

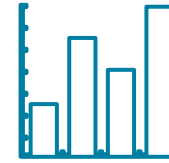
Outlook and Opportunities in New Energy Vehicles

January 2024





93% correlation between GDP growth and New PV growth



EV ~ 55%
Hybrid ~ 39%
ICE PV ~ 4.7%



Lack of low-priced NEV alternatives

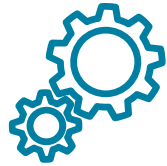


Low base for EV and plug-in hybrid

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Plug-in-Hybrid	121	89	72	77	51	122	215	282	369	483	633	829
Hybrid	182	55	181	155	627	4,050	5,555	9,999	15,998	22,397	29,117	34,940
EV	68	58	154	92	218	502	900	1,350	2,093	3,348	5,524	9,391
NEV TOTAL	371	202	407	324	896	4,674	6,670	11,630	18,460	26,229	35,274	45,160
ICE Passenger New	368,114	365,247	355,397	246,541	304,340	363,692	347,695	360,860	370,421	378,207	384,530	391,436
ICE LCV New	163,317	159,525	153,221	110,912	304,340	135,712	151,499	178,081	180,511	182,941	185,371	187,801
ICE MHV New	26,273	27,455	28,012	22,754	27,075	30,152	32,904	31,282	32,152	33,021	33,891	34,761
NEW TOTAL	557,704	552,227	536,630	380,207	635,755	529,556	532,098	581,853	601,543	620,397	639,066	659,157
NEV % of New Passenger	0.10%	0.06%	0.11%	0.13%	0.29%	1.29%	1.92%	3.22%	4.98%	6.94%	9.17%	11.54%



Geo-political instability and supply chain disruption increase SSA potential



Increased beneficiation necessary

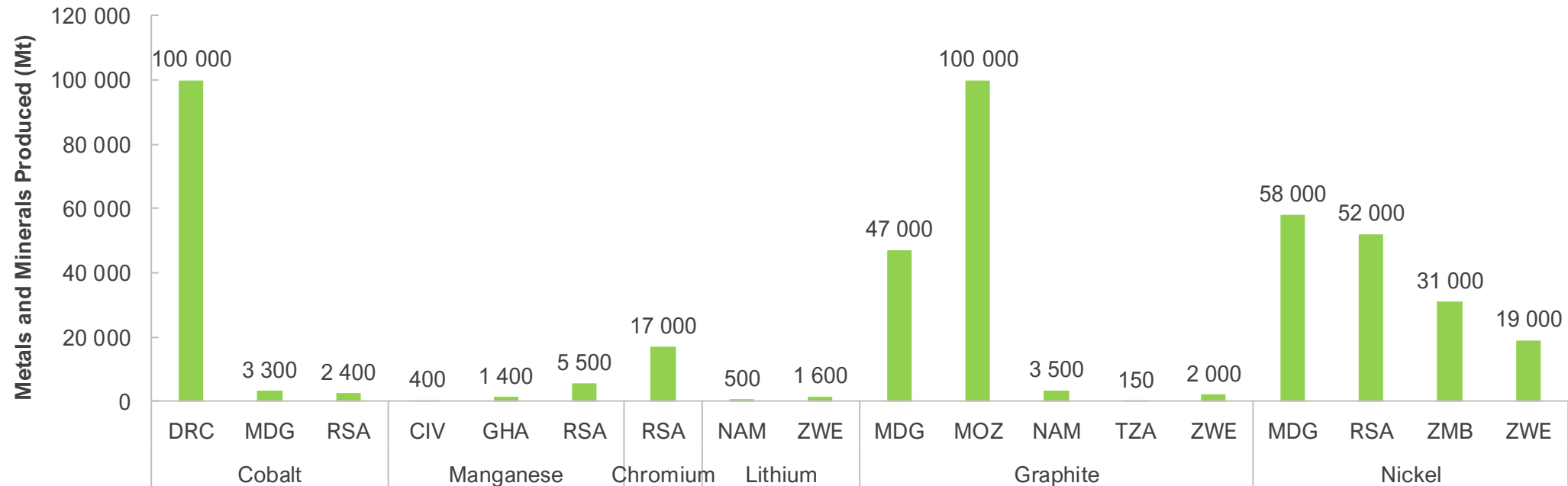


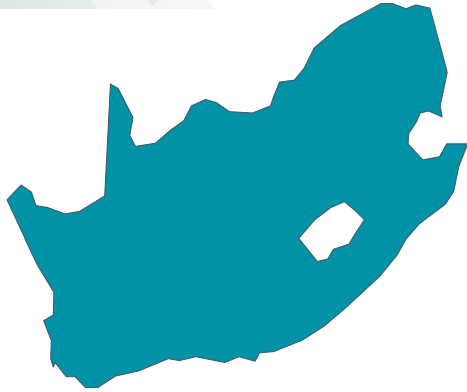
Assembly vs. production of battery technology in SA



Beneficiation of battery-grade minerals can be SA's key competitive advantage – regional hub

Metals and Minerals produced, SSA





46%

The domestic electricity mix by **2030** is set to be comprised of at least 46% **low-carbon energy sources**, as outlined by the Integrated Resource Plan (**IRP 2019**)

The country boasts an immense **renewable energy potential** (solar PV/CSP and wind), supporting the opportunity for **green hydrogen production** through electrolysis

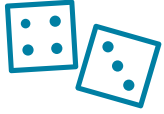
South Africa is home to 75% of the **global PGM resources** including 70% and 85% of the global **platinum** and **iridium** resources, respectively

75%



South Africa could become a **key exporter of green hydrogen** to countries with a renewable energy deficit as the country's **existing natural gas** and **coal infrastructure** can be leveraged creating an industry worth **± \$100-billion**

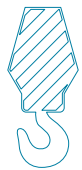
Source: Frost & Sullivan, SAWEA, PWC, Engineering News



Where do we place our bets?



Japan's hydrogen strategy plans to generate just over USD 100 billion in the next 15 years and turn it into a hydrogen economy



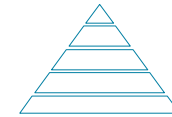
Toyota investing heavily in H2 in Japan and Europe – next-gen fuel cell technology to be released in 2026



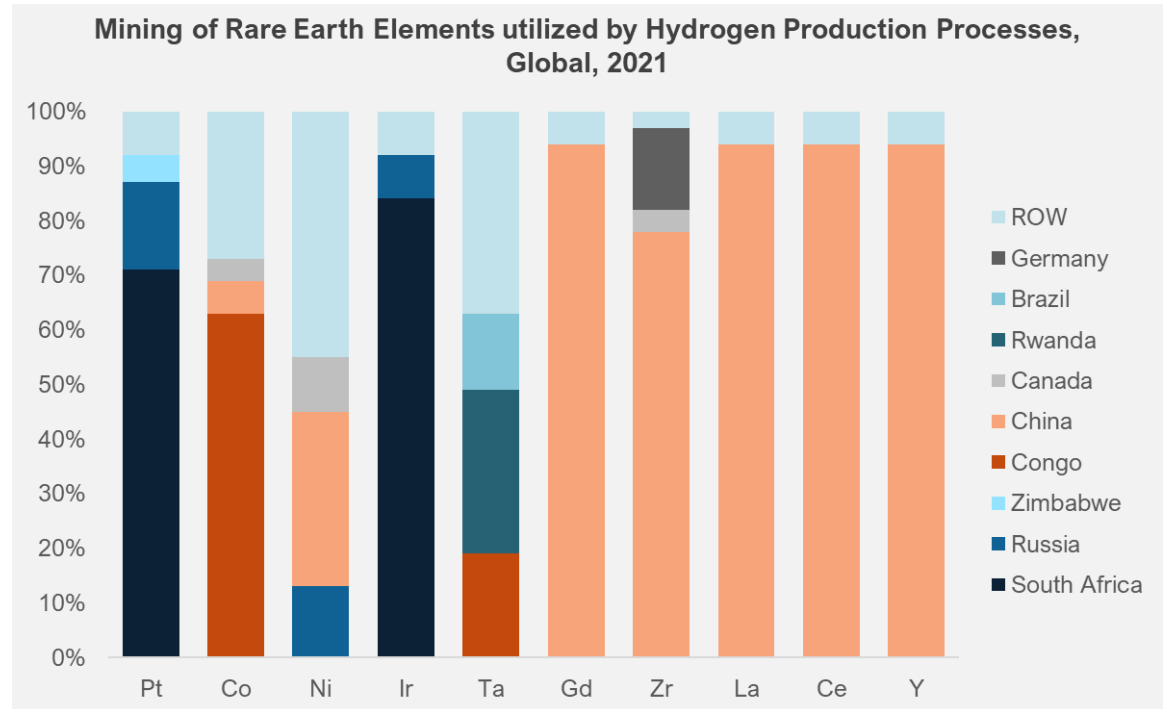
Japan – 800,000 H2 vehicles by 2030
China – 1m H2 vehicles by 2035



Climate change will place EV batteries and grids at risk



Loss of efficiency from source in electricity generation - BEVs 3 times more efficient





Subsidies are essential for NEV uptake – SA needs a strategy and policy



Fleet use and partnership with lower-cost NEV will be a key driver



News is good for SA as both BEV and FCEV will require minerals from SSA



Hybrid vehicles in the mid-range to dominate



EV to remain premium brand/models



Business models for infrastructure need to take into account sustainability and security



Will definitely see threat from North Africa value chains for EU market – nearshoring and supply chain disruption – but could we turn this into an opportunity?



Global South to become more self-sufficient and circumvent global disruption



South Africa in prime position for recycling or second-life applications through SEZ bonded manufacturing opportunities