

## Sector Fund CONACYT-SENER-ENERGY SUSTAINABILITY

### TERMS OF REFERENCE

#### CONACYT – SENER – ENERGY SUSTAINABILITY – 2012 –01 MEXICAN CENTER OF GEOTHERMAL INNOVATION

#### 1. Overview

The program of Mexican Centers of Innovation in Energy (CEMIEs for its acronym in Spanish) of the Secretary of Energy (SENER for its acronym in Spanish) is conceived for the setting of innovation associations in energy matters. The CEMIEs are designed as a means for getting the long-term objectives below:

- a. organization, integration, coordination, management and development of scientific research aimed and targeted to the change, research and technological development;
- b. expansion of research capabilities in science and technology and the advocacy of its collaborative use;
- c. human resource training;
- d. company-industry linkage;
- e. innovation;
- f. encouragement of technology transfer;
- g. encourage the development of technology companies; as well as for
- h. strengthening of the capacities of research and technology development in companies of energy area.

The CEMIEs must be training centers, which respond to emerging scientific and technological opportunities that use the technical and scientific infrastructure of Higher Education Institutions and Research Centers both public and private. Therefore, these Research Centers must meet the requirements outlined in this convocation.

The financial support provided through this convocation will serve to i) develop the projects needed to meet the specific demands, ii) expand the capabilities of scientific and technological research, iii) train expertise human resources with emphasis in technological area and, iv) joint academy with industry.

#### 2. Program Description

The CEMIEs must meet the goals outlined in the previous section. With this convocation is intended to centers promote bonding and contact with researchers and entrepreneurs with common interests and complementary in order to develop a culture of innovation, collaboration and willingness to take risks.

Through this convocation is proposed to establish the Mexican Center for Innovation in Geothermal Energy called for this convocation "CEMIE-Geo."



## 2.1 Sight y mission of the Mexican Center of Innovation In Geothermal Energy

### Sight

*Be the reference for the development of technology and knowledge in the field of geothermal energy and contribute to the development of this energy as a source of renewable energy more used in the country.*

### Mission:

*Being the center with unified knowledge in geothermal energy more important of the country, and to guide the activities of innovation, research and technological development to help strengthen the geothermal industry.*

## 2.2 Objectives of the Mexican Center of Innovation In Geothermal Energy

The CEMIE-Geo shall contribute to achieving the medium-term objectives in terms of geothermal energy in Mexico, which are:

- a. Promoting the technological conditions for the development of geothermal energy industry in Mexico.
- b. The implementation and development of advanced facilities and laboratories supported by current infrastructure and through the contribution of companies forming part of CEMIE-Geo.
- c. Training expertise human resources in geothermal energy.

The project portfolio will be integrated according to the specific demands of the Center described in **Attachment A.**

## 2.3 Elements Integrators in the Mexican Center of Innovation In Geothermal Energy

It is essential that CEMIE-Geo integrates the following elements:

1. Researchers and experts from industry, from Higher Education Institutions and Research Centers both public and private.
2. Collaborative projects with industry, including students and researchers.
3. Facilities of the research centers or higher education institutions.

It is noteworthy that the infrastructure that comes from project development should be maintained as a part of the infrastructure of the support subject.

The CEMIE-Geo can integrate foreign institutions as a part of the association. However, the direct responsibility or leader of the Centre should be a Research Institute and/or of Higher Education of the country.





It is recommended that the CEMIE-Geo develop collaborative projects with institutions and/or foreign companies in which students and Mexican researchers participate.

## 2.4 Establishment, operation and development of CEMIE-Geo

The CEMIE-Geo will be established, through the institution representative of the group or association to be known as "support subject" or "lead entity", which will receive the resources to establish, develop, integrate and operate the CEMIE-Geo.

The portfolio of projects proposed by the CEMIE-Geo will be implemented by the institutions of the group or association, and will be built according to specific demands of CEMIE-Geo described in Attachment A. The funds will be delivered to the entity leader of the association or group, who will provide and allocate resources to the participants, for the realization of projects in the portfolio, so it will be responsible for the proper exercise of all the resources and shall handle all communication with the Fund.

## 3. Continuity of the CEMIE-Geo

The CEMIE-Geo should seek to develop other activities that allow them to generate additional income in order to be self-sufficient once it runs out of resources granted by the Fund through this convocation or through the convocations that in their case, win in the future. This will ensure their stay as a leading center in this area.

## 4. Eligibility criteria and responsible

### 4.1 Eligibility

May participate those Research Institutes and/or of Higher Education of the country, both public and private currently enrolled in the RENIECYT, in collaboration with companies, associations and others.

The group or association which will form the **Mexican Center of Innovation in Geothermal Energy** should comprise at least one higher education institution and/or a public research center both private and public or private company.

In order to provide information for evaluation, group or association must submit as an indispensable prerequisite the following information:

#### a. Higher Education Institutions and Research Centers both public and private:

- Curriculum of researchers or consolidated academic bodies in the area of geothermal energy
- List of publications in refereed journals of national and international reputation, patents and personnel training relevant to the corresponding areas,
- statistics of the institute or center of higher education,



- i. Total number of refereed publications
  - ii. Number of undergraduate students
  - iii. Number of graduate students
  - iv. Number of PhD students
  - v. Number of researchers affiliated with the National System of Researchers (SIN for its acronym in Spanish)
- Educational programs and performance evaluated periodically by an External Review Council or equivalent. Institutions that do not have such a Council, must submit evidence of the processes of evaluating their programs.
  - List of infrastructure and resources that have that are consistent with the level of participation of each of the Institutions, for example.
    - vi. Budget allocated to the faculty or school
    - vii. Budget allocated to the Institution of Higher Learning or Research Centre
    - viii. Number of laboratories
    - ix. Belonging to the National Program of Quality Postgraduate
- b. Public or Private companies, associations and others:
- Show that they have professional groups and/or technical experience in geothermal energy and/or related areas.
  - Have an appropriated level of infrastructure consistent with their level of participation.
  - Projects related to or interest in geothermal energy and/or related areas and their association.

In all cases:

- a. The requesting institutions must have sufficient space to house the infrastructure of CEMIE-Geo. In the evaluation process, it will be considered the value and functionality of the site as well as the history of collaborative projects or services to third parties. In addition, it will assess the possible contribution of equipment that already have the other group or association.
- b. The support subject must submit a letter signed by the legal representative of each of the institutions and enterprise(s) participating in the group or association, by which they commit to providing resources for infrastructure and facilities available to the rest of the group or association..
- c. The other entities members of the association must have an adequate level of infrastructure that is consistent with their level of participation as required in the first part of this subsection.
- d. When so required, SENER will arrange with the Federal Electricity Commission in order to such a Commission grant the facilities required the winner of this convocation to comply with the specific demands described in Attachment A.





## 4.2 Responsible

The CEMIE-Geo proposal must include a technical manager, an administrative manager and legal representative.

The technical manager will be in charge of the initiatives, activities and projects of CEMIE-Geo, compliance of its objectives and goals, the generation of the deliverables and the preparation of technical reports (the responsibility to integrate the progress, results and , maintaining the cohesion of the groups that are generated for the proper care of the portfolio of projects) progress and achievements.

The second, the administrative manager who shall have the immediate level below the CEO or his counterpart in the lead institution, he or she will be responsible for administrative control, accounting and tax, the correct application and testing resources and the development of financial reporting and administrative requirements.

The legal representative is the person with the legal power to enter into commitments and sign the necessary agreements with both the Fund and with other institutions.

The proposal must include a letter of acceptance of technical and administrative managers, whenever the legal representative must submit the notarized power of attorney for commitment and sign the necessary agreements with the Fund and with other institutions.

The three above figures are liable to the Fund both the CEMIE-Geo and the portfolio of projects.

## 5. Structure and characteristics of the proposal

The proponents must comply with the required information in the electronic application of the Project Management Information System (SIAP for its acronym in Spanish) at CONACYT, which shall specify the information that have confidential character. The proponents must have password access to SIAP, otherwise responsible for the proposal will generate its key in the system of online registration page CONACYT (<http://www.conacyt.gob.mx/>).

### 5.1 Proposal

The proposal must be presented in Spanish and by the administrative manager of the Institution of Higher Education and Research Center both public or private of the country, in representation of the group or association. The administrative manager shall submit the proposal to collect and submit the required information in electronic form through the electronic platform defined by CONACYT. The responsible of the proposal should generate its corresponding key in the registry system online at the website: <http://www.CONACYT.mx/test/bekas/nuevo.html>.

Additionally, the proposal and its attachments must be submitted in English. This version must be consistent with the information sent through the defined electronic platform.



### 5.1.1 Structure and characteristics

The information attached must be in PDF files at most 2Mb in size each file and as many as deemed necessary the proponent.

**Profile and background of the participants:** An important aspect in the evaluation of the proposal will be the profile and the backgrounds of the people that participate therein, those will be appreciated by the information contained in the Unified Curriculum Vitae (CVU for its acronym in Spanish) of CONACYT, whereby it is recommended to keep it properly updated.

The delivery of the **Attachments** is mandatory for the correct integration of the proposal. The lack of any of these documents will preclude the evaluation of the same resulting automatic disqualification.

The required Attachments are as follows:

**Attachment I.** General information of the support subject and each integral company and institution of the group or association (content suggested in maximum 1 quartile by institution). This Attachment also must contain letters of acceptance of technical and administrative manager, as well as their appointment.

**Attachment II.** Letter of the proponent in expressing under penalty of perjury that all information is true, provable and confidential and that the proposal translated to the English language is identical in its content to the one of the Spanish language; that they do not have debts with the CONACYT or conflicts raised against these before administrative instances or judicial derivatives of projects supported in any program of the own CONACYT, including the Funds regulated in the Law of Science and Technology, as well as that I have read and understood the Terms of Reference (TdR for its acronym in Spanish) and bases of this convocation, signed by the legal representative.

**Attachment III.** Agreement Framework of Collaboration for the development of the project of the group or association, nevertheless for the initial presentation of the request will be enough with the presentation of a letter of intent, of each one of the participants in the group or association, signed by the legal representative of each of them. In case of being benefitted by the support, the agreement framework of collaboration will be delivered at the end of the first stage. In case of not being delivered, the support will be cancelled and it will be come to the return of the resource to the Fund.

**Attachment IV.** Project General Plan (PGP for its acronym in Spanish) of the CEMIE-Geo. For his integration, it is recommendable to consult the Norm PYF-NMX-GT-002-IMNC-2008 referring to technological projects. The information referred in this section will have to be consistent to the integrated one in the attached files.

The content of the PGP includes the 6 (six) following entries:

1. **Backgrounds.** The context of the scientific, technological and technical knowledge must be indicated, as well as the economic and/or social environment object of the present convocation. It must be included a brief description of the experience of the institutions and personnel proponent in works of research and technological development and/or broadcast to develop of each one of the members in the group or association (content at most one (1) quartile by institution).





2. **Objectives and goals.** The technical objectives and goals for the CEMIE-Geo and its portfolio of projects altogether must be indicated, as well as individual goals for each stage of the CEMIE-Geo and the portfolio of projects.
3. **Expected and deliverable results.** The results must be indicated to be achieved, same that will have to be accorded to the run times for each stage. It should be defined and established quantitative and qualitative indicators that allow to track development of the CEMIE-Geo and the portfolio of projects, as well as means for verification and assumptions considered.
4. **Methodology.** The techniques, procedures and tools for the development of the Center and its portfolio of projects must be described and the achievement of the expected results, emphasizing the line(s) of research to develop.
  - I. Plan for innovation, including the potential that the proposed research for the innovation has, the resources available and the general strategy to promote the innovation. To briefly describe the possible interaction of the technology to be developed with: advanced materials, electronics, nanotechnology, among others.
  - II. Plan of training of human resources and professional practicing, including collaborative training of students of undergraduate and graduate. Role of postdoctoral researchers. Education in aspects of innovation.
  - III. Plan for the broadcast and visibility of the geothermal technology to the population, as well as ways to evaluate the impact of these efforts.
  - IV. Plan for the coordination of the group or association, including the mechanisms for the management of the research and the training, as well as the leveraging by the members of the group or association proponent.
  - V. Plan for the management and operation of the CEMIE-Geo; description of the way of organization of the CEMIE-Geo to assure the representation the involved sectors, the processes of evaluation, tracking and modification/correction of the activities of the CEMIE-Geo, if necessary; description of the coordination of efforts, including the technologies of the information and communication; description of the process of decision making; and a discussion on the agility and flexibility of the CEMIE-Geo to incorporate new ideas, tools and partners.
5. **Program of activities and budget.** The CEMIE-Geo and its portfolio of projects will have to integrate its program of activities and the related budget:
  - I. In three stages, that will include the conformation of the CEMIE-Geo and its portfolio of projects to meet the specific requirements referred to in Attachment A, describing the activities and required resources in each of them. The resources will be assigned in three ministrations according to that indicated in section 7 of these TdR.
6. **Technical-financial evaluation of the project.** The financial-technical evaluation of the project must have at least the elements that are indicated in the format of Evaluation of Project.



**Attachment V.** Chronogram of activities in Project of Microsoft, or equivalent in free software. The chronogram must consider generally the activities to realize for the CEMIE-Geo and its portfolio of projects, consistent with that raised in other entries of the proposal. If approved the proposal, it will be monitored and made partial assessments and complementary to ongoing projects. The information regarding the development of CEMIE-Geo and its portfolio of projects should be consistent with the activities, and set times and the financial breakdown of Attachment VI.

**Attachment VI.** Budget of CEMIE-Geo and its portfolio of projects: should contain the financial breakdown by entry, activity, participating institution (partner) and justification. If personal, it must be listed based on profiles of people to hire (researcher, consultant, postdoctoral, student support, etc. To participate in the development of CEMIE-Geo and its portfolio of projects).

**Attachment VII.** It includes studies of technological information which is supported by the research methodology and the innovative content of the portfolio of projects. It is recommended that a study of the state of the art to perform internationally. This can be done by the Technological Information Center of the Mexican Institute of Industrial Property (IMPI for its acronym in Spanish)

**Attachment VIII.** In this Attachment other documents are included:

Scientific Research Targeted to Change and Technological Research Applied	Technological Development	Technological Packages	Technological Assimilation
Analysis of possible applications and clients	Business Plan of company that sustains the development of the project	In applicable cases, patent request or evidence of analysis of patent	Business Plan that sustains the development of the project
		Information concerning the marketing potential that must include: State of the art (advance, description and benefits, evidence of technological monitoring, etc.), potential market (size estimates, growth), identification of potential clients, users, competitors, substitutes, etc.	

### 5.1.2 Proposals in other formats or incomplete proposals

Proposals will be considered only properly formulated and effectively delivered through the Project Management System (People Soft) of CONACYT, full both requisition in electronic form, and attached supporting information (Attachments), pursuant to the provisions of the present TdR within the applicability of this convocation. Without exception, will not be accepted, nor shall execute proposals entered by any means other than that specified or incomplete proposals or untimely.

### Resources

The resources of the Fund will cover the eligible expenses of the CEMIE-Geo and their portfolio of projects in accordance with the budget and project general plan, authorized by the Technical Committee and Management of the Fund.





It must present a portfolio of projects consistent with the purposes of CEMIE-Geo and according to the specific demands of the Center described in **Attachment A**.

In the case of proposals to consider the acquisition of infrastructure, in terms of paragraph 9.6, by this convocation related to CEMIE-Geo and its portfolio of projects, it should be available for shared leveraging of the members in the selected group or association, covering the requirements established by the beneficiary institution responsible for operation and maintenance and that are agreed by the association.

In all the cases, the economic resources that grants the Fund, will be submitted to the budgetary availability of the same.

### **Amounts of support and ministration of resources**

Resource allocation will be based on the amount authorized by the Technical Committee and Fund Management according to the last paragraph of the preceding numeral. This amount authorized in any case will exceed 90% of the total amount of CEMIE-Geo and its portfolio of projects. The remaining 10% must be provided at the beginning of the project, the enterprise under paragraph 7.1.

The resource ministration will be in 3 (three) stages which will be structured based on the amount requested from the Fund for CEMIE-Geo and its portfolio of projects, as follows: 30% of the first ministration in accordance with paragraph 7.1 and 14.2, 40% in the second stage and subject to the results of partial evaluation, and 20% cash back on completion of all projects. The second and third ministration comes under budgetary planning, on presentation of corresponding technical and financial reports audited relating to the achievement of the targets and the fulfillment of the commitments in the Resource Allocation Agreement.

Financial reports must be audited by an external firm authorized by the Department of Public Service and should have direct correlation with the technical reports. Note that the verification of expenditure and investments related to the CEMIE-Geo and its portfolio of projects will be required only up to resources financed by the Fund.

### **7.1 Contributions of the company**

In order to strengthen the link between higher education institution or research center with the company or companies participating both public or private, domestic or foreign, they must contribute 10% of the total proposal. This amount can be integrated into the center by contribution in kind or monetary.

This contribution must integrate into the first ministration of the Fund. Thus, the first ministration will comprise 30% of the Fund resources and 10% for the contribution of the company.



## 8. Date of completion

In all cases, the CEMIE-Geo projects that meet the specific demands of this convocation will end at 24 months from the first ministration. The CEMIE-Geo must report the progress as stipulated in the conditions described in paragraph 14.3.

## 9. Eligible entries

The resources provided by the Fund may be used to cover all expenses and investments related to the implementation of CEMIE-Geo and its portfolio of projects in the opinion of the Evaluation Committee and the Technical Committee and Fund Management that result indispensable for successful implementation. These expenses and investments must be justified and correspond to the amount approved by the Technical Committee and Management.

### 9.1 Human resources and scholarships

It refers to the cost of man-hours directly related to the operation of CEMIE-Geo and the implementation of projects to be covered at higher education institutions or research centers of the group or association members. Further, these resources may consider temporary support to students seeking to obtain the degree of specialization, master or doctoral degree, through their participation in the project according to the specific demands of **Attachment B**.

The CEMIE-Geo must meet the effective fiscal legal framework.

### 9.2 Travel and per diems

They are the expenses required for the mobility of human resources directly related to the CEMIE-Geo, its portfolio of projects and activities related to it.

### 9.3 Operating expenses

They are the costs of materials, development and operation of laboratories and pilot plants, designs and prototypes for testing experimental, bibliographical collections, documentaries and scientific and technological information useful to the project, design of packaging and packaging as well as the acquisition of laboratory instruments, for prototypes and pilot plants, tooling and test equipment including computing, software and information systems related to the operation of equipment dedicated to research, specialized services, technological development and implementation of the project, among others.

### 9.4 Advising and consulting with national and/or foreign institutions of ITDI

The Fund can support up to 30% of the total project cost to be allocated to the entry of advice and scientific-technological consulting with prestigious national and/or foreign institutions in research, technological development, human resource development and innovation, provided that are directly related to the approved project.





#### 9.5 Expenses related to the protection of intellectual property

The Fund can support expenses related to title registries of protection of the intellectual property. Studies and technological analyses as well as diagnoses and audits or technological monitoring.

#### 9.6 Infrastructure

The Fund can support the indispensable infrastructure to ensure the success of project. The maximum amount to finance under this entry is \$30.000.000 (thirty million of pesos). It must justify the need for each and every one of the requirements that are considered in this entry.

#### 9.7 Report of expenses audited

The Fund covers the costs with the financial reports audited by an office registered in the register of the Secretariat of the Public Service.

#### 9.8 Taxes

The Fund supports the payment of the contributions that are generated by the acquisition of necessary goods and services for the development of the project.

### 10 Non-eligible entries

The resources of the Fund must not be destined a:

- a. Civil work with production aims.
- b. Expenses of management with production aims.
- c. Hiring of personnel for production or marketing.
- d. Expenses of publicity and marketing with commercial ends.
- e. Expenses on studies and permissions related to the environmental regulations and industrial security.
- f. Interests.
- g. Losses due to the currency change.
- h. Credits to third parties.
- i. Financial expenses, including the collections of banking commissions.
- j. Maintenance of the rights of intellectual property.
- k. Acquisition of vehicles, (if required the use of these properties, it must be used the lease figure).
- l. Payment of taxes, that results from the income that generates the support subject, not by fiscal fines or surcharges.



## 11 Evaluation Process

Proposals shall be subjected to an evaluation conducted by the Evaluation Commission of the Fund in accordance with the rules of operation of the Fund. The Evaluation Commission will make recommendations to the Technical and Management of the Fund, which in its case, will approve the proposal and allocate the resources of this convocation.

**The clarity and quality of the proposal are fundamental factors for their correct evaluation.** The resolutions of the Evaluation Commission and the Technical and Management Committee, shall not constitute instance and are final.

The Evaluation Commission will evaluate the proposals. At this stage, the expert reviewers will follow the evaluation criteria set out in paragraph 12 of these Terms of Reference.

### 11.1 Difference between the CEMIE-Geo and its portfolio of projects

The proposal must contain the elements for the setting of the Mexican Center of Innovation in Geothermal Energy, its operation and maintenance. Moreover, it should make the difference between the Centre and its portfolio of projects that start with the specific demands in Attachment A. The winner of the convocation will receive the Fund contribution to the setting of the Mexican Center for Innovation in Geothermal Energy and its portfolio of projects to optimize resources to improve the development of both projects.

## 12 Criteria of evaluation for the CEMIE and its portfolio of projects

The proposals will be evaluated and selected considering section IX, subsection C from the Rules of Operation that include in general terms the following criteria:

- a. Relevance of the Proposals
- b. Innovating content
- c. Technical-financial Viability
- d. technical-economic Impact and benefit
- e. Feasibility of the transference, assimilation and adoption of the results of the project
- f. Time and cost of execution
- g. Commitments of the proponent
- h. Entailment between instances
- i. Profile of Business

## 13 Notification of results

The approved proposal will be determined based on the recommendations of the Evaluation Commission to the Technical and Management Committee of the Fund. The decision and the amount of support will be published in the same media used in the convocation, after they have been approved by the Technical and Management Committee of the Fund.





## **14 Resource allocation and project tracking**

### **14.1 Formalization of economic supports**

The allocation of resources to CEMIE-Geo and selected portfolio of projects should be done through the signing of an agreement allocating resources in the format prescribed for that purpose by the Fund and to be held between the support subject and trustee, which sets forth the terms and conditions of the granting of such resources.

The allocation agreement shall include, by way of attachments, the Project General Plan, the chronogram of activities, the budget and the letter of intent for collaboration. It also defines the penalties that may apply for breach of the provisions governing the support, considering, among other things, the repayment of all resources, the suspension and cancellation of the project or the prohibition to participate in other meetings and the cancellation of RENIECYT.

Once made the approval notice, it should formalize the agreement on allocation of resources within the next 90 calendar days from such notification. The lack of formalization for reasons attributable to the support subject, will involve the cancellation of support.

### **14.2 Delivery of economic supports**

The support subjects should open a checking account non productive in a banking institution established in Mexico, through which the Trustee shall assign to the ministrations of resources. The account will be operated jointly by the technical manager and administrative manager, exclusively to manage the resources channeled to CEMIE-Geo and portfolio of projects. Therefore, it is necessary that the account is credited to the Fund prior to the delivery of the first ministration. Additionally, for the first ministration the support subject will forward the ministration application to the Administrative Secretary of the Fund, including the corresponding receipt or invoice and copy of account opening.

It is the responsibility of the support subject, through the administrative manager, the proper exercise and monitoring of use of resources in the entries authorized by the Technical and Management Committee of the Fund, as well as the correlation with technical advance.

### **14.3 Information of technical and financial advance**

In accordance with the chronogram approved for the project, the support subject, through the administrative manager shall forward the technical and financial advance of each stage. This report will be prepared based on reports made by the technical and administrative manager.

The Fund will follow the CEMIE-Geo and the portfolio of projects in each stage of development. It will also track the results and profits at the end of projects, which will be considered for the granting of further support, as provided in Article 12, paragraph II, of the Law on Science and Technology, but not be determinants for granting.

During the life of support to CEMIE-Geo and its portfolio of projects, as part of the commitment of accountability established by the Federal Government, the support subject through its administrative manager shall submit financial reports at the end of each stage. The financial report must be audited by an audit firm



accredited to the Secretariat of Public Service, the opinion of the office will be the real expenditure incurred on the project of the mentioned period, the financial report of the project should consider elements to clearly verify the basis of actual expenditure by the beneficiary or beneficiaries and the eligible entry on which the support was applied.

Upon approval of the technical and financial report and its correlation, shall be deposited the following ministration for ten (10) work days after receipt of approval of the report, prior the delivery of the receipt or invoice.

#### **14.4 Semester report of activities and annual program of work**

Through the administrative manager will be sent semester reports through which the Fund will track the CEMIE-Geo and its portfolio of projects continuously and supported by progress reports for the period referred to in numeral 14.3.

Through the administrative manager will send the annual work plan with which the Fund will track the CEMIE-Geo and its portfolio of projects so as to ensure representation of the group or consortium, tracking, modification and/or correction activities of CEMIE-Geo.

#### **15 Settlement of the CEMIE-Geo and its portfolio of projects**

At the end of support to CEMIE-Geo and its portfolio of projects, it shall issue a result closing report that allows generate end indicators and submit a report on the progresses and achievements. It also must submit a financial report of the project, which must be audited by an audit firm accredited to the Secretariat of Public Service and be consistent with the technical progress. Both the closing report and financial one must be presented prior to settlement. The project settlement shall comply with the provisions of the Rules of Operation of the Trust of the Fund of Energy Sustainability.

#### **16 Conditions of support of the Fund**

The proposals that are supported by other funds regulated by the Law on Science and Technology and/or other programs of CONACYT, will not be considered eligible for this fund resources, as well as those proposed in the opinion of the Technical and Management Fund is considered as a variant of previous proposals.

No proposals will be evaluated when the support subject takes noncompliance with CONACYT funds or programs.

Not take into account the proposals of groups whose members submit report debts or unresolved conflicts with CONACYT or any of the Funds managed or supported in any form by CONACYT.





## 17 Other Obligations and commitments of the support subject

It is the obligation of support subjects of the Fund to provide the information required by the Integrated System of Information on Scientific and Technological Research (SIICYT for its acronym in Spanish) as well as any information required by the Fund. In all cases, will be respected the issues of confidentiality and intellectual property required.

It is also obligation of the support subject to lead a simplified and independent accounting to allow the identification of resources added to the supported projects.

Also, the support subject must meet the commitments referred to in numeral III of the basis of convocation as well as commitments for the project tracking of numeral 14 of these TdR.

## 18 Confidentiality and information handling

The information that is received as a result of this convocation is subject to the provisions of the Federal Law of Transparency and Access to Government Public Information, so that documentation should be classified as confidential or proprietary, it must be expressly identified as such in the application. The incorporation of sensitive or confidential information, and the consequences of their possible exposure to third parts, is the sole responsibility of the proponent, if the proponent does not issue the specification of sensitive or confidential information, it shall be considered public. Persons having custody or handling confidential information shall be required to keep with that quality. Those who fail to comply with this provision shall be punished in accordance with the provisions of applicable administrative and criminal laws.

The Fund will establish the necessary mechanisms to ensure confidentiality of the information contained in the proposals, both in the assessment phase and follow-up.

Assessors and members of the Evaluation Commission and the Technical and Management Committee of the Fund and, generally any person involved in the process of receiving and evaluating proposals, agree not to communicate, reproduce and/or distribute by any means, or keep in their possession, the material that is subjected for their consideration, agreeing to maintain absolute secrecy regarding the information that is handled in the same. Failure of this entry shall be punished according to the terms of the first paragraph of this section.

In accordance with Article 15 of the Law on Science and Technology, the support subjects are required to provide information required by the Integrated System of Information on Scientific Research, Technological Development and Innovation and give credit to the Fund in proposals, publications, materials for conferences, displays, video tapes and any deliverable or information resulting from the support.

The results of the projects must be always available for the Fund that will respect the confidentiality, intellectual property rights and guidelines emanating from the Transparency Federal Law and Access to Government Public Information.



## **19 Intellectual property (PI for its acronym in Spanish)**

The Fund does not reserve any right of intellectual property associated to the project, so the same will belong to the support subjects.

## **20 Penalties, suspension, cancellation and completion anticipated of supports**

The actions of suspension, cancellation, termination anticipated and other penalties that apply to the support subject for non-compliance with the provisions of this present convocation and other regulations applicable to the Fund, are set in section XII of the Rules of Operation and in the resource allocation agreement for that purpose held by the support subject with the Fund.

## **21 Revisions and audits**

The Fund may conduct reviews, site visits and selective audits to verify at any time during the execution of the project portfolio, the information submitted by the support subject, the fulfillment of its obligations and the correct application of economic resources granted. If detected that the information provided includes false and/or incorrect information, for reasons directly attributable to the support subject, this will result in immediate cancellation of the project at any stage of the proposed program and the support subject will be permanently unable to receive future support from CONACYT and Fund, agreeing to reimburse the total resources from written request to be formulated for this purpose.

## **22 Non-anticipated situations**

Situations not covered in this convocation will be resolved by the Technical and Management Committee of the Fund.

The decisions of the Technical and Management Committee are final.

The information that is received as a result of this convocation is subjected to the provisions of the Federal Law of Transparency and Access to Government Public Information, so that documentation should be classified as confidential or proprietary, it must be expressly identified as such by the requesting institution, group or association.

## **23 Prohibition for political or electoral ends**

Commitments arising out of the Fund and its convocations are the result of permanent and public programs, which are not sponsored or promoted by any political party and its resources come from fees paid by the taxpayers.

It is prohibited from using all or part of the content and scope of the convocation and the Terms of Reference that are part of it, and supported projects and their results for political and electoral ends, profit, and other than those established in thereof.





The terms of the present convocation obey the legal dispositions derived from the Law of Science and Technology and its Normative Instruments, so that the emitted results could only be questioned within the framework that are indicated in the present Bases and Terms of Reference.

## 24 Glossary of terms

The term glossaries of these terms of reference are established in the Rules of Operation of the Trust.

- **CEMIE-Geo:** Mexican Center of Innovation in Geothermal Energy
- **Agreement of resource allocation:** The legal instrument that subscribes the support subject with the Fund through the fiduciary, to formalize the granting of the resources for the execution of a project, where the terms and conditions of the support are shaped.
- **Company:** Public or private, Mexican or foreign company, that concurs the project.
- **Broadcast:** Of scientific and technological knowledge and its entailment with the servicing and productive sectors.
- **Fund:** The Sector Fund CONACYT-SENER- Energy Sustainability
- **Training:** Training of researchers and technologists to solve fundamental national problems, that contribute to the development of the country and to elevate the well-being of the population in all aspects.
- **Innovation:** To generate a new product, design, process, service, method or organization or to add value the existing ones.
- **Research:** That one that includes the scientific, basic and applied research in all the areas of the knowledge, as well as the technological research.
- **Technological packages:** set of elements (package), necessary for scientific and/or technological developments tested and validated at laboratory or pilot plant may be authorized, sold or transferred through a business, legal and technological strategy, to facilitate commercial exploitation and/or assimilation into the sector or user sectors.
- **Proponent or applicant:** The natural or legal people that based on this convocation and/or the provisions of Article 254 Bis of the Federal Law of Rights represent in consideration of the Fund a proposal.
- **Proposals:** The support requests that according to this convocation present the applicants and that are susceptible to receive support by the Fund.
- **Project:** Set of activities targeted to the achievement of a final target and that is associated to time parameters (chronogram of activities), cost (budget and cash flow), as well as originality, relevance and quality (securing of the knowledge generation, fulfillment of goals and process severity).
- **Group or association:** Collaborative network that includes work groups where there is a participation of a Research Center or Higher Education Institutions with at least one private company.
- **Area:** It refers to energy area-energy sustainability.
- **Support subject:** Higher Education Institution or Research Center both public or private of the country that acts like institution leader of the CEMIE and that is responsible to the Fund to meet all the commitments agreed to in the resource allocation agreement.
- **Entailment:** Between the scientific and technological research with the servicing and productive sectors that impact the improvement of the productivity and the competitiveness of the national industry



## 25 Listing of acronyms and abbreviations

- *CFE*: Federal Commission of Electricity
- *CONACYT*: National Board of Science and Technology
- *CV*: Curriculum vitae
- *Fund*: Sector Fund CONACYT-SENER of Energy Sustainability
- *IDTI*: Research, Technological Development and Innovation
- *Mb*: Megabytes (106 bytes)
- *PDF*: Portable Document Format (Document format of Acrobat Adobe)
- *RENIECYT*: National Registry of Scientific and Technological Institutions and Companies
- *SENER*: Secretariat of Energy
- *TdR*: These Terms of Reference of the convocation CEMIE-Geo.

## 26 Contacts

In case of doubts or questions about this convocation, call to:

Fund of Energy Sustainability

[ayudasustentabilidad@conacyt.mx](mailto:ayudasustentabilidad@conacyt.mx)  
[ayudasustentabilidad@energia.gob.mx](mailto:ayudasustentabilidad@energia.gob.mx)  
53227700 ext 5504, 5417, 5313 and 5920  
50006000 ext 2021 and 2159

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MEXICO CITY JULY 27TH 2012







## **Sector Fund CONACYT-SENER-ENERGY SUSTAINABILITY**

### **CONVOCATION**

#### **CONACYT - SENER - ENERGY SUSTAINABILITY - 2012 - 01 MEXICAN CENTER OF INNOVATION IN GEOTHERMAL ENERGY**

The Law for the Leveraging of the Renewable Energies and the Financing of Energy Transition (LAERFTE for its acronym in Spanish) establishes that for the year 2026 the participation of the non-fossil sources in the electricity generation will be of 35%. For this reason, it is required to increase the participation of renewable technologies like a key factor for the Energy Security and Environmental sustainability. This makes necessary to diversify the power sources and to diminish the fossil fuel dependency and the gas emissions of greenhouse effect.

The above is consistent with that indicated by the Special Program of Science, Technology and Innovation 2008-2012 published on September 26, 2008 in the Official Journal of the Federation (the Program), that establishes for the energy sector the necessity to finance projects of scientific research, technological development and innovation, formation of specialized human resources, strategic alliances, as well as the formation of new groups of investigation and development of advanced technologies in compatible areas like sustainable development, alternative methods of renewable and non-renewable energy, hydrocarbon extraction, advanced technologies and emergent matters, among others. In this way, it will foment the transference of advanced technologies and the collaboration between institutions and investigators at national and international level in the matter.

Based on this Program, the SENER and the CONACYT have decided to support, through Sector Fund CONACYT-SENER- Energy Sustainability, the setting of the Mexican Centers of Innovation in Energy (CEMIEs for its acronym in Spanish).

For the fulfillment of these aims, the SENER and the CONACYT, through Sector Fund CONACYT-SENER- Energy Sustainability.

### **SUMMON**

to the Institutions of Higher Education and Research Centers both public and private enrolled in the National Registry of Institutions and Scientific and Technological Companies (RENIECYT for its acronym in Spanish) effective to the shipment of the proposal so that, in group form or association with public or private companies, they present proposals for the setting of a multidisciplinary alliance in the area of geothermal energy.

The proposal must be presented by a Higher Education Institution or Research Center both public or private of the country in the name of the group or association<sup>1</sup>. In case the proposal is selected, this Institution or Research Center will be the support subject and the responsible to the Fund, having to coordinate the activities of the members of the group or association. Only an association or group of the convocation will be selected like a winner.

<sup>1</sup> Art. 254 bis, Law Federal of Rights



## I. Bases of the convocation

The intention of the convocation is the setting of a multidisciplinary alliance in technology formed by a group or association integrated by Institutions of **Higher Education and/or Research Centers both public and private**, with companies and/or associations also public or private for the development of compatible activities to the objectives before raised in the matter of geothermal energy. This alliance will be recognized like the **Mexican Center of Innovation in Geothermal Energy (CEMIE-Geo)**.

With this in mind, the Higher Education Institution or Research Center both public or private, in association with the company, group of companies or associations will develop technological projects in order to be the most important instance in the matter of geothermal energy of the country. In this way, it is intended to create the conditions so that the CEMIE-Geo has the economic resources, of infrastructure and humans to solve technological problems and to provide the plans specialized in the matter of geothermal energy.

The granted economic support through this convocation will serve to I) develop the projects necessary to take care of the specifics demands, II) expand the capacities of scientific and technological research, III) form specialized human resources with emphasis in the technological area and, IV) joint the academy with the industry.

This convocation includes the Terms of Reference that are an integral part of the same.

## II. Eligibility

May participate the Institutions of Higher Education and Research Centers of the country, both public and private currently enrolled in the RENIECYT, in collaboration with companies, associations and others. The **group or association** must be conformed at least by a Higher Education Institution and/or a Research center both public or private, and at least one public or private company. The group or association could be shaped by more Institutions referred in the intention of the convocation. The group or association will be represented by an Higher Education Institution or Research center, which will be the direct responsibility to the Fund, of the fulfillment of the agreed commitments, and will be the one who will receive the resources assigned to the project.

In no case, the Institution or Center representing the group or association who has been approved will be able to appear like a direct responsibility to the Fund of other Mexican Centers of Innovation in Energy.

## III. Commitments

The approved proponent will commit:

- To appoint a technical manager and an administrative manager, who will act like guarantors of the operative and strategic performance of the CEMIE-Geo respectively; both responsible will be to CEMIE-Geo as a whole and its activities.
- To dedicate the necessary technical and operative crew for the good performance of the CEMIE-Geo;
- To enunciate the necessary infrastructure and equipment of laboratories that will make available the integral institutions of the group or association for the operation of the CEMIE-Geo;





- d. In the case of proposals that consider expenses in infrastructure by means of this convocation related to the CEMIE-Geo and the portfolio of projects, this one must be available for the shared leveraging of the members of the selected group or association, covering the requirements that the benefitted institution establishes, responsible for its operation and maintenance and that are decided by the association.
- e. To train the technical staff needed to manage the infrastructure, equipment and/or accessories purchased with the support;
- f. To promote among the national scientific community the use of infrastructure and equipment supported by this convocation;
- g. To Submit a semiannual report of the job status, development, results and the implementation of resources, as well as a self-assessment in accordance with the approved general project plan;
- h. To submit an annual work program;
- i. To demonstrate the contribution of CEMIE-Geo to the formation of specialized human resources, innovation, technology transfer and training for technology companies as set out in the general project plan.

#### IV. Important dates

- Meeting of explanations: The dates for the celebration of the meetings of explanations will publish in the web pages of the CONACYT and SENER.
  - The first meeting will carry out on July 4, 2012 at 17:00 hrs (time of the center of the country) in the Room Fernando Hiriart, Secretariat of Energy, Insurgentes Sur 890-PB, Col. del Valle, C.P. 03100, Mexico D.F. Confirm attendance with Ms Ana Bethlehem Vázquez, tel. (55) 5000-6000, ext. 2021, or the e-mail: [abvazquez@energia.gob.mx](mailto:abvazquez@energia.gob.mx).
- Reception of proposals: Until August 17, 2012 at 18:00 hrs (time of the center of the country)
- Publication of results: as of the month of October, 2012 in the following web pages: [www.conacyt.mx](http://www.conacyt.mx) and [www.energia.gob.mx](http://www.energia.gob.mx)

#### V. Use of the convocation

- The present convocation will be effective as of the date of its publication in the electronic page of the CONACYT and the SENER and until August 17, 2012.

Issued in the city of Mexico, D.F., day 22 of June of 2012

I, REBECCA VIRGINIA MADRIGAL ÁLVAREZ, EXPERT TRANSLATOR, DULY AUTHORIZED BY FEDERAL JUDICIARY COUNCIL, AS PUBLISHED IN THE MOST RECENT UPDATE OF THE JUDICIAL BULLETIN DATED NOVEMBER 22ND 2011 UNDER REGISTRATION NUMBER P-185-2002, DO HEREBY CERTIFY THAT THE FOREGOING TRANSLATION FROM SPANISH TO ENGLISH, CONTAINED IN 3 PAGES IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE AND CORRECT.

MEXICO CITY JULY 23TH 2012

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## ATTACHMENT A - SPECIFIC DEMANDS OF THE MEXICAN CENTER OF INNOVATION IN GEOTHERMAL ENERGY

### GEOTHERMAL

**Topic 1.** Generation of electricity with geothermal energy extracted from hydrothermal and geothermal repositories of high enthalpy. ( $T > 200^{\circ}\text{C}$ ).

#### DEMANDS

1. Elaboration of gradient maps and thermal flow of the Mexican Republic using the existing information in different sources (PEMEX, CFE, CNA, mining companies, Universities).
2. Development and refinement of the techniques of gravimetric, gradiometric and magnetotelluric prospection in the geothermal exploration that includes demonstrative field projects.
3. Development, with the industry of the perforation, of technologies of chemical, thermal and hydraulic stimulation of geothermal wells to increase the permeability that includes demonstrative field projects.
  - ✓ Exploratory well perforation in geothermal zones of the Ejido Nuevo Leon and Cuitzeo with techniques of hydraulic and acid stimulation or combination.
  - ✓ Stimulation by means of hydraulic and chemical fracturing of the well H-21, H-24 in the Cg, the Smoking Chambers and Az-14D in the Sulphurs.
  - ✓ Demonstrative project of multilateral perforation of the wells H-40 and Az-53.

**Topic 2.** Generation of electricity with geothermal energy extracted from hydrothermal and geothermal repositories of median and low enthalpy. ( $T < 200^{\circ}\text{C}$ ).

#### DEMANDS

1. Development, with the industry, of a prototype of pumps for geothermal wells of median and low enthalpy, that simplify the operation and maintenance.
2. Comparative study and development, with the industry, of a prototype of advanced heat exchangers for plants of generation of binary cycle, that are more efficient, than diminish the incrustation problems and lower the costs.
3. Comparative study and development, with the industry, of a prototype, of bottomhole heat exchangers, with materials and novel geometries, that are more efficient, and that diminish the incrustation problems.





## ATTACHMENT A - SPECIFIC DEMANDS OF THE MEXICAN CENTER OF INNOVATION IN GEOTHERMAL ENERGY

4. Comparative study and development, with the industry, of a prototype of small plants of electrical generation with fluids of low enthalpy, that improve the efficiency, simplify the operation and maintenance and lower the costs.

**Topic 3.** Generation of electricity with geothermal energy extracted from repositories of very low permeability or hot dry rock.

### DEMANDS

1. Elaboration of the map of geothermal provinces of the Mexican Republic that serves as a guide for the exploration and development of the conventional geothermal resources and dry rock.
2. Studies and development of technology (demonstrative project) that make the use viable and economic of geothermal resources in fields of low permeability or hot dry rock. To use wells already perforated with hydrothermal resources.
  - ✓ Zone of Acapulco
3. Development of alternative processes of provision of anthropogenic CO<sub>2</sub>, in combination with the geothermal heat extraction in dry rock systems.

**Topic 4.** Use of the geothermal heat of median and low enthalpy for different applications like climate conditioning (heating and cooling) from spaces, heating of greenhouses, heating of pools for aquaculture, mineral and agricultural product drying and industrial uses, water desalination and balneology and therapy.

### DEMANDS

1. Feasibility studies and development of demonstrative projects of the use of the geothermal heat in non-electrical applications in the agro-industry.
2. Feasibility studies and development of demonstrative projects of the use of the geothermal heat in non-electrical applications, conditioning of residential spaces.
3. Feasibility studies and development of demonstrative projects of the use of the geothermal heat in non-electrical applications in process industries.
4. Comparative studies of the use of conventional technologies and heat pumps, as well as of the potential market, for the conditioning of residential and commercial spaces in the North region of the country, that include demonstrative projects.

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MEXICO CITY JULY 23rd 2012



**ATTACHMENT B - SPECIFIC DEMANDS FOR SCHOLARSHIPS OF THE MEXICAN CENTER OF INNOVATION IN GEOTHERMAL ENERGY**

**GEOTHERMAL - SCHOLARSHIPS**

**DEMANDS**

**Topic 1.** Generation of electricity with geothermal energy extracted from hydrothermal and geothermal repositories of high enthalpy.

1. To train investigators who dedicate themselves to refine the techniques of acquisition of data in field of processing and modeling in two and three dimensions.
2. To train investigators who dedicate themselves to study techniques of geothermal prospection in order to obtain one better definition of the depth structures.
3. To train investigators who allow to increase the productivity of geothermal wells with techniques like acidification or thermal shock.
4. To train investigators to avoid the specificities in the operation of geothermal plants in the matter of corrosion and incrustations in injection and steam pipes as well as in turbines.

**Topic 2.** Generation of electricity with geothermal energy extracted from hydrothermal and geothermal repositories of median and low enthalpy. ( $T < 200^{\circ}\text{C}$ ).

1. To train investigators in hydrothermal energy of hydrothermal and geothermal repositories of median and low enthalpy. ( $T < 200^{\circ}\text{C}$ ).

**Topic 3.** Generation of electricity with geothermal energy extracted from repositories of very low permeability or hot dry rock.

1. To train investigators in the area of mechanics of rocks as well as investigators in passive seismic for geothermal energy of repository of very low permeability or hot dry rock.

**Topic 4.** Use of the geothermal heat of median and low enthalpy for different applications like climate conditioning (heating and cooling) from spaces, heating of greenhouses, heating of pools for aquaculture, mineral and agricultural product drying and, industrial uses, water desalination and balneology and therapy.

1. To train investigators in the geothermal heat use of median and low enthalpy for applications of climate conditioning of spaces. I, REBECCA VIRGINIA MADRIGAL ÁLVAREZ, EXPERT TRANSLATOR, DULY AUTHORIZED BY FEDERAL JUDICIARY COUNCIL, AS PUBLISHED IN THE MOST RECENT UPDATE OF THE JUDICIAL BULLETIN DATED NOVEMBER 22ND 2011 UNDER REGISTRATION NUMBER P-185-2002, DO HEREBY CERTIFY THAT THE FOREGOING TRANSLATION FROM SPANISH TO ENGLISH, CONTAINED IN 1 PAGE IS, TO THE BEST OF MY KNOWLEDGE AND BELIEF, TRUE AND CORRECT.

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