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Reducing landscape restoration costs: Feasibility of generating electricity from invasive alien plant biomass on the Agulhas Plain, South Africa

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ABSTRACT:

South Africa has embarked on a large-scale government programme to control invasive alien plants (IAPs). However, to date, very little cost recovery has occurred through the development of value adding industries and the sale of various wood products and bioenergy. Using the Agulhas Plain as a case study, we assess the feasibility of using IAP biomass in modular 250 kWe wood gasifiers to produce electricity with biochar as a co-product. There is sufficient IAP biomass available over a 15 year time-frame for the installation of 2.6 MWe electricity generation capacity, and the financial feasibility is attractive (net present value US$1.35 million for wood gasifiers, compared to -US$2.1 million for diesel-fuelled generators). However, the feasibility of the value added industry depends on sharing the cost for IAP biomass supply between the bioenergy entrepreneur (US$11.01/green tonne) and government (US$17.56/green tonne). A cost-sharing business model and public-private partnerships will be needed to develop value adding industries, control IAPs and reduce the costs of landscape restoration. These value adding industries will also deliver various other socio-economic benefits; including: increasing water availability, reducing carbon emissions, providing jobs, developing skills, stimulating rural development, and helping to steer South Africa towards a more sustainable development path.