Meridian Economics

Core Style sheet for data generation

Core style sheet for excel

Colour usage for charts

Eight core colours to use for distinctive energy sectors. These can be used together when discussing each cohort. Each chart produced will be automated to use these colours, whenever these cohorts are discussed

Wind	Hydro
9ea869	4f7f7f
Solar PV	Solar CSP
dfb73e	715d1c
Gas OCGT	Gas CCGT
	c3e5e7
Battery	Pumped
c89656	f4be6d
Nuclear	Biofuel
6d1510	77804d
Coal	Other
2c2e32	51969b

Document and chart typography

Currently, Meridian Economics is using the Calibri font for all publishing and thought leadership. As this is the automated Microsoft Office font, publishing in this font may come across as generic. We propose using a simple, yet functional font going forward – aligned to your logo

Document heading Sans Serif bold	**18pt**
Heading Sans Serif bold	**16 pt**
Subheading Sans Serif bold	14 pt
Body text Helvetica light	12 pt
Chart heading Sans Serif bold	**14 pt**
Chart labels Sans Serif	9 pt
Key and legend Sans Serif	9 pt

Extended colour usage for charts

When only discussing data which pertains to a specific cohort, the cohort's supplementary colours can be used.

Icon usage can also add to a chart's readability, helping the reader identify the cohort immediately. We have identified some simple icons for Meridian to use within its reports.

Core colours

Wind	222317	353b26	77804d	9ea869	c4caa4	c4f183	eceee0
Hydro	273f3e	3c605f	487373	4f7f7f	8ebfbf	b2d4d5	d9eae9
Solar PV	483e18	805a2f	a7882a	dfb73e	f8dc6f	fae79c	fdf4cd
Solar CSP	372f17	524617	5d4e17	715d1c	876f21	a88b2a	fbefb7
Gas OCGT	080f10	142b2c	1a3b3d	c3e5e7	37696c	4e9ca0	68c4cd
Gas CCGT	51969b	84c7cc	aad7dc	c3e5e7	d0eaee	e0f2f0	ffb9bc
Battery	4d1d16	712318	aa3424	c89656	e6958a	efb9b1	f7dcd8
Pumped	4c3114	a56823	f29c39	f4be6d	f8d8a5	fce5c2	fcf2e0
Nuclear	012143	002e59	004485	ba533d	379eff	7abeff	bcdfff
Biofuel	2b100c	2b100c	7a0005	77804d	ff2e37	ff747a	ffb9bc
Coal	2b2a2a	3b3838	686565	2c2e32	afabab	d0cece	e7e6e6
Other	151b23	222a35	333f50	51969b	8497b0	adb9ca	d6dce5

Icons

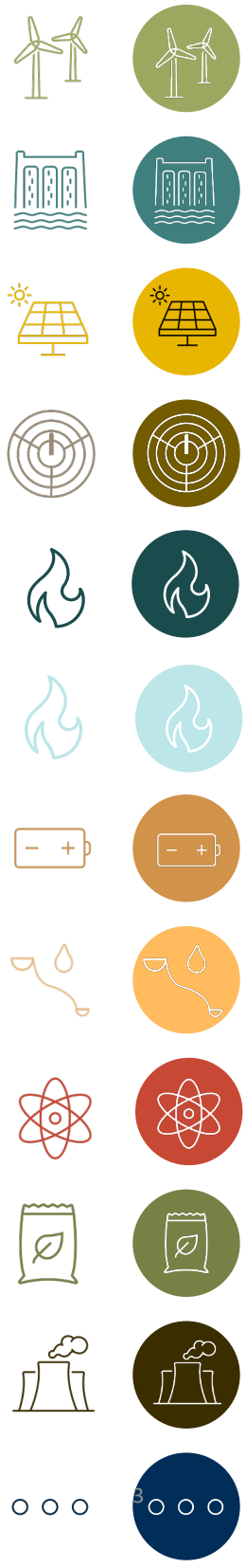

Chart and graphic development tips

You want your chart to shine! So let it take up space. Here are some rules for setting up a chart to look like it has been designed by a professional:

1. Always align the chart title to the left column, never centered in the chart. Add a subheading explaining chart where possible.
2. Use as much white space internally in the chart as possible.
3. Try to limit the amount numbers used, it confuses the reader. For example, an axis depicting years, rather scale in intervals
4. Make sure chart takes up a 1:1 chart to text ratio on the page
5. Follow the percentage point guidelines bellow for the white space usage
6. Icon usage can also add to a charts readability, helping the reader identify the cohort immediately. We have identified some simple icons for Meridian to use within its reports.
7. Limit chart elements the simpler the better. Try remove grid lines and simplify key. We have demonstrated this in the following pages.

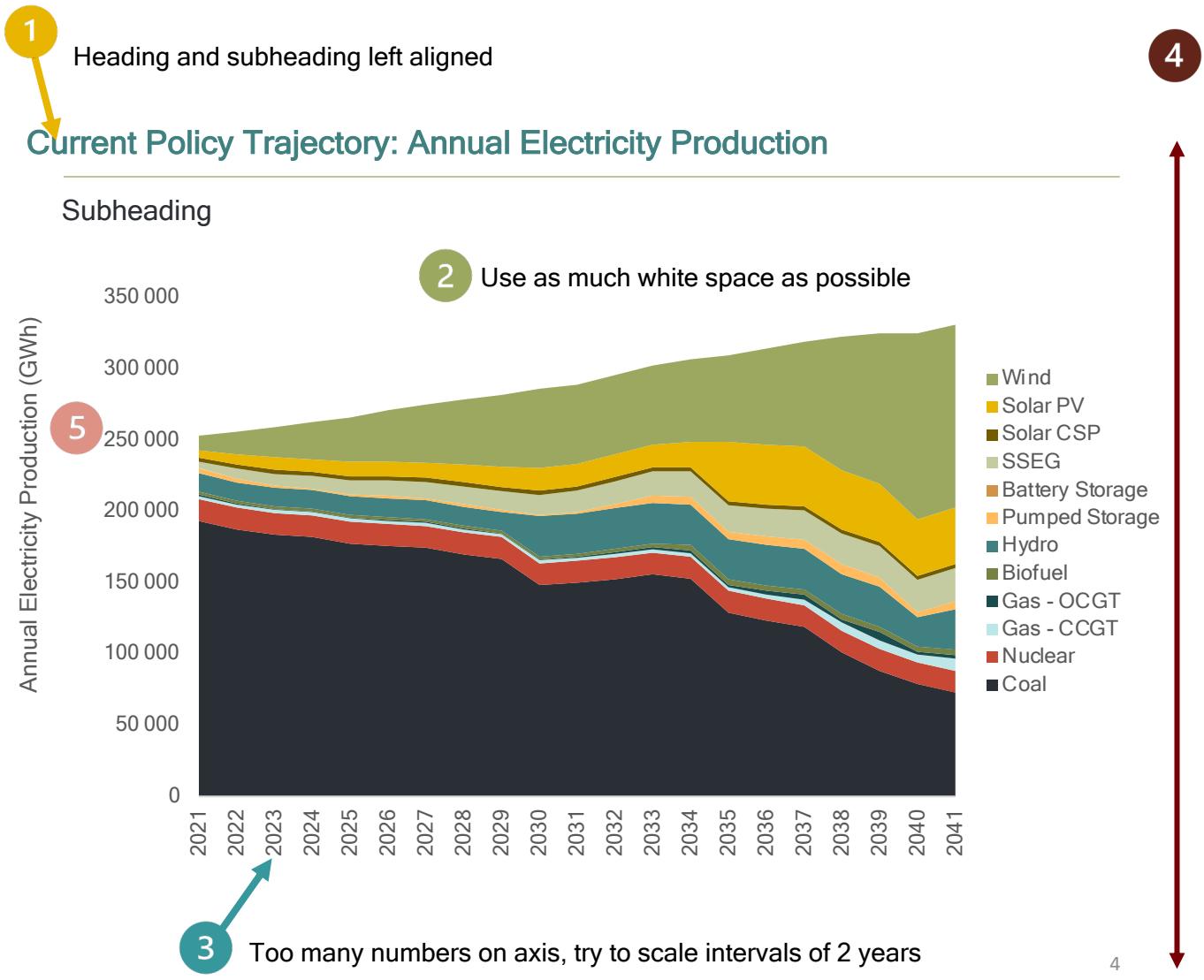

Chart and graphic development tips

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1

Always align the chart title to the left column, never centered in the chart. Add a subheading explaining chart where possible.

Current Policy Trajectory: Annual Electricity Production

Subheading

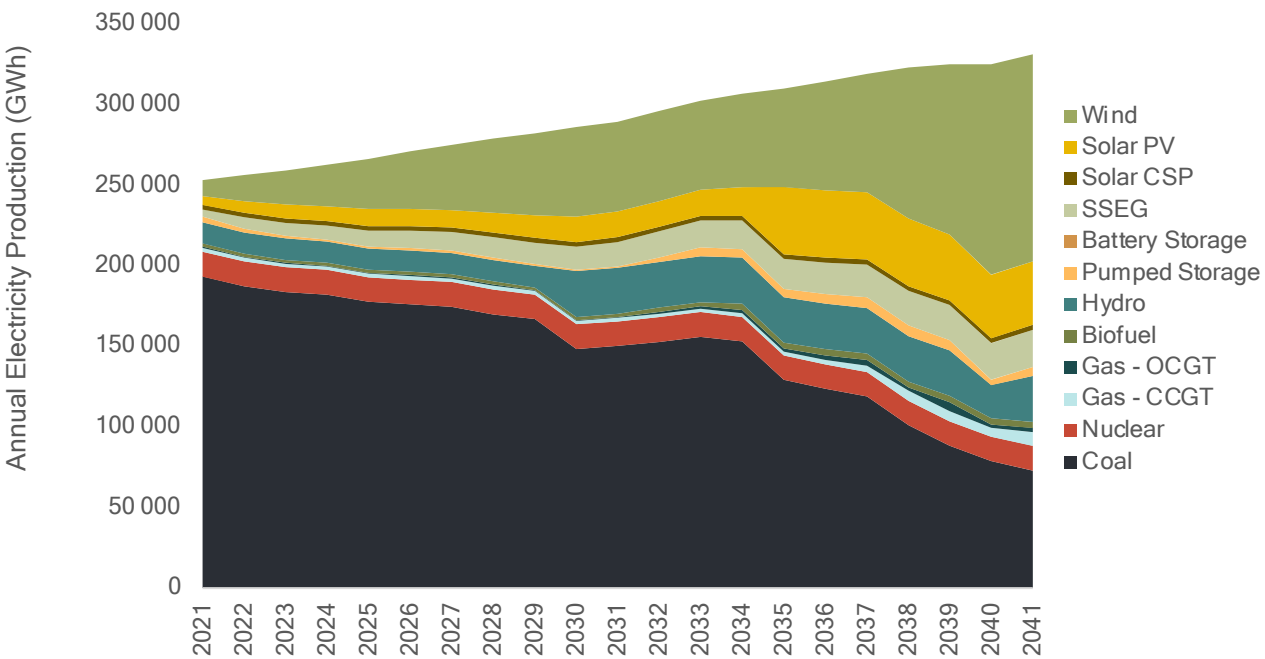

Chart and graphic development tips

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2

Use as much white space internally in the chart as possible.

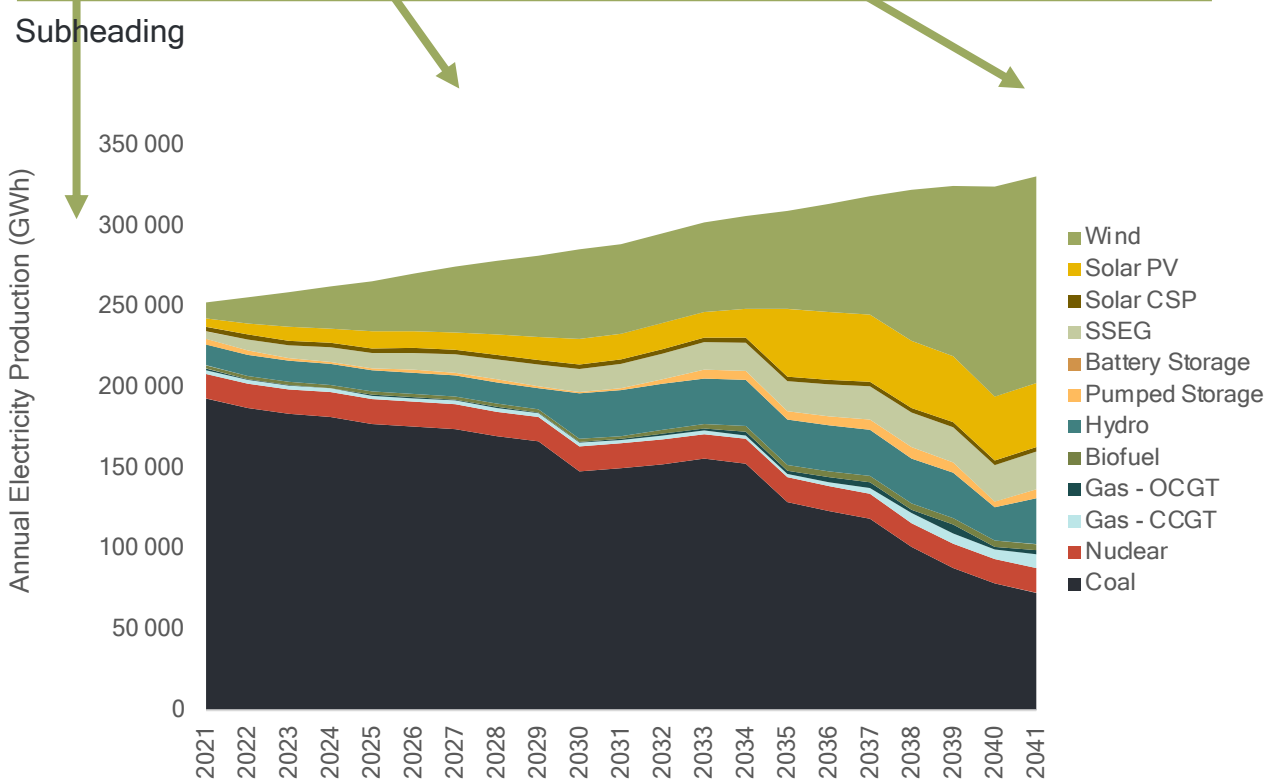

Chart and graphic development tips

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3

Try to limit the amount numbers used, it confuses the reader. For example, an axis depicting years, rather scale in intervals

Here, the axis is too saturated. Recommendation: use an interval of 2 years

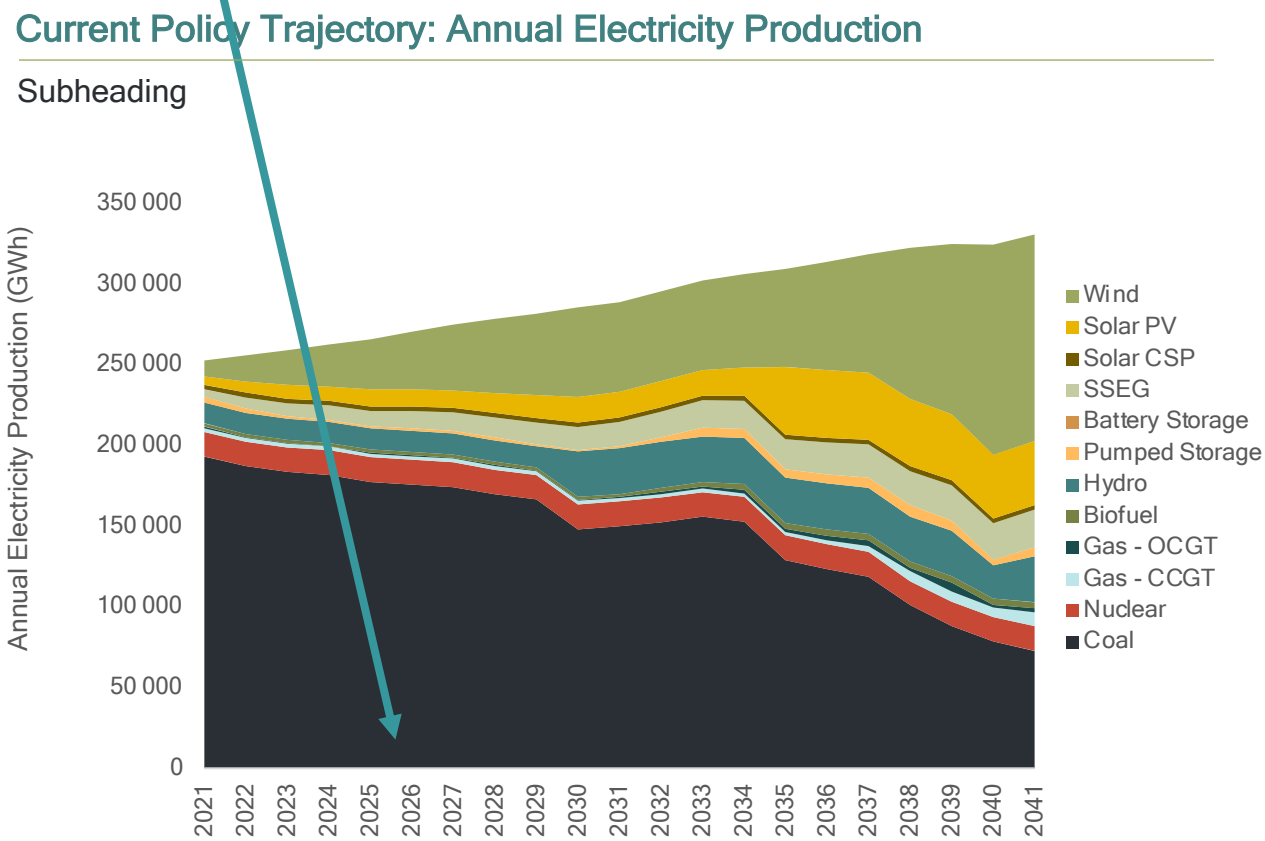

Chart and graphic development tips

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4

Make sure chart takes up a 1:1 chart to text ratio on the page

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Current Policy Trajectory: Annual Electricity Production

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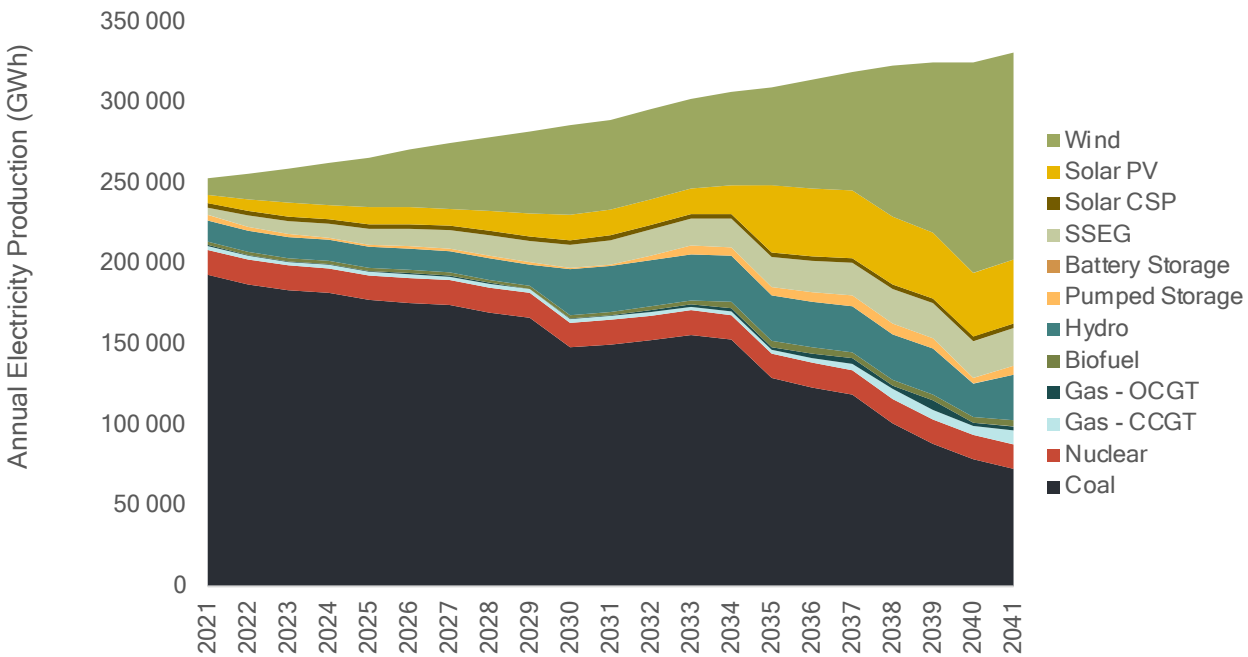

Chart and graphic development tips

You want your chart to shine! So let it take up space. Here are some rules for setting up a chart to look like it has been designed by a professional:

5

Follow the percentage point guidelines bellow for the white space usage

*aligned to McKinsey and Co chart design

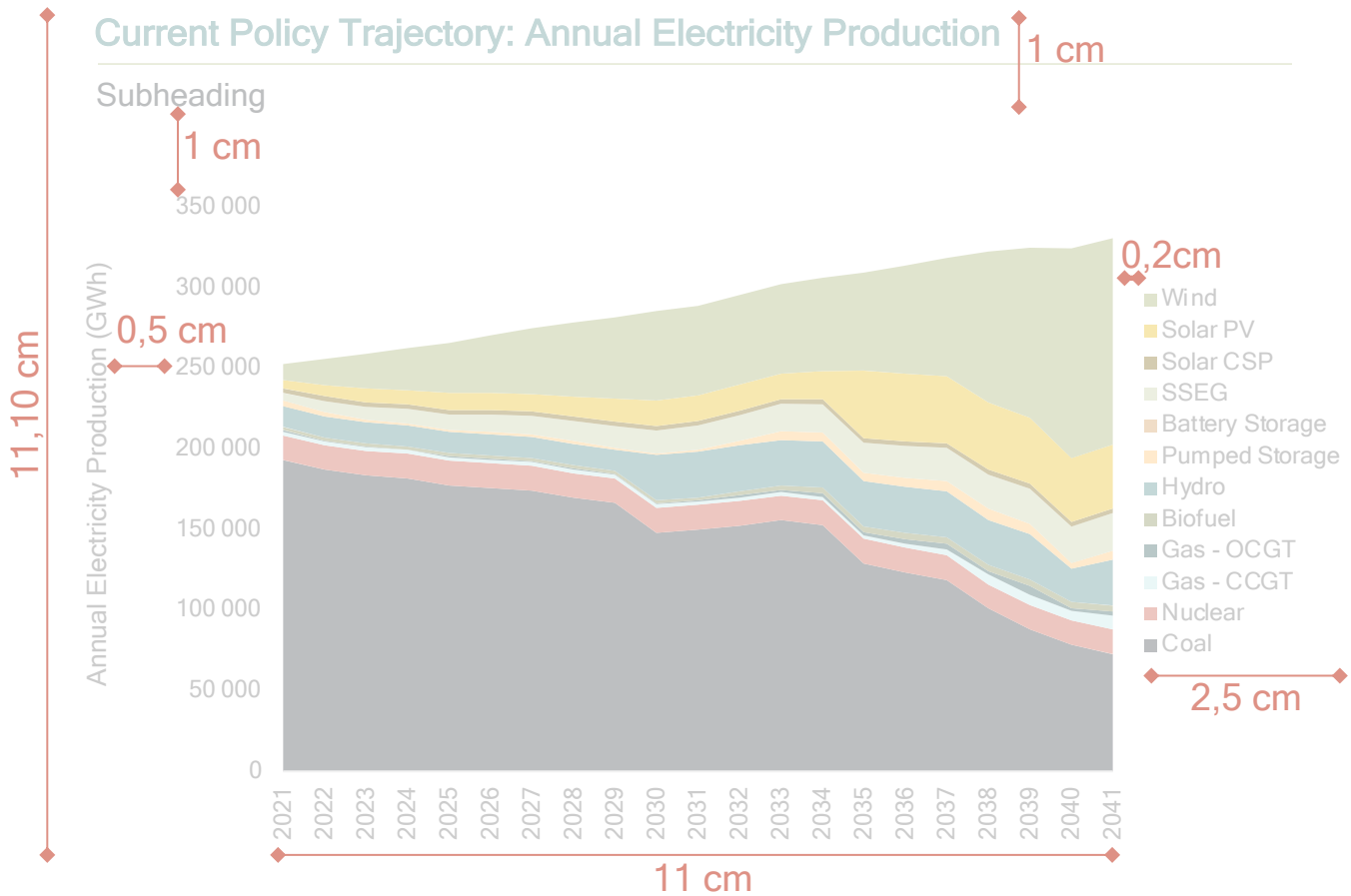

Chart and graphic development tips

You want your chart to shine! So let it take up space. Here are some rules for setting up a chart to look like it has been designed by a professional:

6

Icon usage can also add to a chart's readability, helping the reader identify the cohort immediately. We have identified some simple icons for Meridian to use within its reports.

When using icons, simply the key as below and only use the icons of the key cohort you wish to emphasize

Current Policy Trajectory: Annual Electricity Production

Subheading

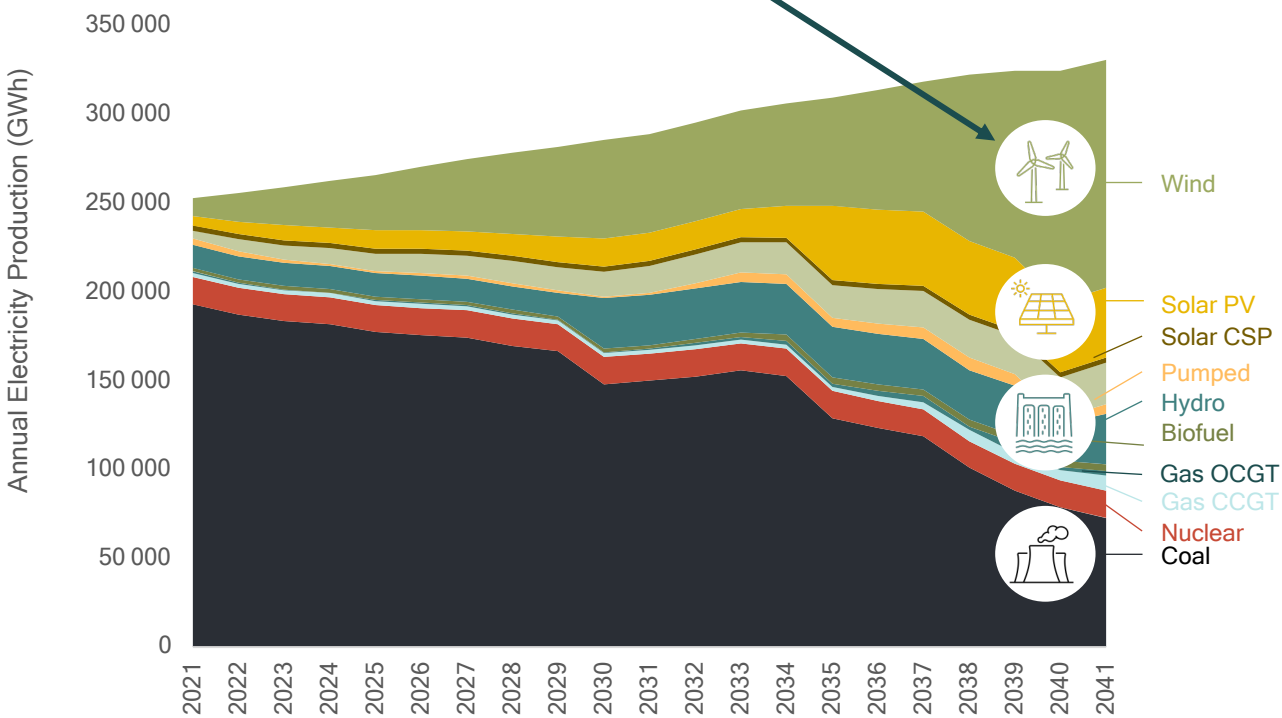

Chart and graphic development tips

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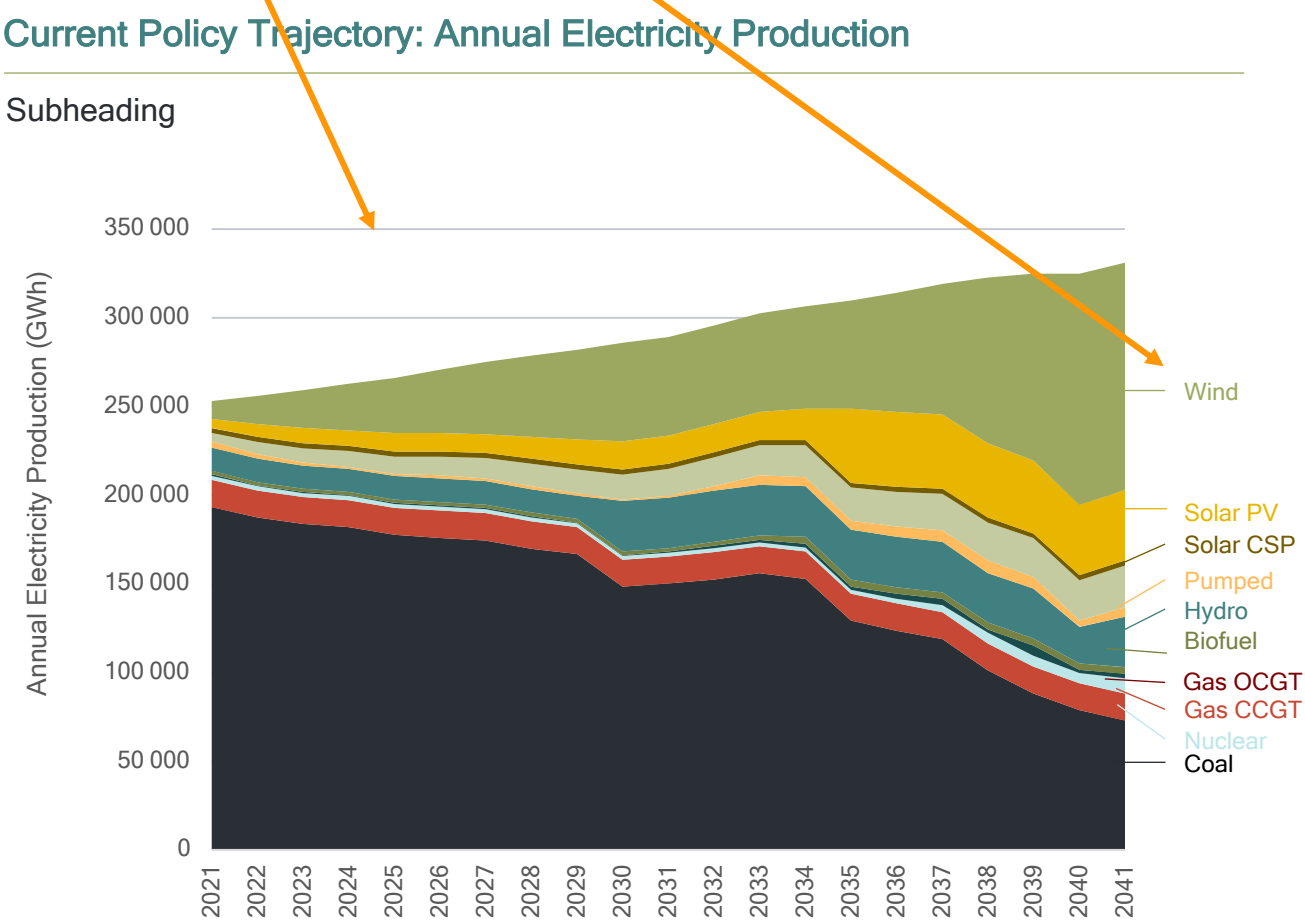
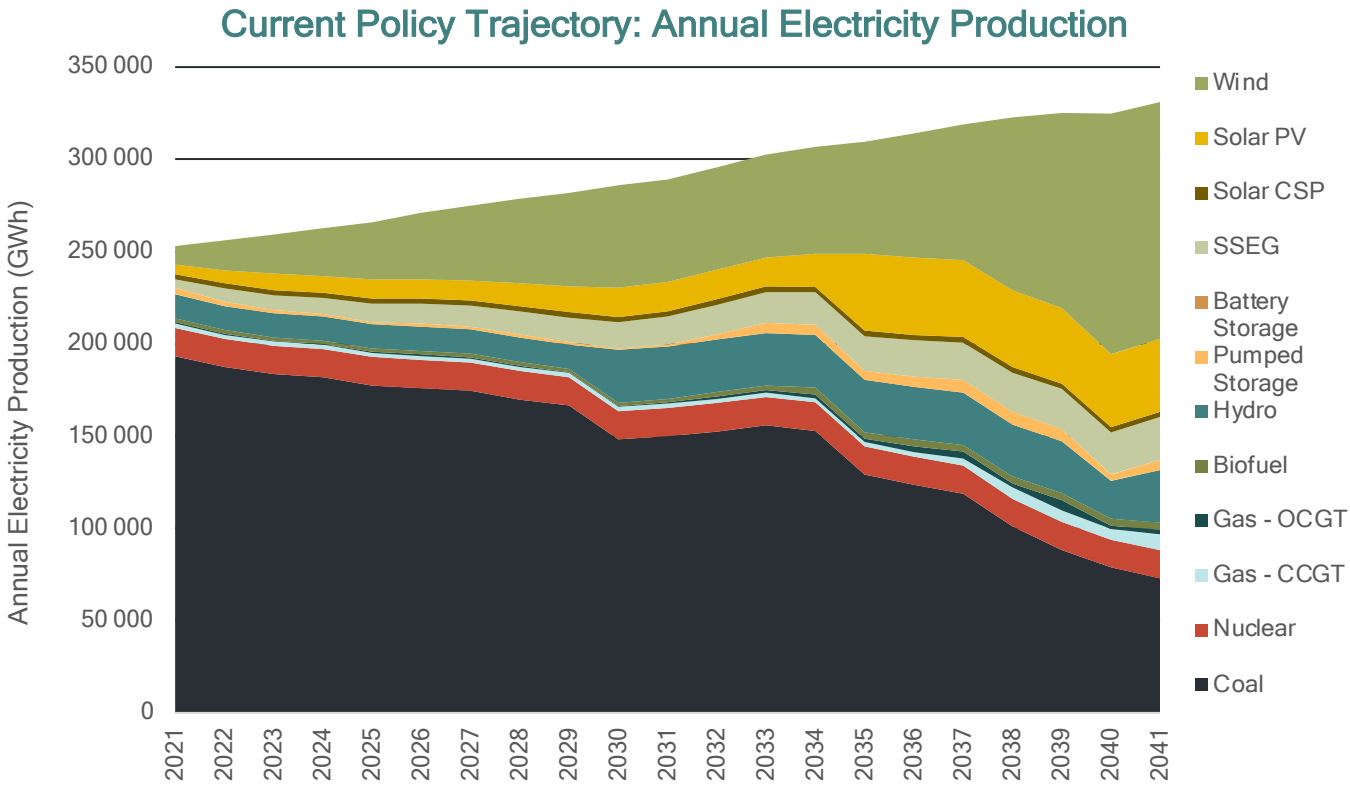
7

Limit chart elements the simpler the better. Try remove grid lines and simplify key.

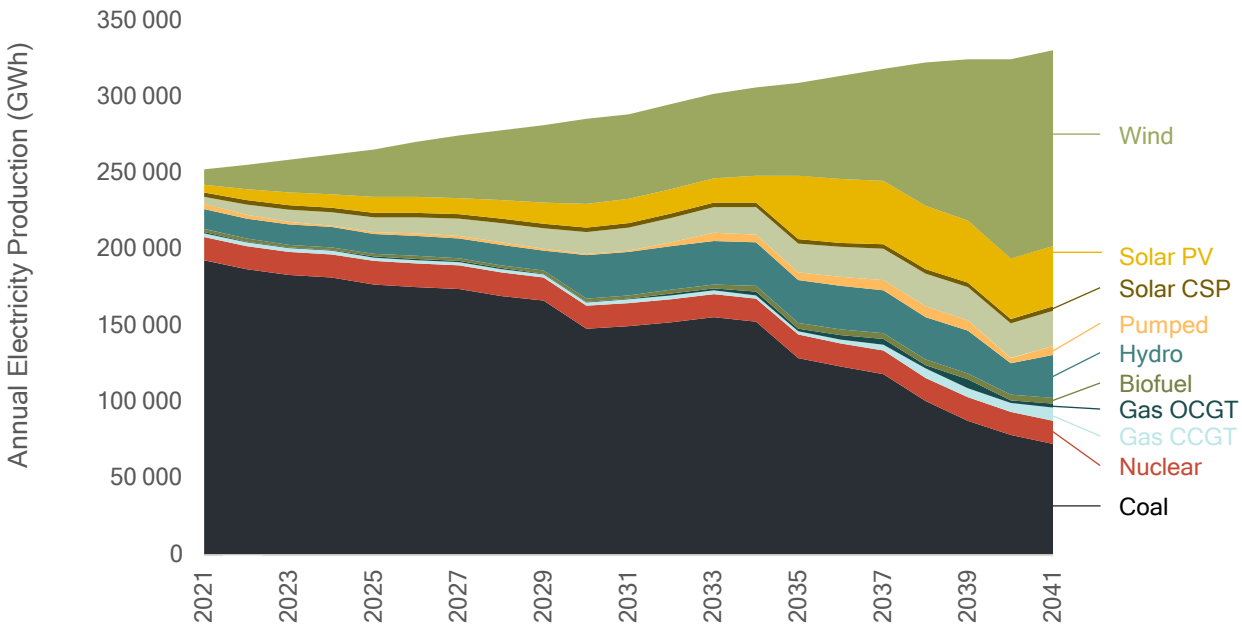


Differences seen in implementation of style guide

Old: now white space, too many numbers, reader feels overwhelmed



New: Simpler, sophisticated and looks professional



Example Layout

Core Style sheet for data generation

1 The JTT in a nutshell

The Just Transition Transaction (JTT) is a prototype, multi-lateral, 'transition finance', or 'coal retirement' mechanism. It aims to secure an accelerated, Paris[1]-aligned, well-managed, affordable, and just energy transition for South Africa's power sector and affected communities.

There are many ways that such a transaction for a highly coal-dependent middle-income country like South Africa could be constructed. Considerations include environmental, social, political, financial, economic, and technical factors of concern to the different parties to the transaction. This paper provides a summary of how such a proposed JTT could be put together. We have socialised this plan through extensive engagement across the South African government and society, and with potential developed country sponsors. This section of the document provides a high-level overview of our proposals. The background, context, further details and structuring options are explained in the remainder of the document.

The parties to the transaction

The primary counterparties to a JTT would be key developed country governments, on the one hand, and the South African government, on the other. It is envisaged that a respected, multi-lateral climate finance institution, such as the Climate Investment Funds (CIF) would act as a key financial intermediary and provide broad coordination support.

In terms of the transaction framework, South Africa will adopt an accelerated, Paris-aligned decarbonisation pathway for its power system, delivering measurable additionally mitigated tonnes (t) of carbon dioxide (CO_2) in comparison with its current policy and decommissioning trajectory.[2] Such a pathway will enable the country to achieve the highest level of ambition expressed in its Nationally Determined Contribution (NDC), and put the net zero by 2050 aspiration of its Low Emissions Development Strategy (LEDS) within reach. In doing so South Africa will have to guide and mobilise society to overcome significant political, financial, technical and social challenges arising from its accelerated decarbonisation commitment.

To overcome these challenges, the South African government will receive a large, highly concessional,[3] debt financing package, to be incrementally drawn down in tranches over several years. Without the level of support envisaged in this JTT proposal, South Africa is unlikely to deliver its full power sector decarbonisation potential.[4]

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[1] *UNFCCC, (2015) The Paris Agreement. United Nations. Available at: https://unfccc.int/sites/default/files/english_paris_agreement.pdf*

[2] *The current policy trajectory is set out in the 2019 Integrated Resource Plan (IRP 2019) published by the Department of Mineral Resources and Energy (DMRE, 2019)*

[3] *"Concessionality" refers to the Net Present Value (NPV) of the concessional loan's cash flows discounted at the market rate for equivalent financing. For the avoidance of doubt we rely on the OECD definition of "concessionality" as, for instance, explained in (Scott, 2017) .*

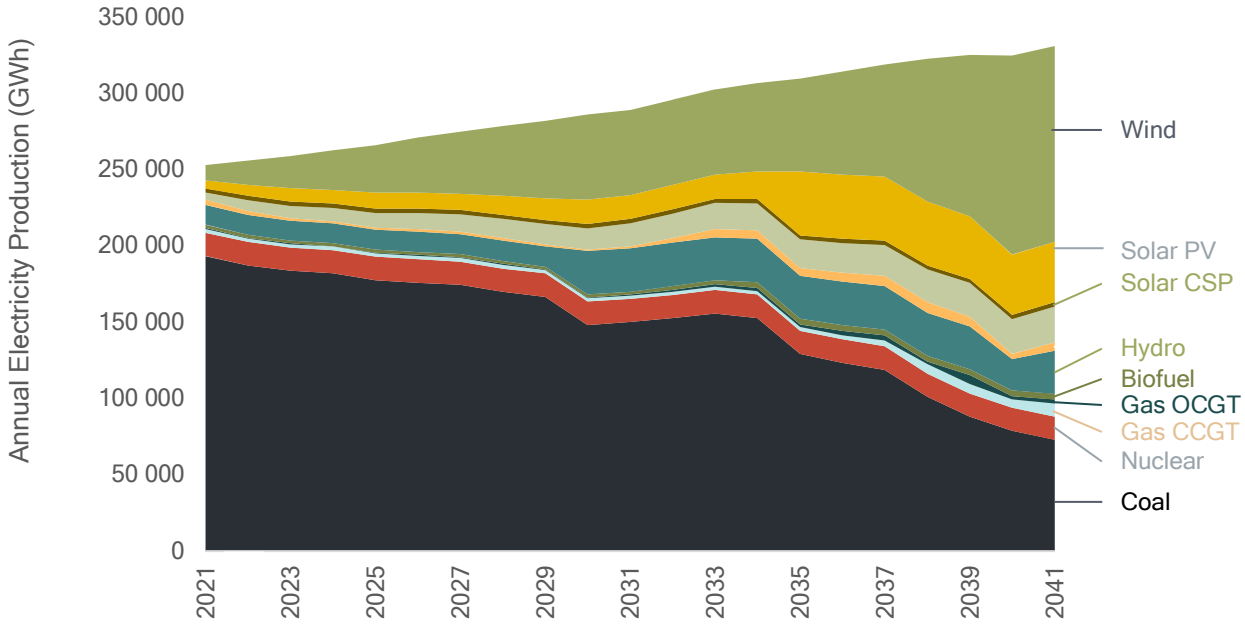
[4] *The transaction will be a leading example of the type of climate finance support envisaged under Article 9 of the Paris Agreement which provides a mechanism for coal-dependent developing countries to achieve more ambitious nationally determined contributions (NDCs) and Low Emission Development Strategies (LEDS) through power sector decarbonisation. (It is not envisaged that the transaction will entail the sale of carbon credits by South Africa as provided for in terms of Article 6 of the Paris Agreement.)*

Valuing JTT mitigated carbon

Central to the transaction is the agreement by the counterparties of a value (in $/t) that will be granted to South Africa for its accelerated carbon mitigation achievements. The eventual total concessionality (support element) of the financing package will be determined by South Africa's actual delivery of carbon mitigation.

Current Policy Trajectory: Annual Electricity Production

Subheading



South Africa will achieve this accelerated power sector decarbonisation pathway by implementing policy, market reform and procurement measures to: (a) steadily reduce coal plant operations and accelerate plant retirement;

(b) cancel plans and processes to construct newcoal plant (c) ensure that adequate renewable energy and associated infrastructure is constructed to meet demand;[5] and (d) ensure the financing and execution for the necessary grid investments.

Dealing with ESKOM debt

Approximately R200bn of Eskom's[6] ~R400bn net debt is not serviceable from available revenues. This is due to large time and cost overruns on its power station construction programme, and

[5] *Due to the favourable economics of renewable energy projects in South Africa this construction programme can mostly be separately funded from the capital markets.*

[6] *Eskom is South Africa's state-owned power utility. It currently generates more than 90% of South Africa's power, 84% of which comes from coal-fired power stations (Calitz & Wright, 2021; Eskom, 2021a).*

regulated tariff increases that have consistently been too low to cover even prudently incurred costs. The South African government has for several years been required to provide ongoing fiscal injections to keep Eskom afloat,[7] at great cost. This is crowding out other fiscal priorities, notably spending to address social objectives and economic recovery. The provision of a comprehensive fiscal debt relief package by government to Eskom is a necessary precondition to ensure that future Eskom entities emerging from the current unbundling and business turnaround process[8] will be financially viable (the way in which this is implemented will have to be designed to resolve the potential moral hazard risks often associated with state-owned entity bailouts).[9] This will be critical for affordable financing of the large grid and generation investments required to deliver the decarbonisation pathway envisaged by the JTT.

Without financially viable and independent Eskom entities that can act as credible power purchase counterparties, raise capital and rapidly invest in new transmission and distribution infrastructure, the required accelerated renewables programme simply will not happen. South Africa will then be forced to rely on coal-based power generation for longer, putting its climate mitigation aspirations out of reach.

The creation of fiscal space

In the context of South Africa's highly constrained fiscal situation, exacerbated by the impact of the Covid-19 pandemic, the net proceeds of the transaction will assist in creating new fiscal space for two purposes.

Firstly, it will provide the initial capitalisation for an appropriately governed South African Just Transition Fund, established by government to support affected coal mine and power station workers and to fund the green economic revitalisation of affected communities such as those in the Mpumalanga province.

Secondly, it will provide fiscal support to the South African government, as Eskom's shareholder and debt guarantor, to assist it to bear the cost of: (a) the reduced revenue resulting from the earlier retirement of coal-fired power stations;[10] and (b) of recapitalising unbundled Eskom entities to reduce or eliminate the need for government guarantees and enable affordable financing of the large-scale generation, grid and other infrastructure required for accelerated decarbonisation.

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[7] Between 2008 and 2021, Eskom has received a total of R220 billion in bailouts from the state (Eberhard, 2021)

[8] As announced by the Department of Public Enterprises , Eskom's vertically integrated structure is currently being unbundled to create at least four legally separated entities (for Eskom holdings; generation; transmission, power purchasing and system operations; and distribution). Transmission will be independently governed and operated.

[9] It is well understood that state bailouts could create moral hazard problems whereby the pressure on management and policy makers to implement the necessary business turnaround decisions and market reforms can be reduced. However, the climate and economic cost to South Africa of not unlocking an accelerated transition, requires that both objectives be achieved. While it is beyond the scope of this paper, there are many ways in which Eskom debt relief can be structured to retain and even strengthen the required incentives for all stakeholders, and therefore also unlock the route to finance and implement an accelerated transition.

[10] This cost will appear on Eskom's balance sheet as a loss in asset value (foregone future earnings) thereby stranding a portion of its debt funding.

Unlocking accelerated decarbonisation

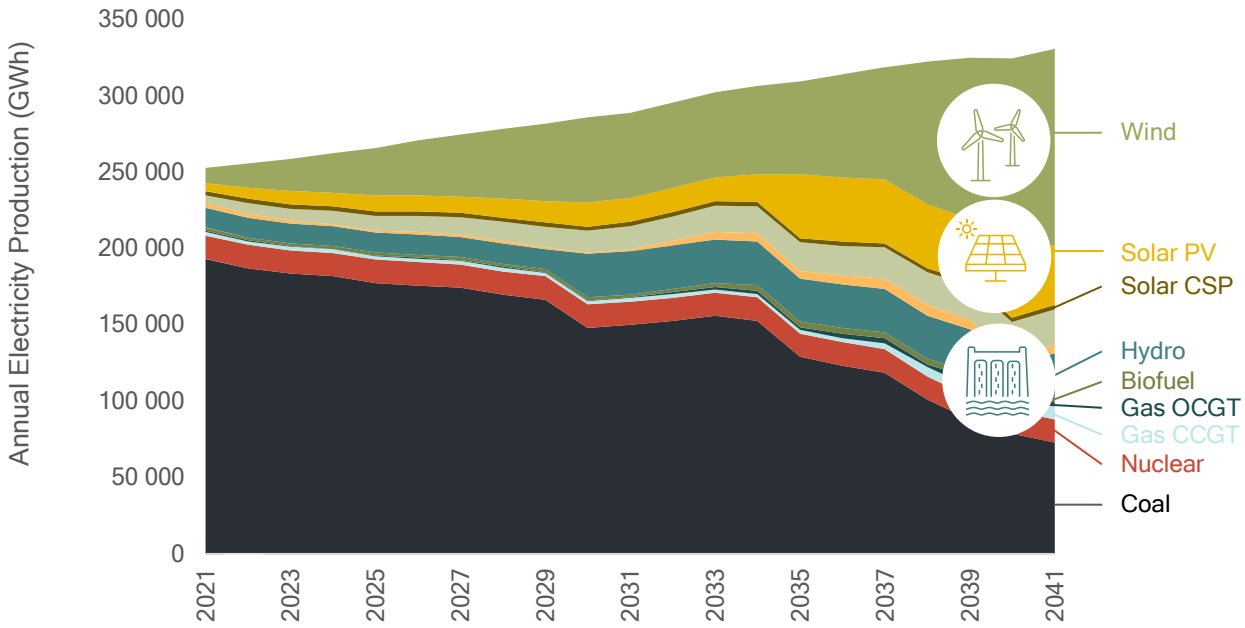
The JTT will be structured as a series of long-term (approximately 25-year) debt-financing tranches ultimately priced at a highly concessional interest rate.

renewable energy programme compared to that anticipated by the IRP 2019.

Actual achieved mitigation only begins to accrue as this additional capacity is commissioned and displaces fossil fuel generation – an incremental process, involving procurement through a variety of public and private means, that gains

Current Policy Trajectory: Annual Electricity Production

Subheading



Referencing the baseline (IRP 2019) emissions pathway, each successive loan tranche will commit South Africa to additional decarbonisation compared to the pathway established by the previous tranche. At the completion of the initial drawdown process, the power sector will be committed to a Paris-aligned decarbonisation pathway.Realising additional mitigation requires the execution of a significantly accelerated (financially viable and separately funded)

momentum over a decade or more. This can be seen in **Error! Reference source not found.** which presents an example of an ambitious, but achievable mitigation pathway that reduces power sector emissions by one-third without compromising system adequacy.[11]

[11] *Analysis drawn from Meridian Economics (2020) 'A Vital Ambition'. Available at: https://meridianeconomics.co.za/wp-content/uploads/2020/07/Ambition.pdf.*

Financial support through a sizeable concessional loan

The South African Treasury anticipates raising long-term dollar debt for between 9–15% of its requirements in the coming years. This creates an opportunity to include concessional JTT debt finance as part of South Africa's existing plans for foreign exchange debt issuances. Utilising a bespoke JTT loan framework, South Africa could take out loan finance

nominally at the market rate (currently around 5.5%). However, instead of fixed annual interest payments, the interest payment profile could be shaped to match South Africa's ability to deliver CO_2 savings, as specified by the JTT trajectory (indicated by the green arrows in Error! Reference source not found.). South Africa would have the right to credit the annual dollar-denominated value of its carbon savings against (i.e. to reduce) its interest payment obligation in each year at a pre-determined $/t deal price.

The $/t deal price is co-determined with the quantum of financial support to be provided to South Africa if it fully delivers the JTT decarbonisation trajectory. In this specific example approximately $7/t[12] yields R100bn (or about $7bn) in net present value terms. This locks in a highly efficient $/t rate for sponsoring countries over 25 years. It also delivers a net present value that responds commensurately to the need for further fiscal space to address the socio-political and financial barriers to unlocking accelerated power sector decarbonisation in South Africa.

In our example, this would be achieved through an overall loan valued at about $16bn, drawn down in five annual tranches with matching end-of-term bullet repayments as illustrated in Error! Reference source not found..[13] Structured in this way, the JTT will enable South Africa to, in effect, reduce the interest rate on such a loan from around 5.5% to a highly concessional ~1.5% by adhering to the agreed carbon-mitigation pathway.

The interest cost saving opportunity provides a powerful incentive for South Africa to achieve its decarbonisation commitments as contained in the JTT.

As can be seen from Error! Reference source not found. it will take time for the renewables build to gain momentum, and therefore to ramp up the stream of additional mitigation. The JTT loan capital will be disbursed over an initial period during which the additional mitigation will still be very modest, even if South Africa is doing everything possible to ensure its compliance with the future committed trajectory.

To maintain credibility of the commitment during this initial period, prior to the bulk of the mitigation delivery, disbursement of capital tranches may be made conditional on relevant enabling milestones. These could include the implementation of the South African Just Transition Fund, Eskom unbundling and recapitalisation, and publication of an updated IRP aligned with the country's ambitious NDC commitments.[14]

Institutional structure

[12] *The deal price is assumed to escalate annually at 2.25% real in dollars. This aligns with the carbon shadow pricing assumptions used by multi-lateral development banks and is based on the work of Stiglitz & Stern, 2017; World Bank, 2017*

[13] *Other financing options that achieve the same value transfer are discussed below, however, this structure allows for the lowest loan size without requiring capital concessions.*

[14] *The Integrated Resource Plan (IRP) is the formal government policy statement for the future development of the power sector.*

The JTT will require careful institutional structuring to accommodate the range of parties that would be involved. Given that it would be (a) a multi-lateral transaction and (b) that parties will not have matching cash flow requirements, it is proposed that it be primarily intermediated by a dedicated facility established by a high-profile, multi-lateral climate finance entity. This entity can finance the initial drawdowns with long-term loans from participating multi- and bilateral development finance institutions, and capital market investors.

The participating sovereigns will support the facility by providing the financial value being transferred to South Africa (by means of the effective ~4 percentage point interest rate discount). This can be done either: (a) by guaranteeing the debt the facility issues, thereby reducing the cost of the financing (to approximate developed-country sovereign debt costs at about 1.5%); or (b) by means of compensating payments for the carbon mitigation value credited against South Africa's debt service payments. In the case of the latter option the facility can raise the finance in ZAR in the domestic market, with the sponsor's compensation payments also preferably denominated in ZAR. This will deliver the entire concessional facility in ZAR.

A system level intervention

Most other proposals for coal retirement mechanisms focus on individual plant closures at the entity level. However, the JTT is conceptualised as a power system level, a sovereign transaction with a primary focus on adherence to an agreed CO_2 mitigation pathway (delivering additional mitigation) in order to accommodate the real-world challenges of managing a decarbonising coal-based power system in South Africa.

In a power sector dominated by ageing, inflexible coal plant, the exact rate of coal plant capacity factor reductions, plant retirement, renewable energy construction, new supporting investments, etc. that will be required to ensure reliability of supply – while implementing rapid decarbonisation – is not known in advance. A workable coal-retirement mechanism needs to take account of this uncertainty and accommodate appropriate responses. While in some cases plant closures can be specified up front, it will be unrealistic, unnecessary, and ultimately counterproductive to expect South Africa to give up its system level flexibility to manage plant closures optimally, while it delivers the agreed mitigation outcomes.

The JTT therefore focuses on the outcomes that matter: (a) measured additional CO_2 mitigation; and (b) financial support to assist relevant stakeholders to overcome political, financial, and technical barriers to accelerated mitigation.

To protect the credibility of South Africa's mitigation commitment, which will be delivered over decades, it will be necessary to put in place an incentive mechanism that remains effective throughout the entire life of the agreement, linking realised concessionally to realised mitigation.[15]

It is beneficial that the sovereign level and power sector scope of the JTT is well aligned to, and can be readily supported by, the current design of South Africa's domestic climate mitigation policy suite – in particular the carbon tax, and the Sectoral Emissions Targets and company-

[15] *The initial disbursement process can be structured in a way similar to the World Bank's Program-for-Results (https://www.worldbank.org/en/programs/program-for-results-financing) that is dependent upon achieving agreed milestones.*

level carbon budgets that will be introduced by the forthcoming Climate Act.

The commitments by the JTT counterparties will crowd in an accelerated and sustained renewables and grid infrastructure investment programme. This will form the core of the post-Covid green industrialisation and economic recovery that South Africa so desperately needs. Ultimately the JTT offers a rare opportunity for South Africa to unlock the ability of a wide range of stakeholders to work together to move the country beyond its current energy policy impasse, along an ambitious, Paris aligned, socially just, decarbonisation pathway.

Infographic example heading

Subheading

Wind

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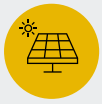
Hydro

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore



Solar PV

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Solar CSP

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Gas OCGT

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Gas

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Battery

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Pumped

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore

Nuclear

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore