

# THE RD&I CLAUSE IN THE OIL AND NATURAL GAS INDUSTRY: AN INNOVATION DRIVER IN THE BRAZILIAN ECONOMY



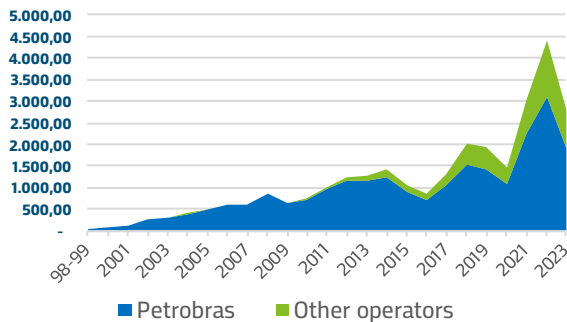
## WHAT IS THE RD&I CLAUSE?

Set out in oil and natural gas exploration and production contracts, the clause determines that oil companies must make investments equivalent to 1% of their gross revenue in research, development and innovation (RD&I) activities.

The National Petroleum, Natural Gas and Biofuels Agency (ANP) is responsible for defining the criteria for distributing the funds, in accordance with the provisions of each specific contract (concession, production sharing and transfer of rights) and Resolution No. 918/2023.

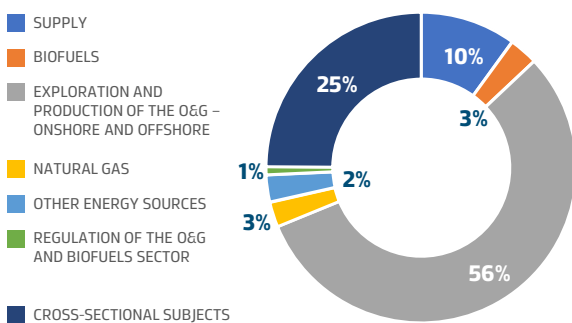
The aim of this measure is to ensure a permanent source of funds to stimulate Science, Technology and Innovation (ST&I) in the Brazilian oil and gas (O&G) sector. Since 1998, when the first regulations on RD&I obligations were established, investments of over BRL 26 billion have been channeled into the sector.

### Volumes of RD&I obligations generated per year 1998-2023, in millions of BRL

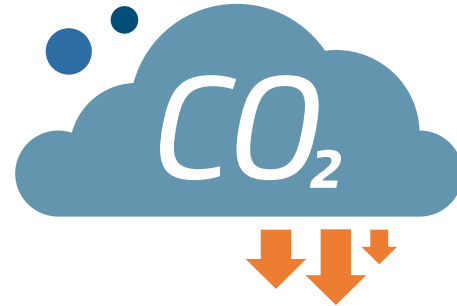


Source: ANP Investment Obligations Dynamic Panel (Total Obligations).

### Distribution of RD&I projects authorized by área (2016-2024)



Source: own elaboration based on data from the ANP (2024).



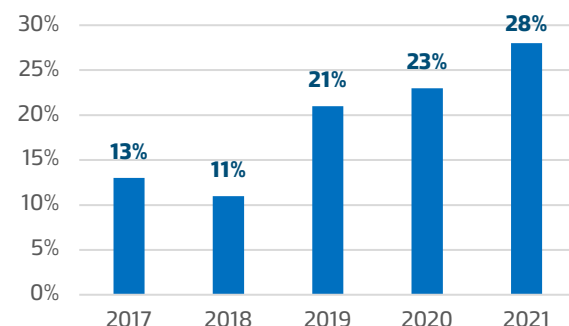
## THE INCREASE IN INVESTMENTS IN DISRUPTIVE, LOW-CARBON TECHNOLOGIES

As companies in the O&G sector take on more ambitious commitments to mitigate the impact of their operations on the environment and diversify their business plans in the context of the energy transition, the amounts allocated to RD&I projects tend to be increasingly directed towards activities that converge with the energy transition..

### Subjects funded with resources from the RD&I Clause associated with decarbonization technologies:

- Carbon capture, storage and utilization (CCUS).
- Negative emission technologies.
- Conversion of CO2 into hydrocarbons.
- Biofuel production technologies.
- The use of nanotechnology to recover degraded areas in the Amazon.
- Agave-based ethanol in Brazil.
- Use of remotely operated and autonomous technologies.
- Image characterization and spill removal efficiency.

### Proportion of projects funded in digital transformation, renewable energies and decarbonization



Source: own elaboration based on data from the ANP (2023).

## RELEVANCE OF THE RD&I CLAUSE IN THE CONTEXT OF THE ENERGY TRANSITION:



It contributes to the development of technological capacity in future-oriented sectors of the energy industries.

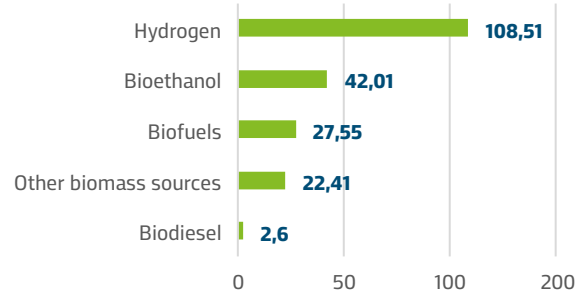


It is a necessary source of funds to enable the decarbonization of the sector and Brazil's energy transition.



Harnessing Brazil's renewable energy potential is the key to ensuring a fair energy transition.

## RD&I Clause funds invested in selected technologies throughout 2022 (in millions of BRL)



Source: own elaboration based on data from the ANP (2023).

## IMPACTS OF THE RD&I CLAUSE IN THE ST&I NATIONAL SYSTEM AND HUMAN RESOURCES TRAINING

Resources from the RD&I Clause have been vital in enabling the training of technical staff required by the O&G industry and other sectors of the national economy, as well as reducing the gap in access to educational opportunities.



Over **170** institutions accredited to receive funds and more than **1000** research units

Fonte: elaboração própria a partir de dados da ANP (2022).

### OUTCOMES TO BE HIGHLIGHTED:



Improved infrastructure conditions for more sophisticated scientific and technological research projects.



University-company integration experiences with tangible results in terms of developing technological solutions for the O&G industry.



Project funding in different regions of Brazil, encouraging regional development.



PROMINP Professional Training Program (2004-2015): over **90 thousand** trained people in **175** professional categories.

Source: PROMINP (2015).



ANP Human Resources Training Program (PRH-ANP):

- From 1999 to 2015: **8,290**.
- From 2020 to October 2021: **1,147**.

Source: ANP (2021).



RD&I Clause investments aimed at human resources training (2012-2021): **BRL 215.8 million**. Source: ANP (2021).

## MAIN PROJECTS UNDER THE RD&I CLAUSE

The challenges posed by the geological, meteorological and oceanographic conditions of the areas where offshore oil and natural gas reservoirs are located in Brazil have led oil companies to develop specific technological capabilities in order to make production activities in these areas viable.

In this sense, the resources of the RD&I Clause have been allocated to the development of technological expertise in sectors beyond the traditional areas of knowledge.

### BLUE AMAZON

Under the direction of the Brazilian Navy Research Center, the funds support initiatives involving research and monitoring of biodiversity and marine resources in the Blue Amazon region, a Brazilian maritime area.



### PARTICLE ACCELERATOR (SIRIUS)

The project is a state-of-the-art particle accelerator, developed by the Brazilian Synchrotron Light Laboratory (LNLS), which allows materials to be analyzed at the atomic and molecular level, boosting scientific and technological research in various areas.



### OCEAN FLOOR CO2 SEPARATOR (HISEP)

Developed by Petrobras, high-pressure separation technology (HISEP) is a solution that allows the gas coming out of the reservoir to be separated and reinjected from a system located on the seabed. With this technology, the field's production is increased, and it also allows for lower greenhouse gas emissions for each barrel of oil produced and lower production costs.



### SUPERCOMPUTERS (CS21)

High-performance supercomputers have made it possible to carry out advanced computer simulations, contributing to the development of more accurate models in the O&G area and in other areas of research. We highlight the supercomputer at SENAI CIMATEC's Supercomputing Center for Industrial Innovation (CS21), in Salvador, Bahia.



## Examples of laboratory infrastructure funded under the RD&I Clause:



Belém, PA



Recife, PE



Natal, RN



Salvador, BA

## INVESTMENT IN RD&I IN THE O&G INDUSTRY IS AN INNOVATION DRIVER FOR THE BRAZILIAN ECONOMY

The technologies developed by the O&G industry have a positive impact on other sectors of the Brazilian economy, generating innovation, competitiveness, employment and income in the country.

## TECHNOLOGIES DEVELOPED BY THE O&G INDUSTRY WHICH ARE USED IN OTHER SECTORS OF THE ECONOMY



### WATER SUPPLY

#### Treatment plant

The process of desalinating seawater for injection into reservoirs, using reverse osmosis, is used to produce drinking water for consumption.



### OCEANOGRAPHY

#### Remotely operated submarine vehicle

This technology is used and constantly improved in the oil industry, as well as to better assess marine fauna and flora in inhospitable locations.



### HEALTH

#### Interpretations of reservoir flow models

Tools and mathematical models made for reservoir analysis have been used to improve the interpretation of MRI scans and investigate the spread of tumors in the human body.



### RENEWABLE ENERGIES

#### Offshore floating wind farms

Based on the model developed for platforms, the structure of wind farms can be assembled close to the coast, to be later moved and anchored in deeper waters, where the wind is stronger and less variable.



### CCUS

#### Geological storage of CO<sub>2</sub>

The injection of CO<sub>2</sub> and other gases is an activity often used by O&G companies as part of advanced oil recovery techniques.

## LEGAL UNCERTAINTY AFTER THE COMPETITIVE BIDDING:



Changing the conditions in the middle of the process would tarnish the entire bidding process, as well as violate the perfected legal act of the contract.



Even if some kind of change is made to the legislation, the contractual clause does not allow for any deviation of purpose. Such a provision would only be valid for new contracts if they so provided.

## IBP'S PERSPECTIVE:

Any change in the regulation of the RD&I Clause must be carefully assessed and discussed, considering the impacts both for companies in the sector and for the country's technological and economic development. It is essential to ensure that the proposed changes do not undermine the Brazilian O&G sector's capacity for innovation and technological progress, avoiding any deviation of purpose that could jeopardize the benefits achieved so far.

## TAKEAWAYS



Over the two decades of its implementation, the RD&I Clause has become a key source of funds for strengthening the national ST&I system, generating benefits for the O&G sector and society in general.



The funds directed through the RD&I Clause have been vital in enabling technological development in the O&G sector, with positive repercussions in other sectors of the economy.



The RD&I Clause has been a vital source of funds to finance the training of technical staff required by the O&G industry and other sectors of the Brazilian economy.



Funds secured under the RD&I Clause are essential to enable the development of the technological solutions needed to ensure that Brazil can meet its emissions reduction targets, as well as seize the opportunities that are opening up as the transition to a low-carbon economy progresses.

Changes to the established model must be carefully evaluated and discussed, considering the impacts both for companies in the sector and for the country's technological and economic development.



CONNECTING THE INDUSTRY TO GO BEYOND.  
**THIS IS ENERGY.**



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