Renewable Energy in the Paper and Pulp industry

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The renewable energy sector has evolved in South Africa over the past years through the midst of continuous policy development. This policy drive began through the South African constitution in 1997, which saw the white paper on Energy policy being developed. The continued growth of renewable energy implementation in the country is affected by policy and funding constraints. Extensive research and development funding is needed to assist organisations like the South African National Energy Development Institute (SANEDI) that strives to bridge a gap in the renewable energy research and development sector in South Africa.

SANEDI was established under the National Energy Act (No.34 of 2008), as a Schedule 3A state owned entity and as a successor to the former South African National Energy Research Institute (SANERI) and the National Energy Efficiency Agency (NEEA). It primarily serves to direct, monitor and conduct energy research and technology development and implement energy efficiency measures across six portfolios, namely: Cleaner Fossil Fuels, Energy Efficiency, Cleaner Mobility, Renewables, Smart Grids and Working for Energy.

SANEDI plays a catalytic role in the energy efficiency field, through continued dialogue with both the public and private sector to find new, innovative and cost-effective solutions for the accelerated uptake of energy efficiency in the country. This is the primary function of the SANEDI energy efficiency programme, a national flagship programme for South Africa. This programme implements the 12L and 12I tax incentives for business as well as informing legislation and incentives to government, more on this can be found at www.sanedi.org.za/energy-efficiency-portfolio/.

The Renewables portfolio supports government goals of energy supply security through identifying viable and sustainable diversified renewable energy supply options. It strives to stimulate socio-economic upliftment through improved access to modern, clean and affordable energy services and to support economic growth – accelerating applied research projects getting to market, ultimately resulting in commercial rollout. This portfolio is also the key point for local and international partnerships to leverage funding, research facilities and share knowledge to accelerate technology development and innovation across thematic areas.

Within this programme, is the Renewable Energy Centre Of Research and Development (RECORD) that has created various renewable energy technology platforms as part of its coordinating role and towards knowledge sharing, these include the Algal Bioenergy Research Platform, the Solar Water Heating Research platform, the Waste to Energy Research platform and others.

These platforms are designed to bring together stakeholders across the respective sectors in a coordinated manner so as to drive research, development and innovation towards strategic goals that best serve South Africa. The Waste to Energy platform focuses on feedstock, technology and product in the waste to energy processes.

RECORD (www.record.org.za) engages routinely with a wide range of stakeholders across the academic, industry, governmental, private and international sectors. It uses these networks and platforms to facilitate knowledge transfer and also to bring role players together that have mutual goals and interests. RECORD can drive, facilitate, coordinate and fund research that is of value in the industry sector, to address specific questions that will inform industry as it sees fit towards a better economic outlook.

Essentially, RECORD strives to interact with industry in a manner that stimulates development and economic growth that benefits the country in terms of jobs, addressing climate change and to strive towards government's strategic goals that promote good economic growth. This can range from the form of desktop information and global best practice to actual demonstration of beneficial technologies.

Biomass is considered a sustainable source of renewable energy, not only because it harnesses energy from the sun, but also because it can re-grow over relatively short periods of time. The main sources currently used for heat and/or electricity generation in South Africa are fuelwood in the rural domestic sector, bagasse in the sugar industry, and forest, pulp and paper byproducts in the commercial forest product value chain.

However, most of South Africa's biomass consumption comes from fuelwood in households mainly in poorer and rural areas. Nonetheless there are other sources that contribute to the growth of biomass as a sustainable energy source, such as the forestry, pulp and paper industry.

Currently 40% of the country's pulp and paper mills make use of biomass-based renewable energy, making the industry a key role player not only in power generation but also in contributing towards sustainable environmental management.

There are three main sources of biomass waste produced by the forestry products industry, namely bark, black liquor and sludge (a byproduct of the paper recycling process).

BARK: Derived mainly from the slash (coarse and fine woody debris) after timber harvesting, the quantity of bark is roughly 9% of softwood pulpwood and 0.5% of hardwood pulpwood intake.

BLACK LIQUOR is a residue from the chemical pulping process. This liquor is concentrated through evaporation and subsequently burnt in boilers to recover valuable process heat, the dominant renewable fuel source at this stage.

SLUDGE quantity and quality varies considerably and depends on mill configuration and type of paper produced. The amount of usable sludge for energy production processes also depends upon its moisture content.

The total pulp and paper industry biomass is about 5.78 million tonnes with an energy content of 10.17 terra-watt hours (TWh). About 90% of this is black liquor with an energy content of 9.03 TWh while the remainder consists of sludge and bark. Black liquor is only produced by the chemical pulping process and is usually burnt to recover chemicals.

Among various other biomass projects in South Africa is the Sappi Ngodwana Mill which successfully bid for a 25 MW Renewable Energy Biomass project in Mpumalanga; it will soon be signing a power purchase agreement for round four of the Department of Energy's Renewable Energy Independent Power Producers Procurement (REIPPP) programme.

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Here are some interesting statistics gathered from various sources on the REIPPP programme:

As of October 2015, 92 projects had been selected as part of the REIPPPP.

A cumulative R91.1 billion has been committed to various community development initiatives within the 50 km radii of each of the 92 projects under the REIPPPP.

Investment in renewables grew 20,500% in one year between 2011 and 2012 – the first year of the REIPPPP.

These projects have attracted R193 billion in private sector investment totaling a contribution of 6,327 MW of capacity to the national grid (of which approximately 2,000 MW is already online).

28% of this total comes from foreign investment – R53.2 billion. This equates to 85.8% of total direct foreign investment in South Africa last year!

Areas where SANEDI and the paper and pulp industry could engage further would include interventions and collaborations focusing on how the industry could reduce its carbon foot print. Implementing greener technologies such as renewable energy retrofitting, incorporating waste to energy concepts into existing processes, implementing energy efficient measures and exploring reduced greenhouse gas emission process engineering. ■

References

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