PSR

ABOUT PSR

PSR is a global provider of consulting services, computational modeling and energy innovation; and actively contributes to research and development of optimization and data analytics solutions.

Our team is comprised of more than 130 experts in engineering, economics, mathematics, high-performance computing, information technology, business development and communications, who deliver technical and innovative solutions designed together with our clients.

PSR in numbers

OPERATES IN
+70
COUNTRIES

+250
PROJECTS CARRIED OUT/YEAR

50%
OF REVENUE OUTSIDE BRAZIL

98%
ANNUAL RENEWAL OF COMPUTATIONAL MODEL LICENSES

33%
OF INVOICING IN INNOVATION

+1,200
CUSTOMERS

+130
EMPLOYEES

A PSR operates on all continents

Our consulting and innovation models and services are applied in more than 70 countries in the Americas, Europe, Asia-Pacific and Africa, in a multitude of varied contexts (size of systems, maturity of economic development and of the energy industry).

INTEGRATION OF CONSULTING, ANALYTICAL TOOLS AND INNOVATION

PSR's work is centered on three essential pillars: development of computational models, consulting and innovation. These three areas are integrated, creating a "virtuous circle", in which the clients' practical problems and challenges motivate the development of new methodologies and analytical computational tools. In turn, these tools allow our consulting teams to add greater value to clients, with analyses always anchored in numerical simulations. Finally, the tools themselves are licensed as products to a broad spectrum of users around the world.

ANALYTICAL TOOLS

- Energy planning
- Hourly probabilistic simulation
- Risk management

CONSULTING

- Regulation, arbitrations and market design
- Price and tariff projections and investment and transaction analysis
- Energy planning and trading

INNOVATION

- R&D projects
- Academic teaching and research
- Customized analytical and computational solutions

ANALYTICAL TOOLS / COMPUTATIONAL MODELS

The suite of tools developed by PSR covers the full range of analytical issues around the energy system as well as related sectors such as electricity, natural gas and the water, energy and food nexus. These different tools can be purchased and used separately or combined, depending on the analyses required.

ENERGY SYSTEMS MODELING

SDDP
Stochastic hydrothermal dispatch with grid constraints

NCP
Short-term operation schedule

OptGen
Long term expansion planning

NetPlan
Transmission expansion planning

RENEWABLE RESOURCE MODELING

HERA
Development of hydroelectric and pumped storage

TSL
Modeling of non-conventional renewable resources

FINANCIAL SUPPORT TOOLS

OptValue
Economic-financial evaluation of generation projects

OptFolio
Management and optimization of energy portfolios

COMPUTING ENVIRONMENTS

ePSR
Corporate system for managing energy studies

PSRCloud
Cloud computing tool

CONSULTING

PSR provides consulting services to the energy industry in technical, economic-financial, regulatory, market and environmental dimensions. The company offers products to public as well as private agents and multilateral and financial institutions products with high added value for decision-making, which integrate PSR's expertise in mathematical modeling of energy markets and its extensive experience with practical aspects from different countries.

ANALYSIS OF ENERGY SYSTEMS

- Regulatory advice and arbitrations
- Market design and new products
- Energy planning
- Projection of prices and tariffs, including TUST[1]
- Water resources

ECONOMIC AND STRATEGIC EVALUATIONS

- Investment analysis
- Evaluation of supply alternatives
- Risk and portfolio management
- Support in generation and transmission auctions
- Strategic planning

TECHNICAL ANALYSIS OF PROJECTS

- Connection and electrical studies
- Generation spill assessment
- Assessment of environmental impacts
- Energy efficiency studies

DECARBONIZATION AND ESG

- Clean energy and green hydrogen certification
- One-stop-shop for decarbonization strategies of companies and countries
- Insertion, roadmaps and blueprints of low carbon technologies

[1]*TUST (Transmission System Usage Tariff)*

INNOVATION ACTIVITIES

Innovation is the fundamental element in our consulting activities and in developing analytical tools, which guarantees our technical leadership and ability to add value to customers.

A recent example is software for optimizing energy systems with quantum computing developed jointly with the Quantum Computing Laboratory of the NASA space agency.

PSR's technical leadership is supported by its numerous scientific publications, which have thousands of citations in the international literature, and the international **recognition of its professionals.**

01 DEVELOPMENT OF NEW METHODOLOGIES AND SOFTWARE FOR R&D AND OTHER PROJECTS

02 COURSES, TEACHING AND ACADEMIC RESEARCH

03 DEVELOPMENT OF ADVANCED COMPUTATIONAL ARCHITECTURES, WHICH ARE FUNDAMENTAL TO SPEED UP THE EXECUTION OF THE MODELS

PSR was the first company in Latin America, in any area, to use Amazon's cloud computing, just one month after the service was launched at the end of 2006. Today, PSR Cloud is executed 50,000 times a year by customers from around the world as well as in its own studies.

INNOVATION PRODUCTS

TRAINING FOR COMPANIES
from C-level to newly formed teams

RESEARCH AND DEVELOPMENT PROJECTS

BUILDING CUSTOM SOLUTIONS

INNOVATION AND START-UP MANAGEMENT

HIGH LEVEL DISCUSSIONS ON FUTURE ENERGY AND FUTURE ENERGY ISSUES

DIVERSIFIED CUSTOMER BASE

Energy companies

Investors and companies from different segments (generation, transmission, distribution, trading, etc.). We provide regulatory, strategic, existing market analysis and future business models; economic-financial valuation models; strategic planning; clean energy certification; energy prices and tariffs; arbitration and investment decision support; and risk management based on quantitative studies.

Consumers

We support energy consumers of all sizes in their contracting decisions, with a study of the future evolution of energy prices and tariffs, energy supply, regulatory and strategic understanding.

Law Offices

We provide support in regulatory and market studies and in arbitration and conflict mediation.

Investors and global funds

Investors, private and institutional funds and managers seeking the best allocation of resources. We support institutional and market understanding in order to identify and execute the best allocation opportunities.

Regional energy planning

Organizations promoting energy integration between countries. We contribute with analysis and projections of energy demand, studies of planning and reliability of electrical systems.

Sector associations

Class entities that represent the interests of agents in the sector. We provide impact studies and regulatory support, structuring technically sound arguments to support advocacy, technological blueprints and for the development of new markets.

Multilateral Agencies and Financing Banks

We provide regulatory, risk and economic-financial analysis to support debt structuring in various segments and in mergers and acquisitions.

Governments and Regulatory Bodies

We support the design of competitive energy markets including the short-term market, energy auctions, transmission pricing, integration of renewables and assessment of security of supply.

System Operators and Planners

We help grid operators in Brazil and around the world with dispatch models and operation programming, such as SDDP and NCP, to make operational decisions, dealing with the increasing share of renewable sources in electrical systems. We also support, with the OPTGEN model, local and regional planners in studies and decisions on integrated resource planning, including integration of renewables.

Consulting companies

Companies that work with knowledge production and market intelligence. We provide analytical tools and computational models, in addition to various analysis and evaluation services for which we are frequently hired.

NGOs

Non-governmental and nonprofit entities that need quality information and technical analysis to support their strategic and operational planning.

Executive Board

LUIZ BARROSO

Holds an MSc degree in Mathematics and a DSc degree in Systems Engineering. He joined PSR in 1998. He was president of Empresa de Pesquisa Energética (EPE) from 2016 to 2018 and returned to PSR in 2019 as CEO and general coordinator of the company's studies and consulting area.

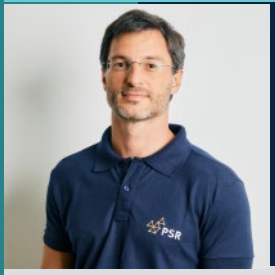
He received the 2010 IEEE Outstanding Young Engineer Award and in 2020 was elected an IEEE Fellow. Since 2013 he has been an affiliated researcher at the Instituto de Investigación Tecnológica (IIT) at the Pontifical University of Comillas in Spain. In 2018 he was a visiting researcher at the International Energy Agency (IEA).

MARIO VEIGA

Graduated with a degree in Electrical Engineering, and an MSc and DSc in Systems Engineering. He founded PSR in 1987 and was its CEO until 2019, when he became Executive Director and general coordinator of the company's innovation, research and technology area. He also acts directly in the development of new optimization algorithms for PSR computational models.

He is an IEEE Fellow and an elected member of the US National Academy of Engineering; Brazilian Academy of Sciences; and National Academy of Engineering. He received the Presidential Medal of Rio Branco, National Medal of Scientific Merit and the Franz Edelman Finalist Award on Management Science Achievement.

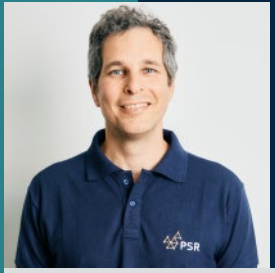
RAPHAEL CHABAR



Has a MSc and DSc degree in Electrical Engineering. He joined PSR in 2002, and is currently Executive Director and general coordinator of the Computational Models area. Additionally, he supervises the financial and operational areas of the company.

He has been an instructor of courses in the areas of hydrothermal dispatch and energy planning and has coordinated support in the applications of PSR models in dozens of countries on all continents.

RAFAEL KELMAN



Graduated with a degree in Civil Engineering, an MSc in Water Resources and DSc in Systems Engineering. He joined PSR in 1997, and is currently Executive Director and general coordinator of the company's Decarbonization, ESG and Water Resources areas.

He was Director of the Brazilian Association of Water Resources and has worked on energy and market planning studies in several countries on all continents; in the development of computational models; and in R&D and innovation projects.

Technical Board

PAULA VALENZUELA

Holds a Bachelor's and a Master's degree in Electrical Engineering with emphasis in Power Systems. She joined PSR in 2009 and coordinates the energy regulation area.

RODRIGO GELLI

Has a Bachelor's and Master's degree in Electrical Engineering. He joined PSR in 2006 and acts in the area of energy and tariff studies within Brazil.

ANGELA GOMES

Mechanical Engineer with an MBA in Finance. She was a PSR consultant between 2001 and 2004 and returned to the company in 2021.

LUIZ CARLOS JR

Electrical Engineer with MSc. and DSc in Systems and Computing Engineering with an emphasis on Optimization. He joined PSR in 2002.

FERNANDO PORRUA

Holds a Master's in Electrical Engineering with an Executive MBA in Business Management, he joined PSR in 2005.

EDMUNDO GRUNE

Holds a degree in Computer Science and a Master's in Energy Planning, both from UFRJ. As of 2023, he has been with PSR for ten years.

SERGIO GRANVILLE

Bachelor's and Master's in Mathematics, he also holds a Master's and Doctorate in Operations Research. He joined the PSR team in 2000.

psr@psr-inc.com
www.psr-inc.com

+55 21 3906-2100

Praia de Botafogo 370 / 1° andar
Botafogo - Rio de Janeiro, RJ - Brasil