SAEE: GAS-TO-POWER

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South Africa Gas-to-Power Plan

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Introduction

Snapshot : Since Eskom's Generation Recovery Plan (Apr 2023), system performance has increased system stability

Policy Basis

Current gas plan still anchored in **IRP 2019** allocation of ~3 GW gas-to-power

- Timing in IRP 2019: ~1 GW around 2024 and 3GW by ~2027

KEY POINTS TO CONSIDER

Section	Key Points
Procurement Programmes	Gas capacity being procured through:— **RMIPPPP** (Risk Mitigation IPP Programme)— **GASIPPPP** (Gas IPP Programme) **Targets** ▪ **RMIPPPP:** ~2 GW total— ~1.2 GW gas— ~650 MW other technologies (hybrid / storage / renewables) ▪ **GASIPPPP:** ~2 GW gas-to-power
Current Contracted and Preferred Gas Projects	RMIPPPP agreements signed with **7 of 11 preferred bidders** **Capacity contribution includes:** ▪ ~1.2 GW gas projects ▪ ~578 MW non-gas projects Gas projects include:— Karpowership Coega (420 MW)— Karpowership Richards Bay (420 MW)— Karpowership Saldanha (320 MW)
Institutional Framework in Place	• **Policy & planning:** DEE + SANEDI (IRP process) • **Procurement:** IPP Office (IPPO) • **Regulation:** NERSA
Key Delivery Risk	• Institutions exist, but delivery depends on **coordinated execution** • Misaligned pace across policy, procurement, and regulation leads to delays
Observed Impact	• IRP 2019 gas allocations already delayed • Delays weaken investor confidence and slow capacity delivery
CORE MESSAGE	**Institutional capability is present — coordination speed determines whether gas capacity is delivered on time.**

Scenarios assessed

Time series: 2025–2025

Scenario: A structured, consistent set of assumptions about future demand, technology, fuel prices, and policy used to test how the power system could evolve under different conditions.

Policy-Compliant Scenario

Policy Compliance Scenario represents the ideal, policy-aligned pathway for South Africa's power-sector evolution, consistent with the objectives of the NDP 2030, IRP 2024, TDP 2024, and NDC 2025. It positions the country on a growth-led energy transition that supports a balanced "energy system"; ensuring security of supply, affordability, environmental sustainability, and socio-economic development.

Elements

- Aligned with national policy and growth goals
- Unrestricted delivery; stable
- Depoliticized governance
- Full resource and institutional readiness
- Timely SAWEM implementation (2026–2030)

Assumptions

Parameter	Value / Description
GDP growth	3 % p.a.
Electricity-demand growth	2 % p.a.
Gas capacity	2 GW (Richards Bay 2030) + 2 GW (Gas IPP 2032)
Coal EAF pathway	68 % (2026/27) → 70 % (2028 onward)
Renewables build	Unconstrained (base case); sensitivity triggered > 5 GW per year
Coal decommissioning	Arnot (2029), Grootvlei (2031), Hendrina (2033), Camden (2033), Kriel (2030)
Emissions trajectory	398–510 Mt CO_2 (2025); 350–420 Mt CO_2 (2030); Net-zero 2050
Grid readiness	Adequate per TDP 2023/24 and Grid Unlock Study

Delayed Gas Scenario

Delayed Gas scenario captures a stress-test or downside case for South Africa's power-sector transition. It reflects a situation where investment confidence weakens, **gas infrastructure delivery delays**, and renewable-energy deployment slows sharply because of financing and grid bottlenecks. In this trajectory, gas-to-power only enters the system after 2033, delaying flexible-generation capability and extending the operational burden on the ageing coal fleet.

Elements

- Delayed gas-to-power rollout
- Slower renewable build
- Extended coal reliance
- Fiscal and institutional constraints

Assumptions

Parameter	Value / Description
GDP growth	3 % p.a. (targeted) — risk of slippage due to energy constraints
Electricity-demand growth	2 % p.a. (modelled)
Gas capacity	2 GW (Richards Bay 2033) + 2 GW (Gas IPP 2034)
Coal EAF	68 % (2026/27) → 70 % (2028 onward)
Renewables build cap	2 GW per year (total solar + wind + hybrid projects)
Coal decommissioning	Arnot (2029), Grootvlei (2031), Hendrina (2033), Camden (2033), Kriel (2030)
Emissions trajectory	398–510 Mt CO_2 (2025); 350–420 Mt CO_2 (2030); net-zero 2050 (PCC 2022)
Grid readiness	Low — transmission expansion delayed; critical corridors underfunded

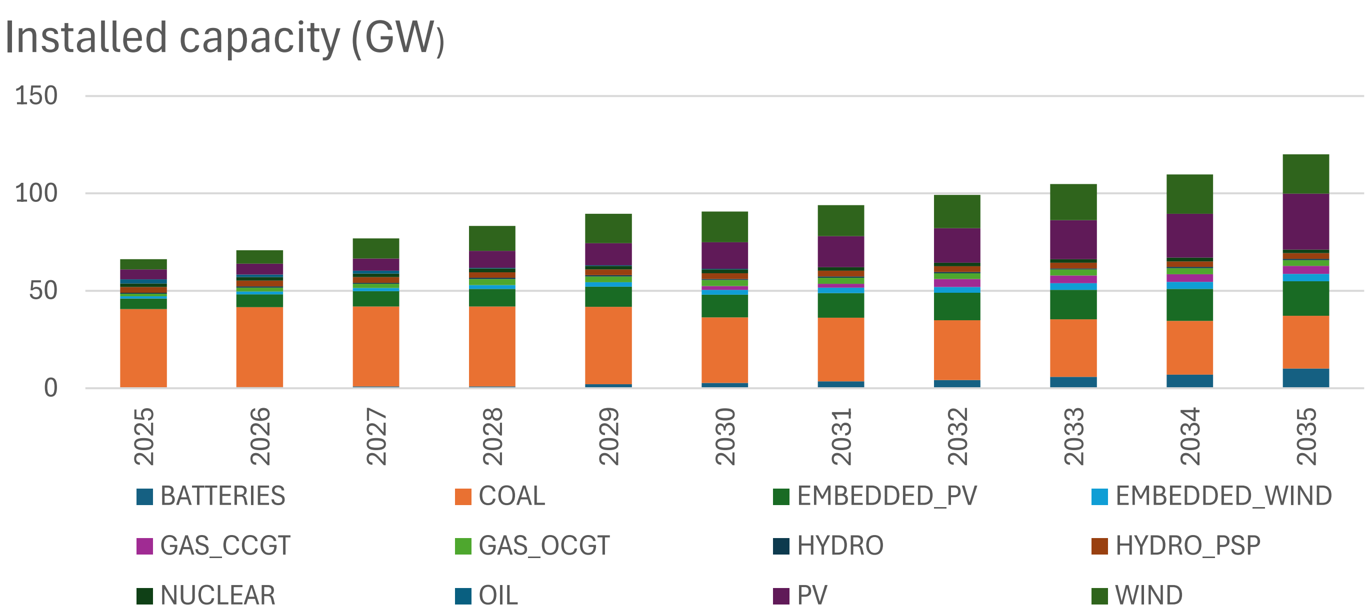
Installed capacity

Time series: 2025–2025

Installed capacity: Total rated maximum power output (usually in MW or GW) of all generation and storage plants that are built and available in the system.

Policy-compliant Scenario Elements

- Aligned with national policy and growth goals; fast, unrestricted delivery; stable, depoliticized governance; full resource and institutional readiness; timely SAWEM implementation (2026–2030)



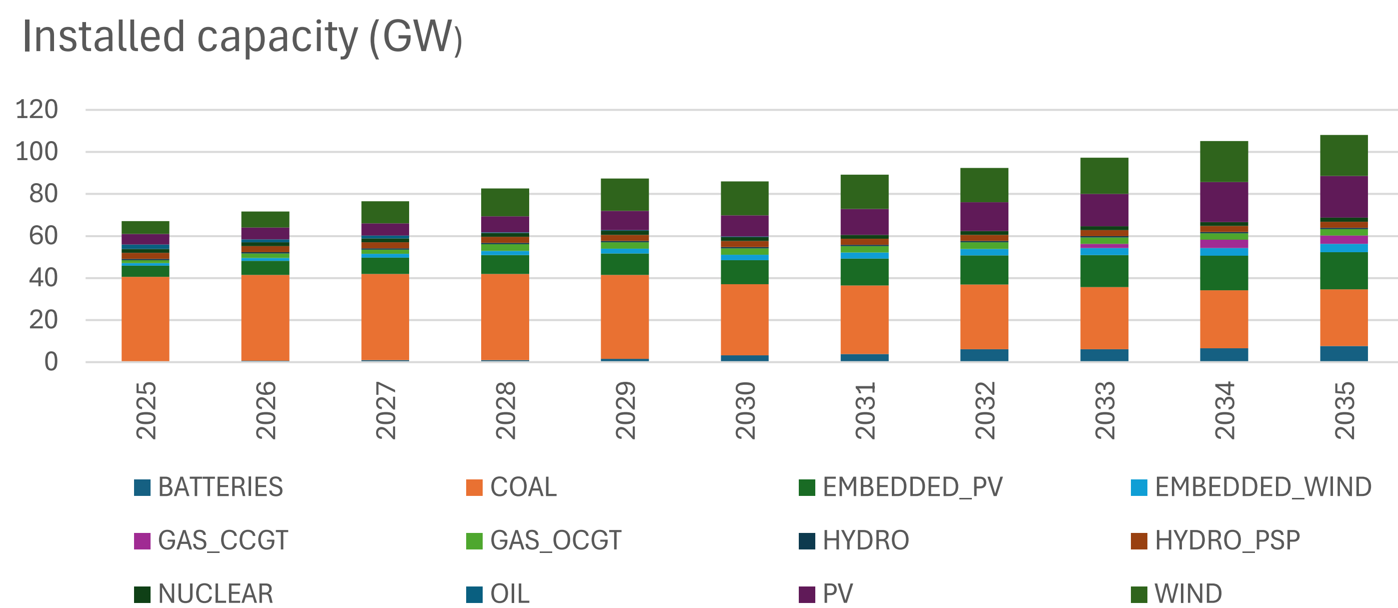
Insights: 4 GW of Gas by 2028

- PV: 29 GW by 2035
- Wind: 20 GW by 2035
- Battery: 10 GW by 2035
- Embedded (PV + wind): 20 GW by 2035

Total: 79 GW by 2035

Delayed Gas Scenario Elements

- Delayed gas-to-power rollout; slower renewable build; extended coal reliance; fiscal and institutional constraints.



Insights: 4 GW 4 GW of Gas by 2034

- PV: 20 GW by 2035
- Wind: 20 GW by 2035
- Battery: 7 GW by 2035
- Embedded (PV + wind): 17 GW by 2035

Total: 64 GW by 2035

System cost

Time series: 2025–2025

System cost: The total cost of building and operating the electricity system over time, including generation, storage, fuel, networks, and operating costs needed to reliably meet demand.

Policy-compliant Scenario Elements

- Aligned with national policy and growth goals; fast, unrestricted delivery; stable, depoliticized governance; full resource and institutional readiness; timely SAWEM implementation (2026–2030)

Delayed Gas Scenario Elements

- Delayed gas-to-power rollout; slower renewable build; extended coal reliance; fiscal and institutional constraints.

Policy compliant

System cost

Build Cost ($mln)

Technolgy	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
BATTERIES	0	0	0	0	715	467	582	499	1009	729	2074	6073,87
COAL	0	0	0	0	0	0	0	0	0	0	0	0,00
EMBEDDED_PV	0	0	0	0	0	0	0	0	0	0	0	0,00
EMBEDDED_WIND	0	0	0	0	0	0	0	0	0	0	0	0,00
GAS_CCGT	0	0	0	0	0	1791	0	1791	0	0	0	3581,33
GAS_OCGT	0	0	0	0	0	0	0	0	0	0	0	0,00
HYDRO	0	0	0	0	0	0	0	0	0	0	0	0,00
HYDRO_PSP	0	0	0	0	0	0	0	0	0	0	0	0,00
NUCLEAR	0	0	0	0	0	0	0	0	0	0	0	0,00
OIL	0	0	0	0	0	0	0	0	0	0	0	0,00
PV	0	480	656	1868	1920	1683	1620	1317	1529	1696	4117	16884,75
WIND	1569	2064	4495	3331	2929	853	246	1454	1783	2200	0	20923,57
Grand total												47463,51

Delayed gas

System cost

Build Cost ($mln)

Technolgy	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
BATTERIES	0	0	0	0	450	1107	468	1500	0	263	704	4492
COAL	0	0	0	0	0	0	0	0	0	0	0	0
EMBEDDED_PV	0	0	0	0	0	0	0	0	0	0	0	0
EMBEDDED_WIND	0	0	0	0	0	0	0	0	0	0	0	0
GAS_CCGT	0	0	0	0	0	0	0	0	1791	1791	0	3581
GAS_OCGT	0	0	0	0	0	0	0	0	0	0	0	0
HYDRO	0	0	0	0	0	0	0	0	0	0	0	0
HYDRO_PSP	0	0	0	0	0	0	0	0	0	0	0	0
NUCLEAR	0	0	0	0	0	0	0	0	0	0	0	0
OIL	0	0	0	0	0	0	0	0	0	0	0	0
PV	0	611	0	1496	1117	683	1620	1033	1058	2480	597	10695
WIND	2679	1727	3955	3547	2929	853	246	0	1287	2823	0	20046
Grand total												38815

Insight: The policy-compliant system cost is higher than the delayed-gas scenario. Gas helps open the market for renewables, but prices only decline when gas deployment is delayed.
The main cost drivers are batteries, wind, and embedded generation.

Emission cost

Time series: 2025–2025

Emission cost: Added cost of electricity generation based on the amount of greenhouse gases emitted, calculated by applying a carbon price to each unit of emissions and including it in total system cost.

Policy-compliant Scenario Elements

- Aligned with national policy and growth goals; fast, unrestricted delivery; stable, depoliticized governance; full resource and institutional readiness; timely SAWEM implementation (2026–2030)

Delayed Gas Scenario Elements

- Delayed gas-to-power rollout; slower renewable build; extended coal reliance; fiscal and institutional constraints.

Policy compliant

Emission cost

Emissions Cost ($mln)

Technlogy	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
COAL	1593	1526	1459	1392	1324	3068	3422	3640	3903	4039	4270	29635
EMBEDDED_PV	0	0	0	0	0	0	0	0	0	0	0	0
EMBEDDED_WIND	0	0	0	0	0	0	0	0	0	0	0	0
GAS_CCGT	0	0	0	0	0	7	9	24	24	42	46	151
GAS_OCGT	0	1	0	0	1	4	5	5	6	8	8	39
HYDRO	0	0	0	0	0	0	0	0	0	0	0	0
HYDRO_PSP	0	0	0	0	0	0	0	0	0	0	0	0
NUCLEAR	0	0	0	0	0	0	0	0	0	0	0	0
OIL	0	0	0	0	0	0	0	0	0	0	0	1
PV	0	0	0	0	0	0	0	0	0	0	0	0
WIND	0	0	0	0	0	0	0	0	0	0	0	0
Grand total												29826

Delayed gas

Emission cost

Technlogy	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
COAL	1577	1525	1458	1391	1318	3067	3464	3814	4083	4132	4536	30365
EMBEDDED_PV	0	0	0	0	0	0	0	0	0	0	0	0
EMBEDDED_WIND	0	0	0	0	0	0	0	0	0	0	0	0
GAS_CCGT	0	0	0	0	0	0	0	0	28	65	89	182
GAS_OCGT	0	1	1	1	8	12	14	20	19	15	24	113
HYDRO	0	0	0	0	0	0	0	0	0	0	0	0
HYDRO_PSP	0	0	0	0	0	0	0	0	0	0	0	0
NUCLEAR	0	0	0	0	0	0	0	0	0	0	0	0
OIL	0	0	0	0	0	1	0	0	0	0	0	1
PV	0	0	0	0	0	0	0	0	0	0	0	0
WIND	0	0	0	0	0	0	0	0	0	0	0	0
Grand total												30660

Insight: The policy-compliant system cost is lower than the delayed-gas scenario. Gas helps open the market for renewables, and the delayed cost emission is higher.
Coal emission cost is the main driver.

Use of system cost

Time series: 2025–2025

Use-of-System (UoS): Network charge paid for using the transmission and/or distribution grid to transport electricity from generators to customers.

Policy-compliant Scenario Elements

- Aligned with national policy and growth goals; fast, unrestricted delivery; stable, depoliticized governance; full resource and institutional readiness; timely SAWEM implementation (2026–2030)

Delayed Gas Scenario Elements

- Delayed gas-to-power rollout; slower renewable build; extended coal reliance; fiscal and institutional constraints.

Policy compliant

Use of system (UoS)

UoS Cost ($mln)

Technlogy	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
BATTERIES	0	0	0	0	0	0	0	0	0	0	0	0
COAL	4897	4689	4481	4265	4063	3869	3763	3558	3435	3237	3131	43388
EMBEDDED_PV	0	0	0	0	0	0	0	0	0	0	0	0
EMBEDDED_WIND	0	0	0	0	0	0	0	0	0	0	0	0
GAS_CCGT	0	0	0	0	0	23	24	57	51	82	81	319
GAS_OCGT	2	3	3	3	4	11	10	9	10	12	12	79
HYDRO	62	62	62	62	62	62	62	62	62	62	62	685
HYDRO_PSP	17	24	56	109	101	90	88	93	97	100	118	891
NUCLEAR	253	271	265	265	261	263	265	263	265	263	261	2894
OIL	0	0	1	0	0	0	0	0	0	0	0	2
PV	319	360	395	518	620	778	929	988	1099	1208	1498	8713
WIND	475	586	903	1067	1282	1447	1459	1476	1600	1742	1701	13737
Grand total												70707

Delayed gas

Use of system (UoS)

Technlogy	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	Total
BATTERIES	0	0	0	0	0	0	0	0	0	0	0	0
COAL	4847	4689	4480	4264	4044	3870	3809	3730	3590	3308	3325	43958
EMBEDDED_PV	0	0	0	0	0	0	0	0	0	0	0	0
EMBEDDED_WIND	0	0	0	0	0	0	0	0	0	0	0	0
GAS_CCGT	0	0	0	0	0	0	0	0	60	127	159	346
GAS_OCGT	1	4	4	5	47	30	30	37	32	23	33	245
HYDRO	62	62	62	62	62	62	62	62	62	62	62	685
HYDRO_PSP	16	28	56	117	117	73	76	87	88	91	95	844
NUCLEAR	250	246	266	266	263	273	271	271	270	268	268	2914
OIL	0	0	1	0	0	1	0	0	0	0	0	3
PV	319	370	357	464	522	608	757	829	928	1094	1149	7398
WIND	540	632	916	1091	1312	1486	1499	1456	1538	1694	1680	13844
Grand total												70237

Insight: The policy-compliant and delayed gas UoS cost is almost equal.
The UoS cost main drivers are coal, PV and wind

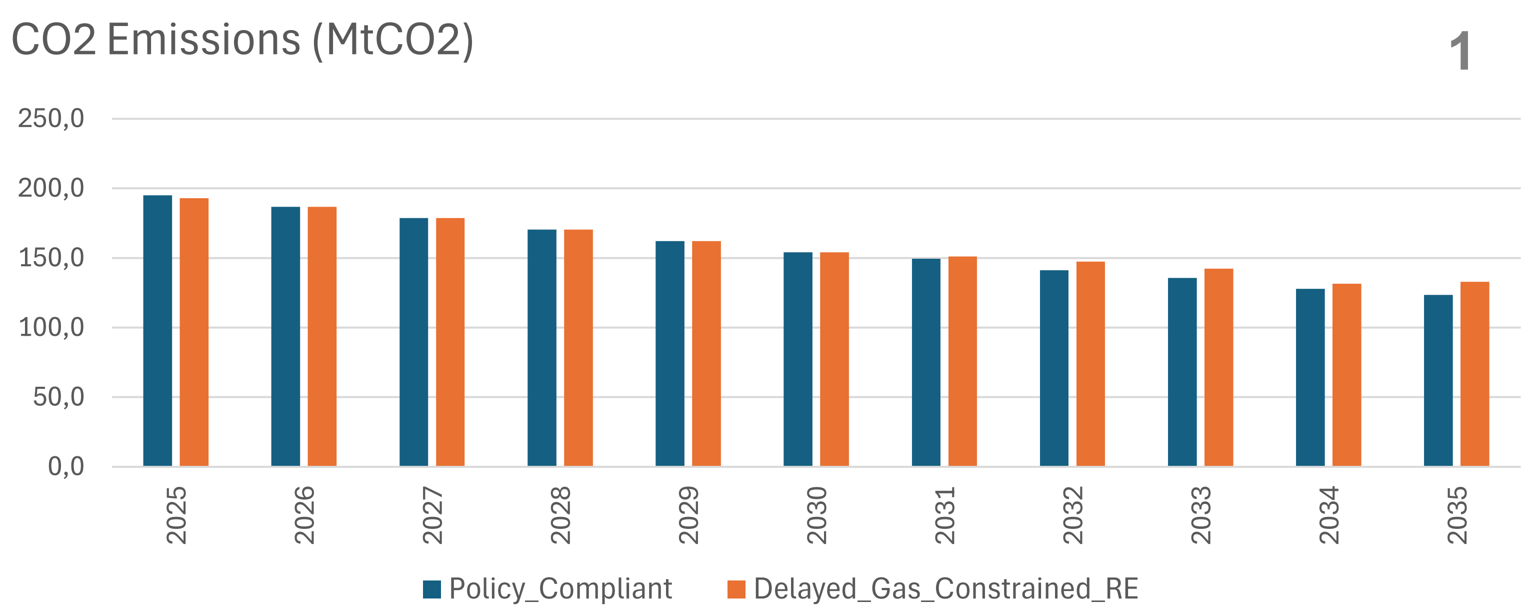
Emissions

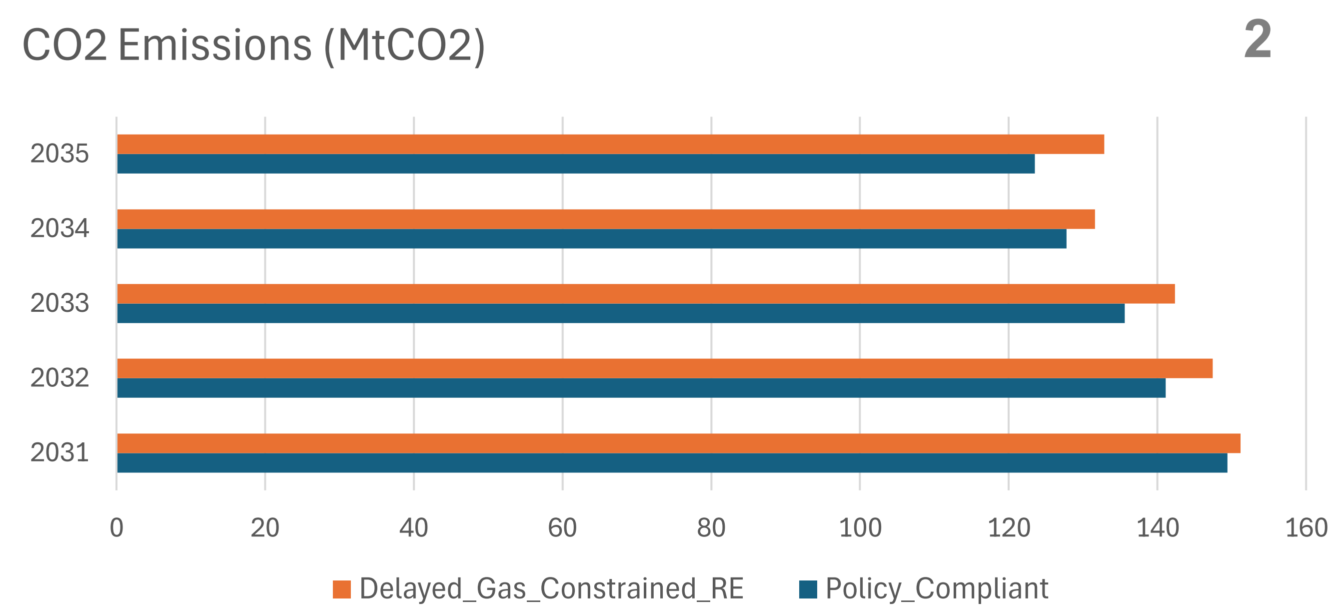
Time series: 2025–2025

Use-of-System (UoS): Network charge paid for using the transmission and/or distribution grid to transport electricity from generators to customers.

Trend summary

- **Both scenarios show a steady decline** in emissions over time — from roughly ~195 $MtCO_2$ in 2025 down to ~120–135 $MtCO_2$ by 2035.
- 🔵 **Policy-Compliant scenario falls faster** — emissions reduce more consistently year-by-year.
- 🟠 **Delayed Gas / Constrained RE declines more slowly** — emissions remain slightly higher from about 2031 onward.
- **Early years are very similar** between scenarios, but the gap widens **(see spectrum 2)** in later years as cleaner capacity builds faster in the policy-compliant case.





Bottom line: Emissions decrease in both cases, but faster clean build → but faster emissions reduction in the policy-compliant scenario.

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Conclusion

Snapshot : Since Eskom’s Generation Recovery Plan (Apr 2023), system performance has increased system stability

Gas provides critical balancing and security capacity, enabling higher renewable penetration and reducing system risk.

It supports renewable market development, with sequencing and pacing key to unlocking adjacent markets.

Key considerations:

- Cost and emissions outcomes depend on timing and scale of rollout.
- Procurement should be predictable and strategically structured to reduce build and emissions costs.

Closure
Thank you for your support and participation