From the first solar-powered stadium in Latin America to “PV Business for everybody” under the Brazilian Net Metering regulation

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Solar energy and biogas plays today just a marginal role in Brazil’s energy supply. The almost endless Brazilian natural renewable solar and wind resources had no business case for small scale systems. The new Net Metering regulation of ANEEL has finally opened the doors to tap a vast potential for decentralized small scale electricity generators up to 1 MW. It is a big step for Brazil´s renewable energy sector and great opportunities for German technologies in the Brazilian market.

Brazil’s economy is continuously growing – as is its consumption-minded middle class. There has been a corresponding increase in demand for energy and a secure nationwide supply. Since the electricity supply crisis of 2001, the Brazilian Government has been attempting to diversify electricity production. However, despite high levels of global irradiation, photovoltaics (PV) have not yet been able to benefit from this energy policy.

Players within the energy sector are generally not very familiar with the technology: at the end of 2012, when net metering was introduced for small-scale electricity generators of up to 1 MWp running on renewable energies, only around 2 MWp of PV capacity was connected to the grid.

Within the solar energy sector, Germany offers a great wealth of experience, technological know-how and innovative ideas for different applications from which Brazil can benefit. The two countries therefore agreed that promoting renewable energy and energy efficiency should become focus areas for cooperation.

Latin America’s first solar-powered stadium – Pituaçu Solar

In June 2009, the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, acting on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ), organised the first ever study trip to Germany on the issue of solar energy and solar-powered stadiums. Since therewere no economic basis for PV projects in Brazil at that time due to unfavourable prevailing conditions, the idea of using the 2014 World Cup – and football in general – as a high-profile vehicle for PV pilot projects was born.

Ana Mascarenhas, head of the energy efficiency department at the private energy provider COELBA in Bahia, was impressed by the idea and, at the end of the study trip, announced that she would promote the construction of Latin America’s first solar-powered stadium in Salvador.

The Brazilian electricity sector regulatory body, ANEEL, agreed to finance this innovative project using funds from the national energy efficiency programme on the condition that the beneficiaries, namely Bahia’s State government, would participate with approximately a third of the 5.5 million Reais (approx. 2.3 million euros) investment costs. The GIZ supported COELBA in implementing the project throughout all its phases with a German-Brazilian team, whose work included:

- designing the project;
- preparation of the tender??? documents;
- assessment of the submitted technical bids
- inspections during the construction phase;
- power take-off of the PV systems;
- personnel training;
- dissemination of information about the project and its results in cooperation with the non-governmental organisation Instituto IDEAL.

On the 10th of April 2012, this technically ambitious project was inaugurated with PV systems being placed on the roofs of the spectator stands, dressing rooms, parking lots and utility buildings. The PV systems were installed by the German-Brazilian company Gehrlicher Ecoluz Solar and are the largest building-integrated systems in Latin America, with 400 kWp. Annually, this will produce approximately 600 MWh of solar energy, which constitutes about 20 per cent of the total grid-connected PV power generation.

Around EUR 60,000 was used to trigger an investment of approximately EUR 2.3 million. Every German taxpayers’ euro mobilised therefore around 40 euros of private funding from Brazilian parties as an investment in renewable energy.

The regulatory body ANEEL agreed for the first time in its historyto offset the electricity used each month by the
stadium and surrounding buildings against the electricity produced (net metering). The electricity is therefore automatically remunerated at the high user tariff (final rate) and does not have to be sold separately.

Figure 1: The final solar module is installed on the parking lot of ‘Pituaçu Solar’ (15.03.2012)

From pilot project to the introduction of net metering

Discussions held during the development of the project for the solar-powered stadium regarding a non-bureaucratic net metering system, supported the instigation of a regulatory process to introduce net metering for all small-scale electricity generators of up to 1 MWp running on renewable energies. This was passed by the regulatory body ANEEL on the 17th of April 2012. By mid-December 2012, following a 240-days period for adapting to the specificities of the new regulations, it became possible to connect small-scale systems to the low and medium-voltage grid. This is a paradigm shift in Brazil’s heavily centralised electricity sector.

As part of the German-Brazilian Cooperation for Sustainable Development (ZNE), GIZ supported the regulatory body ANEEL throughout the introduction of net metering by commenting on the draft regulations and providing extensive transfer of specialised international know-how. Within this context, emphasis should be placed on the studies and consultancy work performed by Prof. Ingo Stadler from Cologne University of Applied Sciences regarding transfer of technical standards for decentralised feeding of power into the grid system, the study conducted by Becker Büttner Held on administrative processes related to grid-connectivity of small-scale electricity generators and the inputs by Klaus Preiser (Badenova) aimed at providing information to the Brazilian energy suppliers on grid-connected photovoltaics. These efforts helped to considerably reduce bureaucracy within the draft regulations of ANEEL and to defuse resistance by the energy suppliers.

The steps towards connecting a PV system under the Brazilian net metering framework are described below.

Proceeding step-by-step to individual photovoltaic generators in Brazil

1. Pre-dimensioning the individual PV systems taking into account the actual level of electricity usage. When dimensioning the system, attention must be paid to ensuring that electricity production does not exceed electricity usage within a three-year timeframe, because then it would no longer be possible to offset the surplus electricity production against consumption within the context of net metering. There is, however, a possibility of considering the surplus electricity production when calculating the electricity usage of other consumption units (e.g. holiday homes).

2. Contracting a qualified company to plan, install and finalise the connection of the photovoltaic system to the grid in compliance with Regulation Nr. 482 of the 17th of April 2012 from the Brazilian national energy agency – ANEEL, as well as the applicable Brazilian technical standards issued by ABNT.

The contracted company should take the following steps:

3. Download the list of documents that need to be submitted to the respective network operator, including the technical standards, as well as the technical procedures that need to be followed during the project development.

4. Application to connect to the grid using the documents listed under Step 3 and the project documentation for installing the connection.

5. The network operator is required to issue the connection certificate to the applicant within 30 days of receipt.

6. Implementation of any adjustments to the planning process that may be required. These should be carried out within 60 days of receiving the connection certificate.

7. Installation of the photovoltaic system.

8. Application for an inspection by the network operator to approve the grid connection. The network operator is required to carry out the inspection within 30 days of receiving the formal application.

9. Installation by the network operator of a system capable of monitoring net metering. The installation should be carried out within the 30-day inspection deadline.

10. Inspection by the network operator.

11. Issuing of inspection report by the network operator within 15 days.

12. Signing of the operating agreement ‘Relacionamento Operacional’ by the applicant and the network operator. This should take place within 90 days of issuing the connection certificate, and therefore takes place alongside the previously described Steps 6-12.

13. Approval of network access within seven days of receiving the inspection report or following completion of the modifications called for in the report.

These regulations mark a crucial step towards decentralised energy supply based on renewable energy in Brazil, and also provide new market opportunities for German companies. An article in the forthcoming issue of Solarzeitalter will report on the profitability of investing in PV systems.

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Figure 2: Air photography of the Stadium „Pituaçu Solar“ (15.03.2012)

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