Rethinking Economic Policy for South Africa in the Age of Covid-19:

Innovative policy responses for the post-lockdown Phase

Vehicle-to-Grid (V2G) energy-transport system

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A V2G energy-transport proposal for phase 3 of President Ramaphosa's recovery plan

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Executive Summary

This NIHSS policy proposal addresses all three of President Ramaphosa's Covid-19 crisis targets for longer-term economic recovery process; namely, 1. an economic strategy to drive economic recovery; 2. continuous measures to stimulate demand and supply; and 3. a significant investment in new infrastructure. The policy aim – minibus vehicle electrification and battery storage known internationally as the Vehicle-to-Grid system (V2G) – targets a sector with clear growth, employment, and income-generation potentials. V2G not only promotes optimal charging times for eTransport – including battery-powered minibuses – but also provides for their off-take of electricity at periods of system-wide or local peak demand. When optimally implemented, it would make transport more affordable, cleaner, more streamlined, extensive, and safer; generating tens of thousands of permanent, direct and indirect transport and renewable-energy related jobs; improving air quality and reducing congestion and traffic-related accidents and deaths; and providing a source of decentralised energy storage for offtake of surplus renewable energy generation, which in turn would stimulate investment in small-scale RE generation, stabilise the grid through the provision of decentralised, vehicle-based storage, and thereby lowering average retail electricity prices.

Adequate implementation requires that network augmentation costs are addressed along with flexible charging infrastructure. After the V2G policy concept and its potential benefits are elaborated in section 1, section 2 details the economic case for V2G policy, using SATIMGE modelling, which iteratively integrates energy utilization (and associated CO2 emissions) in with dynamic assessments of demand, price and technology mix, for the period of 2020 to 2040. This also allows for comparison of different scenarios: in addition to the reference V2G case including charging infrastructure, and capex for network connection, these also include scenarios with either no transport demand profile, or no charging infrastructure, or neither additional factor.

From the exclusive perspective of maximizing generation capacity (and thus, over time, maximizing the proportion of RE generation capacity), the modelling finds that the most preferable scenario would be V2G without controlled charging stipulations, followed by neither V2G nor controlled charging stipulations for private vehicles, then no provision of additional charging infrastructure, then minibus V2G, with business-as-usual being the least preferable. However, this perspective excludes consideration of several additional variables, as elaborated upon in the conclusion, including: saved imported fuel, refining, and peaking-power costs; saved health, congestion, and traffic death costs; employment multipliers from vehicle conversion and RE construction; and stimulated rural development from extended MBT route provision.