

# THE SOLAR ENERGY POTENTIAL: A PROMISE OF FUTURE FOR THE ARICA AND PARINACOTA REGION, CHILE

The use of solar energy has accompanied and has been determinant in the development of all forms of life and its associated activities in our planet. It suffices to indicate that the sun, with an estimated age of 5 million years, provides 2850 times more energy than that which is consumed in the world. In modern times, as the result of the growth and development of countless activities, mostly in the industrial sphere, the energetic demand, arising nowadays mainly from conventional sources, has grown at an unsuspected rate, becoming a highly strategic resource. Thus, the use of non-conventional renewable energy (NCRE) appears as an important alternative at a worldwide level.

In Chile, according to the Ministry of Energy, the country is going through a historical energetic transition. During the current year, and for the first time, a 100% of the 33 plants under construction will generate 1,839MW from NCRE. To this end, investments of US\$ 6,978 million are being made. With the current development and the projection of new initiatives it has been estimated that 75% of the energy generation in 2030 could be from renewable sources; in this context, solar energy would provide 30% of the electric energy production.

The high amounts of solar irradiation that the surface receives in the desert of the *Norte Grande* of Chile are noteworthy. Preliminarily, an incident irradiation of  $7.15\text{kWh}\cdot\text{m}^{-2}$  on horizontal surfaces has been determined, a consequence of the transparency of the atmosphere and of the high number of days with little or no cloudiness. Such a value is only surpassed in the world by the region of Marigat, Kenya. The situation provides exceptional conditions for the production of energy from solar radiation and constitutes a permanent challenge for technological innovation.

At an international level, Germany stands out. Despite a much lower average incident irradiation level, of about  $1.25\text{kWh}\cdot\text{m}^{-2}$ , the use of solar energy grew by 65% in the first trimester of this year, driven by a progressive reduction in the cost of solar panels to about € 0,10 per kWh, making installations more accessible to the financial capabilities of

consumers, according to information from USB-Solar. It is an unprecedented and noticeable fact, which took place at the beginning of this year, that during some hours the German electric powerplants using renewable resources produced more energy than that required by the whole country.

In Latin America and the Caribbean, where there is a great potential, with an average of  $4.5\text{kWh}\cdot\text{m}^{-2}$ , energetic reforms implemented during the last five years have given rise to a marked development of sustainable renewable energies, mainly solar. Brazil, Mexico, Chile and Honduras stand out in this matter.

The remarkable conditions and projections derived from this global and national situation were fundamental for the creation, through CONICYT, of the Solar Energy Research Center (SERC-Chile), whose aim is to position itself with international leadership in the field, with special emphasis in the development of the potential of the Atacama Desert. SERC-Chile, jointly with the *Universidad de Tarapacá*, *Universidad de Chile*, *Universidad de Antofagasta* and *Fundación Chile*, with the financial support of the BHP Billington Foundation, is developing in the Arica and Parinacota region the initiative 'Solar *Ayllu*' ('community' in *Quechua* language), which comprises a program of activities focalized to highlight the knowledge and usage of solar energy in the benefit of urban and rural communities, as an important tool to support their sustainable development, in the view of turning the region into a world referent in the use and export of solar energy.

This undertaking, together with other initiatives in course in the region, such as the solar photovoltaic field Aguila 1 in the Andean foothills area, confirm that Arica and Parinacota is a land of opportunities, also in that which refers to the generation of electricity produced from non-conventional and non-contaminating energy sources.

EUGENIO DOUSSOULIN ESCOBAR AND YURILEV CHALCO CANO  
Universidad de Tarapacá, Chile.