THE PRESIDENCY
REPUBLIC OF SOUTH AFRICA

national treasury
Department:
National Treasury
REPUBLIC OF SOUTH AFRICA

Operation Vulindlela

Supporting the implementation of priority structural reforms

Presentation to the Presidential Climate Commission (PCC)

30 July 2021

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Five desired outcomes of Operation Vulindlela as part of the Economic Reconstruction and Recovery Plan

1

Supply of electricity stabilised

2

Reduced cost and increased quality of digital communications

3

Sustainable water supply to meet demand

4

Competitive and efficient freight transport

5

A visa regime that attracts skills and grows tourism

Electricity is the burning platform

Relative to expectations in 2019 and 2020, the supply-demand balance has worsened (with significant downside risk). This means that load shedding is likely to persist in the medium term, which would in turn make economic recovery unlikely.

- **Eskom EAF*** has declined (65-67% actual performance vs 70-75% expectation in IRP 2019, with 62% YTD in 2021). There is no realistic possibility of the EAF reaching 70-75% in the next few years.
- **New-build capacity** is delayed – new generation capacity in coal, gas, solar photovoltaic (PV) and wind planned but will not come online within the timeframes initially expected in the IRP 2019.
- **Short-term capacity shortfall** estimates range from 3 000 MW (IRP 2019) to 4 000 MW (MTSAO** 2020) and 8 000 MW (CSIR 2020), resulting in an energy shortfall of between 4 500 Gigawatt hours (GWh) and 17 500 GWh.
- **Demand** will either remain stable or increase in 2021 and beyond. Supply constraints act as a "handbrake" on growth – the faster the economy grows, the greater the energy shortfall.

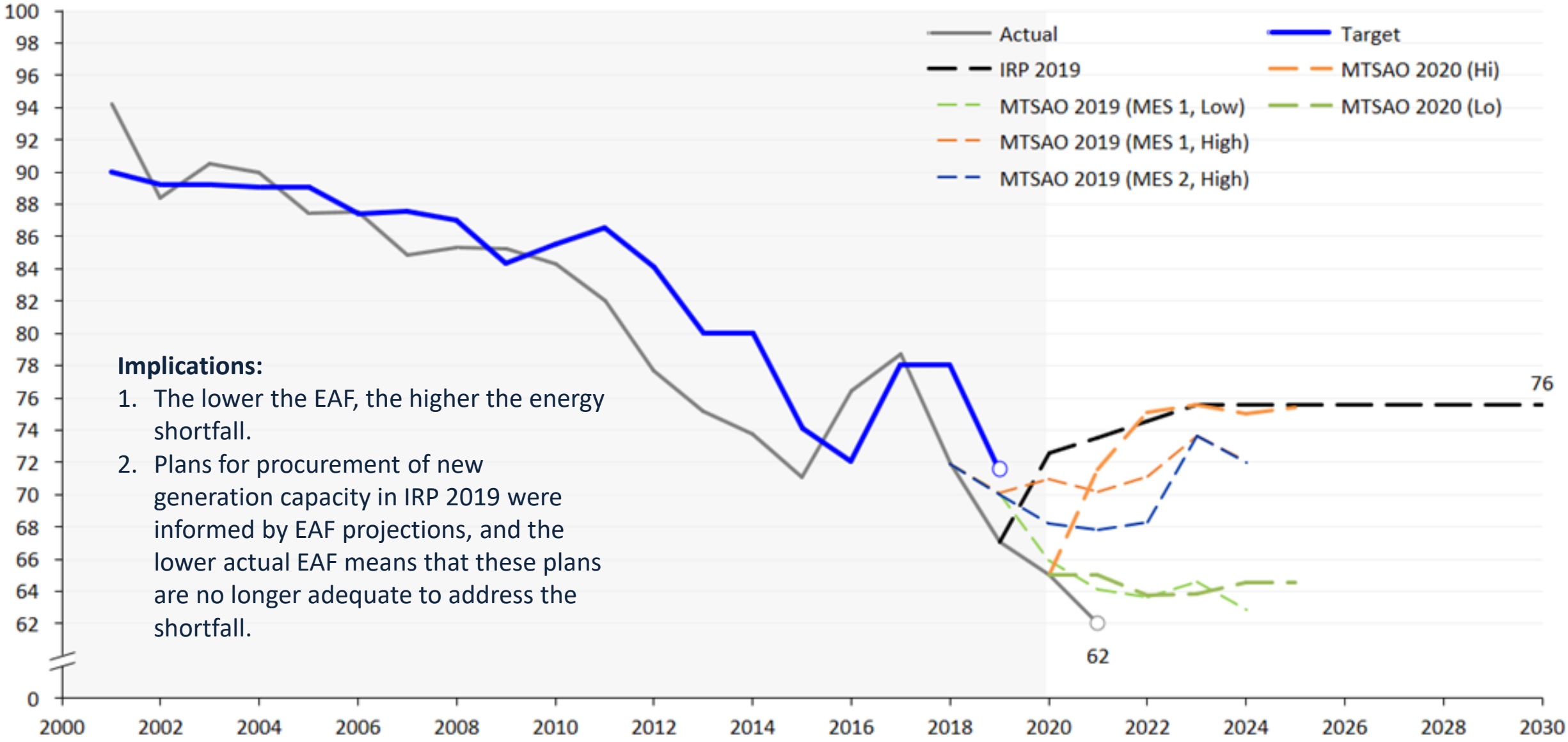
The bottom line: current interventions will not be sufficient to meet the electricity supply shortfall until at least late 2023 or early 2024 – even if new generation capacity is not delayed in any way (including REIPPPP Bid Window 5 and the RMIPPPP).

The only feasible solution is therefore to enable embedded generation rapidly and at scale.

**EAF = Energy Availability Factor – an indication of the energy that generation plant is able to produce relative to its theoretical potential, given installed capacity.*

*** Medium Term System Adequacy Outlook – annual system analysis produced by Eskom.*

Eskom's EAF has under-performed every year since 2018, necessitating procurement of new generation capacity even if demand remains constant.



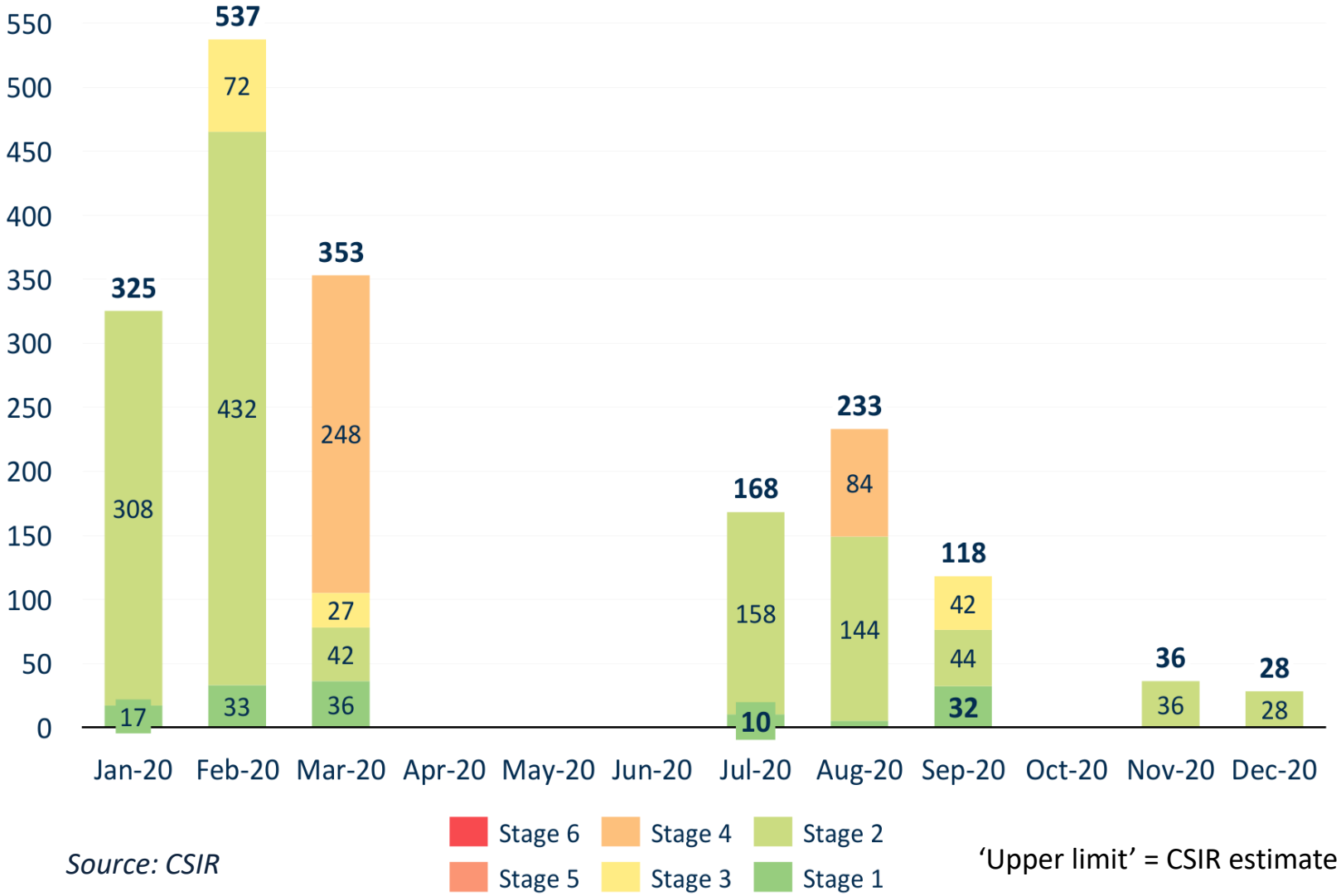
Implications:

1. The lower the EAF, the higher the energy shortfall.
2. Plans for procurement of new generation capacity in IRP 2019 were informed by EAF projections, and the lower actual EAF means that these plans are no longer adequate to address the shortfall.

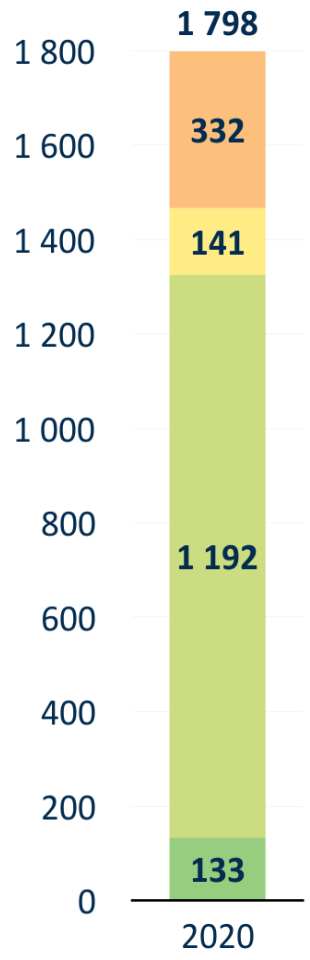
EAF – Energy Availability Factor
NOTE: 2021 EAF actual is YTD (not seasonally adjusted)

2020 was the worst year on record for load shedding with an upper-limit of 1798 GWh of load shed, surpassing 2015 & 2019 levels of 1325 GWh & 1352 GWh of load shed respectively.

Monthly load shed, upper-limit [GWh]



Annual loadshedding (upper limit) [GWh]



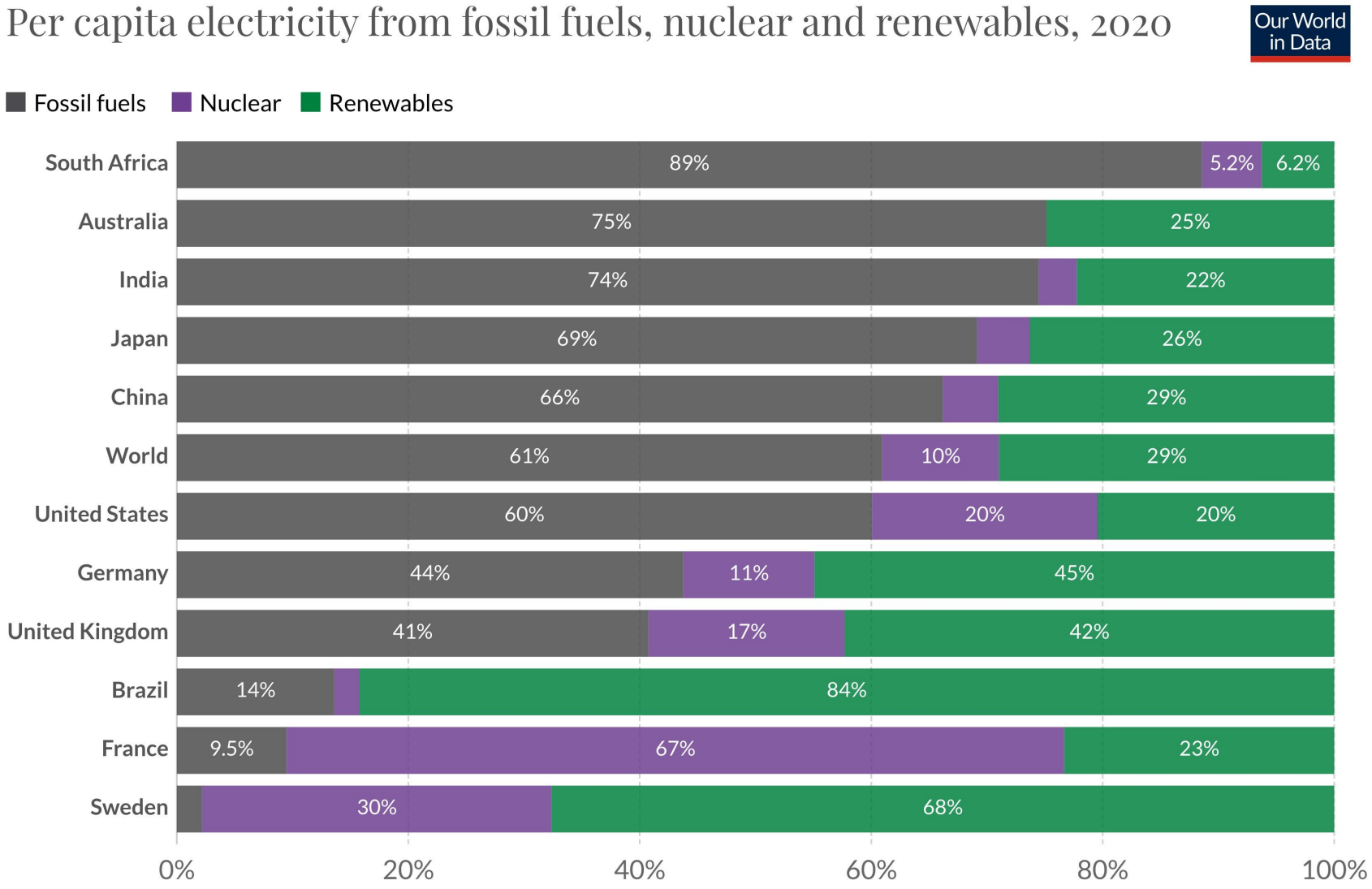
Risk of load shedding remains high (2021 has already seen 783 GWh of load shedding – to end 03/21).

With a cost to the economy of over R100 billion p.a., load shedding at this scale acts as a binding constraint on growth.

Source: CSIR

'Upper limit' = CSIR estimate based on announced load-shedding times and stages.

In addition to the inadequate and unreliable electricity supply, South Africa's carbon intensity is a threat to economic growth and recovery. SA firms need access to green energy sources to stay competitive.



South Africa needs to accelerate the transition to renewable energy sources to maintain export competitiveness:

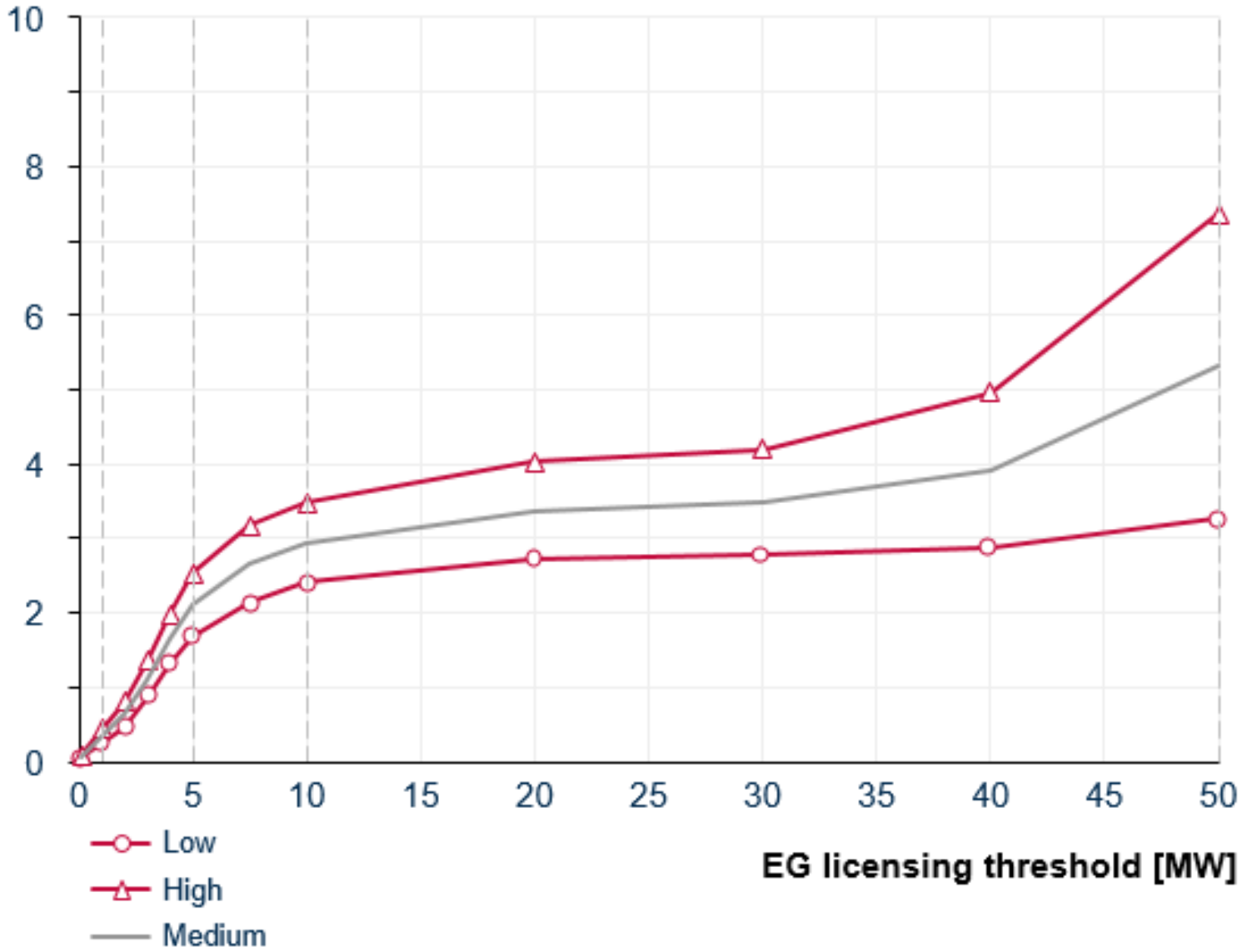
- Product competitiveness and acceptability (SA-made inputs will become increasingly unattractive to firms seeking carbon neutrality)
- Access to capital markets (inability to access ESG-linked finance, increasing bias towards green assets)
- Threat of carbon border tax, rendering SA automotives and other exports uncompetitive and obsolete

Embedded generation can contribute to energy security and climate goals

The President and Minister of Mineral Resources and Energy announced on 10 June 2021 that the licensing threshold for generation projects would be raised from 1 MW to 100 MW.

- The exemption from licensing for grid-connected generation projects below 100 MW is expected to unlock significant investment in new generation capacity, and to reduce the risk of load shedding. The majority of this investment will be in solar PV and wind due to its cost advantages.
- Generation projects will still require grid connection approval from Eskom or the relevant municipality, and will have to comply with the Grid Code to protect grid stability. All projects will have to register with NERSA, so that government has accurate information on the quantity of supply. Projects will also need to comply with requirements of the National Environmental Management Act to limit their impact on the environment.
- This will ensure the integrity of the grid while allowing for a significantly faster deployment of new generation capacity for commercial, industrial and mining customers, alleviating pressure on the grid and preventing disruptions to economic activity.
- The amendment to Schedule 2 of the Electricity Regulation Act raising the licensing threshold is being finalised for publication by 10 August 2021.

Potential installed EG capacity Com/Ind/Min [GW]

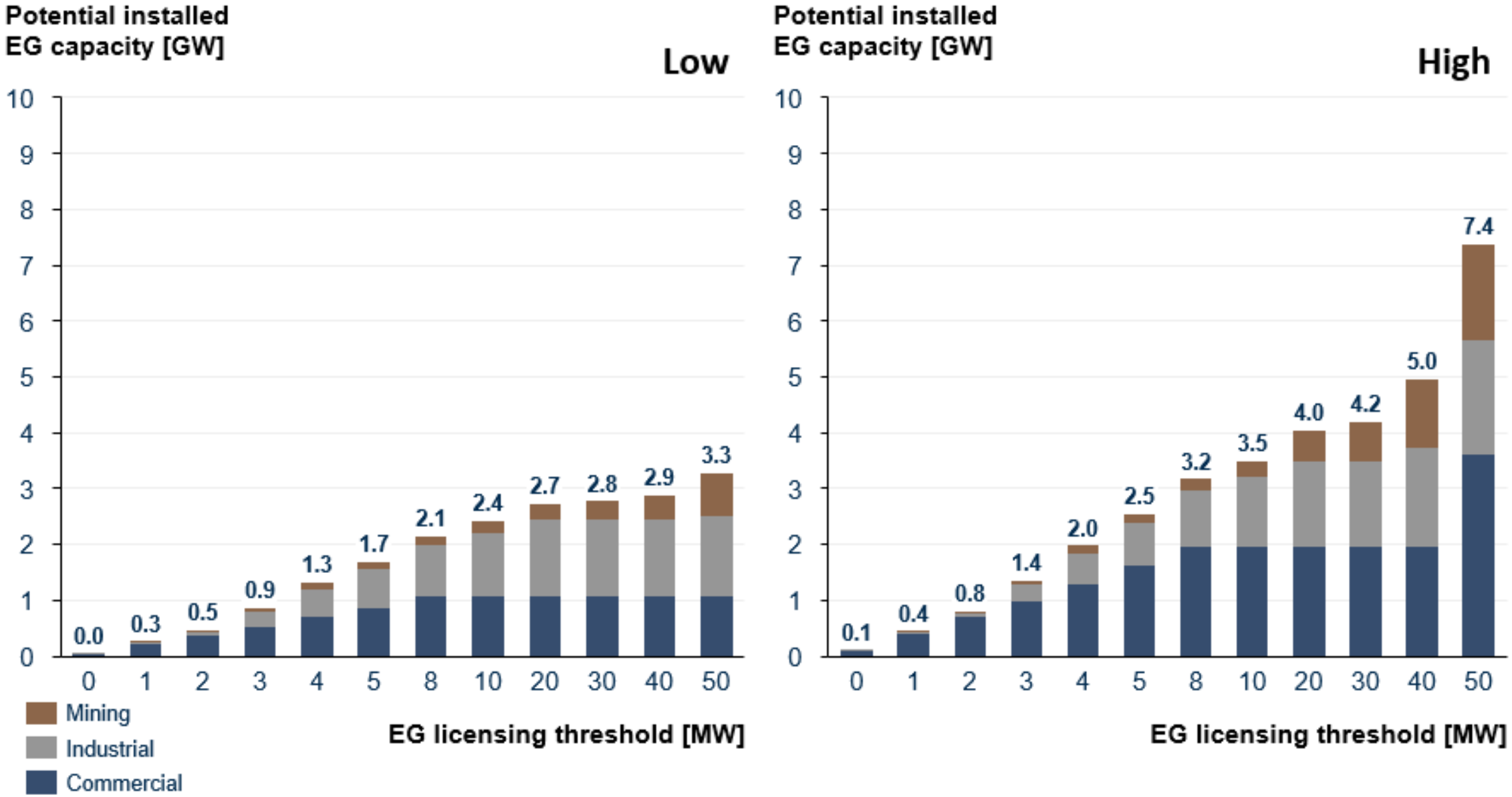


NOTES: Eskom data only – excludes municipalities; Installed EG capacity of up to 1.24/1.40/1.27 of maximum demand for com./ind./min. customer categories (profile dependent);
Sources: Eskom; CSIR analysis

Initial CSIR modelling of differential impact of raising the licensing threshold to different levels (<u>all market segments</u>).

Raising the licensing threshold to 50 MW would unlock approximately 3300-7400 MW (likely estimate 5300 MW). A higher threshold of 100 MW is likely to unlock additional capacity, but with fewer projects of a larger size.

The mining industry will benefit from a 100 MW threshold, supporting investment and growth in the sector.



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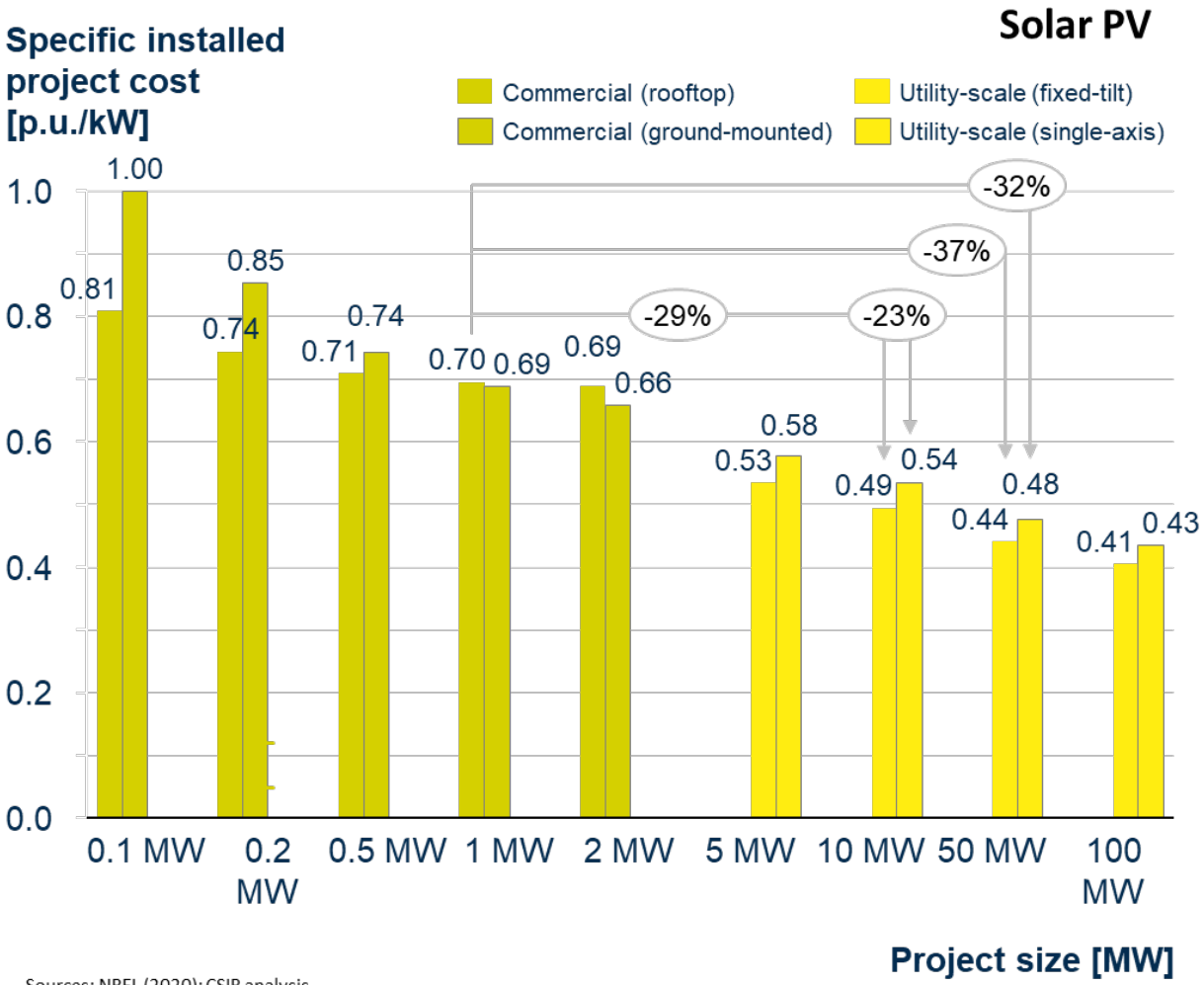
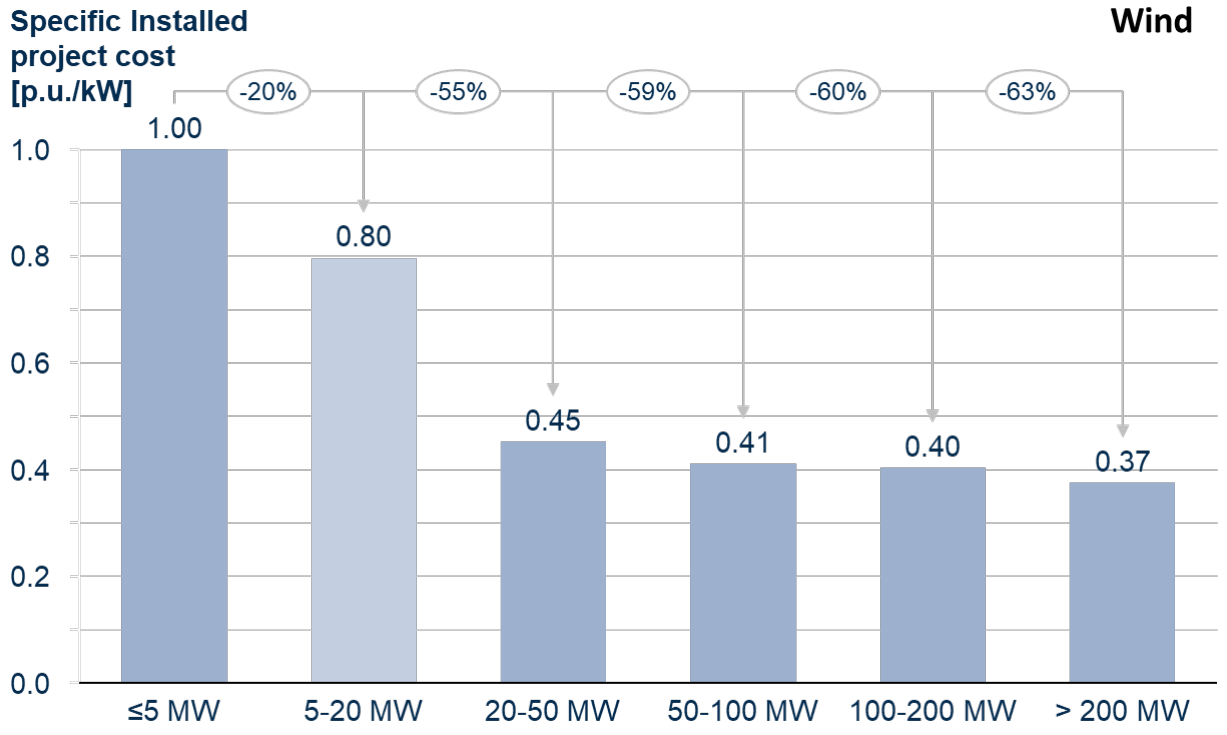
Sources: Eskom; CSIR analysis

The higher licensing threshold will enable economies of scale to be achieved in embedded generation.

- For solar PV, relative investment cost reductions from 1 MW to 10 MW of ≈20-30% are feasible with further reductions towards 30-40% for 100 MW projects.
- For wind, reductions of ≈20% when moving towards 5-20 MW but substantial investment cost reductions beyond this of 55% for 20-50 MW range and 60% for 100 MW.



Sources: NREL (2020); CSIR analysis



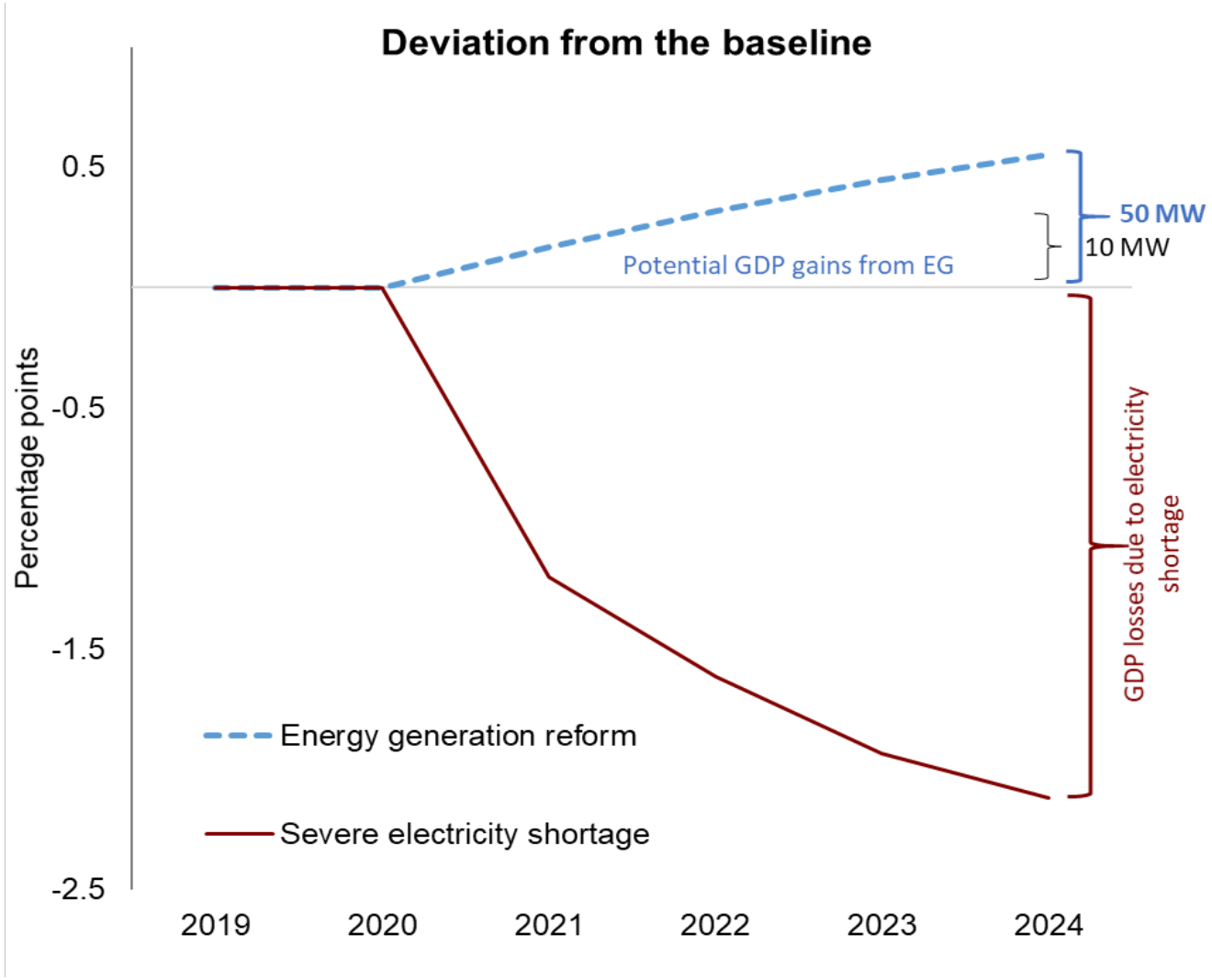
NOTES: 5-20 MW interpolated (no data for this range)
Sources: LBNL (2020)

Embedded generation in the context of the ongoing evolution of the electricity market in SA

Raising the licensing threshold for embedded generation is in line with broader long-term restructuring of the energy sector.

- The SA electricity market has evolved over the years, in line with international best practice, to achieve a better balance between state-dominated control of the sector via Eskom and private sector participation in generation.
- International best practice is to shift towards multiple buyers and sellers with the transmission/distribution grid remaining in state control, partly driven by technology change favouring more competitive smaller generators. Eskom unbundling is part of this evolution.
- Through the REI4P, the private sector has already been contracted to provide 6 500 MW and this contribution is set to increase under the IRP 2019.
- The aim of these changes has been to improve the reliability and affordability of electricity, to diversify the energy mix and confront climate change.
- The reforms related to embedded generation will enable further private sector participation in the generation space, but not in distribution or transmission. In addition, Eskom and municipalities will remain in control of access to the grid.
- Embedded generation will remain small relative to the overall capacity of the system (± 5 GW vs approximately 46 GW) and will allow government to enable new generation capacity without the state guarantees required by the REIPPP.
- Raising the licensing threshold to 100 MW is not aimed at utility-scale generation – anything above 100 MW remains subject to licensing.

Embedded generation will not only prevent GDP losses from load shedding, but will boost GDP growth



Under the severe electricity shortage scenario, GDP is 2.1 ppts below the baseline by 2024. This scenario assumes current timeframes for procurement of additional power including RMIPPP and IRP2019 bid windows.

Raising the licensing threshold increases GDP by 0.5 ppts above baseline by 2024.

Almost R380bn is lost in nominal GDP under the electricity shortage scenario.

Significant economic impact and multiplier effects

Raising the licensing threshold for embedded generation is expected to have significant positive impact on growth, investment and jobs.

- **GDP**
  - 0.5% additional GDP growth (above baseline)
- **Investment**
  - R75 to R85 billion in investment per annum
- **Jobs**
  - 12,000 to 16,000 new direct jobs per annum, excluding value chains

Source: Meridian Economics (assuming 5,000 MW of new generation capacity)

Long-term potential for jobs in manufacturing

With rapidly increasing investment in renewable energy across the world in the coming decades, South Africa needs to position itself as a global leader in renewables manufacturing.

- By 2019, installed solar capacity was almost 15 times higher than in 2010, and wind power 3.5 times higher *(The Economist*).
- Annual clean energy investment is expected to exceed $4 trillion per annum by 2030, three times its average over the past five years (*BloombergNEF*).
- This investment will require a massive ramp-up in production of inputs and manufacturing of components.
- South Africa is falling behind in this regard, as the stop-and-start procurement of renewable energy has led to a decline in local manufacturing capacity.
- The deployment of significant new embedded generation capacity over the next five years presents an opportunity to “kick-start” local manufacturing again, and to build on this to position South Africa as a major supplier to export markets.
- Industrial policy (including through the SA Renewable Energy Masterplan) should take advantage of the raising of the licensing threshold to support local manufacturing capability and encourage global players to invest in local production facilities.

Summary and conclusion

Additional investment in embedded generation will alleviate the immediate energy supply shortfall, with wider economic benefits.

- The amendment to Schedule 2 of the Electricity Regulation Act is being finalised by the Department.
- The registration process should create an enabling environment with rapid approval.
- Eskom should put in place additional capacity to expedite inspections and grid connection approvals, and to ensure compliance with the Grid Code, as most projects will connect to the Eskom network.
- Appropriate tariffs for wheeling and balancing should be approved by NERSA to ensure cost recovery and a smooth transition to greater participation of embedded generators.
- Substantial investment will be required to strengthen Eskom's transmission network as more embedded generation capacity (much of it requiring wheeling) connects to the grid.
- Measures should be put in place to ensure that local manufacturing industries benefit from a surge of investment in new generation projects, especially in solar PV and wind.

Thank you