



RECOMMENDATIONS

- South Africa needs to develop a biofuel strategy that balances rural development and long-term energy requirements. This strategy should be clearly articulated and open for public debate.
- Targeted co-operation and knowledge sharing needs to be encouraged more strongly in India–Brazil–South Africa (IBSA) and can be inspired by bilateral agreements already in place. This should include capacity-building and collaborative research and development on second-generation biofuel.
- Specific incentives to draw Brazilian biofuel investments to South Africa (and Africa) should be created through IBSA. This could include credit provisions from the Brazilian Economic and Social Development Bank, the Industrial Development Corporation and the Development Bank of Southern Africa.
- IBSA can gain by developing a joint position on biofuels. This should contribute to a broader, more beneficial, joint position on climate change at a global level.
- Biofuel production should be an important consideration in the land reform debate in South Africa.

Biofuel Technology Transfer in IBSA: Lessons for South Africa and Brazil

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EXECUTIVE SUMMARY

The success of biofuel production in Brazil (bioethanol in particular) is recognised as a tangible point of collaboration in the India–Brazil–South Africa (IBSA) Forum. Sharing knowledge and systematic technology transfer on biofuels can strengthen co-operation among IBSA countries. But opportunities and pitfalls need to be assessed more rigorously to establish a feasible strategy for collaboration and development co-operation in Africa.

Priorities and interests differ between countries, and these tend to influence perceptions about biofuel. Historical differences on biofuel and energy between Brazil and South Africa raise a number of questions about effective technology transfer.

While biofuels may be a long-term energy solution for South Africa, and a way forward against climate change, gains from co-operation will depend on the country's capacity to elucidate its own strategy, define priorities and develop institutions and policies equipped to manage biofuel development. Concerns about food security, social development and land reform tend to cross-cut the debate on energy and climate change at present.

BACKGROUND

Technical co-operation has always featured prominently on the IBSA agenda. Biofuels were identified as a clear area of collaboration and a cross-cutting issue that transcends a number of active IBSA working groups — notably in the fields of energy and climate change. The common interest was formalised through a Memorandum of Understanding on Biofuels in September 2006.

Global trends were a compelling factor behind this move. Global consumption of biofuels is expected to grow on average 6.3% a year until 2030.² Production is being supported by national policies worldwide as a means to boost rural development, diversify energy sources, reduce oil dependency and fight climate change.

Brazil aims to play a pivotal role in consolidating biofuels in international markets while exporting technology to potential ethanol-producing African countries on a local level in an effort to spread the basket of producers.

Its traditional Lusophone connection, which has resulted in financial and technical assistance for biofuel production in Angola and Mozambique,³ will be extended to other African countries. Africa sees Brazil as a benchmark for ethanol production and in 2008 a trans-Atlantic task-force was established to co-ordinate activities between Brazil and the Southern African Development Community (SADC).

In addition, the last EU–Brazil summit on 6 October 2009 stressed a commitment to develop a trilateral partnership with the African Union to promote sustainable bio-energy in Africa.

PROMOTING TECHNOLOGY TRANSFER

The potential of bioethanol development in South Africa and Africa using technology and expertise from Brazil provides a real South–South opportunity for co-operation. But the African experience is different from that of Brazil.

Sugar production has been a central pillar of the Brazilian economy since the 16th century. Research on bioethanol began in the early 1900s and gained momentum during the oil crisis of the 1970s. The Brazilian national alcohol programme (Proálcool) was launched in 1975 in an effort to shed dependency on oil and helped position the country as a global leader in bioethanol production today.

Ongoing research and development (R&D) and improved technology have reduced production costs. Most mills generate their own energy requirements through burning process waste: straw and the so-called cane ‘bagasse’. Gasoline is now blended with up to 25% ethanol, and flex-fuel engines — which accept any combination of gasoline, ethanol or diesel — have created a thriving domestic market for bioethanol in the all-important transportation sector. The establishment of this infrastructure in Africa would require enormous amounts of

investment and political commitment.

South Africa, unlike Brazil is a relatively small cane grower with no tradition of bioethanol production. There is a concern in government about the potential incompatibility of rural development goals with energy policy objectives and thus current biofuel strategies lack coherence.

A comprehensive analysis assessing the delicate balance of policy priorities and sustainable development options should help inform a strategy of biofuel technology transfer between Brazil, South Africa and Africa in general.

BIOFUELS AND FOOD SECURITY

Food security is the strongest counter-argument to biofuel development in Africa. Simply, first generation biofuels rely on food stocks used for humans. Basic economics tells us that an increase in demand for biofuels will raise commodity and food prices and will in turn require larger areas of fertile land to be devoted to fuel crops instead of food crops.

However, biofuels are not the only source of food price increases. There are other factors like oil price increases and surging purchasing power in large emerging economies.⁴ Given the political sensitivities in South Africa around food price hikes in the context of high unemployment, biofuel strategies are considered with the utmost caution to avoid any perceived undermining of food security.

Innovative approaches from Brazil do help counter this argument. Agricultural and industrial productivity around sugar cane in Brazil grew three fold since the launch of Proálcool. Over the last three decades, ethanol production increased from 2 000 litres a hectare to 6 000 litres and 46 litres a ton to 77 litres.⁵

Food security considerations have also shifted preference to second-generation biofuels. These are produced from virtually any cellulosic biomass like grass or agricultural waste processed through hydrolysis and gasification. Second generation biofuels — being a technology of the future — should be an important component of South African strategy.

Unfortunately their commercial viability is

not yet fully developed. Collaboration within IBSA on R&D is essential to reduce research costs and reinforce links that will enable innovation to spread.

TACKLING CLIMATE CHANGE

CO₂ emissions from developing countries are expected to climb substantially between 2004 and 2030.⁶ Transport will become the second-largest contributor, accounting for 20% of total emissions. Only power generation will emit more. Both power and transport are significant emitters in South Africa.

Since biofuel is a substitute for petrol and diesel, bioethanol vehicle fuel could significantly reduce South Africa's carbon footprint. Under similar circumstances, Brazil reduced its CO₂ emissions through gasoline substitution by close to 53 million tons in 2008/09 — equivalent to Switzerland's entire emission in 2005.⁷

Policy co-ordination on consumption behaviour is essential in any biofuel strategy. This is never easy. In the early years Brazil's bioethanol production suffered when subsidies were eliminated and oil prices dropped. But bioethanol fuelled cars and mandatory blend targets with gasoline — part of Proálcool — helped boost demand. More recently, the introduction of flex-fuelled engines provided another important boost early in the new millennium. Brazil is now firmly on the path to bioethanol consumption across the board. By 2008, flex-fuelled cars made up 75% of all light vehicles sold.⁸

A recent agreement between South Africa's Industrial Development Corporation and the Brazilian Economic and Social Development Bank (BNDES)⁹ has put in place technology transfer on alternative-fuelled vehicles in South Africa. IBSA could certainly be used to promote such approaches that would then stretch further to include India and perhaps other developing countries down the line.

BIOFUEL AND SOCIAL DEVELOPMENT

A strong argument for biofuel production is that it provides rural producers with an additional

source of income and security.

In Brazil, the ethanol industry creates direct employment for roughly one million people as well as four million indirect jobs, mostly in the agricultural sector. Seasonal labour is therefore a reality, although less so than in other crops like soybeans. Bioethanol is also more labour-intensive than comparable industries.¹⁰

Since economically feasible biofuel production requires larger scale agro-industry, it would require strengthening the farming sector in South Africa. This means greater co-ordination of smaller farm units through support services, clustering and infrastructure development.

Brazil's biodiesel programme may be instructive. Selo Combustível Social, or Social Fuel Label, allows producers to promote social responsibility and enjoy government financial incentives if they provide technical assistance and purchase crops from smallholders at pre-determined prices. This is instructive for the South African government, which could provide similar support and incentives to help facilitate production.¹¹

Land reform and socio-environmental issues are crucial components of the biofuel debate in South Africa. Feasibility studies and feedback from initiatives already undertaken should inform decision-making on this complex issue.¹² These should also be considered at the IBSA level to avoid duplication.

BIOFUEL INVESTMENT

Private investors fund 97% of renewable energy projects worldwide.¹³ In Brazil, the private sector has always been a main supporter and biofuel is today among the most attractive investment sectors.¹⁴

In South Africa studies indicate that there is no single private venture behind renewable energy projects.¹⁵ Technology from Brazil is unlikely to include investment.¹⁶ IBSA is therefore important in helping to build capacity in the bioethanol agro-industry as a way of overcoming initial investment constraints by piggy-backing on existing technology development from Brazil and thus lowering start-up costs.

South Africa needs a competitive investment

environment to lure potential biofuel investors. Policy co-ordination is imperative. Resolving land tenure issues, for instance, is crucial for long-term investment in the agricultural sector, and ultimately in biofuels.

CONCLUSION

Technology transfer in IBSA can help develop bioethanol production in South Africa. Despite divergent trajectories and historical experiences, there is substantial scope for knowledge sharing and technology transfer from Brazil to South Africa. Such transfers extend beyond technical assistance. They include instructive lessons arising from know-how, capacity-building and social-technology — or linking development priorities to biofuel production.

For South Africa, balancing policy constraints — from social and rural development to land reform, energy and climate change — against the objectives of a biofuel strategy remains the most complicated part. Biofuels are not a silver bullet solution for an integrated sustainable development policy. There will be trade-offs. Ultimately this is an ongoing process that requires astute policy co-ordination underpinned by a strong commitment to development co-operation between Brazil, South Africa, India and countries in Africa, with a progressive outlook for the future.

ENDNOTES

- 1 Dr Lyal White is a research associate and Tatiana Cyro Costa a visiting intern at the South African Institute of International Affairs (SAIIA).
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