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Insights for enabling greater finance and investment for bioenergy solutions

Policy reforms and market signals have played a critical role in enabling clean energy development in Colombia, such as recent solar and wind additions. Unlocking opportunities for bioenergy requires building upon this progress to target regulatory measures and market incentives that enable finance and investment in these solutions. The government of Colombia can take a number of actions such as establishing clear targets and capacity additions, improving co-ordination across relevant authorities, strengthening guidance and regulations on waste disposal, and ensuring access to the grid for distributed energy solutions. The government can also work with partners to improve awareness and familiarity with bioenergy technologies, whilst also supporting targeted financial schemes to encourage affordable finance and de-risk investment in those projects.

Colombia has made remarkable progress over the last decade in developing the overall policy environment and market framework for clean energy development. The government's recent Nationally Determined Contribution (NDC) update, alongside a number of important high-level policy signals like the Green Growth, Circular Economy and Bioeconomy strategies, have all emphasised the country's commitment to reducing its greenhouse gas emissions and achieving its Sustainable Development Goals. Further reforms, such as on-going capital market improvements and the emerging sustainable finance framework through the forthcoming taxonomy, are also critical measures signalling the government's intent to achieve these high-level sustainability ambitions.

Still, enabling the clean energy transition through opportunities like bioenergy development requires additional policy signals, regulatory reforms and market incentives to create the enabling environment for investment in these solutions. Colombia is fortunate to have considerable clean energy resources, from outstanding solar and wind capacities to untapped agricultural, industrial and municipal waste streams that can be used to produce multiple forms of bioenergy, whether these be biofuels for transport, biogas for industry or biodigestion for clean electricity and heat production. These bioenergy opportunities can play a critical role in addressing growing reliance on fossil fuel imports, not only tapping into domestically available renewable energy resources but also increasing security of supply through local energy sources, for instance for small-scale electricity generation in areas not connected to the national grid.

Recent developments such as the 2019 renewable energy auctions have drawn interest from both national and international developers and investors, signalling the significant opportunity to achieve clean energy ambitions with private sector participation. However, opening the door for scaled-up private capital for finance and investment of clean energy development requires additional targeted measures that ensure a robust pipeline of bankable projects. This includes clear reflection of NDCs and sustainable development ambitions in national energy policy, notably signalling the expected role of clean energy, including bioenergy vectors, with respect to fossil fuel use in the country's short-, medium- and long-term development strategies. Critically, this will create the policy environment for project developers, businesses and investors to formulate their own strategic plans on actions forward.

Policy signals can also more clearly address the expected roles and opportunities for bioenergy projects including how they link to the achievement of multiple national ambitions, ranging from secure, reliable and affordable energy to better waste management, improved productivity and enhanced bioecology. Lessons extracted from experiences with bioenergy technology use and growth in the sugarcane and palm oil industries can help to design the appropriate policy tools, regulatory measures, market incentives and financial support to drive uptake of these technologies in other applications.

This includes opportunities for bioenergy use for electricity generation, which in addition to providing more secure and reliable local clean energy capacity, for instance in non-interconnected zones (zonas no interconectadas ZNI), can also help to phase-down fossil fuel use in power generation, address the increasing impact of climate effects on the country's formidable hydroelectricity capacity and help to close the gap to meet the National governments' ambition to have 100% energy access by 2030. Bioenergy capacity also can support further deployment of variable renewable electricity sources such as solar and wind, playing an important role across the wholesale, firm (reliability) and spot markets.

Yet, these values need to be more clearly reflected in energy market policy, regulations and electricity market design. Specifically, Planning Unit of the Ministry of Mines and Energy (Unidad de Planeación Minero Energética, UPME) electricity generation plans do not sufficiently reflect the strategic value of bioenergy solutions given the heavy reliance on the current pipeline of planned capacity additions, which effectively benefits incumbent technologies over new and emerging ones. Rules around electricity market access (e.g. for off-site power purchase agreements with unregulated customers) and the consequences of a considerably integrated market, compelling high dependence on retailer willingness to connect distributed generation projects, also make for critical barriers to bioenergy electricity capacity additions.

Renewable energy portfolio standards, without retailer benefit to work with self-generators, cogenerators and unregulated consumers, likewise limit opportunities for bioenergy projects.

The regulatory environment for waste management, which does not sufficiently encourage sorting, treatment, recycling, re-use and recovery of waste, further compounds the challenges for bioenergy development. While Colombia has a strong framework for waste collection and disposal, landfill fees are quite low and despite calls to reduce waste streams, there is no legally binding framework to encourage development of alternatives to disposal. The number of actors, authorities and regulations touching on waste-to-energy opportunities also make it challenging to navigate development of such applications.

Access to finance is another key barrier to bioenergy projects. While green finance flows may be improving, including notably for large, utility-scale renewable energy development, the cost of finance for bioenergy and other less established clean energy technologies is still typically high, limiting the overall pipeline of these projects. Limited experience with bioenergy technologies, unfamiliarity with their application and the creditworthiness (or lack of credit history) of smaller borrowers increase the overall perceptions of risk to investors. Even more established applications, such as sugar-cane bioenergy co-generation, often rely on existing corporate credit lines, which can add to the cost of finance for capacity additions.

To address these issues, the government of Colombia can take a number of actions to improve the overall conditions for bioenergy finance and investment. These include:

- Establishing clear targets for bioenergy and other clean energy capacity additions within UPME's Reference Electricity Expansion Plans, reflecting national policy priorities for the country's energy transition and the techno-economic potential of these technologies to meet Colombia's strategic policy ambitions.
- Improving institutional co-ordination across the relevant authorities and related policies that influence opportunities to develop bioenergy capacity. Such co-ordination could be led by the National Planning Department (Departamento Nacional de Planeación), or the government could consider the creation of a specific task force of co-ordinating body to manage inter-sectoral public and economic policy touching on bioenergy development, like the Inter-institutional Bioenergy Table in Ecuador.
- Strengthening opportunities for waste-to-energy projects through clear policy guidance and strengthened market signals such as increased gate fees for landfills and more stringent extended producer responsibility measures, including possible mandatory end-of-life requirements for manufacturers and industry. The Ministry of Environment and Sustainable Development (Ministerio de Ambiente y Desarrollo Sostenible) and Ministry of Mines and Energy (Ministerio de Minas y Energía, MME), in co-operation with other authorities such as the Ministry of Housing, City and Territory, can also provide support for innovative business models to sort, treat and recover waste, including for energy production.
- Ensuring fair and non-discriminatory access to the grid, reviewing current market practices to address barriers under 2018 reforms that still limit development of bioenergy opportunities, for instance through bilateral contracts for corporate sourcing of renewables. As part of this review, the Energy and Gas Regulation Commission (Comisión de Regulación de Energía y Gas, CREG) can provide clearer guidance and eventual regulatory measures to enable better power wheeling arrangements to facilitate businesses (whether unregulated or regulated customers) that would seek procurement of off-site bioelectricity production.
- Working with domestic stakeholders like the National Centre for Cleaner Production and Environmental Technology (Centro Nacional de Producción Más Limpia y Tecnologías Ambientales) to build awareness and capacity for bioenergy development. This includes engaging industry familiar with market needs and opportunities for bioenergy projects, as has been the case with the sugar association, Asocaña. Similar industry groups, like the National Fund for Pork

Producers, ProColombia, can help sector actors to navigate regulations and the project approval and permitting processes, whilst helping to identify ways to streamline procedures to reduce administrative costs and timelines for biogas development.

- Assessing opportunities to implement targeted financial schemes to increase flows of capital to bioenergy projects, including development of tools such as guarantees, green credit facilities and concessional lending that enable more attractive finance and diminish perceived risks for investors. These support mechanisms and transaction enablers can be designed within existing funds and facilities, such as Findeter and FENOGE, and/or in partnership with international funds or climate finance (e.g. through blended finance) to maximise use of public funds in a way that catalyses private investment in bioenergy development.
- Pursuing continued capital market reforms with further policy and regulatory actions such as standardisation of project documentation to help diversify financial products and develop market instruments such as green bonds that can attract capital for clean energy projects at the necessary scales. This includes co-operation across relevant authorities such as MME and the Ministry of Finance and Public Credit to carry out training and capacity building that familiarises market actors with the institutional and operational aspects of bioenergy and other clean energy projects.

In addition, MME can work with key partners like UPME to improve information on the business case and market opportunities for bioenergy development. This could include developing a bioenergy project or mapping database, similar to the Australian Renewable Energy Mapping Infrastructure¹ and Indonesia Geoportal One Map² to provide data and information on bioenergy resource potential with respect to existing and planned transmission and distribution capacity. This could include other dynamic information, such as electricity demand profiles and local electricity and energy prices, and could be tied to investment promotion under the ProColombia portal.

Given that bioenergy technologies can struggle to compete with the falling cost of solar and wind projects, MME and CREG can also consider targeted measures to support bioenergy market development over the next decade, in line with the technical potential and policy priorities highlighted in the Green Growth, Circular Economy and Bioeconomy strategies. Such measures can include targeted procurement of bioenergy capacity additions outside future renewable energy auctions as well as designing features within the auctions to support participation of bioenergy solutions. This could be through tailored support such as government guarantees of certain types of bioenergy projects to address barriers to participation, like the required performance bonds and start-up guarantees. Future auction design could also include pricing that incorporates elements like a locational component, which has been used in Mexico to help select projects over other less expensive ones if they had more value for the system.

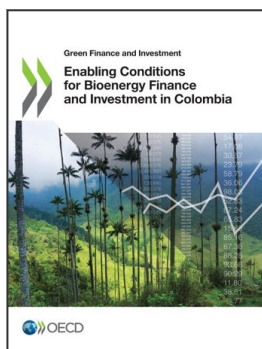
Other targeted support, such as design of possible public-private partnership (PPP) models for bioenergy projects, will likewise encourage greater input of private capital for bioenergy technology development, whilst carrying public resources further. These PPP structures could initially target bioenergy technologies that have a wide potential across the economy or be designed strategically to attract capital to bioenergy projects of strategic interest, for instance in ZNI.

Lastly, public support can target new bioenergy applications, technologies and business models through clean energy incubators and other innovation support schemes. These can help develop bioenergy solutions and market models fit for the Colombian context, whilst enabling greater national expertise in bioenergy capacity development and increasing productivity across important economic sectors like industry and agriculture.

Notes

¹ For more information, see: <https://arena.gov.au/projects/aremi-project/>.

² For more information, see: <https://geoportal.esdm.go.id/monaresia/home/>.



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