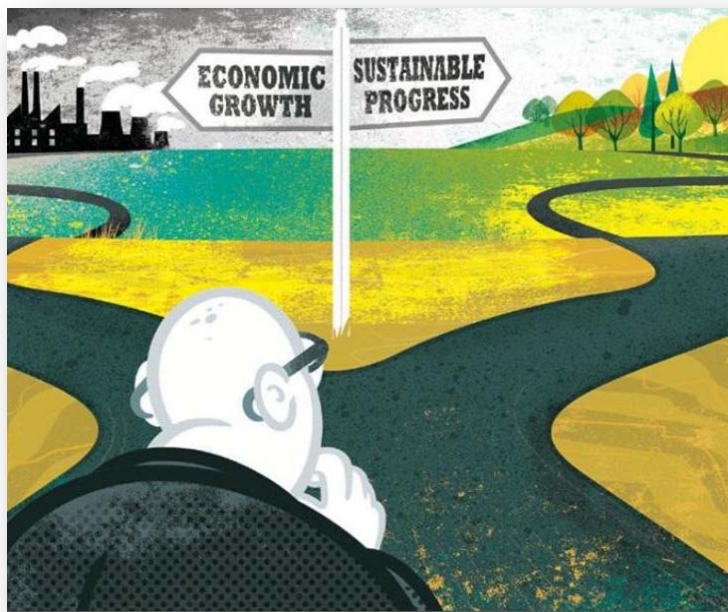


Poverty alleviation: a role for technology and infrastructure?

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Economic Growth and Sustainable Progress

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As Pier Paolo Pasolini used to say, the difference between development and progress, is that the first is aimed exclusively to economic growth, like GDP, and is achieved by increasing goods production, even if they are unnecessary.

Progress, on the other hand meets the improvement of quality of life and the overall social conditions, not just the economic ones, and has the objective to guarantee the necessary goods to everyone possible.

If richness and productivity are a consequence of development, culture and freedom are a connected to progress.

Society cannot be economically rich only: education, culture, open-mind are not connected to unnecessary goods, but come from a sustainable progress, embedded in the communities where the company operates. And these communities are willing to liaise only with companies creating sustainable progress through meritocracy and social development.

Without sustainable progress there are no smart people, thus no innovation. But sustainable progress cannot go on without innovation.

Therefore innovation means creating a better world for future generations, an economically, socially and environmentally sustainable world.

When energy can change your life: Ollagüe

A concrete example of Enel innovation creating sustainable development for the community where it operates, is the hybrid generation power plant with storage in the Chilean village of Ollagüe.

Ollagüe is a small cut off village, originally a mine one, 160 km far away from Calama, at the border with Bolivia. Its little more than 200 inhabitants live at an altitude of 3700 m and are mainly devoted to their domestic cattle, and modest catering at the border.

The village is not connected to the SING –Sistema Interconectado del Norte Grande- and there only exists a micro grid circuit powered by a 250 kW diesel generator, supplying electricity for no more than 16 hours a day –none is provided from 1:00-8:00 am.



The changes in temperature are extreme, reaching a delta of 22°C in a day time, with minimums of -20°C.

The project is made up of a non-SING-connected hybrid off-grid plant, with PV solar and wind components, battery storage, and a backup diesel generator. Additionally, some thermodynamic cogenerating concentration systems have been connected to the same commune of Ollagüe.

They are mainly passive systems, with few electrical active components, so needing minor specialized maintenance, except

for the batteries. A control system will then have the components communicate and work correspondingly – each one separately, some or all together, just as an orchestra conductor.

Why Ollagüe off-grid hybrid System? Because off-grid hybrid systems represent one of the most fast growing applications for renewables, due to large request of energy coming from remote areas with weak and limited or no access to the grid where energy intensive activities happen, and cost of diesel is relevant due to the distance from urbanized areas.

In the meantime, experimental data of PV plants performance, and power electronic devices, together with Energy Storage Systems are increasingly becoming important following the expansion of PV in such areas. In this project, both items will be the object of field test in order to collect current operational data.

What are the social impacts? The social and economic advantages of having green energy 24/7 are quite important for this small community living in extreme climatic conditions, giving the fact that electricity is pivotal for development, and electrification is strongly linked to better life conditions and welfare improvements. The immediate benefit of electrification comes from improved lighting, promoting extended hours of study and reading, contributing to better educational achievements. Extended hours of lighting can also benefit other household activities, such as weaving by women who in return constitute additional revenues for the Ollagüe's families.

Before the hybrid system, Ollagüe's community depended on a diesel generator producing electricity 16 hours a day. It is important to note that the community was not paying anything for the electricity, thus generating at least two negative behaviors: a relation of dependency on the electricity donated, as well as an inefficient use of electricity, (given that it was free, people used not to pay attention on how much they consumed during the hours it was available). The hybrid system will allow from one side to eliminate this sense of dependency, with the community now "owning" the technology, and from the other side to gradually learn energy efficient behaviors. A further advance is constituted by the introduction of smart metering devices, supplied by Chilectra, which will promote energy efficiency awareness and better consumption behaviors, thus making Ollagüe a "smart village".

The operation and maintenance model has been designed in order to be sustainable. Social integration of the stakeholders in the management model is strategic for medium and long term success.

This is the reason why the municipality, community, regional government, academic and private sectors have been integrated both in the development and operation phases of the hybrid plant.

Early inclusion of the community as a focal point, and stakeholders' integration are keys to the activity success.