data Warehouse.

11.2 Work with relevant stakeholders, including councils, communities and industry, to prepare land use plans that respond to the lifecycle of resource activity for active and emerging mining areas.

11.3 Implement the cumulative impact assessment methodology when planning for important agricultural land and water resources.

11.4 Review the Synoptic Plan: Integrated landscapes for coal mine rehabilitation in the Hunter Valley (1999) in conjunction with the development of the Upper Hunter Strategic Biodiversity Assessment to ensure best-practice rehabilitation and visual impact management for closed mines.

Direction 12 – Diversify and grow the energy sector

The Hunter accounts for 44 per cent of power generation in NSW,[21] however prospective closures of Liddell and Bayswater power stations in 2022 and 2035 respectively,[22] mean the transformation in the energy sector that is under way will need to be accelerated.

The Hunter has the solar, wind and geothermal resources to deliver large-scale projects. It is already home to some landmark projects including CSIRO's solar farm in Newcastle.

Energy efficient and renewable energy technologies can drive innovation, improve business and agricultural productivity and underpin long term economic growth. Ground–source heat exchange, solar pumping in agriculture, bioenergy, small-scale hydro, hydrogen and storage technologies have enormous potential to contribute to the regional economy.

With its energy industries and research base, the Hunter region has the potential to be a major hub for next-generation power.

Actions

12.1 Diversify and grow the energy sector by working with stakeholders, including councils, communities and industry, to identify and support opportunities for smaller-scale renewable energy initiatives such as those using bioenergy or waste coalmine methane.

12.2 Enable opportunities for renewable energy industries by reviewing local planning controls.

Direction 13: Plan for greater land use compatibility

Ongoing investment in rural and resource industries will underpin the sustainable growth, economic prosperity and ongoing productivity of the Hunter region. As the Hunter continues to grow and new economic development opportunities emerge for rural and resource industries, there is potential for compatibility issues to arise and for competition to develop for water resources and for infrastructure to support other uses.

There is also potential for conflict if new housing encroaches into rural and resource areas, leading to increased management costs. Conflict could also affect the potential to sustain or grow rural and resource industries. The expansion of rural and resource industries can also affect established urban activities if not managed appropriately. Land use planning can provide greater certainty for investment in rural and resource industries by establishing clear parameters and transparent processes to support new development.

Managing the compatibility of land uses requires a whole-of-government response. The NSW Government is already responding to community concerns about the long-term future

of coal and gas mining around the State. The Government has developed a policy framework for strategic release areas for coal and petroleum exploration licences and assessment leases. The Department has begun a project to investigate and develop options to provide greater guidance on assessing and managing the social impacts of State significant mining projects.

The NSW Government will continue to engage with communities, interest groups and industry around land use conflict to better understand all sides of the debate. This will assist with future policymaking and initiatives that balance the economic, social and environmental needs of the Hunter community.

Actions

13.2 Limit urban and rural housing encroachment into identified agricultural and extractive resource areas, industrial areas and transport infrastructure when preparing local strategies.

13.3 Amend planning controls to deliver greater certainty of land use.

13.4 Provide non-statutory guidance on the types of land uses that would be considered most appropriate, suitable or sympathetic to existing land uses in the Upper Hunter and other areas where land use conflicts occur.[23]

Collectively, these directions provide guidance to land use across the rural landscape of the MidCoast, which is considered in more detail throughout this Report:

- Land use plans are expected to respond to the lifecycle of resource activity, which recognises the changing opportunities for land use and development prior to, during and after productive phases. Specific reference is made to the Synoptic Plan prepared for the Hunter Valley in 1999. While this doesn't include the MidCoast LGA, it does provide a useful methodology for a lifecycle approach to planning in general.
- The NSW State Government is expected to provide access to up-to-date information about coal, petroleum and other mineral resources. This is currently provided through an online platform (Common Ground) and data warehouse.
- The potential for growth in the small-scale renewable energy sectors.
- It is critical for land use plans to encourage growth in the renewable energy sector particularly at small-scale and community-based levels.

4.3.2 MidCoast Regional Economic Development Strategy 2018-2022

The development of Regional Economic Development Strategies across New South Wales was the initiative of the NSW Department of Premier and Cabinet, through the Centre for Economic and Regional Development (CERD) . These Strategies were developed with strong linkages to the findings and recommendations of the 20 Year Economic Vision for Regional NSW strategy document.

CERD worked closely with local councils to the Strategies, which apply standardised regional economic development methodology to identify existing economic strengths; new opportunities to enhance the region's development performance and competitiveness: and to set the region on a path to sustainable economic development.

The MidCoast Regional Economic Development Strategy (REDS) was released in July 2018. The process included a series of well-attended workshops held across the region, aimed at collaborating to build sustainable economic development. The strategy includes an action plan

[23] https://www.planning.nsw.gov.au/Plans-for-your-area/Regional-Plans/Hunter/Hunter-regional-plan/The-leading-regional-economy-in-Australia

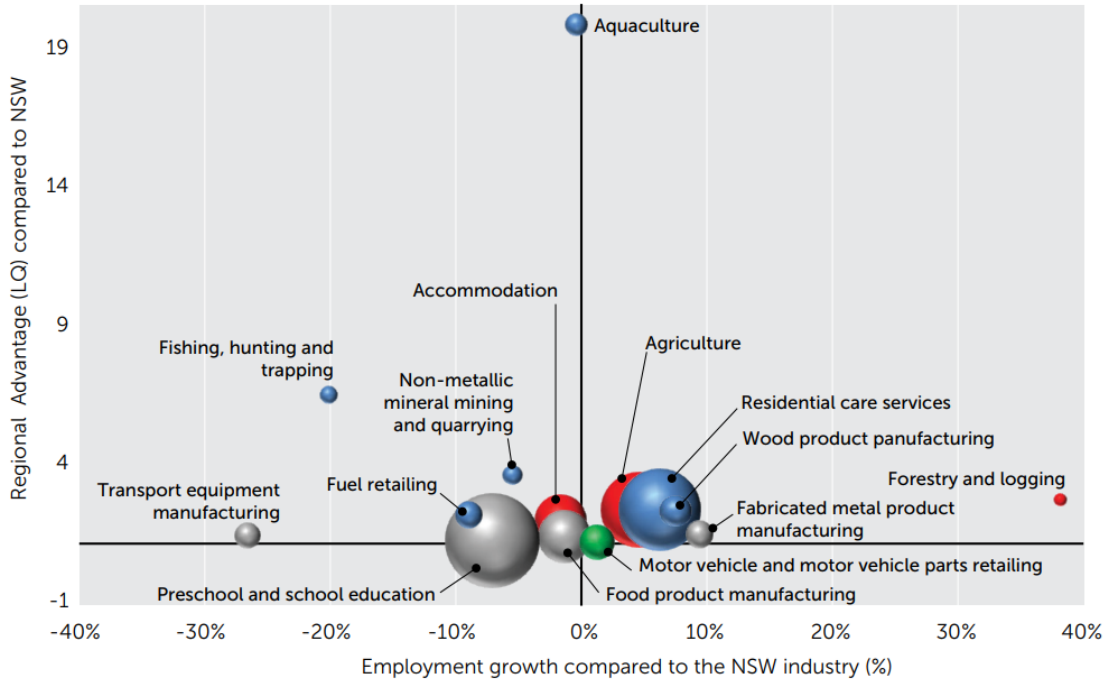
for the next three years, leveraging regional strengths such as our land and water assets, our infrastructure, and our location, lifestyle and amenity.

The MidCoast REDS is linked with Council's Community Strategic Plan and Destination Management Plan, and provides a strategic platform for community, business and Council to work with the State Government in driving economic growth. It is an important plan that will help attract State resources to underpin economic projects and create employment in the region.

REDS identified key strengths of the MidCoast regional economy that can be capitalised upon, including our *Land, water and related assets*:

> *The Gloucester coal basin, located in the west of the Region extending from Gloucester to Stroud, provides the foundation for the coal mining industry and was identified as a source of coal-seam gas.*
>
> *There are a number of key industry specific assets that are used for processing product from the land and from water industries. These include the beef abattoir located in Wingham (which is export licensed), private seafood processing, saw milling facilities and mining infrastructure.*

Figure 6. Location Quotients and Employment Growth for MidCoast Industries



Source: Census 2011, 2016. See the Supporting Analysis for notes regarding the analysis.

REDS also examined the region's competitive advantage (Location Quotient) by industry and comparing these findings to the same sector across NSW.

One of the top five industries in the MidCoast was identified as Non-metallic Extractive resources (LQ of 3.7). The LQ analysis alone illustrates the MidCoast Region does not have a specialisation in Mining. Coal mining is an important industry near Gloucester and is a small employer but does currently contribute significantly to the Region's exports. The trend is expected to decline in line with the general decline in coal related exports.

The Strategy goes on to identify opportunities to strengthen and grow key industry sectors but does not address and specific extractive resource, energy or climate change actions.

4.4 Local Level Considerations

At the local level i.e. applying exclusively within the local government area (LGA), additional policy considerations are set out in a range of documents endorsed by the State Government and/or Council. Again, these offer goals, directions and actions that complement, or provide more detail, than those provided in the Hunter Regional Plan 2036.

It is important to note here that the MidCoast Regional Economic Development Strategy, while it applies exclusively to the MidCoast LGA, has been recognised as a regional strategy as it has this intention and purpose. The fact that the MidCoast LGA was found to be an effectively independent Functional Economic Region during preparation of the Strategy, is informative as both an opportunity and a challenge for the MidCoast.

The following Council documents, which will be discussed in additional detail below, have been identified as particularly relevant to long-term planning for the MidCoast:

- MidCoast 2030: Shared Vision, Shared Responsibility
- MidCoast Destination Management Plan

4.4.1 MidCoast 2030: Shared Vision, Shared Responsibility

MidCoast 2030 was the first Community Strategic Plan prepared for the new 10,000 square kilometre MidCoast local government area created in May 2016.

> *Our Vision: We strive to be recognised as a place of unique environmental and cultural significance. Our strong community connection, coupled with our innovative development and growing economy, builds the quality of life we value.*

Within this Plan we valued: our unique, diverse and culturally rich communities; a connected community; our environment; our thriving and growing economy; strong leadership and shared vision[24]. Critically, we also recognised that whilst we have a strong resource base, these resources must be managed wisely.

> *As a community we are conscious of our environmental footprint and we manage the resources we have available to us wisely as we transition from an economy based on traditional agriculture and industrial practices to one which is more diversified.*

Table 1. Extractive resources, Energy and Climate Change Actions from MidCoast 2030

WE VALUE... our environment		
Where do we want to be?	How will we get there?	Who can help?
We protect maintain and restore our natural environment	Ensure climate change risks and impacts are understood and managed. Improve the capacity of industry and the community to achieve the best possible outcomes for the natural environment.	MidCoast Council NSW and Federal Government

[24] https://www.midcoast.nsw.gov.au/Council/Plans-and-reports

	Ensure our natural assets are maintained to a standard appropriate to their use.	Environmental groups Local Aboriginal groups and organisations Education and training providers Chambers of Commerce and business community
We manage resources wisely	Proactively manage our resource consumption	
We balance the needs of our natural and built environments	Ensure growth and new development complements our existing natural assets, cultural assets and heritage sites. Optimise land use to meet our environmental, social, economic and development needs.	
How will we know we are on track? 2 There is a reduction in council's annual carbon emissions 4 The community is satisfied with land use planning decisions		

WE VALUE... our thriving and growing economy		
Where do we want to be?	How will we get there?	Who can help?
Our region is a popular place to visit, live, work and invest	Provide an environment to grow and strengthen local businesses and attract new business.	MidCoast Council NSW and Federal Government Regional Development Australia Local Aboriginal groups and organisations Chambers of Commerce and business community
Our villages and business precincts are vibrant commercial, cultural and social hubs	Ensure strategies and processes recognise, maintain and support sustainable economic growth. Use existing knowledge, expertise and technology to develop businesses based on new ways of thinking.	
We encourage greater rural and agricultural economic diversity	Encourage the diversification and sustainability of agribusiness through the utilisation of sustainable farming practices, new technologies and innovation.	
How will we know we are on track? 1 There is a reduction in the MidCoast unemployment rate 2 The net number of new businesses has increased		

WE VALUE... strong leadership & shared vision		
Where do we want to be?	How will we get there?	Who can help?
We work in partnership with our community and government to ensure council is a	Partner with, and positively influence the State and Federal Governments in delivering local priorities and services.	MidCoast Council

trusted and flexible organisation that delivers on their needs		NSW and Federal Government Regional Development Australia Local Aboriginal groups and organisations Other councils Education and training providers Chambers of Commerce and business community
We develop and encourage community and civic leadership	Inform, educate and empower council, business and community leaders to respond and adapt to challenges and change. Identify and participate in initiatives for regional cooperation and collaboration. Identify and participate in initiatives for regional cooperation and collaboration.	
How will we know we are on track? 2 The community is satisfied that decisions are made in their best interest 4 The community is satisfied that council provides value for money for ratepayers		

4.4.2 Mining & Extractive Industry Policy

The former Gloucester Shire Council adopted a Mining and Extractive Industries Policy in 2014.

The policy specified:

- Council's expectations regarding applications for new mines, or expansion of existing mines in the local area;
- Compliance and monitoring requirements of approved mines;
- Specific roles for Council;
- Community's expectations of mining companies operating in our area; and
- information required in an Environmental Impact Statement (EIS).

While the Policy has not been reviewed and updated since adoption, the objectives and provisions are considered to have ongoing relevance in the MidCoast and may be appropriate for incorporation into a new development control plan, to provide guidance for small-scale extractive industries that are not captured by the investment triggers of the State Environmental Planning Policies. Including, but not necessarily limited to the following:

- *contributions to greenhouse gas emissions;*
- *impacts on community health – noise, dust and exposure to heavy metals;*
- *impacts on scenic amenity - noise, dust and light disturbance;*
- *impacts on groundwater flows - excavation, subsidence or interception of aquifers;*
- *land clearing and the loss of habitat;*
- *impacts on land adjacent to mining - loss of value and amenity;*
- *impacts on the availability of affordable housing;*
- *impacts on the rural landscape - artificial rather than natural topography, visual scars, mounds, terminal pits and permanently altered geology;*
- *result in degradation or loss of agricultural land and displacement of some agricultural industries;*
- *loss in other economic sectors - agriculture, lifestyle retirement and tourism;*

- *social impacts - disempowering of communities, loss of a "sense of place", population growth and decline and breakdown of community cohesion.*[25]

Council also participates into both the Duralie and Stratford coal mine community consultative committees, chaired by an independent secretary approved by the NSW Department of Planning and Environment. Such committees aim to ensure that through community-industry partnerships, the social obligations of all stages of the mining process are met and in keeping with assessment outcomes and approvals. Continuation of this is supported during the operation of existing mining operations and through all phases of rehabilitation of extractive industry sites.

Should renewable energy production industries be established within the MidCoast, as new developments of as part of a transition on an existing mining site, similar development controls and committee arrangements would be appropriate to ensure consistent long-term site management and broad community outcomes.

4.4.3 MidCoast Climate Change Policy & Strategy

At the time of writing, the Draft MidCoast Climate Change Policy and Strategy was on public exhibition and the following information was provided:

> *MidCoast Council recognises a state of climate emergency exists, with the elected Councillors declaring a climate emergency in October 2019.*
>
> *In declaring a state of climate emergency, Council affirmed that urgent action is required by all levels of government to take clear steps to avert a climate crisis.*
>
> *This declaration recognises our commitment to mitigating the impacts of climate change over several years.*
>
> *It also recognises the responsibility of all government, including local councils, to reduce carbon emissions and help our communities adapt to the impacts of climate change.*
>
> *We need to plan for the unavoidable impacts of climate change, especially the risk of inundation of low-lying areas, accelerated coastal erosion, the reduction in annual rainfall, stream flow and water supply.*
>
> *To do this we are developing a risk-based Climate Change Policy and Action Plan, to both manage and reduce our greenhouse emissions, and adapt our practices to reduce our impact on the environment and our communities.*
>
> *While mitigation and adaptation actions have been undertaken across the MidCoast for some time now, the action plan is an opportunity to bring all these measures together, and plan for future sustained actions to mitigate and adapt to climate change.*
>
> *Developing a climate change policy and an action plan is the first step, and we will engage with our community to ensure climate change risks and impacts are understood and managed collaboratively.*[26]

The focus of the Policy was for Council-led initiatives and actions, to ensure Councils services and facilities are managed and constructed to reduce emissions and organisational impacts on climate change, including:

- *Undertaking energy audits and developing energy management plans for Council's major facilities*
- *Completing of carbon sequestration activities including wetland acquisition and restoration, and major revegetation projects at various sites including Bootawa Dam*

[25] GSC-Policy-Mining-and-Extractive-Industries (1).pdf
[26] Climate Change and the MidCoast - MidCoast Council (nsw.gov.au)

- *Participating in the Cities for Climate Protection, Sustainability Advantage & Sustainable Procurement Programs*
- *Preparing a Local Greenhouse Action Plan and setting emission reduction targets*
- *Preparing Climate Change Risk Assessments and Adaptation Plans for Council's operations and services*
- *Monitoring Council's energy and water consumption, carbon emissions and reductions*

*To coordinate our future actions, we are currently developing a **Climate Change Policy and Strategy**, from which we will produce a*

- ***Climate Change Resilience and Adaptation Plan** – to integrate actions in coastal management programs, floodplain risk management plans, and land use planning.*
- ***Climate Change Mitigation Plan** – to invest in renewable energy, efficiency measures and set emission reduction targets for all Council assets.*

Actions in these plans will be implemented by developing partnerships with other government agencies and industry groups and engaging with local communities.

Our membership of the Cities Power Partnership allows us access to a significant source of knowledge and resources on climate change, and the support and learnings from other councils who are developing innovative solutions to tackling climate change.

We are also supporting a community plan to establish a Community Solar Farm.[27]

While these initiatives are relevant to the Rural Strategy, insufficient information is available at this time to document how they will inform and influence Council environmental planning instruments and controls. Therefore, as these plans are progressed the implications for land use and management need greater consideration and integration where possible.

4.5 Environmental Planning Instruments

The way extractive industries and energy production is considered through various State and local environmental planning instruments, is relevant to long-term planning and plan making considerations.

These environmental planning instruments are: State Environmental Planning Policies (SEPP) and Local Environmental Plans (LEP). The content and format of an LEP is required to be consistent with the Standard Instrument Principal Local Environmental Plan (2006) and not inconsistent with, or repetitious of, the provisions of any relevant SEPP.

This section briefly describes how these types of activities are permitted and relevant considerations for the assessment and determination of development applications within the MidCoast.

4.5.1 Mining, Petroleum Production and Extractive Industries SEPP

State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 ('Mining SEPP')[28] is a major consideration for local strategic planning and plan-making.

Part 2(7) of the Mining SEPP makes extractive resources permitted with consent anywhere that agriculture or industry are permitted.

[27] Climate Change and the MidCoast - MidCoast Council (nsw.gov.au)
[28] https://www.legislation.nsw.gov.au/#/view/EPI/2007/65

Part 2(9A) of the Mining SEPP does exclude coal seam gas production from occurring within 2km of a 'residential zone', which is defined as R1 General Residential, R2 Low Density Residential, R3 Medium Density Residential and R4 High Density Residential and the RU5 Village zone.

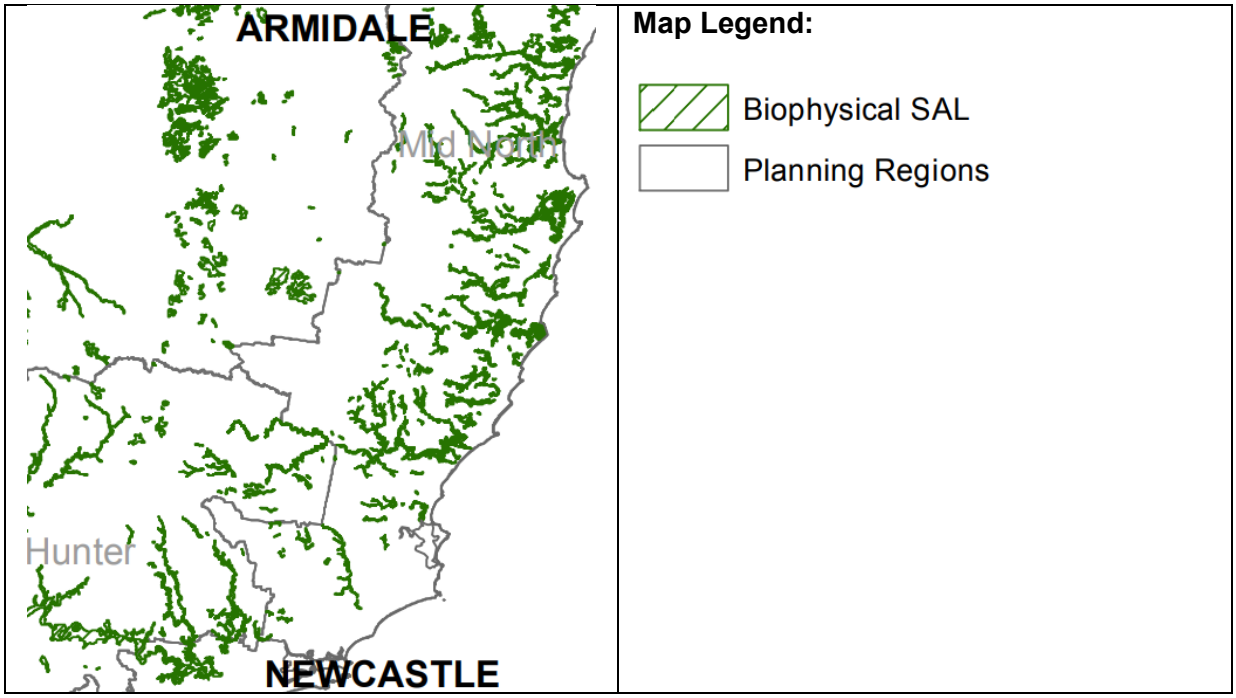
Notably, R5 Large Lot Residential and E4 Environmental Living zones, which are commonly applied in rural areas, are not considered to be 'residential zones' for the purpose of excluding coal seam gas production.

Clause 50A of the Environmental Planning and Assessment Regulation 2000 requires a development application for mining and petroleum development on land shown on the Mining SEPP's 'Strategic agricultural land map' to be accompanied by a Gateway certificate and Site verification certificate, which are both issued by the State Government.

At the time of writing, the only publicly available map for this assessment is shown in Figure 4 below, with the following introduction from the Department of Planning, Industry and Environment website:

> *Biophysical Strategic Agricultural Land (BSAL) is land with high quality soil and water resources capable of sustaining high levels of productivity. BSAL plays a critical role sustaining the State's $12 billion agricultural industry.*
>
> *A total of 2.8 million hectares of BSAL has been identified and mapped at a regional scale across the State. In October 2013, 1.74 million hectares of BSAL were mapped in the Upper Hunter and New England North West regions. In January 2014, the NSW Government finalised mapping for an additional one million hectares of BSAL across the rest of the State.*

Figure 4. Biophysical Strategic Agricultural Land (BSAL), NSW Map[29]



[29] Safeguarding our Agricultural Land - (nsw.gov.au)

Critically for the MidCoast as documented previously, amendments to the Mining SEPP which commenced on 26 June 2020 specifically prohibited open cut mining at the site of the proposed Rocky Hill Coal project near Gloucester[30].

4.5.2 Exempt and Complying Development SEPP 2008

The Exempt and Complying Development (CODES) SEPP contains planning provisions for developments that are likely to have minimal environmental impact to reduce the level of assessment or approval required.

No development for the purposes of any mining, extractive resources and energy generation purposes fits within the provisions of the Codes SEPP.

4.5.3 State and Regional Development SEPP 2011

Mining of Extractive Resources

Many extractive resources projects are typically classed as state or regionally significant developments under the State Environmental Planning Policy (State and Regional Development) 2011 based on specific site or development triggers including: nature (mineral type); scale (tonnes/year or total resource tonnage); location (in relation to environmentally sensitive or other State significant areas); or capital investment value.

State or regionally significant development requires the preparation of an Environmental Impact Statement (EIS) in accordance with the Planning Secretary's environmental assessment requirements (SEARs)[31] to support decision-making and enable the community and other stakeholders to understand the project and its impacts.

Before the preparation of an EIS, a Preliminary Environmental Assessment (PEA) may inform the consent authority of project have input into the preparation of an EIS by notifying the Planning Secretary and/or the developer of locality-specific issues.

Most extractive resources development applications are determined either by the NSW Government or the Joint Regional Planning Panel, depending on the project's specific circumstances.

Under current legislation, coal and petroleum production, larger scale quarrying activities, and any projects located in sensitive areas or attracting a capital investment value greater than $30 million are generally assessed as State Significant Development. In those circumstances, the State Government is the determining authority and Council's development control plans do not apply.

However, while Council is not the consent authority, it is a key stakeholder in the determination process. Council can make a written submission to the relevant consent authority during the public exhibition process and identify any matters of support or objection to the proposal. If Council objects to a State Significant Development application or if the application receives more than 25 public objections, it is referred to an independent commission for determination.

Council has a stronger voice where applications are determined by the Joint Regional Planning Panel. In these cases, Council's development control plan does apply. Council may

[30] State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) Amendment 2020 (nsw.gov.au)

[31] NSW Government 2015

also appoint members to sit on the Joint Regional Planning Panel when a proposed development within their council area is being decided.

Energy Production Industry

Development for electricity generating works can also be classed as state or regionally significant under the State and Regional Development SEPP.

Two consent authorities may assess and determine development projects under this SEPP – the Independent Planning Commission for certain State significant development; and the Joint Regional Planning Panel for certain Regionally significant development.

Schedule 1 of the SEPP also identifies a broad range of State Significant development categories which includes certain electricity generating works where the capital investment value is more than $30 million, or where the location is an environmentally sensitive area of State significance and capital investment value is more than $10 million.

Schedule 3 identifies additional categories of State significant infrastructure, undertaken by or on behalf of a public authority including: General public authority activities that have a capital investment value of more than $30 million.

Schedule 7 also allows for Regionally significant development in broad categories including but not limited to:

- General development that has a capital investment value of more than $30 million.
- Council related development that has a capital investment value of more than $5 million if Council is the applicant, owner of the land to be developed, the developer or party to an agreement relating to the development.
- Development carried out by or on behalf of the Crown that has a capital investment value of more than $5 million.
- Private infrastructure and community facilities that has a capital investment value of more than $5 million for specific purposes including but not limited to: air transport facilities, electricity generating works, port facilities, rail infrastructure facilities, road infrastructure facilities, sewerage systems, telecommunications facilities, waste or resource management facilities, water supply systems, or wharf or boating facilities.

Guidelines have been developed for large-scale solar energy and wind energy projects that are classed as State Significant Development to guide community, industry and regulators through the planning framework[32][33].

4.5.4 State Environmental Planning Policy (Infrastructure) 2007

The State Environmental Planning Policy (Infrastructure) 2007 is a major consideration for local strategic planning and plan-making relating to energy in that it incurs certain exemptions for certain electricity generating works both when undertaken by or on behalf of a public authority and private works.

The exceptions highlighted in Part 3, Division 4 of the SEPP are summarised below.

[32] Large Scale Solar Energy Guideline 2018 (nsw.gov.au)
[33] Wind Energy Guide (nsw.gov.au)

34 Development permitted with consent

(1) Development for the purpose of electricity generating works may be carried out by any person with consent on the following land—

(a) in the case of electricity generating works comprising a building or place used for the purpose of making or generating electricity using waves, tides or aquatic thermal as the relevant fuel source—on any land,

(b) in any other case—any land in a prescribed rural, industrial or special use zone.

(2) Development for the purpose of a back-up electricity generating plant that operates for not more than 200 hours in any year may be carried out by any person with consent on any land.

(2A) Development for the purpose of the expansion of existing electricity generating works may be carried out by or on behalf of a public authority with consent on any land that is adjacent to the existing works.

(2B) Consent is not required to carry out any such development on land if the development could, but for subclause (2A), be carried out on that land without consent.

(3) Development for the purpose of, or resulting in, a change of fuel source of an existing coal or gas fired generating works by a proportion of more than 5 per cent in any 12 month period may only be carried out with consent.

(4) If, under any environmental planning instrument (including this Policy), development for the purpose of—

(a) industry, or

(b) a waste or resource management facility,

may be carried out on land with consent, development for the purpose of electricity generating works that generate energy from waste, or from gas generated by waste, may also be carried out by any person with consent on that land.

(5) Without limiting subclause (1), development for the purpose of a small wind turbine system may be carried out by any person with consent on any land.

(6) However, subclause (5) only applies in relation to land in a prescribed residential zone if—

(a) the small wind turbine system has the capacity to generate no more than 10kW, and

(b) the height of any ground-mounted small wind turbine in the system from ground level (existing) to the topmost point of the wind turbine is no more than 18m.

*(7) **Solar energy systems** Development for the purpose of a solar energy system may be carried out by any person with consent on any land.*

(8) (Repealed)

35 Other development permitted with consent where electricity generating works permitted

If, under any environmental planning instrument (including this Policy), development for the purpose of coal-fired or gas-fired electricity generating works may be carried out on land with consent, development for the purpose of industry may also be carried out by any person with consent on that land if the industry—

(a) is located close to the works, and

(b) provides opportunities for energy efficiency or co-generation in the operation of the works.

36 Development permitted without consent

(1) Development for any of the following purposes may be carried out by or on behalf of a public authority without consent on any land—

(a) the generation or distribution of hydro-electric power using existing dam infrastructure,

(b) routine maintenance of, or emergency works relating to, electricity generating works,

(c) the installation of plant that—

(i) is on the site of, and required in connection with, existing electricity generating works, and

(ii) does not increase the existing electricity generating capacity of the works by more than 2 percent.

*(1A) In subclause (1)(c), **existing electricity generating capacity** of works includes the electricity generating capacity of the works, as changed from time to time as a result of the alteration of the works (other than solely as a result of alterations that have been carried out in reliance on that paragraph).*

(2) If, under any environmental planning instrument (including this Policy), development for the purpose of sewage treatment plants may be carried out on land without consent, development for the purpose of electricity generating works that generate energy from waste, or from gas generated by waste, may also be carried out by any person without consent on that land.

*(3) **Solar energy systems** Development for the purpose of a solar energy system may be carried out by or on behalf of a public authority without consent on any land if it is ancillary to—*

(a) an existing infrastructure facility, or

(b) an educational establishment within the meaning of State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017.

37 Complying development

*(1) **Small wind turbine systems** Development for the purpose of a small wind turbine system is complying development on any land if—*

(a) the development complies with clause 20B, and

(b) the land is not in a heritage conservation area, and

(c) the system is installed no less than—

(i) 25 metres—in the case of a system that has a source sound power level of 0–70 dB(A), or

(ii) 40 metres—in the case of a system that has a source sound power level of 71–80 dB(A), or

(iii) 126 metres—in the case of a system that has a source sound power level of 81–90 dB(A), or

(iv) 200 metres—in the case of a system that has a source sound power level of more than 91 dB(A), or

(v) 200 metres—in the case of a system that has an unknown source sound power level,

from any dwelling that is not owned or occupied by the owner of the system, and

(d) the system is located clear of any works, including power lines, of any relevant network operator (within the meaning of the Electricity Supply Act 1995) and complies with any requirements of the network operator that relate to clearance from those works, and

(e) the system is installed in accordance with the manufacturer's specifications or by a person who is endorsed for the design and installation of small wind turbine systems under the Clean Energy Council's wind endorsement scheme, and

(f) in the case of any ground-mounted small wind turbine in the system—the turbine does not penetrate any obstacle limitation surface shown on any relevant Obstacle Limitation Surface Plan that has been prepared by the operator of an aerodrome or airport operating within 2 kilometres of the proposed development and reported to the Civil Aviation Safety Authority, and

(g) in the case of land in a prescribed residential zone—

(i) the system has the capacity to generate no more than 10kW, and

(ii) if the system is ground-mounted—

(A) the development will result in no more than one small wind turbine being situated on the lot concerned, and

(B) the small wind turbine has a height of not more than 18m above ground level (existing), and

(C) the small wind turbine is not installed forward of any existing building line on the lot concerned that faces a primary road, and

(iii) if the system is not ground-mounted—

(A) the development will result in no more than 2 small wind turbines being situated on the lot concerned, and

(B) each small wind turbine does not protrude more than 3m above any building to which it is attached (as measured from the point of attachment), and

(C) each small wind turbine is not attached to a wall or roof facing a primary road, and

(h) in the case of land in a prescribed rural, industrial or special use zone—

(i) the system has the capacity to generate no more than 100kW, and

(ii) if the system is ground-mounted—

(A) the development will result in no more than 3 small wind turbines being situated on the lot concerned, and

(B) each small wind turbine has a height of not more than 35m above ground level (existing), and

(iii) if the system is not ground-mounted—

(A) the development will result in no more than 4 small wind turbines being situated on the lot concerned, and

(B) each small wind turbine does not protrude more than 5m above any building to which it is attached (as measured from the point of attachment), and

(i) in the case of land in any land use zone other than a land use zone referred to in paragraph (g) or (h)—

(i) the system has the capacity to generate no more than 100kW, and

(ii) if the system is ground-mounted—

(A) the development will result in no more than 2 small wind turbines being situated on the lot concerned, and

(B) each small wind turbine has a height of not more than 26m above ground level (existing), and

(iii) if the system is not ground-mounted—

(A) the development will result in no more than 4 small wind turbines being situated on the lot concerned, and

(B) each small wind turbine does not protrude more than 5m above any building to which it is attached (as measured from the point of attachment).

(2) ***Solar energy systems*** *Development for the purpose of a solar energy system is complying development on any land if—*

(a) the development complies with clause 20B, and

(b) the land is not in a heritage conservation area, and

(c) in the case of development for the purposes of a photovoltaic electricity generating system—the system is installed in accordance with the manufacturer's specifications or by a person who is accredited by the Clean Energy Council for the installation of photovoltaic electricity generating systems, and

(d) in the case of development for the purposes of a system other than a photovoltaic electricity generating system—the system is installed in accordance with the manufacturer's specifications, and

(e) in the case of a system that is ground-mounted—

(i) the total area occupied by the system (together with any other ground-mounted solar energy system on the lot concerned) does not exceed 500m^2, and

(ii) the system has a height of not more than 10m above ground level (existing), and

(iii) the system is installed no less than 10m from any adjoining property boundary, and

(iv) if the system involves the use of mirrors or lenses to reflect or concentrate sunlight—the system is installed no less than 100m from any dwelling or other building that is not owned or occupied by the owner of the system, and

(v) if the solar energy system is a photovoltaic electricity generating system having the capacity to generate 10kW or more—the system is installed no less than 50m from any dwelling that is not owned or occupied by the owner of the system, and

(f) in the case of a system that is not ground-mounted—

(i) the development does not reduce the structural integrity of, or involve structural alterations to, any building to which the system is attached, and

Note — *The term* ***building*** *is defined in the Environmental Planning and Assessment Act 1979 as including any structure.*

(ii) the system does not involve mirrors or lenses to reflect or concentrate sunlight, and

(iii) if the land is in a prescribed residential zone and the system is attached to a wall or roof facing a primary road—the system does not protrude more than 0.5m from the wall or roof (as measured from the point of attachment), and

(iv) if the land is in a prescribed residential zone and the system is not attached to a wall or roof facing a primary road—

(A) the system does not protrude more than 1.5m from any building to which it is attached (as measured from the point of attachment), and

(B) the system is installed no less than 1m from any adjoining property boundary if the system protrudes more than 0.5m from any building to which it is attached (as measured from the point of attachment), and

(v) the system does not protrude more than 3m from any building to which it is attached (as measured from the point of attachment) if the land is in a land use zone other than a prescribed residential zone.

*(3) For the purposes of subclause (1)(c), a **source sound power level** is a level that is measured at a wind speed of no less than 8 metres per second and in accordance with the International Standard IEC 61400—11Noise Measurement.*

38 Prohibited development

Development on any land for the purpose of electricity generating works that burn native forest bio-material (within the meaning of clause 57L of the Protection of the Environment Operations (General) Regulation 1998) is prohibited.

39 Exempt development

*(1) **Small wind turbine systems** Development for the purpose of a small wind turbine system is exempt development on land in a prescribed rural zone if—*

(a) it complies with clause 20 (other than clause 20(2)(f)), and

(b) the system is ground-mounted, and

(c) each small wind turbine has a height of not more than 35m from ground level (existing), and

(d) each small wind turbine is installed no less than 200m from any dwelling that is not owned or occupied by the owner of the system, and

(e) the development will result in no more than 2 small wind turbines being situated on the lot concerned, and

(f) each small wind turbine is located clear of any works, including power lines, of any relevant network operator (within the meaning of the Electricity Supply Act 1995) and complies with any requirements of the network operator that relate to clearance from those works, and

(g) each small wind turbine does not penetrate any obstacle limitation surface shown on any relevant Obstacle Limitation Surface Plan that has been prepared by the operator of an aerodrome or airport operating within 2 kilometres of the proposed development and reported to the Civil Aviation Safety Authority, and

(h) the system is installed in accordance with the manufacturer's specifications or by a person who is endorsed for the design and installation of small wind systems under the Clean Energy Council's wind endorsement scheme, and

(i) if the land contains a State or local heritage item or is in a heritage conservation area—the system is not visible from any road at the point where the road adjoins the property boundary concerned.

*(1A) **Wind monitoring towers** The installation of a wind monitoring tower used in connection with investigating or determining the feasibility of a small wind turbine system that has a generating capacity of no more than 1 MW is exempt development on any land if—*

(a) it complies with clause 20 (other than clause 20(2)(f)), and

(b) the tower is located clear of any works, including power lines, of any relevant network operator (within the meaning of the Electricity Supply Act 1995) and complies with any requirements of the network operator that relate to clearance from those works, and

(c) the tower does not penetrate any obstacle limitation surface shown on any relevant Obstacle Limitation Surface Plan that has been prepared by the operator of an aerodrome or airport operating within 2 kilometres of the proposed development and reported to the Civil Aviation Safety Authority, and

(d) the tower is installed in accordance with the manufacturer's specifications or by a person who is endorsed for the design and installation of small wind turbine systems under the Clean Energy Council's wind endorsement scheme, and

(e) if the land contains a State or local heritage item or is in a heritage conservation area—the tower is not visible from any road at the point where the road adjoins the property boundary concerned, and

(f) in the case of land in a prescribed residential zone—

(i) there is no other wind monitoring tower installed on the lot concerned, and

(ii) the height of the tower from ground level (existing) to the topmost point of the tower is no more than 18m, and

(iii) the tower is installed no less than 18m from any dwelling that is not owned or occupied by the owner of the tower, and

(g) in the case of land in a prescribed rural, industrial or special use zone—

(i) there are no more than 2 other wind monitoring towers installed on the lot concerned, and

(ii) the height of the tower from ground level (existing) to the topmost point of the tower is no more than 35m, and

(iii) the tower is installed no less than 35m from any dwelling that is not owned or occupied by the owner of the tower, and

(h) in the case of land in any land use zone (other than a land use zone referred to in paragraph (f) or (g))—

(i) there is no more than one other wind monitoring tower installed on the lot concerned, and

(ii) the height of the tower from ground level (existing) to the topmost point of the tower is no more than 26m, and

(iii) the tower is installed no less than 26m from any dwelling that is not owned or occupied by the owner of the tower, and

(i) in the case of a development application in relation to the small wind turbine system to be used in connection with the tower that is refused or withdrawn—the tower is demolished within 3 months after the decision to refuse or withdraw the application.

(2) Development for the purpose of a wind monitoring tower used in connection with the investigation or determination of the feasibility of a wind farm that has a generating capacity of more than 1 MW is exempt development if—

(a) it complies with clause 20, and

(b) the tower—

(i) is erected in accordance with the manufacturer's specifications, and

(ii) has a height of not more than 110m, and

(iii) is removed within 30 months after its erection is completed, and

(c) the site of the tower—

(i) is enclosed by a fence that prevents unauthorised entry to the site, and

(ii) is not within 100m of any public road, and

(iii) is not within 1km of any other wind monitoring tower or a school, and

(iv) is not within 1km of any dwelling except with the prior written permission of the owner of the dwelling, and

(v) is not within 500m of any State heritage item, and

(vi) does not affect a significant view to or from any such item that is identified in a conservation management plan (as defined by clause 3 of the Heritage Regulation 2005) for the item, and

(d) before the tower is erected, the Civil Aviation Safety Authority (established under the Civil Aviation Act 1988 of the Commonwealth) is notified in writing of—

(i) the tower's "as constructed" longitude and latitude co-ordinates, and

(ii) the ground level elevation at the base of the tower, referenced to the Australian Height Datum, and

(iii) the height from ground level (existing) to the topmost point of the tower (including all attachments), and

(iv) the elevation to the top of the tower (including all attachments), referenced to the Australian Height Datum, and

(v) the date on which it is proposed to remove the tower.

*(3) **Solar energy systems** Development for the purpose of a solar energy system is exempt development if—*

(a) it complies with clause 20 (other than clause 20(2)(f)), and

(b) in the case of development for the purposes of a photovoltaic electricity generating system—the system is installed in accordance with the manufacturer's specifications or by a person who is accredited by the Clean Energy Council for the installation of photovoltaic electricity generating systems, and

(c) in the case of development for the purpose of any solar energy system other than a photovoltaic electricity generating system—the system is installed in accordance with the manufacturer's specifications, and

(d) the system does not involve mirrors or lenses to reflect or concentrate sunlight, and

(e) in the case of a system that is ground-mounted—

(i) the total area occupied by the system (together with any other ground-mounted solar energy system on the lot concerned) does not exceed 150m^2, and

(ii) the system has a height of not more than 5m above ground level (existing), and

(iii) the system is installed no less than 3m from any adjoining property boundary, and

(iv) if the land contains a State or local heritage item or is in a heritage conservation area—the system is not visible from any road at the point where the road adjoins the property boundary concerned, and

(v) if the solar energy system is a photovoltaic electricity generating system having the capacity to generate 10kW or more—the system is installed no less than 10m from any dwelling that is not owned or occupied by the owner of the system, and

(f) in the case of a system that is not ground-mounted—

(i) the development does not reduce the structural integrity of, or involve structural alterations to, any building to which the system is attached, and

***Note —** The term **building** is defined in the Environmental Planning and Assessment Act 1979 as including any structure.*

(ii) if the land is in a prescribed residential zone and the system is attached to a wall or roof facing a primary road—the system does not protrude more than 0.5m from the wall or roof (as measured from the point of attachment), and

(iii) if the land is in a prescribed residential zone and the system is not attached to a wall or roof facing a primary road—

(A) the system does not protrude more than 1m from any building to which it is attached (as measured from the point of attachment), and

(B) the system is installed no less than 1m from any adjoining property boundary if the system protrudes more than 0.5m from any building to which it is attached (as measured from the point of attachment), and

(iv) if the land contains a State or local heritage item or is in a heritage conservation area—

(A) the system is not attached to any wall or roof of a building facing a primary road, and

(B) the system does not protrude more than 0.5m from any building to which it is attached (as measured from the point of attachment), and

(v) the system does not protrude more than 1.5m from any building or structure to which it is attached (as measured from the point of attachment) if the land is in a land use zone other than a prescribed residential zone.

(vi) (Repealed)

Certain sections of the SEPP also indicate requirements for development of electricity transmission or distribution networks to be permitted without consent by public or electricity supply authorities.

Schedule 3 of the SEPP also requires certain traffic generating development proposals, based on minimum thresholds and potential impacts on access to a classified road, or road that connects to a classified road, to be referred to Roads and Maritime Services for assessment.

4.5.5 Standard Instrument Principal Local Environment Plan

The Standard Instrument LEP contains the following relevant definitions relating to mining, extractive resources and energy production:

***electricity generating works** means a building or place used for the purpose of—*

(a) making or generating electricity, or

(b) electricity storage.

***Extractive resources** means the winning or removal of extractive materials (otherwise than from a mine) by methods such as excavating, dredging, tunnelling or quarrying, including the storing, stockpiling or processing of extractive materials by methods such as recycling, washing, crushing, sawing or separating, but does not include turf farming.*

***Note.** Extractive industries are not a type of **industry**—see the definition of that term in this Dictionary.*

extractive material *means sand, soil, gravel, rock or similar substances that are not minerals within the meaning of the Mining Act 1992.*

mining means *mining carried out under the Mining Act 1992 or the recovery of minerals under the Offshore Minerals Act 1999, and includes:*

(a) the construction, operation and decommissioning of associated works, and

(b) the rehabilitation of land affected by mining.

open cut mining *means mining carried out on, and by excavating, the earth's surface*

public authority *has the same meaning as in the Act.*

public utility undertaking *means any of the following undertakings carried on or permitted to be carried on by or by authority of any Public Service agency or under the authority of or in pursuance of any Commonwealth or State Act—*

(a) railway, road transport, water transport, air transport, wharf or river undertakings,

(b) undertakings for the supply of water, hydraulic power, electricity or gas or the provision of sewerage or drainage services,

and a reference to a person carrying on a public utility undertaking includes a reference to a council, electricity supply authority, Public Service agency, corporation, firm or authority carrying on the undertaking.

underground mining *means:*

(a) mining carried out beneath the earth's surface, including bord and pillar mining, longwall mining, top-level caving, sub-level caving and auger mining, and

(b) shafts, drill holes, gas and water drainage works, surface rehabilitation works and access pits associated with that mining (whether carried out on or beneath the earth's surface)

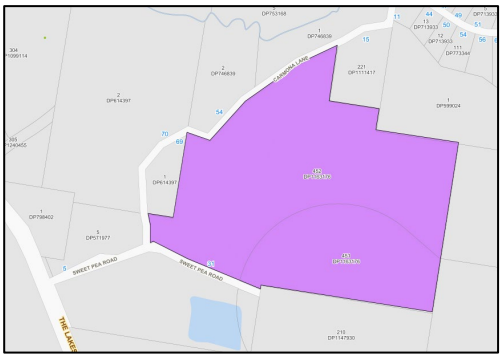
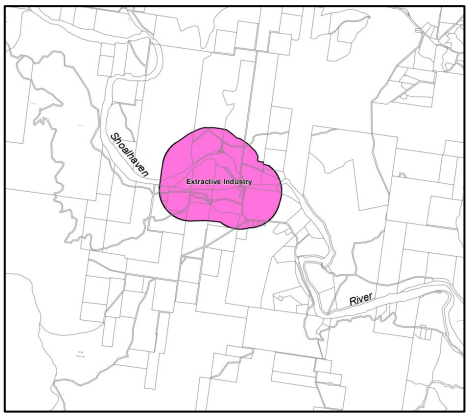
No specific local clauses are available from the Standard Instrument LEP that relate to extractive resources or renewable energy production.

There are however, two Model Clauses relevant to extractive industries within the MidCoast. Model clauses are those that have been settled by the Parliamentary Counsel's Office in relation to topics commonly raised by Councils across the State[34]. Model clauses are usually associated with mapped controls and may also be modified by Councils to reflect local character and assessment requirements.

Examples of the two clauses that may be included in a new local environmental plan to protect strategic mineral resource areas from sterilisation and/or provide buffers to these resources, are provided below in Table 2 below.

[34] https://www.planning.nsw.gov.au/Plans-for-your-area/Local-Planning-and-Zoning/Resources

Table 2. Local Environmental Plan examples of extractive resource and buffer provisions

Great Lakes LEP 2014	Shoalhaven LEP 2014
 **Mineral Resource** Identified Resource	 **Buffer** HMAS Albatross Extractive Industry Sewage Treatment Plant
7.14 Significant extractive resources[35] *(1) The objective of this clause is to identify the location of significant resources of minerals, petroleum or extractive materials for the purposes of clause 13 of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007.* *(2) The land identified as "Identified Resource" on the Mineral Resource Area Map is the land to which clause 13 of State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007 applies.*	*"7.15 Development in the vicinity of extractive industries and sewage treatment plants*[36] *(1) The objective of this clause is to protect the operational environment of certain industries operating on the land to which this clause applies.* *(2) This clause applies to land identified as "Extractive Industry" and "Sewage Treatment Plant" on the Buffers Map.* *(3) Development consent must not be granted to the carrying out of development on land to which this clause applies unless the consent authority has—* *(a) made an assessment of the impact of noise, odour and other emissions from any industry carried out on that land, and* *(b) considered the potential impact of noise, odour and other emissions associated with that industry on any activities that will be associated with the development, and* *(c) considered any opportunities to relocate the development outside that land, and* *(d) has considered whether the development would adversely affect the operational environment of that industry.*

[35] https://www.legislation.nsw.gov.au/#/view/EPI/2014/176/part7/cl7.14
[36] https://www.legislation.nsw.gov.au/#/view/EPI/2006/155a/part3/cl3.3

4.5.6 Land use permissibility within a Local Environmental Plan

The Standard Instrument-Principal Local Environmental Plan (Standard Instrument LEP), only mandates that 'extractive industries' and 'open cut mining' must be included as permitted with consent in the RU1 Primary Production zone.

However, the combined effect of the Mining SEPP and Standard Instrument LEP, limits the ability of Councils to zones to influence where mining can occur across the rural landscape, without also limiting other rural and agricultural activities.

Table 3 outlines how the Mining SEPP and Standard Instrument LEP work together to permit mining within rural and environmental zones.

Table 3. Mining SEPP provisions and Standard Instrument LEP outcomes

Zone Permissibility	Mining SEPP provisions	LEP outcomes
All zones **without development consent**	Part 2 (6) Mineral exploration and petroleum exploration without development consent.	Exploration permitted without consent in any zone
All zones **with development consent**	Part 2 (7) Mining or petroleum production, extractive industry (including processing and transport of that material and concrete works) – where agriculture or industry may be carried out with or without development consent Extractive industry in any part of waterway, estuary in coastal zone or coastal waters not in an environmental conservation zone	RU1 Primary Production, RU2 Rural Landscape and RU4 Primary Production Small Lots - agricultural uses **must be permissible** with or without consent RU3 Forestry - does not mandate, but agricultural or industrial uses can be made permissible with or without consent by Forestry. E1 National Parks and Nature Reserves - does not mandate, but agricultural or industrial uses can be made permissible with or without consent by NPWS. RU5 Village, RU6 Transition, R5 Large Lot Residential, E2 Environmental Conservation, E3 Environmental Management and E4 Environmental Living - does not mandate agricultural or industrial uses, but extensive agriculture commonly made permissible with or without consent by Councils.
Coal seam gas **prohibited** in exclusion zones	Part 2 (9) Mapped Rocky Hill exclusion zone (recommendation by IPC) Part 2 (9A) - exclusion zones: land in a residential zone, future residential	The Mining SEPP does not define the E4 Environmental Living as a 'residential zone', which means it is not excluded from the potential for coal seam gas development.

Zone Permissibility	Mining SEPP provisions	LEP outcomes
	growth area, rural village land, critical industry cluster; - land in a buffer zone: within 2km of a residential zone, future residential growth area or additional rural village land. - land in an exclusion zone requested by local council and supported by Minister.	
Exempt development – on land not already approved for mining	Part 2 (10) mineral or petroleum exploration Not in an environmentally sensitive area of State significance. Note: (a) must be of minimal environmental impact, and (b) cannot be carried out in critical habitat of an endangered species, population or ecological community (identified under the *Threatened Species Conservation Act 1995* or the *Fisheries Management Act 1994*), and (c) cannot be carried out in a wilderness area (identified under the *Wilderness Act 1987*).	Standard LEP and other environmental planning instruments (SEPPs) do not generally map these areas. Identification and mapping would be required to be undertaken through planning proposal process by local councils. RAMSAR wetlands of international significance data is available and may be readily mapped in LEPs; Coastal wetlands and littoral rainforests are mapped in the Coastal Management SEPP based on State data and mapping.

For electricity generating works, the combined effect of the Infrastructure SEPP and Standard Instrument LEP provide a similar framework to permit a range of energy production and distribution activities across the rural landscape and cover a range of activities including:

> ***electricity generating works*** *means a building or place used for the purpose of—*
>
> *(a) making or generating electricity, or*
>
> *(b) electricity storage.*
>
> ***small wind turbine*** *means a wind turbine that has a generating capacity of no more than 100kW.*
>
> ***small wind turbine system*** *means a system comprising one or more small wind turbines each of which feed into the same grid or battery bank.*
>
> ***solar energy system*** *means any of the following systems—*
>
> *(a) a photovoltaic electricity generating system,*
>
> *(b) a solar hot water system,*
>
> *(c) a solar air heating system.*

The implications of the combined provisions of these planning instruments is summarised in Table 4 below.

Table 4. Infrastructure SEPP provisions and Standard Instrument LEP outcomes

Zone Permissibility	Infrastructure SEPP Part 2 Division 4 provisions	LEP outcomes
Electricity generating works **permitted with consent**	Clause 34 (1) by any person — (a) comprising a building or place using waves, tides or aquatic thermal as the relevant fuel source—on any land, (b) in any other case—any land in a prescribed rural, industrial or special use zone. (2) back-up electricity generating plant (max 200 hours/year) by any person on any land. (2A) expansion of existing facility by or on behalf of a public authority on any land adjacent to the existing works. *(2B) Consent is not required to carry out any such development on land if the development could, but for subclause (2A), be carried out on that land without consent.* (3) change of fuel source of an existing coal or gas fired generating works by a proportion of more than 5 per cent in any 12 month period. (4) If (a) industry, or (b) a waste or resource management facility is permitted with consent – a facility that generates energy from waste, or from gas generated by waste, may be permitted with consent, on that land. (5) a small wind turbine system may be carried out by any person with consent on any land. (6) a small wind turbine system may be in a residential zone if it has — (a) capacity no more than 10kW, and (b) the height is no more than 18m. (7) solar energy system may be carried out by any person with consent on any land.	Land use tables should ensure that electricity generating works are permissible with consent in all zones to ensure there are no inconsistencies with the provisions of the SEPP. The Essential Services clause may be amended to incorporate alternative energy production.
Development permitted with consent where electricity generating works are permitted	Clause 35 If, development for the purpose of coal-fired or gas-fired electricity generating works may be carried out on land with consent, development for the purpose of industry may also be carried out with consent on that land if the industry — (a) is located close to the works, and	Land use tables should ensure that electricity generating works are permissible with consent in all zones to ensure there are no

Zone Permissibility	Infrastructure SEPP Part 2 Division 4 provisions	LEP outcomes
	(b) provides opportunities for energy efficiency or co-generation in the operation of the works.	inconsistencies with the provisions of the SEPP.
Electricity generating works **permitted without consent by or on behalf of a public authority**	Clause 36 (1) on any land— (a) the generation or distribution of hydro-electric power using existing dam infrastructure, (b) routine maintenance of, or emergency works, (c) the installation of plant that — (i) is on the site of existing electricity generating works, and (ii) does not increase the existing electricity generating capacity by more than 2 percent. (2) If sewage treatment plants may be carried out on land without consent, development for the purpose of electricity generating works that generate energy from waste, or from gas generated by waste, may also be carried out by any person without consent on that land. (3) solar energy system on any land if it is ancillary to — (a) an existing infrastructure facility, or (b) an educational establishment	Land use tables should ensure that electricity generating works and sewage treatment works are permissible with consent in all zones to ensure there are no inconsistencies with the provisions of the SEPP.
Complying development	Clause 37 (1) a small wind turbine system is complying development on any land if it meets specific zone and locational criteria. (2) a solar energy system is complying development on any land if it meets specific zone and locational criteria.	Land use tables should ensure that electricity generating works are permissible with consent in all zones to ensure there are no inconsistencies with the provisions of the SEPP. The Essential Services clause may be amended to incorporate alternative energy production. Note: Development control plan provisions may include additional locally relevant guidelines but cannot contradict or override provisions of the SEPP.

Zone Permissibility	Infrastructure SEPP Part 2 Division 4 provisions	LEP outcomes
Prohibited	Clause 38 Development on any land for the purpose of electricity generating works that burn native forest bio-material (within the meaning of clause 57L of the *Protection of the Environment Operations (General) Regulation 1998*) is prohibited.	N/A
Exempt development	Clause 39 (1) a small wind turbine system is exempt development on land in a prescribed rural zone if it meets specific zone and locational criteria. (1A) & (2) a wind monitoring tower used in connection with investigating or determining the feasibility of a small wind turbine system on any land if it meets specific zone and locational criteria. (3) a solar energy system on any land if it meets specific zone and locational criteria.	Land use tables should ensure that electricity generating works are permissible with consent in all zones to ensure there are no inconsistencies with the provisions of the SEPP. The Essential Services clause may be amended to incorporate alternative energy production. Note: Development control plan provisions may include additional locally relevant guidelines but cannot contradict or override provisions of the SEPP.

4.5.7 Council as Consent Authority

In certain circumstances, such as small gravel quarries or small-scale mineral or gem mines, where development is not identified as state significant or regional development under the Mining SEPP Council will be the consent authority. The preparation of an Environmental Impact Statement is still required for these development applications and will be assessed against:

- the provisions of Part 3 of the Mining SEPP (matters for consideration);
- any relevant considerations in the LEP, including any zone objectives;
- any Development Control Plan; and
- any relevant Council Policy.

In certain circumstances Council is also the consent authority for applications seeking a Modification of Consent for extractive resource activities. These applications have a limited capacity in that they must be for 'generally the same development', meaning these applications are usually limited to minor extensions to the area of extraction and/or an extension to the approved operational period of the extractive resource activity.

Likewise, the Infrastructure SEPP provides considerable scope for the establishment and development or a range of electricity generating works, including alternative energy production industries.

The key considerations for Council will be:

- ensuring the local environmental plan makes suitable provision for these activities within land use tables; and additional consideration of alternative energy production in remote locations within the Model Essential Services Clause; and
- the development of any locally specific development guidelines in a development control plan or Council policy that may provide additional consistency in assessment and management of these activities across the MidCoast.

4.5.8 Development controls

To ensure existing resources are not sterilised it is necessary for local governments to ensure that adequate buffers can be provided to reduce land use conflict between extractive industry activities and surrounding land uses. Buffers can ensure residential and other development is not located near quarries and resource extraction industries where blasting and other noise and dust generating activities may occur.

The Standard Instrument LEP, as discussed previously, has limited capacity for the mapping of buffer areas but local Development Control Plans (DCPs) may be used to establish and manage the consideration of buffers to extractive industries through the development assessment process.

The NSW Department of Industry factsheet Agriculture issues for extractive resources development, provides additional information for Councils and applicants on what matters should be considered when assessing extractive resources development in agricultural lands[37].

Development Control Plan provisions for small scale renewable energy additions to developments that do not meet the criteria stipulated in the Infrastructure SEPP are also encouraged[38]. However, additional and consistent assessment tools for small scale solar farms or other electricity generating works, including battery storage, would also be appropriate.

[37] Agriculture issues for Extractive resources Development (nsw.gov.au)
[38] https://www.midcoast.nsw.gov.au/Plan-Build/Stage-2-Rules-and-Regulations/Planning-Rules

5 Review of extractive resources considerations

This section summarises the key findings of our review research efforts for existing extractive resource areas identified in the LGA. This information is presented for context, to support the recommendations outlined in the Planning Framework presented later in this paper.

5.1 Lifecycle and operation of extractive resource industries

Mining and extractive industries, including privately owned quarries, are generally carried out in several stages:

- **Identification** of resource potential, noting coal and petroleum resources are subject to the NSW Government's Strategic Release program.
- **Exploration** to confirm a resource is present via time-limited lease.
- **Assessment** to confirm a project is viable via time-limited lease.
- **Commencement** of mining/production via time-limited lease; and planning assessment.
- **Ongoing operation** with approval and compliance requirements; and additional planning assessments may be required to expand or modify.
- **Care and maintenance**.
- **Cessation and rehabilitation** as per consent conditions.

Prior to 2001 the *Mining Act 1992* did not require a lease for private quarrying operations and a number of these quarries are currently still in operation.

Post-consent conditions for major projects, including mining projects, can have major economic, environmental and social impacts over extended periods of time. As a result, a Community Consultative Committee is usually formed and operates as part of the approval, providing a forum to:

- establish good working relationships between the company, community and other stakeholders
- provide for the ongoing communication of information on mining operations and environmental performance including:
    - project assessment, including scoping of issues
    - implementation of conditions of approval, the mining operations plan and any other management plans, including rehabilitation and closure plans
    - the results of environmental monitoring and annual management reports
    - outcomes of audit reports, including those required by the approval
- provide an opportunity for comment on the environmental performance
- discuss community concerns and review the resolution of community complaints
- discuss how best to communicate relevant operational information and its environmental performance to the broader community, and
- work together towards outcomes of benefit to the company, operation, immediate neighbours, local and regional community.

The committee may:

- provide feedback to the company and/or relevant State agencies regarding environmental management and community relations outcomes
- undertake regular site visits
- review complaints-handling procedures and outcomes regarding mining operations, environmental management or community relations

- provide advice on how to address community relationships, including:
  - providing information to the community
  - identification and contribution to community initiatives
- liaise with other community consultative committees where there are common issues or potential cumulative impacts from separate mines, with a view to information sharing and joint meetings on matters of common interest.

Ultimately however, the monitoring and enforcement of the mine's compliance with the conditions of approval are the responsibility of government agencies. Major mining projects can also have other implications toward strategic planning such as:

- environmental and bio-diversity offsets to ensure protection of threatened species.
- financial contributions toward community facilities, community infrastructure, community groups, education programs and the like.
- land acquisitions to provide buffers to mining activities.

5.2 Extractive resources considerations by Resource

There are various mineral resources in the MidCoast, including the following known and/or potential extractive resources: coal; petroleum in the form of coal seam gas (CSG); construction materials; industrial materials; metallic minerals; gemstones; and road aggregate. Minerals are classified by the Mining Regulation 2016 for the purposes of the Mining Act 1992, into either Schedule 1 or Schedule 2 minerals with Schedule 2 minerals being further classified into 11 groups[39].

5.2.1 Coal-based resources

Coal is a Schedule 2, Group 9 mineral under the provisions of the Mining Regulation 2016.

[39] https://www.resourcesandgeoscience.nsw.gov.au/miners-and-explorers/applications-and-approvals/mining-and-exploration-in-nsw/coal-and-mineral-titles

Figure 5. NSW Coalfields[40]

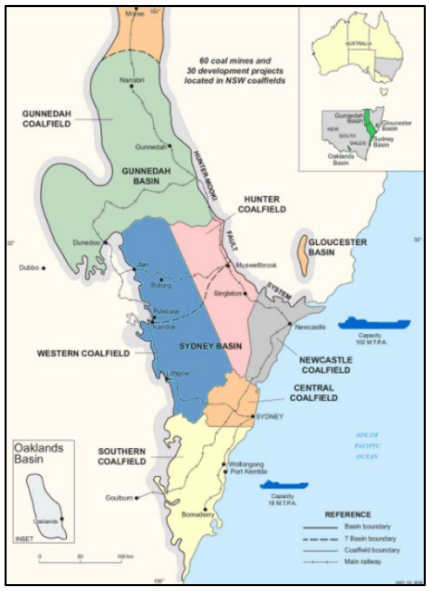
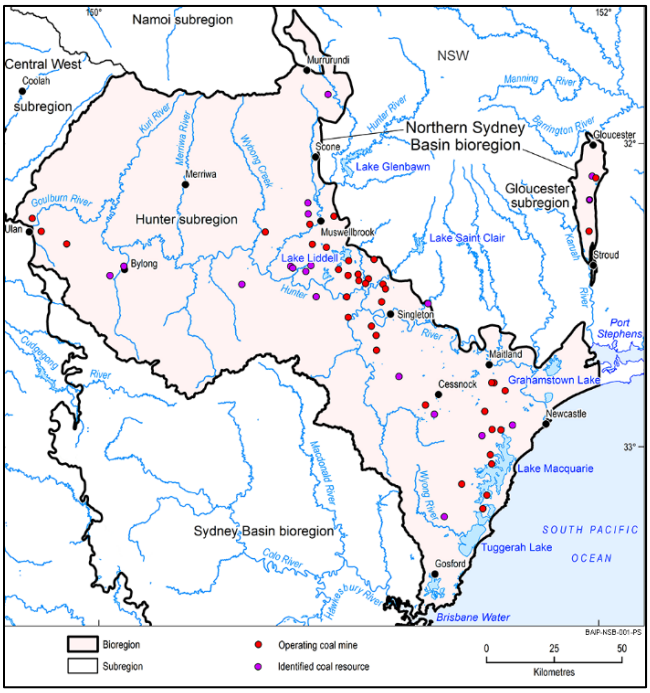


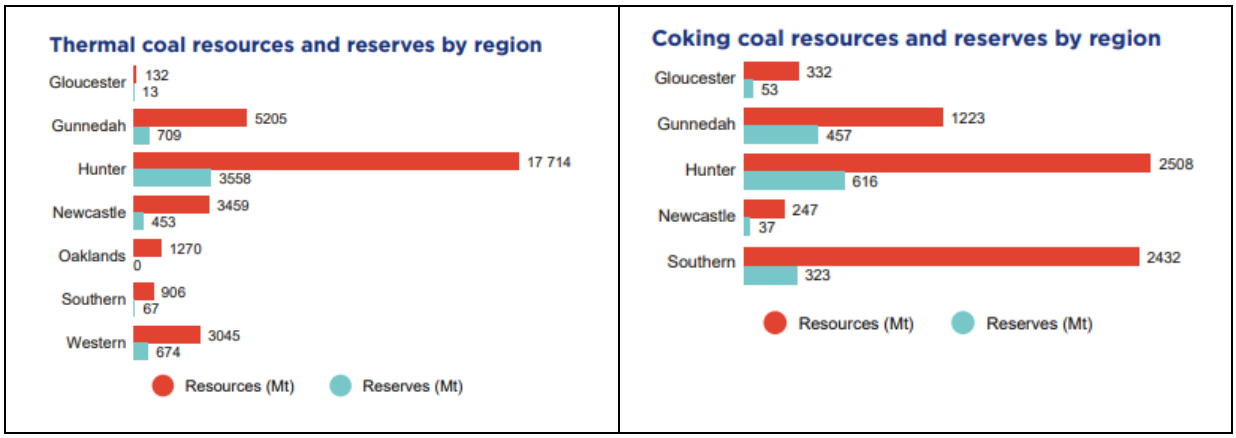
Figure 6. Northern Sydney Basin Bioregion (2015) [41]



The MidCoast forms part of the Hunter Region, which is one of the most productive coal-based regions in NSW. Within the MidCoast, coal-based resources are confined to the Gloucester Basin subregion of the Northern Sydney Basin coal bioregion as shown in Figure 5 and Figure 6 above.

The Gloucester Basin is approximately 38km long and 20km wide. It mostly contains thermal (medium-ash, medium-volatile) and to a less extent coking coals that are mined in five seams. Thicker and better-quality coals are found on the eastern margins of the Gloucester Basin, but it is generally considered a minor coal resource and reserve within the context of NSW, as illustrated in Figure 7.

Figure 7. Comparative thermal[42] and coking[43] coal resource and reserve capacities by NSW Coalfield Subregion



[40] https://www.resourcesandgeoscience.nsw.gov.au/landholders-and-community/minerals-and-coal/geoscience-for-landholders/coalfields

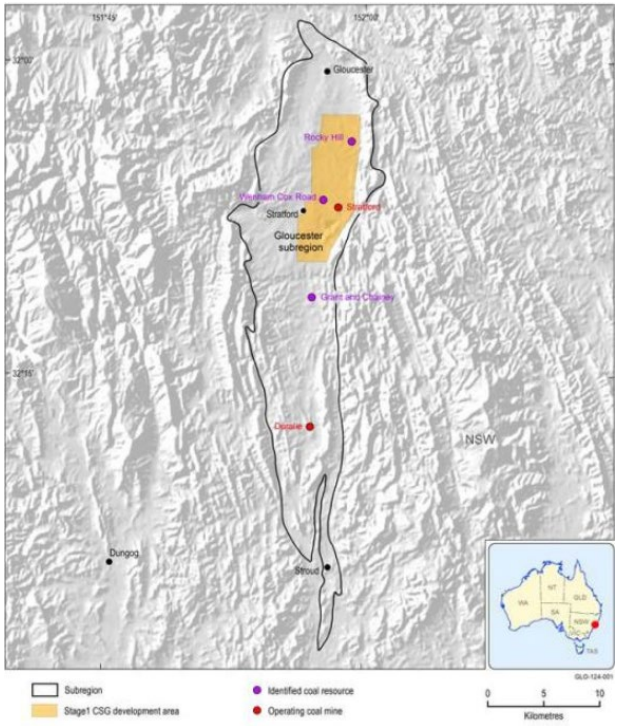
[41] https://www.bioregionalassessments.gov.au/assessments/northern-sydney-basin-bioregion

[42] Thermal coal opportunities in New South Wales, Australia (nsw.gov.au)

[43] Coking coal opportunities in New South Wales, Australia (nsw.gov.au)

The Gloucester Basin currently has two approved coals mines operating at Stratford 'Stratford mine' and Stroud 'Duralie mine'. Three other coal deposits have been confirmed at Rocky Hill, Wenham Cox Road and Grant and Chaney, as illustrated in Figure 8 below.

Figure 8. Gloucester Basin identified coal resources and operating coal mines[44]



A new mine was proposed at Rocky Hill, with associated development proposed at Stratford. This application was refused in 2017 and the refusal was upheld on appeal in 2019. The area, as discussed previously in this report, has been identified as an exclusion zone within the Mining SEPP.

The Australian Government is also undertaking an assessment of coal bioregions throughout the country. These assessments are intended to provide an understanding of how coal seam gas and coal mining development could affect water resources and water-dependent assets. The Gloucester Basin has been assessed, with the synthesised findings released in 2018[45].

Although the assessment concluded that expanding coal mining and coal seam gas development within the Gloucester Basin is predicted to cause minimal impacts on water resources and water-dependent assets, the study also recognised a level of modelling uncertainty due to the quality of available data. This suggests further investigations should be undertaken to improve the information available to undertaken environmental assessments, particularly in relation to:

- Vegetation mapping and ongoing research to more accurately identify ground-water dependent ecosystems;
- Information on deeper groundwater systems, including mapping of depth to groundwater;
- Information of the hydraulic properties of the surface weathered and fractured rock layer and storage; and

[44] https://www.bioregionalassessments.gov.au/assessments/12-resource-assessment-gloucester-subregion/124-catalogue-potential-resource-developments
[45] Australian Government 2018

- The number, orientation and characteristics of faults present[46].

The assessment recommended water quality monitoring was prioritised for Avondale Creek, Dog Trap Creek, Waukivory Creek, Oaky Creek and the Avon River.

As discussed in the Rural Waterways report, maintaining and improving water quality standards in accordance with NSW Public Health Guidelines[47] is critical, where extraction is either currently operating or proposed:

Finally, there are six coal exploration licenses that are still active for the Gloucester Basin which cover over 21,000ha and reflect the whole of the remaining resource that isn't already in production. The existing exploration licenses are all held by private companies and are either already expired (2017) and pending renewal or nearing expiration (2020).

At the time of writing this report, no applications have been lodged for the remaining coal deposits and the status of the licenses is unclear and unconfirmed.

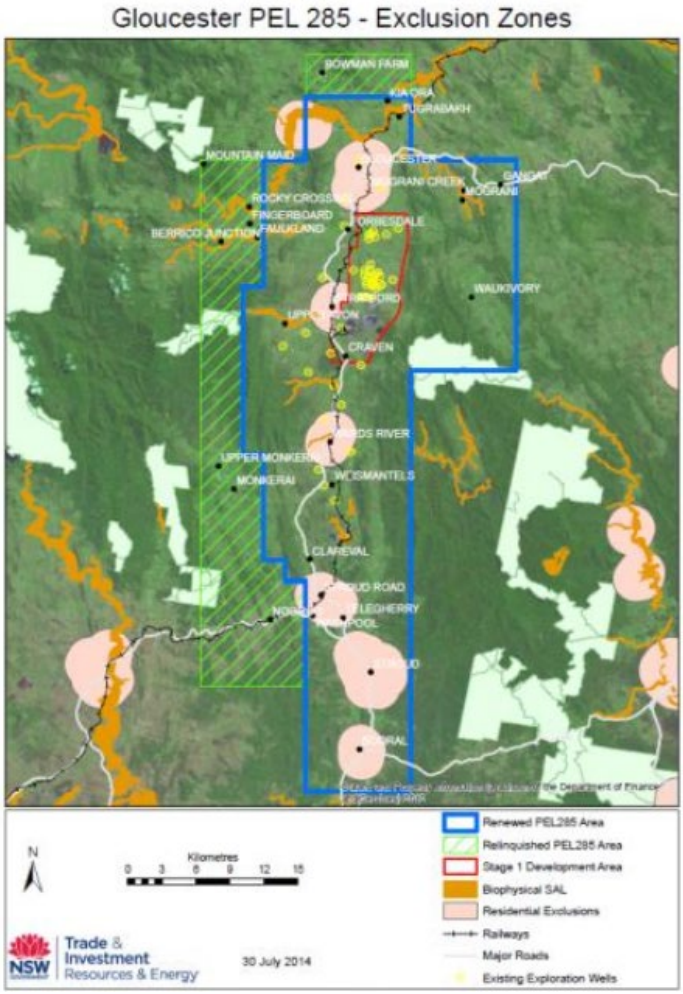
5.2.2 Petroleum-based resources

Petroleum-based resources are classified under the provisions of the Petroleum (Onshore) Act 1991. The major potential petroleum resource in the MidCoast LGA is the fracking of natural coal seams to obtain gas which is then cooled and liquified for ease of storage and transport. This liquified natural gas is used in a wide range of industrial, commercial and domestic applications.

[46] 5 Outcome synthesis for the Gloucester subregion | Bioregional Assessments

[47] https://www.health.nsw.gov.au/environment/water/Pages/NSW-guidelines-for-drinking-water-management-systems.aspx

Figure 9. Petroleum Exploration Licence (PEL) 285 and residential exclusion zones[48]



The Gloucester Basin contains up to eleven major gas seams and numerous minor seams. A coal seam gas field development by AGL Energy project was approved and commenced near Stratford 'Gloucester Gas Project'. The first stage of this 'Waukivory Project' involved the conversion of four existing exploration wells to pilot wells using fracture simulation techniques[49]. The development area for this project is illustrated in Figure 9.

A business case for the Gloucester Gas Project found inadequate gas flow data from the Waukivory Pilot wells and economic modelling resulted in AGL announcing on 4 February 2016 that it would not continue with the Gloucester Gas project[50]. This project was abandoned, and decommissioning and rehabilitation works have commenced[51].

The petroleum (CSG) exploration licence PEL 285 is still in effect for the whole of the Gloucester Basin but was relinquished back the NSW Government and was due to expire 4 August 2020. As of the time of writing, a renewal application has not been lodged.

48 https://www.resourcesandgeoscience.nsw.gov.au/landholders-and-community/coal-seam-gas/information-on-petroleum-titles/gloucester-gas-project
49 https://www.resourcesandgeoscience.nsw.gov.au/landholders-and-community/coal-seam-gas/information-on-petroleum-titles/gloucester-gas-project
50 https://www.agl.com.au/about-agl/media-centre/asx-and-media-releases/2016/february/review-of-gas-assets-and-exit-of-gas-exploration-and-production
51 https://www.resourcesandgeoscience.nsw.gov.au/landholders-and-community/coal-seam-gas/information-on-petroleum-titles/gloucester-gas-project

5.2.3 Other minerals

The NSW Government has undertaken an audit of mineral resources across the state. Minerals other than coal are generally categorised as construction materials i.e. road base, gravel, construction sand; industrial minerals such as limestone; metallic minerals and gemstones. The audit provides mapping which identifies the location and stage of each resource noting:

- Potential resources are where the geological conditions suggest a high likelihood of a resource existing; and
- Identified resources are where additional investigations have confirmed a resource exists and indicates where these are:
    - Undeveloped, meaning extraction has not commenced; or
    - Operating, where ongoing or intermittent extraction has commenced.

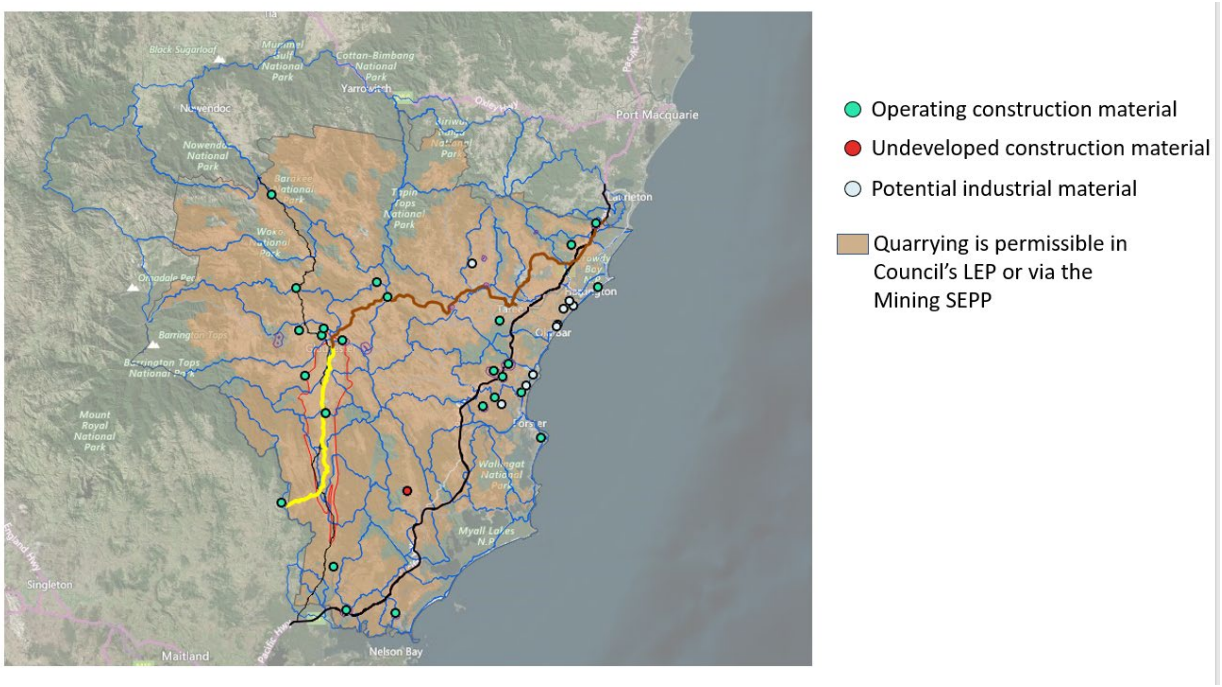
The audit confirmed that the MidCoast contains a range of mineral deposits providing:

- Construction materials, such as rock, sand and gravel;
- Industrial materials including brick clay and limestone, which are used in construction and as soil conditioners etc; and
- Metallic minerals like gold; and potential Gemstone deposits, including rubies.

Construction materials

Construction materials can include various classes of minerals under the Mining Regulation 2016 including: Group 2 minerals such as silicon, limestone, asbestos, graphite, phosphates, chlorites, potassium, fluorites, and gypsums; and Group 5 clay minerals such as shale used in brickmaking. Aggregate, rock or gravel used for road-base construction and landscaping applications. are generally ungrouped. A map of the construction materials audit of the MidCoast is provided in Figure 10 below.

Figure 10. Construction material mineral resource audit for MidCoast LGA[52]



The mineral audit identified 43 separate construction material resource sites which are widely dispersed across the LGA. The majority (18) are suitable for sand mining operations and occur in coastal areas, with a smaller cluster of lime resource deposits located near Gloucester. There are also several 'potential' locations where the actual sand or rock aggregate resource has not yet been confirmed.

There are 28 quarries currently operating (continuously or intermittently) within the LGA to produce construction materials. The majority of these are currently owned and operated by MidCoast Council and the materials are directed to road construction and maintenance. Several gravel pits and quarries also exist in State Forests.

There are four quarries that are not currently operational but have historic approvals and may still have viable resources. Three of these relate to coastal sand resources at South Forster, Nabiac and Mudbishops Point near Old Bar. The remaining site at Moorland, relates to coarse aggregate resources.

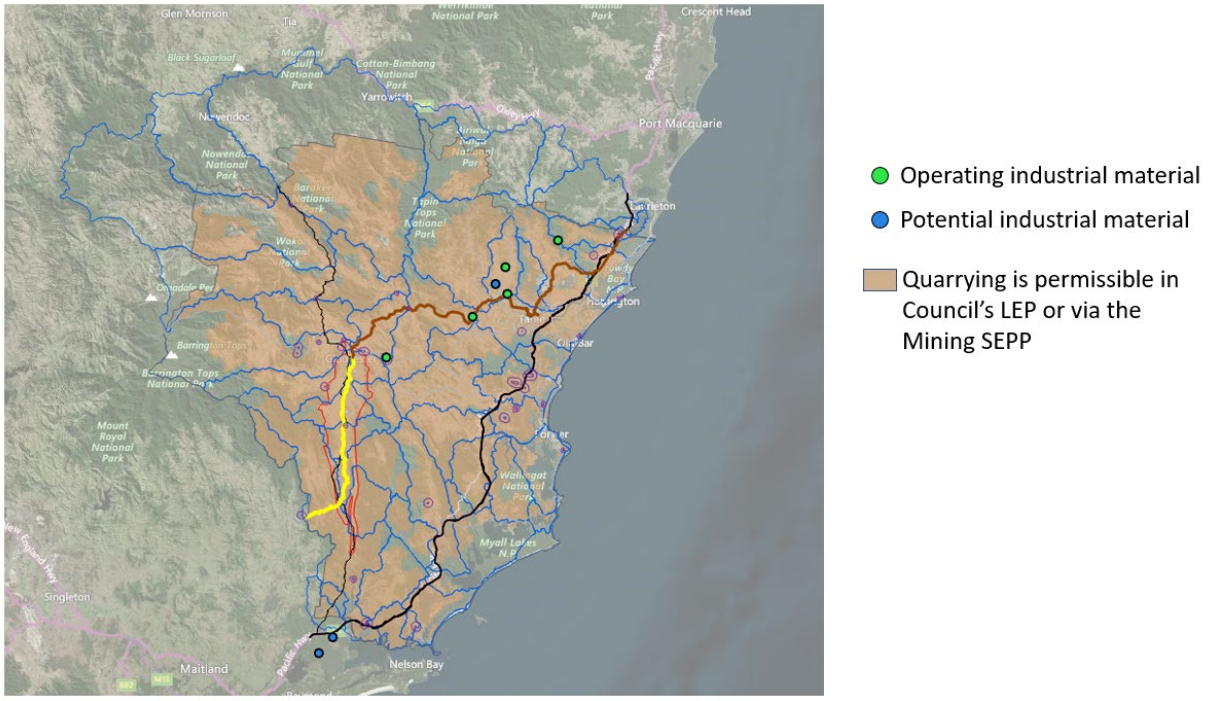
Many construction material resource opportunities also exist in the form of overburden, created during the operation of other mineral extraction industries.

Industrial materials

Many industrial materials can also be Group 2 minerals under the Mining Regulation 2016 including: limestone, asbestos, graphite, phosphates, chlorites, potassium, fluorites, gypsums. A map of the industrial materials audit across the MidCoast LGA is included in Figure 11 below

[52] CityPlan Services & MJD Environmental 2018

Figure 11. Industrial materials resource audit of the MidCoast LGA[53]



The NSW Government mineral audit identified seven separate sites relevant to industrial material resources.

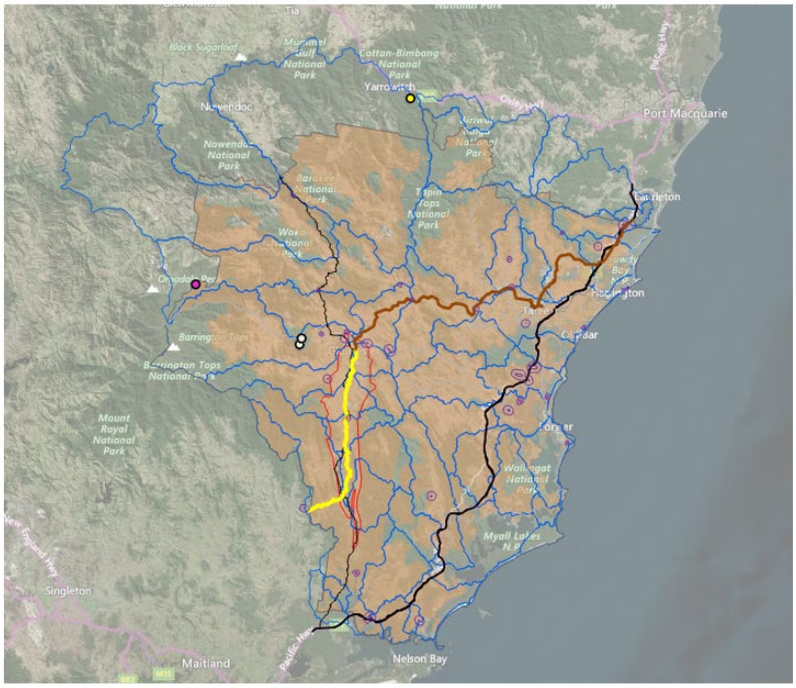
One site at Wingham is a location where potential limestone resources have not yet been confirmed. Whereas there is an operational lime mine at Tugrabakh which primarily supplies the agricultural industry, as a product to reduce soil acidity. Six of the sites in Figure 11 have been confirmed and are operational, though mostly on an intermittent basis. Five are brick clay deposits located in the general Failford/Krambach area.

Metallic minerals and gemstones

Metallic Minerals and Gemstones are also identified under the provisions of the Mining Regulation 2016 and the resource audit map of these minerals across the MidCoast is provided in Figure 12 below.

[53] CityPlan Services & MJD Environmental 2018

Figure 12. Metallic mineral and gemstone resources audit of the MidCoast[54]



Of the sites identified, three gold deposits have been confirmed, including two sites at Copeland and one in the Cottan-Bimbang National Park. The Copeland mining leases also produce quartz as much of the gold is attached to water-worn quartz fragments in this location.

There are two areas identified that have potential ruby deposits and both are in the Barrington Tops State Forest.

5.3 Lifecycle and operational characteristics of energy generating facilities

Based on the information available during preparation of this report, there is no major electricity generating facility located within the MidCoast LGA, and other than for domestic, small-scale and community-based initiatives, the potential for energy generation in the MidCoast is limited.

Electricity generated in NSW, either from finite or renewable energy sources, is bought and sold through the National Electricity Market (NEM), which comprises both a wholesale electricity market and the physical power systems[55].

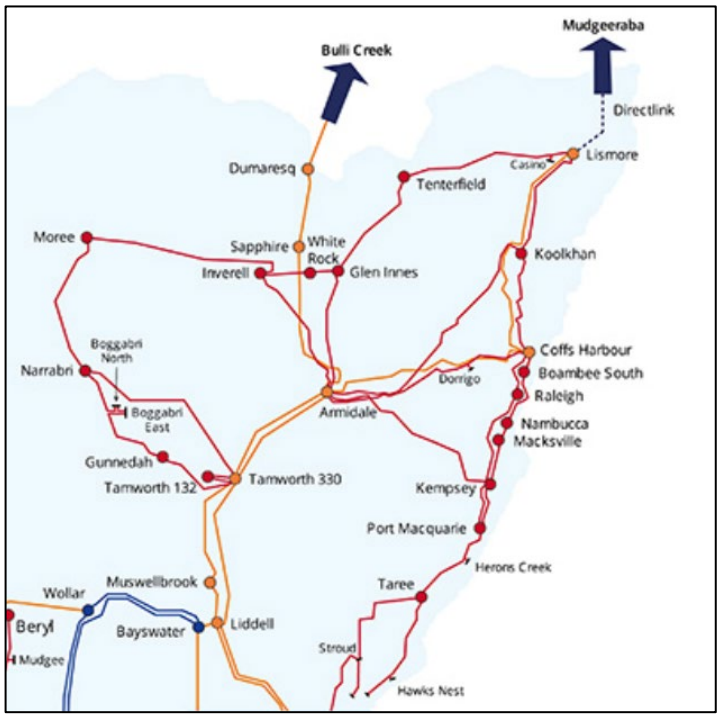
To enable electricity trading, electricity in the MidCoast LGA is distributed via high-voltage transmission lines by TransGrid, which owns 13,000 kilometres of high voltage transmission lines, underground cables and substations across NSW as illustrated in Figure 11 below. The substations convert the electricity to low voltage electricity suitable for household consumption.[56]

The major TransGrid substation in the MidCoast was established in 1958 in Muldoon Street, Taree. Substations and distribution networks then deliver electricity through smaller poles and

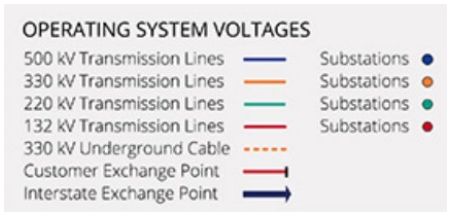
[54] CityPlan Services & MJD Environmental 2018
[55] AEMO | National Electricity Market (NEM)
[56] Our Network (transgrid.com.au)

wires networks. In the MidCoast, this distribution network is owned and operated by Essential Energy.

Figure 13. TransGrid electricity system distribution map[57]



Map Legend:



5.4 Energy Resources consideration by type

Energy resources can be divided into two main categories:

- Finite resources such as gas and thermal coal; and
- Renewable energy sources such as wind, water, solar, biomass and geothermal heat.

5.4.1 Finite Resources

Natural Gas

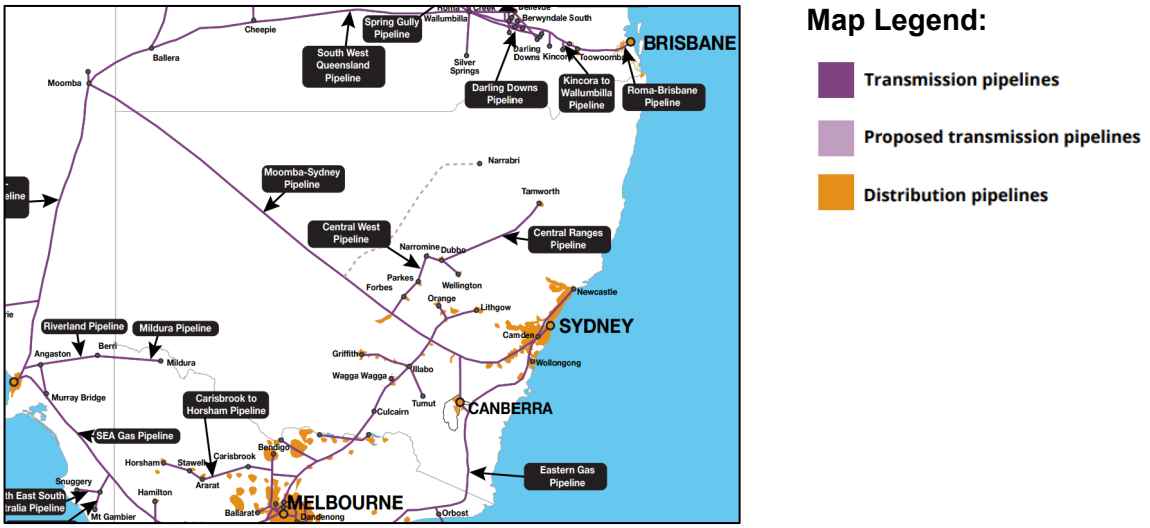
The NSW Gas Network, otherwise known as Jemena Gas Network (JGN) is a distribution pipeline owned and operated by Jemena Gas Networks (NSW) Ltd[58].

The NSW Gas Network is connected to the Moomba Sydney Pipeline and the Eastern Gas Pipeline where gas is sourced from the Cooper Basin, Bowen/Surat Basins and Gippsland Basin respectively. The network services much of NSW, providing gas to over 1.3 million customers across 25,000 km of pipeline[59] as illustrated in Figure 12 below.

No natural gas pipeline currently exists or is proposed to service the MidCoast LGA for domestic or industrial purposes.

[57] Our Network (transgrid.com.au)
[58] NSW: NSW Gas Network | AEMC
[59] NSW: NSW Gas Network | AEMC

Figure 14. Australian Energy Market Commission (AEMC) Gas Network in NSW[60]



Coal

Traditionally, the electricity system in NSW has been powered by coal and currently approximately 80% of the electricity generated in NSW is sourced from coal[61]. Most coal extracted from the Stratford-Duralie mines is coking coal not suitable for electricity generation.

NSW thermal coal-fired power plants exist at Liddell, Bayswater and Lake Macquarie. No coal-fired power stations exist or are proposed within the MidCoast LGA.

5.4.2 Renewable Energy Resources

Wind Power

Wind energy accounted for 2.7% of the total electricity generated in NSW in 2017. In 2019, wind energy overtook hydroelectricity as Australia's leading source of renewable energy.[62]

A wind turbine for electricity generation comprises of four main parts: the base, tower, generator and blades which catch the winds currents. Kinetic energy from the wind turns the turbines blades which spin a series of gears connected to a generator. The generator then convert's the wind energy into electricity[63].

Wind farms predominantly occur on leases from rural landowners, where the primary agricultural use of the land continues. Typically, wind farms require approximately 25 hectares of land per megawatt produced, although only 3% of this land is used for actual turbine development and associated infrastructure, with the balance preserved to ensure there are no obstructions to airflow[64].

The largest wind turbine in Australia was installed in Coopers Gap, Queensland, with each turbine having a tip height of 180 metres with a rotor dimeter of 110 metres. The above-mentioned Coopers Gap wind farm comprises of a total of 123 turbines. [65]

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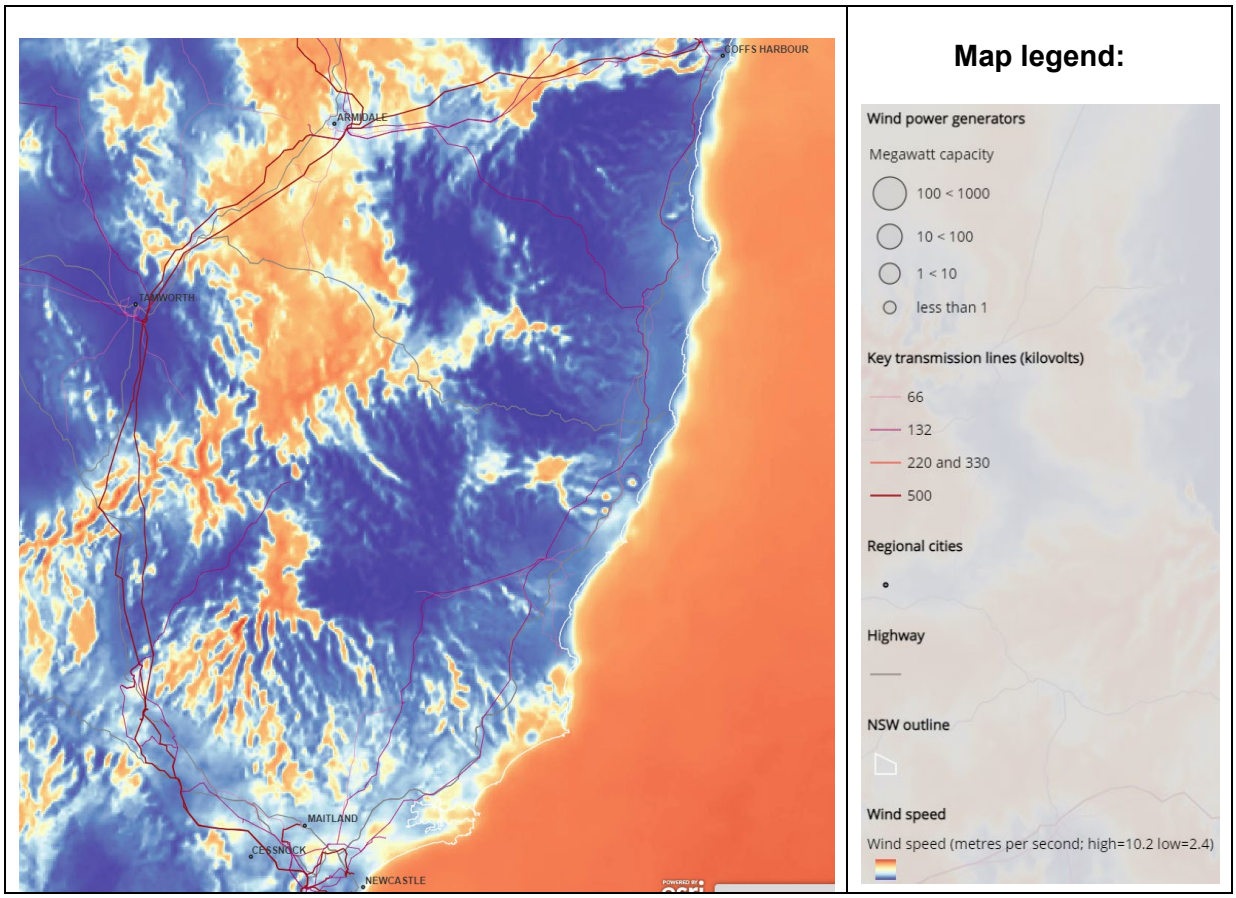
[60] Gas_scheme_register_map.pdf
[61] Future of NSW Coal Fired Electricity Generation Study - NSW Resources and Geoscience
[62] Clean Energy Council 2020
[63] Renewables explained: How wind power works | EnergyAustralia
[64] Australia Wind Power – Wind Turbine Lease Explained | LDC Infrastructure
[65] AGL 2019

There are currently no existing or proposed wind farm developments in the MidCoast. An analysis of the renewable energy sources of New South Wales map shown below in Figure 15 indicates there is potential for wind farms to be established where annual wind speeds exceed 9 metres per second. These areas generally have a flat topography for consistent airflow and in the MidCoast these areas include the Rawdon Vale area west of Gloucester, Elands and along the coastline, south of Seal Rocks.

Figure 15. NSW Renewable Resource Map - Wind and Wind Farms[66]



Large scale wind turbines are subject to rigorous environmental assessments that include consideration of issues including but not limited to visual impacts and the potential mortality of bird and bat species from wind turbine collision.

There is also the potential for domestic small-scale wind turbines to be established, but in urban areas obstacles/buildings can cause too much turbulence for effective wind turbine operation. Domestic wind turbines therefore may be more suitable for rural areas with suitable topography.

Hydroelectricity

Small-scale hydro-electric generation accounted for 1% of total electricity generated in NSW in 2017[67]. A hydro-electric facility utilises gravity from waterflow to turn turbines that convert this energy into electricity. There are three types of hydro-electric technology:

- Storage systems – where water is stored in a dam or reservoir and released to drive turbines. These systems are generally also water supply systems.
- Pumped storage systems – water is pumped to a higher storage reservoir and later released to provide on-demand storage.

[66] Renewable energy resources of New South Wales - basic viewer (arcgis.com)
[67] Hydro energy | Energy NSW

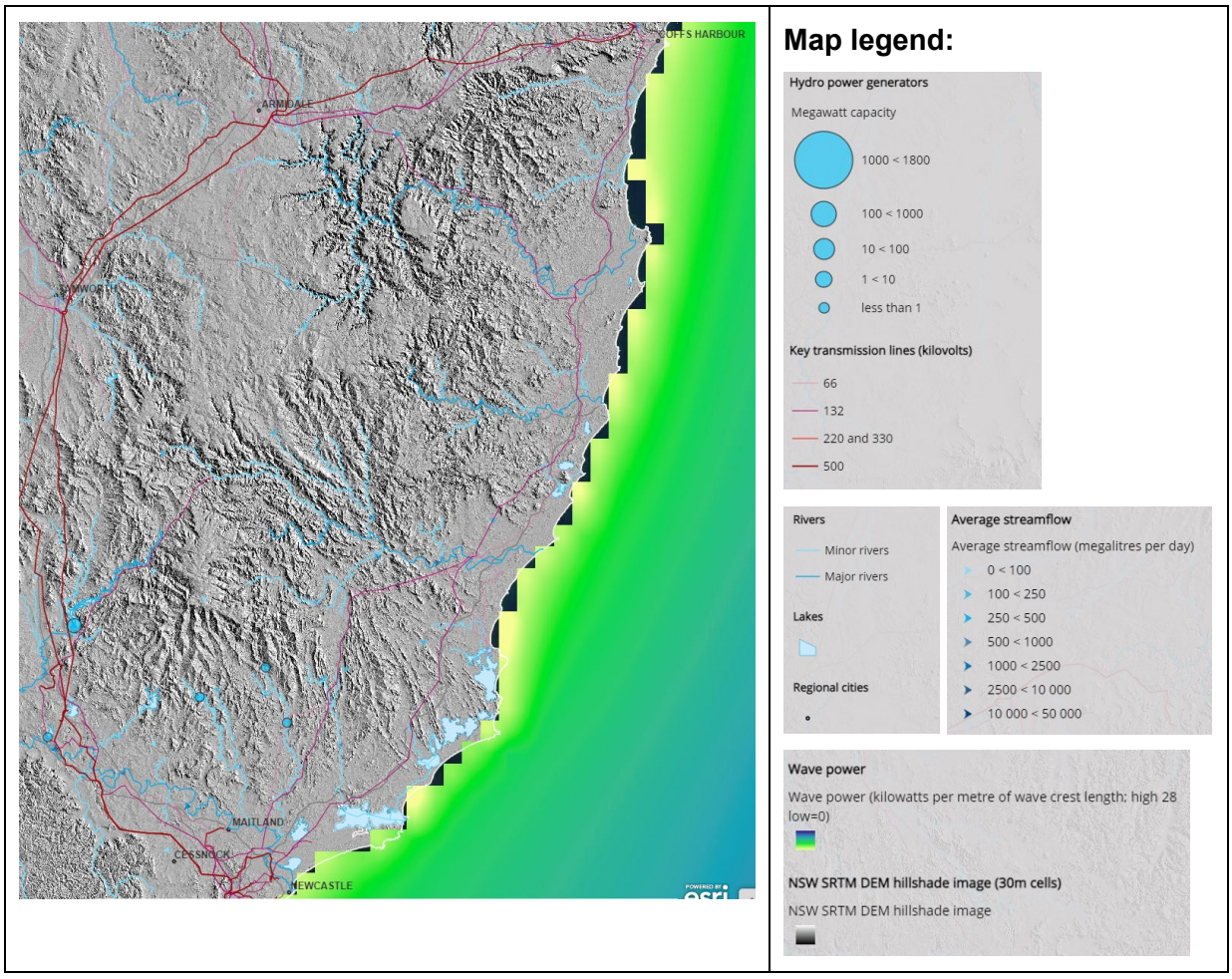
- Run-of-river systems – where the natural flow of river is utilised to drive turbines.

The most notable hydro-electric system in NSW is the Snowy Hydro-electric Scheme which is a pumped storage system consisting of nine power stations, 16 major dams, 80 kilometres of aqueducts and 145 kilometres of inert-connected tunnels. The Scheme produces 4,500 giga-watt hours of electricity per year[68].

The MidCoast LGA currently has no existing or proposed hydro-electric developments and the Chichester Dam facility is the closest small storage hydro-electric system that generates electricity, but only in peak times[69].

An analysis of the renewable energy sources of New South Wales map indicates the potential for hydro-electric facilities where the average streamflow of megalitres of water per day are the highest. These include the upper reaches of the Manning River including the Barrington River. Pumped-hydro opportunities also currently exist in existing and abandoned mine pits at both the Duralie and Stratford coal mining facilities.

Figure 16. NSW Renewable Resources Map - Hydro and wave energy[70]



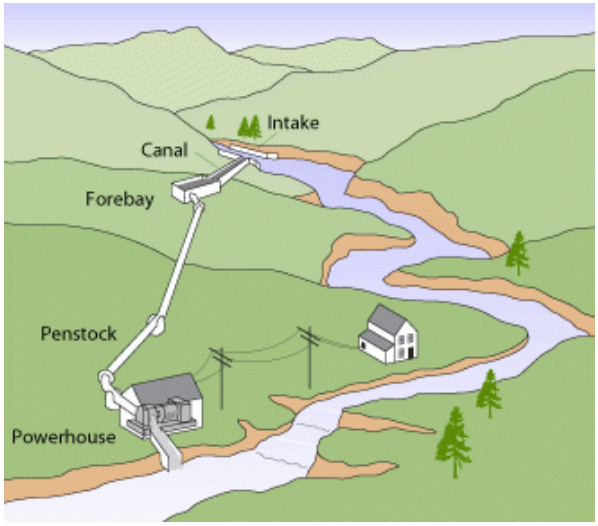
Major hydro-electric developments, particularly those that require the damming of rivers are highly controversial due to their environmental impacts.

Domestic small-scale hydro-electric systems (micro-hydro-power) are possible and may be suitable in rural environments where significant water flow exists, with some systems able to

68 The Snowy Scheme - Snowy Hydro
69 CEC - Chichester Dam Mini-Hydro (archive.org)
70 Renewable energy resources of New South Wales - basic viewer (arcgis.com)

generate electricity for small communities.[71] An indicative layout of such a system is provided in Figure 17.

Figure 17. Indicative micro-hydro-power system[72]



Solar Power

Solar energy accounted for 12% of the total electricity generated in NSW in 2019[73].

Solar power involves photovoltaic cells absorbing sunlight and converting this energy into direct current (DC) and then to alternate current (AC) electricity via an inverter[74].

Large-scale solar farms predominantly occur on leases from rural landowners where the primary agricultural activity can continue, depending on the height the system is installed above the ground. If crops are grown beneath solar panels, this agricultural system is known as 'agrivoltaics'[75]. Typically, a solar wind farm requires 2-3 hectares of land per megawatt generated, although only 5% of the ground is disturbed during installation and only 40% of the surface is over-sailed by the solar panel modules[76].

Like wind farms, solar farms are subject to rigorous environmental assessments requiring significant buffers to residential uses due to the expansive area required; potential loss of agricultural production; and the potential glare and light impacts on adjoining landowners and uses and the aviation industry[77].

No scale solar farms capable of large-scale energy production exist in the MidCoast, although a number of projects are being considered for the development of community solar farms at the time of writing, including "Energise Gloucester" who have received a $46,000 grant from the NSW Regional Community Energy Fund to develop a 500kW capacity community solar farm to reduce energy costs for the local community.[78]

[71] The Land, 2019
[72] Energy Saver, 2020
[73] Solar energy | Energy NSW
[74] Australian Govern, Department of Industry, Science, Energy and Resources 2020
[75] Sharing the sky: The case for agrivoltaics - Renew
[76] Sharing the sky: The case for agrivoltaics - Renew
[77] Large Scale Solar Energy Guideline (nsw.gov.au)
[78] Energise Gloucester 2020

Small scale domestic solar has observed rapid development in the last 10 years with 582,000 rooftops with solar in NSW as of June 2020[79].

At the time of writing, in the MidCoast it is estimated that 14,534 dwellings (approximately 31.5%) have photovoltaic installations, predominantly in the form of rooftop solar, for an estimated installed capacity of 67,003 kW[80].

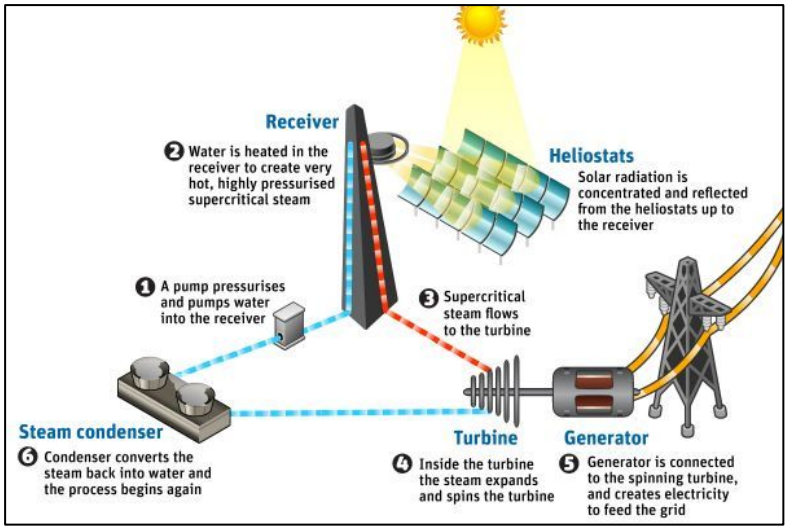
There are also three larger-scale photovoltaic power systems with a capacity of 100kW or more:

- The MidCoast Council Yalawanyi Ganya Offices – 160kW
- Bushland Health Group various sites – total 252kW
- Bunnings Taree – 209kW

Solar thermal

Solar thermal electricity generation is a growing technology that produces power by concentrating heat toward a central point via hundreds of reflective panels, which then heats up liquid to produce super-concentrated steam, used to power a turbine to generate electricity as illustrated in Figure 18 below.

Figure 18. Conceptual layout of a solar thermal electricity generating system[81]



The Jemalong Concentrated Solar Power Pilot plant is the first of its kind in NSW near Forbes[82].

The MidCoast currently has no existing or proposed solar thermal projects planned.

Bioenergy

Bioenergy power generators accounted for approximately 1.5% of the total electricity generated in NSW in 2017[83].

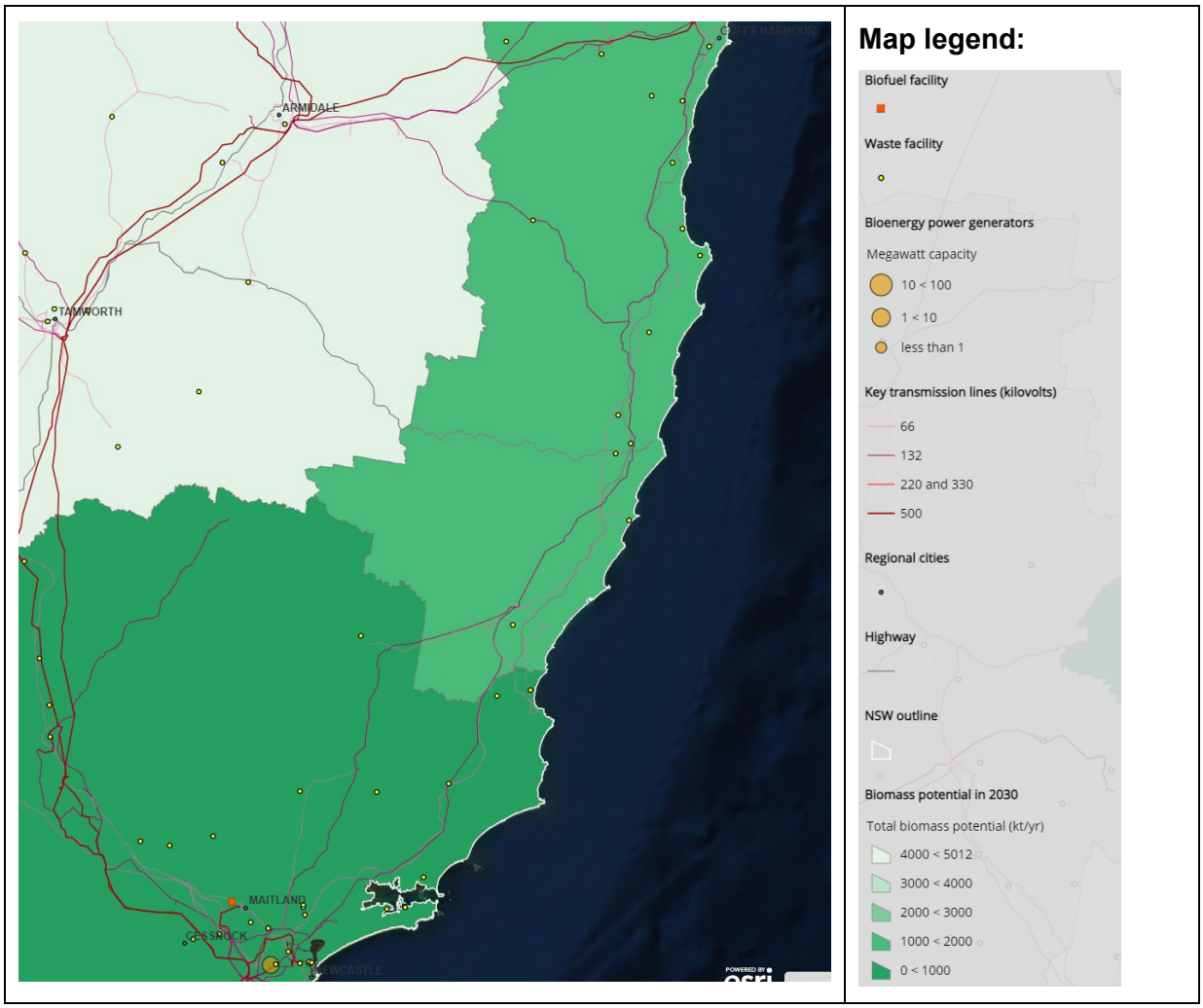
Bioenergy is generated from organic matter called biomass, which can include waste. There are number of ways biomass may be used to generate electricity as follows:

[79] Solar energy | Energy NSW
[80] Australian Photovoltaic Institute • Mapping Australian Photovoltaic installations (apvi.org.au)
[81] Our solar team sets a hot and steamy world record – CSIROscope
[82] Solar energy | Energy NSW
[83] Bioenergy | Energy NSW

- Direct combustion – the burning of biomass such as wood to heat water to drive turbines.
- Gasification – the heating of solid biomass, such as agricultural waste to very high temperatures with limited oxygen supply. This creates syntheses gas ("syngas") which can be used to power turbines or to manufacture other fuels such as methanol or bio-diesel
- Anaerobic digestion – the breaking down of biomass such as manure, in the absence of oxygen which creates bio-gas, mainly a mixture of methane and carbon dioxide. Removing the carbon dioxide creates biomethane which can then be sued as a fuel source for power generation[84].

There are currently no bio-energy facilities in the MidCoast and an analysis of the renewable energy sources map, provided in Figure 19 below, indicates the biomass potential based on kilo-tonnes per year, is relatively low within the LGA.

Figure 19. NSW Renewable Resources map - Bioenergy[85]



However, there is the potential for small scale gasification and anaerobic digestion plants associated with the agricultural waste from dairy and poultry industries. This could take the form of power generation facilities for individual farms, or co-generation plants where there is a cluster of agricultural uses that produce a critical level of waste.

[84] Biomass to bioenergy (originenergy.com.au)
[85] Renewable energy resources of New South Wales - basic viewer (arcgis.com)

Geothermal Energy

Geothermal energy is where electricity is created from the extracted of super-heated underground water or steam to drive turbines. Due to the lack of accessible and sufficiently heated groundwater sources, there are currently no geothermal power stations in NSW.[86]

Ocean Energy

There are currently no ocean current generated power generation facilities in NSW.

[86] Energy NSW 2020

6 Recommended Planning Framework

Given the broad influence of both the Mining SEPP and Infrastructure SEPP, it is not recommended or necessary to apply land use zones in a manner that actively encourages or discourages mining or extractive industries within the MidCoast. Instead, developing and establishing locally relevant planning frameworks are recommended:

- Undertake additional investigation and consultation with existing mining operators in the MidCoast to describe and determine the likely remaining lifecycle of these activities. Engage with the operators and relevant Consultative Committees to investigate transitional and long-term land uses for these sites.
- Investigate the use of local clauses and mapping in the local environmental plan and development control plan to: identify and prevent where appropriate, the sterilisation of significant mineral resources; and identify and manage land use conflicts between existing and future land users, through the establishment of buffers and/or environmental offset areas.
- Review the State Government's Integrated Mining Policy, Department of Primary Industries Agriculture Issues for Extractive Industry Development and the former Gloucester Shire Council Extractive Industries Policy, to inform a local-relevant assessment policy. The matters for environmental, social and economic consideration may be integrated into a local clause in the local environmental plan, development control plan or as a Council policy, to provide consistent and locally appropriate benchmarks for development assessment local, regional and State proposals.

In comparison, Council should ensure the planning framework across the MidCoast is open to the establishment of existing and emerging renewable energy production industries:

- Enable the establishment of electricity generating works across the rural landscape. Monitor and review emerging assessment matters for renewable energy production facilities to produce consistent and locally appropriate benchmarks for development assessment local, regional and State proposals. Investigate opportunities to incorporate these benchmarks into a local clause in the local environmental plan, development control plan or as a Council policy.
- Provide information on existing guidelines in State Environmental Planning Policies that allow for the installation of appropriate domestic-scale electricity generating works such as solar panels and wind turbines.
- Investigate opportunities for the establishment of small or community-scale renewable energy production facilities.
- Identify strategic locations like the existing mining sites at Stratford and Duralie and the Stratford Industrial Precinct, where renewable energy facilities may be established:
    - with minimal impact on agricultural activities, the rural landscape and residential uses; and
    - economic and social benefits for rural communities;
    - utilising State or Federal initiatives and funding;

  as a potential game changer projects for rural communities in the MidCoast.
- Encourage corporate investment and demonstrate leadership in renewable energy production, by the ongoing implementation of Council's Climate Change Action Policy.

7 References

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