# R&D proposal “Large-scale type” called for in FY2019 (Form 1)

Confidentiality class2

|  |  |
| --- | --- |
| Technology Theme  | Innovative Thermoelectric conversion technologies for stand-alone power supply of sensors |
| Title of R&D project*\* about 20 words* |  |
| R&D period | Whole period: month, 2019-month, year ( years) |
| R&D Budget*\* (1)=(2)+(3)**Omit decimal point* | (1) Total R&D costs desired for the whole period (　　　　million yen) |
| (2) Total R&D costs desired for 1st to 4th year(　　　　million yen) |
| (3) Total R&D costs desired for 5th year and after (　　　　million yen) |
| Estimated fund from a sponsoring organization\* | Total amount for year fiscal - year fiscal (　　million yen) |
|  | *\*Be sure to see “2.2.1 (3) 8), Stage gate evaluation”* |
| Name of R&D Representative (PM) |  |
| Affiliation, Department and Title |  |
| Conflicts of Interests with R&D supervisor*\* Check* | Conflicts of interests with R&D supervisor Yes □ No □*\* If “Yes,” describe contents in Form 5 “5. other”* |
| Conflicts of interest with R&D proposer*\* Check* | Participation of R&D proposer-related organizations: Yes □ No*\* If “Yes,” describe contents in Form 3 “6. other.” For details, Check 2.3.3 (2) 2) Managing conflicts of interest of R&D proposer in the Application Guideline.* |
| Researcher number | *\*Enter the 8-digit “e-Rad” login ID number which is provided by registering researcher information on the The Cross-ministerial Research and Development Management System (e-Rad)* |
| Information on R&D representative (PM) | URL: Author ID: *\* URL if website (lab website, researchmap page) available for information on Project Leader, or ID if ORCHID ID, Researcher ID, or SCOPUS author ID is known* |

# Basic information on the R&D representative (Form 2)

|  |  |
| --- | --- |
| Name |  |
| Nationality/gender |  | Birth date (A.D.) |  |
| Affiliation, title |  |  |
| Address |  |
| Academic history(after graduation from college) | Academic history:*(Filling-in example)**OO year OO university OO department graduation**OO year OO graduate school OO department master’s course**OO major**OO year OO graduate school OO department doctoral course OO major**OO year Ph.D. (OO major) (OO university)* |
| Research history(main history and research contents) | Job history:*(Filling-in example)**OO year-OO year OO Co., Ltd OO R&D department (development of OOOO)**OO year-OO year OO university special associate professor (research on OOOO)**OO year-OO year OO Co., Ltd OO department (in charge of OO)* |
| Other special matters | *(voluntary description on social contributions, international**activities)* |
| Information on quality and knowledge #1 | *(major experience, achievement related to management of R&D aiming for commercialization or converting advanced technologies to business)* |
|  |
| Information on quality and education #2 | (reason why the applicant qualifies as PM this project seeks) |
| *\* See “5. Are the quality and achievements of the Project Manager appropriate?" in “2.2.2 (5) Selection viewpoints” when filling in here.* |
| Effort after adopted as PM | 　　　% (planned) |

# R&D proposal document, comprehensive ideas (Form 3)

*\* Be sure to check Application Guideline “2.2.5 (5), Selection viewpoints” and “Appendix Application Guideline, Chapter 6 “Management policies for projects in Large-scale type.”*

**1. The POC to be achieved by this R&D project**

*\* Provide a simple and clear description of the POC\*to be reached during the entire R&D period. The description must include enough detail to allow for an objective assessment of success or failure.*

 *\* A stage for the society and industries to be able to judge practicability (proof of concept; POC)*

**2. Reasons for establishing the POC for this R&D project**

*\* Quantitatively and specifically, describe your reasons for setting this POC as a goal to be reached within a R&D period, in accordance with the questions below:*

*- What problem needs to be worked on right now to demonstrate and achieve technological or social or industrial insights? Describe the historical context and reasons for setting this problem.*

*- What values, or social and economic impacts, will be created in Japan and overseas, when this problem is solved (social implementation of the POC)*

*- Is this a high-risk high impact project with a challenging technological theme that could not be approached by any other program? Does it aim for stand-alone innovation, rather than slow progress?*

*\* Summarize “1. The POC that will be achieved through this R&D project” and the items of this article and describe it in “research objective” section of the e-Rad “common matters” page (in about 170 words in English).*

**3. Measures necessary for reaching POC**

*\* Provide a quantitative and specific description, taking the following into consideration:*

*- Clarify the context, background, and problems that could prevent the POC from being reached, after analyzing the situation in Japan and overseas such as the market trends, social demands, and R&D and technology trends.*

*- Take into account the above, describe the measures needed to overcome the problems that could prevent the POC from being reached. In addition, demonstrate the originality, challenge, and effectiveness of the measures used to describe recognized risks.*

***- Do not exceed four A4-size sheets (no exceptions) -***

# R&D proposal document, R&D plan (Form 4)

**1. Preparatory situation at the initiation of R&D projects**

*\* Provide specific descriptions of the preparatory situation concerning the following points, including R&D trends in Japan and overseas.*

*- Understanding problems in social implementation*

*- Understanding R&D projects and their difficulty and feasibility*

*- Checking conventional technologies and existing intellectual property rights to understand differences and the superiority of the proposed creative technology*

*- Plan to collaborate with and participate in industries toward understanding and solving problems and reaching the POC*

**2. Detailed R&D plan and how to proceed accordingly**

*\*Set proper milestones (timing, contents) including how and when R&D will be carried out and describe a quantitative and specific progress schedule including the following points:*

*- Approaches to problems in social implementation*

*- Approaches to technological problems*

*- Timing and contents of fund introduction from funding organizations*

*- Understanding pertinent research and technology trends and evaluation followed by application to a necessary extent*

*\* Summarize contents here concisely to describe the summary in the “research outline” of e-Rad “common matters.”*

*(in about 170 words in English)*

**3. Ideas for the creation, protection, and utilization of intellectual properties**

*\* Concisely describe basic ideas of PM regarding intellectual properties for the items below:*

*(1) Basic ideas of PM about which team of which members are to be built for managing intellectual properties*

*(2) Basic ideas for classifying research results created by this project as intellectual properties, and basic ideas about announcement or non-disclosure of the subjects*

*(3) Basic ideas about obtaining rights, maintenance (including required funds), abandonment, and transfer of intellectual properties during and after the execution of this project*

**4. Management policies for R&D carried out by PM**

*\* Concisely describe how to manage R&D to maximize results for each of the following:*

(1) Method for managing progress, policies for information management

(2) Policies for forming a joint research group

*\* Method of group formation, how to manage competition and cooperation among groups*

(3) Policies for social implementation including industries

(4) Policies for improving or altering the track for R&D, introducing new findings and technologies, and developing achievements

***- Form 4 should not exceed 10 pages including figures and tables -***

# Team to conduct R&D (Form 5)

**1. Idea for R&D team**

*\* Describe major R&D organizations highly expected to participate and the timing of their participation, their roles, needs, and the main joint researchers expected to participate. Describe research organizations expected to participate in the future and the timing of their participation to the extent possible. Also describe R&D groups to be given roles through public calls for participation after R&D initiation.*

*In addition, provide special descriptions concerning important points about major joint researchers and R&D organizations planning to participate, such as top-level R&D capabilities and findings in Japan.*

**2. Ideas for support system of R&D organizations**

*\* Describe support policies and systems of the leading research organizations expected to surely participate that will allow R&D to proceed effectively and efficiently and allow researchers to concentrate on R&D tasks. In addition, describe the leaders and the departments in the organizations that approve the support.*

**3.** **Schematic illustration of an R&D team**

*\* Illustrate an R&D team (Clearly show the initial and future teams. Correct the illustration according to the proposed ideas and plans for R&D as appropriate. The illustration below is provided for reference.)*

Joint Research Group c

From FY2019 participation (by open call)

**4. R&D team**

**(1) Team of R&D representative (PM) group**

|  |  |  |  |
| --- | --- | --- | --- |
| Name of R&DRepresentative | Name of Research Organization1) | Title | Effort2) |
| *OO OO* | *OO university* *graduate school OO department OO major* | *Professor* | *10%* |
| Name of R&DParticipant3,4) | Affiliation (omit if same as above5 | Title |
| *OO OO* |  | *Professor* |
| *OO OO* |  | *Associate professor* |
| *OO OO* |  | *Lecturer* |
| *XX XX* | *XX Co., Ltd., XX Institute*  | *Chief Researcher* |

1. *If adopted research is to be carried out at an organization different from the present affiliation, describe the former and inform us as a special matter.*
2. *Describe effort in percentage for ratio (%) of time distributed to the research relative to 100% for the whole annual work hours of the researcher (not only including research activities, but education and therapeutic activities).*
3. *Adequately examine the roles of research group members.*
4. *Add lines for research participants. A description like “00 researchers” is acceptable if their names are not definitely known.*
5. *In case a number of organizations need to approach the same research project, the addition of members of other organizations as research participants is acceptable.*
	1. **Role of the relevant group in R&D ideas**
	2. **R&D outline**
	3. **Special matters**

*-If special duties (managing position such as head of department or chairman of an academic association) demand work hours (effort), describe the situation and reasons.*

**(2) Team of lead joint researcher “a”**

*- Describe in this form 5 each joint research group (joint research organization) besides the organization that the research representative is affiliated with. Describe all the joint research organization which concludes an R&D agreement with JST and is planned to be allocated R&D costs.*

*- A joint research group may include various research organizations from industries, universities, and the government.*

*- No upper limit is set on the number of R&D groups. However, compose a team that is optimal, necessary, and adequate for carrying out the research ideas of the research representative. In forming a team, select R&D organizations and researchers through proper methods such as nomination and public calling for recruiting top-level R&D capabilities and knowledge in Japan.*

*- A team in which the main joint researcher does not play a central role or roles and the position of the joint research group is not clear is not an adequate R&D team.*

*- Add or delete tables depending on the number of groups.*

*- There is no need to describe names, affiliations, or titles of participants. However, provide clearly understandable descriptions of the number of participants. In addition, describe in special matters the timing of the call for proposals and what kinds of organizations and researchers are expected.*

**Joint research group “a”** *(example)*

|  |  |  |  |
| --- | --- | --- | --- |
| Name of main Joint Researcher | Name of joint R&D Organization 1) | Title | Effort2) |
| *OO OO* | *OO Institute OO Department OO team* | Team Leader | *10%* |
| *Researcher number6): 12345678**Research organization code7): 1234567890* |
| Name of R&D Participant3,4) | Affiliation (omit if same as above) | Title |
| *OO OO* |  | *Chief Researcher* |
| *OO OO* |  | *Researcher* |
| *Plan to employ two*  |  | *Special Researcher* |
| *XX XX* | *XX Co., Ltd. X Institute* | *Chief Researcher* |

*See the prior page for 1)– 5).*

1. *Include the eight-digit researcher number for the main joint researcher that was granted when the researcher’s information was registered in the R&D management system common to ministries (e-Rad [http://www.e-rad.go.jp/]).*
2. *Describe the code for affiliated research organizations of the R&D management system common to ministries (e-Rad [http://www.e-rad.go.jp/]).*

**(2-1) Role of the group in R&D ideas**

**(2-2) R&D outline**

**(2-3) Special matters**

*-When forming the group through public call outs, input the timing and characteristics of expected organizations and researchers.*

*-If special duties (managing positions such as the head of department, chairman of an academic association) demand work hours (effort), describe the situation and reasons.*

**(3) Other participating R&D organizations** (\*)

|  |  |  |
| --- | --- | --- |
| Name of R&D participant3,4) | Affiliation | Title |
| *OO OO* | *OO Institute OO Department OO team* | *Chief Researcher* |
| OO OO |  | *Researcher* |
| *XX XX* | *XX Co., Ltd. XX Institute* | *Chief Researcher* |

*\* Business firms and universities that have not signed an R&D agreement with JST but collaborate and cooperate with research groups that have concluded an R&D agreement with JST.*

**(3-1) Roles of participating organizations in R&D ideas**

**5. Other**

*\* If there are conflicts of interest with the R&D supervisor, describe the specific contents. In addition, if there are conflicts of interest with the R&D proposer of this proposal, describe the specific contents. Check (2) Managing the conflicts of interest (persons engaged in selection) in the Application Guideline “2.3.3 Selection method” for the definition of conflicts of interest.*

# R&D budget (Form 6)

*- Fill in this form for a research expense plan by account for each R&D group separately for every fiscal year.*

*- A more detailed research expense plan needs to be submitted at the time of the selection interview.*

*- Research expenses may be reviewed at the time of adoption or during the research period, depending on the total budget situation, management by the R&D supervisor, and project evaluations.*

*- Form an optimum R&D team that is necessary and adequate for realizing the research ideas of the R&D representative (PM). The R&D group needs to be indispensable to the realization of research ideas and must be able to make great contributions to the goal.*

**○ R&D plan by account (for a whole team)** *(example)*

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *(Fill-in example)* | 1st year(2019 Nov. -2020 Mar.) | 2nd year(2020 Apr. -2021 Mar.) | 3rd year(2021 Apr. -2022 Mar.) | 4th year(2022 Apr. -2023 Mar.) | Total(million yen) |
| DirectExpenses | Equipment | *196* | *196* | *196* | *196* | *784* |
| Supply | *60* | *60* | *60* | *60* | *240* |
| Travel | *4* | *4* | *4* | *4* | *16* |
| Personnel & Gratitude(number of researchers) | *22 (4)* | *22 (4)* | *22 (4)* | *22 (4)* | *88* |
| Other | *26* | *26* | *26* | *26* | *104* |
| Direct cost total | *308* | *308* | *308* | *308* | *1,232* |
| Indirect costs | *92* | *92* | *92* | *92* | *368* |
| Subtotal | *400* | *400* | *400* | *400* | *1,600* |
| Estimated fund introduction by fund introducing organizations | *0* | *0* | *0* | *0* | *0* |
| Total (million yen) | *400* | *400* | *400* | *400* | *1200* |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| (Fill-in example) | 5th year(2023 Apr.-2024 Mar.) | 6th year(2024 Apr.-2025 Mar.) | 7th year(2025 Apr.-2026 Mar.) | 8th year(2026 Apr.-2027 Mar.) | 9th year(2027 Apr.-2028 Mar.) | Last year(2028 Apr.-2029 Mar.) | Total(million yen) |
| Directexpense | Equipment | *294* | *294* | *294* | *294* | *294* | *294* | *1,764* |
| Supply | *60* | *60* | *60* | *60* | *60* | *60* | *360* |
| Travel | *4* | *4* | *4* | *4* | *4* | *4* | *24* |
| Personnel & Gratitude(number of researchers) | *24 (4)* | *24 (4)* | *24 (4)* | *24 (4)* | *24 (4)* | *24 (4)* | *144* |
| Other | *26* | *26* | *26* | *26* | *26* | *26* | *156* |
| Direct cost total | *408* | *408* | *408* | *408* | *408* | *408* | *2,448* |
| Indirect cost | *122* | *122* | *122* | *122* | *122* | *122* | *732* |
| Subtotal | *530* | *530* | *530* | *530* | *530* | *530* | *3,180* |
| Estimated fund introduction by fund introducing organizations | *133* | *133* | *133* | *133* | *133* | *133* | *798* |
| Total (million yen) | *663* | *663* | *663* | *663* | *663* | *663* | *3,978* |

*\* Accounts for R&D budgets are given below.*

*Equipment: expenses for purchasing equipment*

*Supply: expenses for purchasing supplies*

*Travel: travelling expenses for the R&D representatives and participants*

*Personnel, gratitude: personnel costs for researchers, engineers, research aides, RA (\*), gratitude*

*\* See Application Guideline (4.15 Improving the treatment of (latter-stage) doctoral students) for RA (research assistant).*

**○ Research expense plan by research group**

*Form an optimum R&D team that is necessary and adequate for realizing the research ideas of the R&D representative. The joint R&D group needs to be indispensable to the realization of research ideas and must be able to make great contributions to the goal.*

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *(Fill-in example)* | 1st year(2019 Nov.-2020 Mar.) | 2nd year(2020 Apr.-2021 Mar.) | 3rd year(2021 Apr.-2022 Mar.) | Total(million yen) |
| R&D representative GOO university | *20* | *40* | *25* | *145* |
| Joint research G-aXx university | *20* | *30* | *10* | *80* |
| Joint research G-bXx institute | *17* | *24* | *9* | *75* |
| Total direct costs |  |  |  |  |
| Indirect costs |  |  |  |  |
| Total(million yen) | *57* | *94* | *44* | *300* |

**〇 Major facilities to be utilized (name of instrument, installation site)**

**〇 Major facilities planned for purchase**

(more than JPY 5,000,000 for every order, name of instrument, approximate cost)

*(example)*

Group A:

 XXXXXXXXX 15,000 thousand yen (Purchase fiscal year )

 XXXXXXXXX 5,000 thousand yen (Purchase fiscal year )

 XXXXXXXXX 10,000 thousand yen (Purchase fiscal year )

Group B:

 XXXXXXXXX 7,000 thousand yen (Purchase fiscal year )

 XXXXXXXXX 10,000 thousand yen (Purchase fiscal year )

# List of achievements, results of evaluation at completion,

# list of patents (Form 7)

**1. Main papers and books related to this R&D proposal (15 reports or less)**

*\* Describe items below for papers (the same applies to books).*

*\* Place a “●” mark in front of a paper cited in Form 4.*

1. Main papers and books by R&D representative (PM)

*\* Authors (all authors), name of the paper, journal, volume, page, year*

1. Main papers and books by the joint researcher(s)

*\* Authors (all authors), name of the paper, journal, volume, page, year*

**2. Papers and books besides those stated above (30 reports or less)**

(1) Main papers and books by the R&D representative (PM)

(2) Main papers and books by a joint researcher

**3. Evaluation at the completion of the research project of another competitive funding system for which the R&D representative served as a representative**

(only those disclosed after fiscal year 2014)

**4. List of intellectual property rights related to this proposal**

*\* Place a “●” mark in front of each of the important intellectual property rights*

*\* See “Basic policies for managing intellectual properties” （https://www.jst.go.jp/contract/download/2019/2019mirais305manua180401.pdf）for*

*specific subjects and definitions.*

# Other Funding Supports (Form 8)

*\* If the Principal Investigator (PM) and Lead Joint Researchers are receiving, applying for, or planning to apply for alternative funding systems or other research subsidies (including from private foundations or overseas organizations), describe the research title, research period, role, amount of research expenses received, and efforts made thus far for each of system or subsidy. Also, see Application Guideline “4.2 Measures to address unreasonable duplication and excessive concentration.”*

*\* If a description is found to be false, an adopted proposal may be cancelled later.*

*\* If, during the selection process for this R&D proposal, a description in this form requires alteration because the research subsidies applied or planned to be applied for, as mentioned above, have been altered, correct this form and send a notification e-mail to the contact details provided at the end of these application requirements.*

*\* Copies of the application documents and plans submitted to other systems may be requested during the selection interview.*

*(example)*

**Project leader: *XX XX (name)***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name of program | Situation | Name of research projects(name of representative) | Researchperiod | Role(representative/shared role) | Received R&D budget(1) (whole period)(2) (FY2020)(3) (FY2019)(4) (FY2018) | Effort(%) |
| JST-Mirai Program (this Proposal) | applied |  |  | representative |  |  |
| *Grant-in-Aid for Scientific Research(S)* | *received* | *◊◊ creation by xx**(OOOO)* | *2017Apr.-2021 Mar.* | *representative* | *(1)100 thousand yen**(2)50 thousand yen**(3)25 thousand yen**(4) 5 thousand yen* | *20* |
| *JST Strategic Basic Research Programs**CREST* | *applied* | *◊◊ upgraded function by xx**(OOOO)* | *2019 Oct.**-2024 Mar.* | *shared role* | *(1)140 thousand yen**(2)35 thousand yen**(3) 8 thousand yen**(4) -* |  |

*\* List, in descending order of the amounts received (over the entire period), subsidies received or expected to be received. Then, describe subsidies applied for and those that you plan to apply for, if applicable.*

*\* If a subsidy is being received or you expect to receive it, enter “received.” Enter “applied” if you have applied for but not yet received a subsidy or if you plan to apply for a subsidy.*

*\* Describe representative or shared duties under “role.”*

*\*Describe the amount (direct costs) to be received by the research representative her/himself under “research expenses received by the research representative.”*

*\* Describe the distribution ratio of the time required to perform the research relative to 100%, which represents total annual work hours (including not only time for research activities but also educational and therapeutic activities) under “effort” [as defined at the Comprehensive Science, Technology, and Innovation Convention]. Only account for efforts expended or planned to be expended on the presumption that a proposal is adopted by JST-Mirai program, not efforts made in regard to proposals submitted to other research organizations, such as those applied to or those planned to be applied to. The total efforts made during the entire R&D period and efforts made toward subsidies being received should not exceed 100%.*

*\* Add or delete lines as necessary.*

*(example)*

**Lead Joint Researcher *a*: *XX XX (name)***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name of program | Situation | Name of research projects(name of representative) | Researchperiod | Role(representative/shared role) | Received R&D budget(1) (whole period)(2) (FY2020)(3) (FY2019)(4) (FY2018) | Effort(%) |
| JST-Mirai Program (thisProposal) | applied |  |  | shared |  |  |
| MHLW, Grants-in-Aid for Science Research | received | ◊◊ creation by xx(OOOO) | 2017.May-2021. Mar. | representative | (1)50 thousand yen(2)20 thousand yen(3)20 thousand yen(4) 5 thousand yen | 10 |
|  |  |   |  |  | (1) thousand yen(2) thousand yen(3) -(4) - |  |
|  |  |  |  |  |  |  |

*(example)*

**Lead Joint Researcher *b*: *XX XX (name)***

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Name of program | Situation | Name of research projects(name of representative) | Researchperiod | Role(representative/shared role) | Received R&D budget(1) (whole period)(2) (FY2020)(3) (FY2019)(4) (FY2018) | Effort(%) |
| JST-Mirai Program (thisProposal) | applied |  |  | shared |  |  |
| *OO Foundation**xx Research Grants* | *received* | *◊◊ creation by xx**(OOOO)* | *2018Apr.-2020 Mar.* | *representative* | *(1)2 thousand yen**(2)0 thousand yen**(3)1 thousand yen**(4)1 thousand yen* | *15* |
|  |  |  |  |  | *(1) thousand yen**(2) thousand yen**(3) -**(4) -* |  |
|  |  |  |  |  |  |  |

# Protection of Human Rights and Compliance with Laws and Regulations (Form 9)

*\* Describe the measures and actions that you will take if your research involves compliance with the related laws and regulations (e.g. research requiring the consent and the cooperation of the other party when implementing the research plan, research requiring consideration for the handling of personal information and research requiring efforts regarding bioethics and safety measures).*

 *This applies to surveys, research, experiments which require an approval procedure in an ethics committee inside and outside the research institution, such as for example questionnaire surveys in which personal information is involved, interview surveys, the use of provided samples, analysis study of the human genome, recombinant DNA experiments, experiments on animals, etc.*

*\* When your R&D team includes an overseas joint research group, be sure to describe the preparedness on regulations concerning security export control both in PL's research group and the domestic joint research group.*

*\* Please indicate where this is not applicable.*

# References (Form 10)

*\* Provide the names of two (2) individuals who have good knowledge of your Research Project (non-Japanese person(s) are acceptable). Provide names of the reference person, institution and contact information (phone numbers and e-mail address). The evaluators (JST and R&D Supervisor) may contact them regarding the R&D proposal during the screening process.*

*\* Providing this reference information is not mandatory.*