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Energy Economics: Winners and Losers from SAs changing energy mix? Labor considerations

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Overview

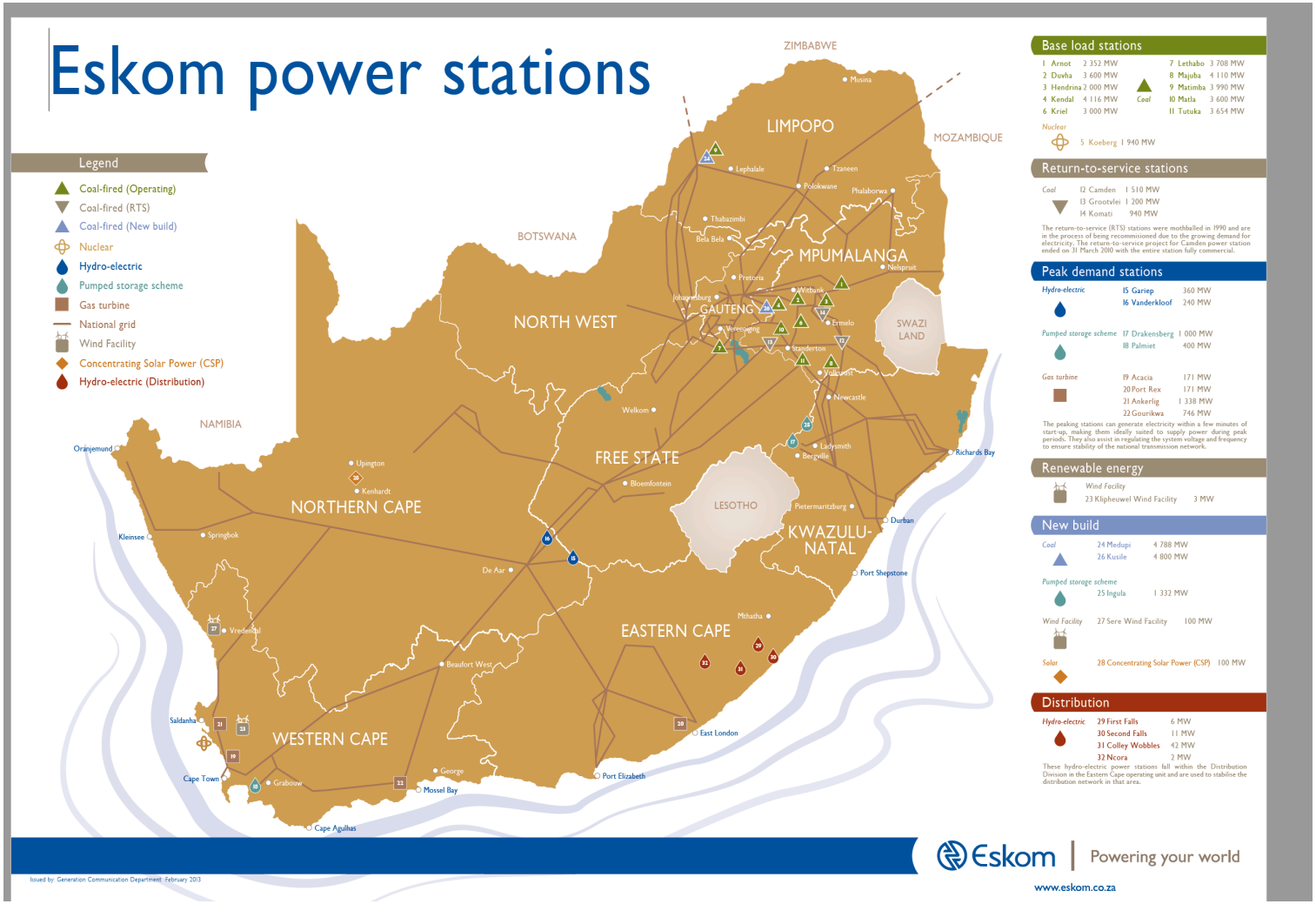
Transition to cleaner forms of energy

- This transition to cleaner forms of energy has been associated with societal benefits, environmental improvement and economic development (Consoli et al. 2016; Porter and van der Linde,1995).
- Promoting greener forms of energy production is generally agreed to contribute to job creation by many studies (Cameron and van der Zwaan, 2015; Lehr et al., 2008)
- However this fact is challenged by others (Henriques, Coelho and Cassidy, 2016; Sooriyaarachchi, et al., 2015): potential increases of electricity prices as a result (Lesser 2010)

Transition to cleaner forms of energy (cont.)

- Bulavskaya and Reynes (2017) estimated the employment potential of renewable energy and heat generation in the Netherlands in around 50 000 new jobs by 2030 and a positive effect of 0.85% to the GDP of the country relative to a baseline scenario.
- This amount of jobs might have been even higher if it was not for the negative consequence of the higher electricity prices expected mainly because of higher capital requirements of the new technologies.

Geographical distribution of coal generation



Need for a regional analysis

- Regional analysis is required due to the heavy concentration of coal-fired generation in South Africas Mpumalanga province where 12 of the countrys 15 coal plants are located.
- Examining the effects of the proposed generation-mix change at only a national level would therefore ignore disparate regional outcomes that may pose serious consequences for coal-producing provinces such as Mpumalanga.
- Bohlmann, H.R., Horridge, J.M., Inglesi-Lotz, R., Roos, E.L., Stander, L. Regional economic effects of changes in South Africa's electricity generation mix. Under review

Method - CGE and dataset

- SATERM recognizes 52 different industry and commodity groups, 10 occupation groups and 9 provincial regions.
- 2015 Supply and Use Tables (SUT) data as per Roos (2015)
- 26% of coal produced in South Africa is used by the electricity industry and 57% is exported, while 15% is used by other industries and households.
- Semi-skilled labour, including plant and machine operators and trade workers make up the bulk of employment in the coal industry.
- Over 75% of coal in South Africa is produced within the Mpumalanga region.

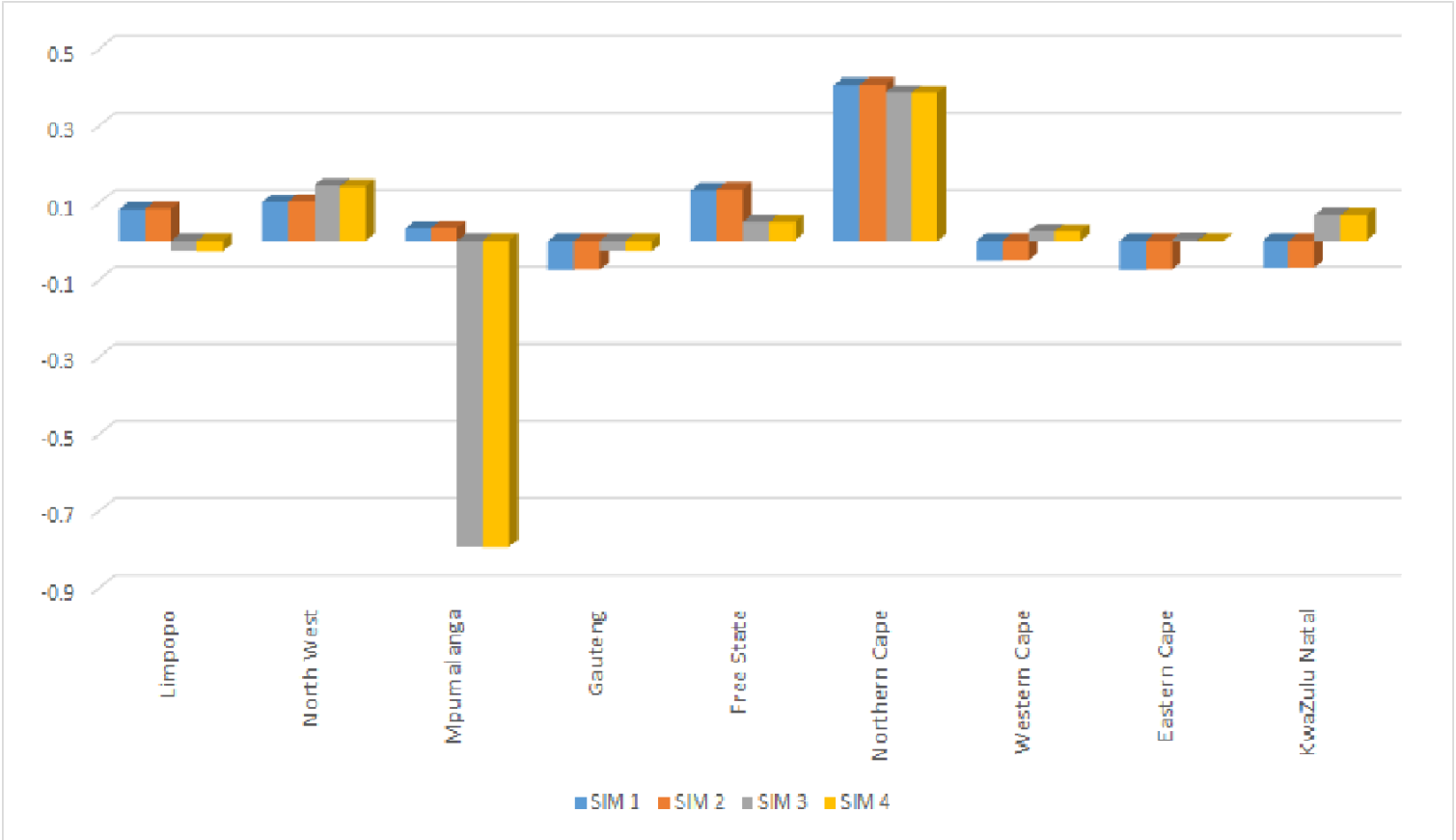
Assumptions for Scenarios

- Standard long-run policy closure in which a cost-neutral technological change is applied to the electricity industry so that it uses 40% less coal and 7.5% more of all other inputs to make one unit of electricity.
- This policy shock, which effectively alters the recipe of production for electricity, is common across all four simulation scenarios.The policy shock replaces coal mined in Mpumalanga (and to a lesser extent Limpopo) with new non-coal electricity generation in every other region.

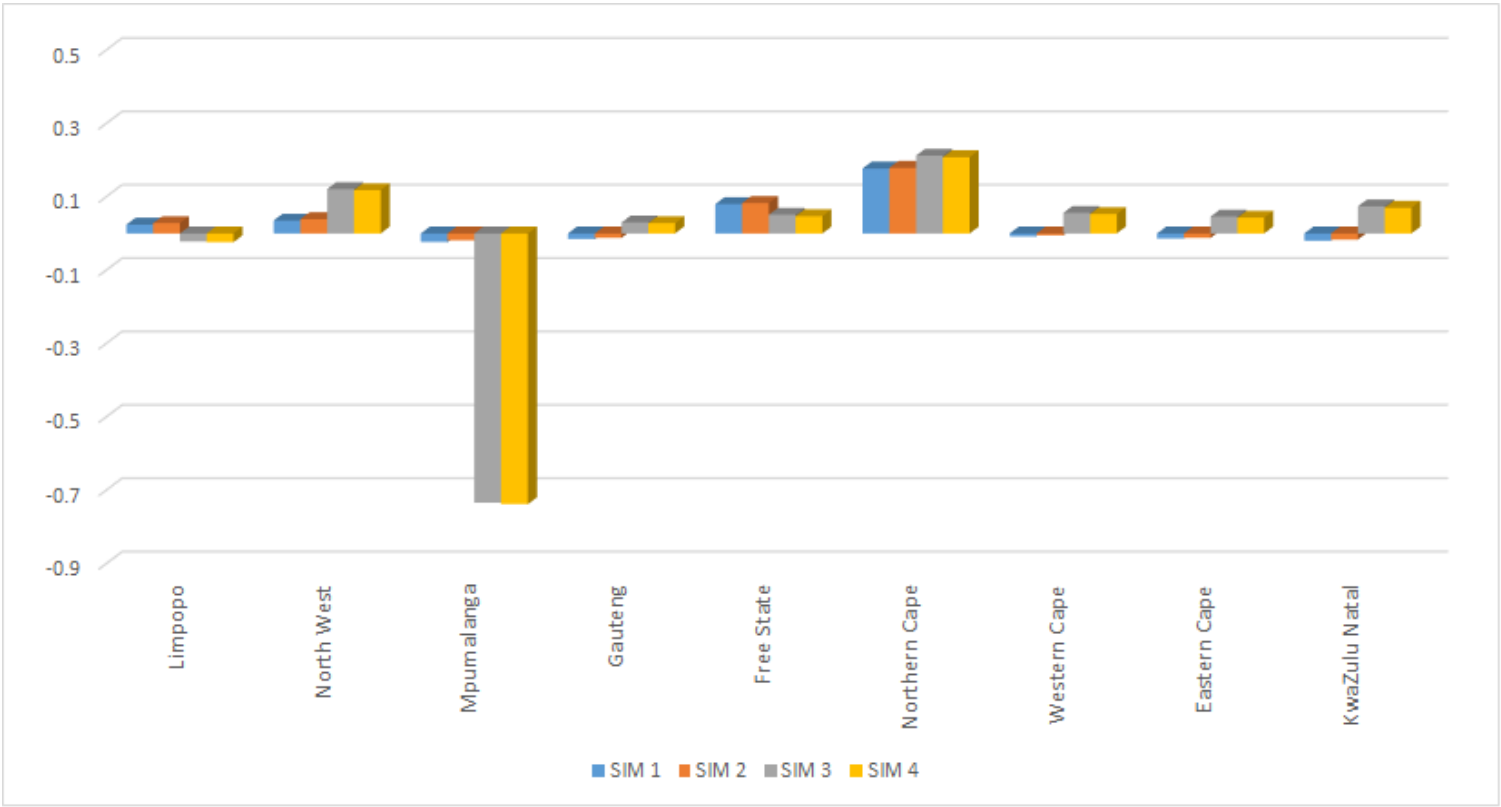
Assumptions for Scenarios(cont.)

1. SIM 1 or Baseline
2. SIM 2 same closure as in SIM 1 Supply of semi-skilled labor to endogenously adjust (with fixed real wages) to the shock to the input demand. This reflects the abundance of unemployed semi-skilled labor in South Africa.
3. SIM 3 replicates SIM 1, but with coal exports fixed at baseline levels.
4. SIM 4 replicates SIM 3 but with semi-skilled labor again allowed to adjust endogenously.

Provincial GDP Results



Provincial Employment Results



Conclusion and Discussion

- Our results suggest that the effect of the policy is sensitive to other economic and policy conditions, in particular export market conditions regarding coal.
- Under conditions in which surplus coal resulting from lower domestic demand cannot be readily exported, the economies of coal-producing regions in South Africa such as Mpumalanga are significantly affected.
- The subsequent migration of semi-skilled labor from Mpumalanga to other regions in South Africa demand careful planning by policymakers.
- Semi-skilled jobs in the coal industry are most vulnerable.

References

Bulavskaya, T., and F. Reynes. (2017). Job creation and economic impact of renewable energy in the Netherlands. Renewable Energy. In Press.

Cameron, I., and B. van der Zwaan. (2015). Employment factors for wind and solar energy technologies: a literature review. Renewable and Sustainable Energy Reviews 45: 160-172.

Consoli, D., G. Martin, A. Marzucchi, and F. Vona. (2016). Do green jobs differ from non-green jobs in terms of skills and human capital? Research Policy 45: 1046-1060.

Henriques, C. O., D. H. Coelho, and N. L. Cassidy. (2016). Employment impact assessment of renewable energy targets for electricity generation by 2020 - an IO LCA approach. Sustainable Cities Society 26: 519-530.

Lehr, U., J. Nitsch, M. Kratzat, C. Lutz, and D. Edler. (2008). Renewable energy and employment in Germany. Energy Policy 36 (1): 108-117.

Lesser, J. (2010). Renewable Energy and the fallacy of 'green' jobs. The Electricity Journal 23 (7): 45-53.

Porter, M. E., and C. van der Linde. (1995). Toward a new conception of the environment-competitiveness relationship. Journal of Economic Perspective 9: 97-118.

Sooriyaarachchi, T. M., I. Tsai, S. El Khatib, A. M. Farid, and T. Mezher. (2015). Job creation potentials and skill requirements in PV, CSP, wind, water-to-energy and energy efficiency value chains. Renewable and Sustainable Energy Reviews 52: 653-668.

Thank you!

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