

# REQUEST FOR PROPOSALS (RFP)

RFP Number: DSA- ENERGY AND REDEVELOPMENT #15-01

The Ohio Development Services Agency, Ohio Coal Development Office is requesting proposals for:

## **2015 Ohio Coal Research Consortium (OCRC 2015)**

- Request For Proposal (RFP) Released – January 16, 2015
- Full proposals due – February 16, 2015
- Successful projects announced – June 1, 2015
- Projects start – September 1, 2015

Submit proposals to:

Ohio Development Services Agency  
Ohio Coal Development Office  
77 South High Street  
P.O. Box 1001  
Columbus, OH 43216-1001  
Attn: *Ohio Coal Research Consortium RFP*

**This RFP consists of six (6) sections totaling eighteen (18) pages and six (6) attachments, totaling seventy eight (78) pages. Please verify that you have a complete copy.**



## SECTION I. OVERVIEW

### A. Background

Most of Ohio's coal is burned in older electric generation plants that have been retrofitted to meet existing environmental requirements. The United States Environmental Protection Agency (U.S. EPA) has proposed limits on greenhouse gas emissions from new power plants and limits on existing power plants. For new power plants, the U.S. EPA is proposing that natural gas combined cycle electric generating units (greater than 850 MMBtu/H) should be limited to 1,000 pounds of CO<sub>2</sub> per MWh. Natural gas-fired combined cycle units less than or equal to 850 MMBtu/H and coal-fired units (greater than or equal to 25 MWe), would be limited to 1,100 pounds of CO<sub>2</sub> per MWh. These proposed standards can readily be achieved in natural gas-fired plants without the addition of CO<sub>2</sub> capture technology. However, coal-fired plants would be required to reduce carbon emissions by approximately 30-40 percent (depending on the cycle selected). With stricter standards for particulate matter, SO<sub>2</sub>, mercury, air toxics, NO<sub>x</sub> and new emission standards for CO<sub>2</sub> promulgated by the U.S. EPA<sup>1</sup>, the electric generation industry has been and is expected to continue to switch to natural gas as a fuel source for electric generation. The final rule for new power plants is expected in early 2015. In June, 2014, the U.S. EPA proposed separate regulations for existing power plants that aims to cut CO<sub>2</sub> emissions from existing power plants to 30 percent below 2005 levels by 2030. In the face of these and other challenges, new and expanded research is required to meet the short-term and long-term needs of the Ohio coal industry.

Principal Investigators (PI) are advised to keep current with the latest air emissions restrictions enacted or proposed by the U.S. EPA that impact electric generation, or industrial end-users, so that PI's research and work will remain relevant, including CO<sub>2</sub>, SO<sub>2</sub>, NO<sub>x</sub>, particulate matter, mercury, and toxics.

### B. Purpose

The Ohio Coal Development Office (OCDO), within the Ohio Development Services Agency (ODSA), invites interested and qualified Ohio colleges/universities to submit proposals for the 2015 Ohio Coal Research Consortium (OCRC).

ODSA operates in accordance with state statute (Ohio Revised Code Sections 1551 and 1555) – with the assistance of the Ohio Coal Technical Advisory Committee (TAC). The TAC is comprised of members who serve in both the public and private sectors, and maintain some role or interest in the use, conversion, or study of Ohio coal. Current members are listed in Attachment 4.

The OCRC was created in 1990 to support college/university research and is directed to improve the science and technology of chemical and physical processes involved in coal use.

The multi-pronged purpose of the OCRC is:

1. To address technical problems being experienced today by Ohio coal producers and end users and to improve and/or lower the cost of technologies that enable continued or expanded use of Ohio coal;
2. To improve the environmental performance of coal-based technologies and/or lower their cost of operation;
3. To generate innovative research in the field of coal use; and
4. To train a future supply of Ohio-based scientists and technologists in clean coal and emission control technologies.

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<sup>1</sup> <http://www2.epa.gov/carbon-pollution-standards>

### C. Goals and Objectives

PIs should exhibit an awareness of the anticipated environmental restrictions end users will have to meet and the cost of meeting those restrictions.

All projects should be guided by one or more the following objectives:

- Benefit Ohio coal by improving the efficiency of the coal to electricity conversion process;
- Benefit Ohio coal before combustion;
- Find novel and more economical ways to convert Ohio coal to a liquid, a gas, or chemical feedstock;
- Reduce or control the emissions resulting from the use of Ohio coal that can meet proposed emission reduction regulations; or
- Lower the cost of controls, and/or increase the effectiveness of controls that are installed on new or existing power plants that meet proposed emission reduction regulations.

With the overarching goal of:

- Generating results that will contribute toward accelerating development and supporting early stage deployment of processes or technologies that can enhance or improve the use of Ohio coal in an environmentally acceptable manner; or
- Producing and generating new ideas and processes for improvement and cost reductions of coal technologies and processes that directly benefit and have applicability to Ohio coal.

In addition to research that addresses the current and proposed environmental regulations which limit air emissions, water effluents, and solid waste disposal practices associated with coal combustion, proposals are solicited that will address research to expand the current uses for coal beyond combustion to raise steam to produce electricity. The Principle Investigator (PI) can propose new uses for coal as a starting material for production of fuels, chemical feedstocks, and other high value end uses. PIs should demonstrate an awareness of the anticipated capital costs of the proposed system, the proposed systems annual operating and maintenance costs, potential environmental regulations and cost of compliance, and the selling price of the product<sup>2</sup>. PIs are encouraged to present a process flow diagram showing the major components of the process, estimated capital and operating and maintenance costs, and what are the key research issues that need to be solved.

ODSA is most interested in developing or advancing technologies in the following areas:

1. Mine Productivity – The OCRC is seeking research which can improve mine productivity or coal transportation, including economic ways to improve product quality, improve the recovery of coal by improving preparation plant efficiency, and waste handling at preparation plants. Economic methods to reduce greenhouse gas emissions during coal mining and coal preparation plant operations are sought.
2. Coal End Uses – The OCRC is seeking concepts to increase coal markets. Research proposed in this area must show that the concept is economically competitive or can increase the competitiveness of using coal as a feedstock significantly, with either existing technology or with the current method to produce the product. In addition to using coal to produce alternate clean fuels, the OCRC is entertaining proposals that will produce other high volume products from Ohio bituminous coal. Proposals that significantly reduce the emission of such conversions are also sought. These products could include

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<sup>2</sup> PIs should use the most recently available fuel price from EIA found in the latest available Annual Energy Outlook (<http://www.eia.gov/forecasts/aeo/er/>).

metallurgical grade coal or merchant coke, carbon fibers, and other novel products that are high value added materials and could not only expand Ohio's coal mining activity but cause new industries to form in Ohio to utilize these breakthroughs.

3. Improving Power Plant Efficiency – One manner to reduce CO<sub>2</sub> emissions per kilowatt is to develop economical improvements to increase the conversion efficiency at existing or new power plants independent of CO<sub>2</sub> capture. For example, for an existing boiler, the backend temperature could be reduced; for every 40° to 50° F reduction in flue gas temperature, the conversion efficiency improves by 1 percent. This reduces the carbon dioxide emissions by 1 percent. Research is needed into determining the economic and process issues associated with reducing the cold end temperature.

For advanced technology systems, such as integrated gasification combined cycle or ultra-supercritical plants, evaluation of the potential to reduce the capital and annual revenue requirements to lower the parasitic energy demand or improve plant capacity factor by reducing outages for Ohio bituminous coal are sought. For example, types of systems to reduce parasitic energy demand that can be evaluated such as converting from a cryogenic air separation unit (ASU) to high temperature membranes or similar processes which have a lower energy penalty than a cryogenic ASU. Other options include high temperature sulfur, ammonia, and particulate controls.

4. Greenhouse Gas Control – One factor that could significantly affect coal utilization to produce electricity and conversion of coal to alternate fuels is the cost of CO<sub>2</sub> control<sup>3</sup>. Current economic analyses suggest that CO<sub>2</sub> control for a coal-fired boiler would add between 50 and 80 percent to the cost of electricity. This is significantly greater than the U.S. Department of Energy (U.S. DOE) research target of a 35 percent increase in the cost of electricity<sup>2</sup> for new plants. Novel ways to reduce the cost of CO<sub>2</sub> control for new generating units are sought, including ways to reduce the cost of air separation in the generation or introduction of oxygen for gasification or combustion technologies and other incremental process improvements.

If U.S. EPA finalizes a standard of performance for new natural gas-fired combined cycle (NGCC) systems which fire at more than 850MMBtu/H of 1,000 pounds of CO<sub>2</sub> per MWh and a new coal-fired plant or NGCC unit firing less than or equal to 850 MMBtu/H at 1,100 pounds of CO<sub>2</sub> per MWh, then the NGCC system will not require any greenhouse gas controls while the coal-fired plant would be required to remove about 30 percent of the greenhouse gas emissions based on an ultra-supercritical boiler design with a heat rate of 8600 Btu/KWh. This would result in increased capital and operating costs for the coal plant, compared to the natural gas-fired plant. The U.S. EPA has also proposed greenhouse gas emission standards for existing electric generating units in June 2014 and is expected to finalize standards by 2015. There are several options made available by the U.S. EPA to states on how to meet the proposed emission reduction targets for existing power plants. Those include; increase plant efficiency, use low-emitting power sources, use more zero or low-emitting power sources, and use electricity more efficiently.

5. Sequestration of CO<sub>2</sub> – To have zero or low-emitting power sources from coal, CO<sub>2</sub> must be captured and effectively sequestered. Sequestration is dependent on the quality of the cap rock above the geological zone used for sequestration. Additionally, there are chemical differences in the composition of the sequestration zone, which can

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<sup>3</sup> James Black, Cost and Performance Baseline for Fossil Energy Plants Volume 1: Bituminous Coal and Natural Gas to Electricity, DOE/2010/1397, Revision 2 November 2010. [http://www.netl.doe.gov/energy-analyses/pubs/BitBase\\_FinRep\\_Rev2.pdf](http://www.netl.doe.gov/energy-analyses/pubs/BitBase_FinRep_Rev2.pdf)

limit the volume of CO<sub>2</sub> sequestered in a given strata. The OCOD seeks projects that attempt to better understand the behavior of CO<sub>2</sub> when stored in Ohio's geologic formations.

6. Markets for CO<sub>2</sub> – Using the captured CO<sub>2</sub> for enhanced oil recovery is a well-known use of carbon dioxide. Research to determine enhanced oil recovery applications in Ohio and factors that limit the Ohio enhanced oil recovery applications are requested. In addition to enhanced oil recovery, Ohio is seeking innovative ideas for new markets for CO<sub>2</sub> such as CO<sub>2</sub> as a chemical feedstock, non-geological storage of CO<sub>2</sub> that immobilizes CO<sub>2</sub> permanently by producing a stable solid useful material, or other novel applications.
7. Environmental Issues – In addition to CO<sub>2</sub> control, efforts in the area of waste water treatment from wet flue gas scrubbers, coal fly ash and flue-gas desulfurization (FGD) by-product utilization, etc. are sought due to tightening of disposal regulations. Waste water treatment can force the economic advantage from using an Ohio coal-fired boiler equipped with a wet scrubber, to a Power Ridge Basin coal and a spray dryer. Methods to economically treat FGD waste waters are sought. Other environmental issues include:
  - a. Water intake structures that reduces impacts. The U.S. EPA is currently evaluating the need to redesign water intake structures to reduce fish kills, and the feasibility of using of lower quality water at power plants.
  - b. Solid waste. Research topics could include impact of mercury and other trace element controls on by-product utilization (FGD gypsum use in wall board, fly ash in cement, fly ash and scrubber by-products for soil amendments, etc.).
  - c. Treatment of flue gas to remove several pollutants in a single step (SO<sub>2</sub>, SO<sub>3</sub>, mercury, NO<sub>x</sub>, particulate matter, fine particulates and HCl). Preference will be given to projects that propose processes that:
    - i. Achieve a 20 percent cost reduction compared to current technology.
    - ii. Combine CO<sub>2</sub> and one or more of SO<sub>2</sub>, SO<sub>3</sub>, mercury, NO<sub>x</sub>, particulate matter, fine particulate matter, and HCl control that is included in a single reaction step.
    - iii. Mercury control for plants where the emission limits is 0.0002 lbs/Gwe (gross)<sup>4</sup>. For new plants, the level of mercury control required is 99.5+ percent.
    - iv. Designing selective catalytic reduction (SCR) catalysts to achieve 90+ percent NO<sub>x</sub> control while simultaneously oxidizing 99 percent of the coal elemental mercury to the oxidized state in the flue gas downstream of the air preheater.
    - v. Baghouses or electrostatic precipitators (ESP) which are capable of 0.01 lbs/MMBtu particulate matter emission rates which is the designated emission rate for equivalent compliance with the trace element MACT standard.
    - vi. More wear-tolerant, low-pressure-drop, ultra-high-efficiency baghouses.
    - vii. Improved performance of ESP for applications not suited to baghouses or amenable to upgrading in existing power plants.
    - viii. Test and model wet and dry scrubbers which can also be used to remove hazardous air pollutants. Unless the economic and annual usage volume advantages are clearly shown to be superior to current end uses, using coal fly ash as a soil amendment and scrubber-

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<sup>4</sup> EPA MACT rule 2011. (Section 40CFR Part 63)

produced gypsum or sludge to manufacture wall board, road underlayment, or reclaiming strip mines will be considered non-responsive, as these systems have been clearly demonstrated and are in commercial use today.

ix. Acid mine drainage mitigation/remediation.

8. Techno-economic Studies for Emerging Technologies – Studies must follow the most recent and available U.S. DOE fossil energy baseline report cost assumptions. An example of a techno-economic study funded by the U.S. DOE report is titled: **Assessment of Hydrogen Production with CO<sub>2</sub> Capture Volume 1: Baseline State of the Art Plants DOE/NETL-2010/1434**. All studies must be independently conducted. The Principal Investigator and the independent organization performing the techno-economic study must execute Confidentiality Agreements and Non-disclosure Agreements.
9. Other – Areas not listed above are also acceptable, but must have a direct connection to the purpose of the OCRC and to the overarching goals of the program. Projects that are outside of the scope of the recommended areas should also have a clearly defined market application and addresses a major challenge facing the Ohio coal industry.

Preference will be given to projects that have industry partners either strategically or financially involved in the project.

#### **D. Review Process**

The Consortium Review Committee (CRC) is charged with the initial review and ranking of proposals received under this annual RFP. The CRC is comprised of individuals from various fields of coal expertise, which includes electric utilities, coal producers, federal and state government, private research entities, private coal consultants and scientists. A list of CRC members is listed in Attachment 4. The CRC members rank the proposals and the CRC makes funding recommendations to the TAC who meet publicly, discuss the projects, and vote to recommended projects to the ODSA Director. ODSA will make final determinations and announce successful proposals to the CRC chair.

Once projects are reviewed by the TAC and recommended for funding, and projects are approved by ODSA Director, CRC members serve in an advisory capacity to the project team for the duration of the study.

## **SECTION II. AWARD INFORMATION**

### **A. Estimated Funding**

Approximately \$1.5 million in Ohio Development Services Agency (ODSA) funding is expected to be available under this RFP.

### **B. Maximum Award Size**

The maximum ODSA award for an individual project awarded funding under this RFP will be limited in accordance with the following parameters:

- Up to \$160,000 for a two-year project, or up to \$80,000 for a one-year project.

### **C. Cost Share**

PIs are expected to contribute or secure from third parties other than the state of Ohio cash and/or in-kind funding. ODSA's maximum contribution towards a project will be:

- Up to 80 percent of the total project cost.

PI cost share should be provided throughout the two years in proportion to the release of ODSA funds.

PIs should attempt to use OCRC grants to leverage co-funding from other sources such as federal funds or other state or private funds for the project. An executive summary of any companion proposal(s) submitted to U.S. DOE, other federal, state or private entity or funding program should be attached as an appendix to the proposal. The anticipated decision date and funding time frame of companion proposals should be included. Full proposals that contain a companion proposal executive summary will be evaluated more favorably than those that have not attempted the same. (Note: If a proposal was submitted and the final decision was unfavorable, the attempt to leverage will still be recognized.)

Commitment letters must be provided for each cost share provider and collaborator identified in the budget. Commitment letters may not be more than two pages. The letters must adhere to the following parameters:

- Be submitted on the letterhead of the collaborator or cost share provider;
- Include the name of the Principal Investigator (PI), the title of the proposal;
- Briefly state the nature of the collaboration;
- State the duration of the collaboration;
- State the resources, other than cost share, the collaborator or college/university is committing to the proposed project;
- State the specific amount of the commitment that matches the cost share amount on the corresponding budget;
- State the source of the commitment;
- State when the committed resources will be available to the PI; and
- Be dated and signed by a representative with the authority to make the cost share commitment.

### **D. Expected Number of Awards**

ODSA expects to make approximately 10 awards under this RFP.

### **E. Period of Performance**

It is anticipated that grants will cover project activities that will be performed for a period of one or two years. It is anticipated that the majority of projects will include a full two-year research period. However, to ensure sufficient progress, a review (review of status reports that are described on page 17, site visit or conference call) during the first year of the project may be made to confirm that the project statement of work and other requirements have been followed. If concerns arise about a project, ODSA, technical advisors and the project mentor from the

CRC will discuss the situation with the funded project sponsor to attempt resolution. If resolution of concerned area(s) is not possible, the project funding may be discontinued at the end of year one or an extension of the year one milestones may be given, allowing opportunity to correct the problem prior to a decision to fund year two.

There will be events where experimental results make it appropriate to consider changes to the statement of work and Program Plan. In such cases, OCDO staff and the CRC project mentors will work with the project sponsor to adjust the program. Such adjustments of direction, when done in consultation with OCDO staff and the CRC project mentors, will not jeopardize continuation of a project for the full two years of the grant.

#### **F. Expected Start Date**

Funding is expected to start in September 2015.

#### **G. Other Funding Details and Restrictions**

Restrictions include, but are not limited to the following:

1. ODSA will fund equipment necessary to complete the work up to 80 percent of its actual cost. Upon successful completion of the project, title to the equipment will be granted to the college/university. PIs may count the other 20 percent of the equipment's cost toward cost share.
2. Faculty compensation during the academic year is not an allowable cost. During academic calendar summer months, ODSA shall fund up to a total of two months faculty time. The two months can be divided between the Principal Investigator (PI) and Co-PIs as appropriate for the project. Actual charges will be based upon the academic year salary rate of the PI and Co-PIs and their portion of the two-month limit. Otherwise, unlimited additional faculty time may be funded by the participating college/university and/or by a third-party funder and counted toward the required cost share.
3. Graduate student costs shall be at the college/university's regular rates for the appropriate level of the student.
4. Travel in the project budget should be limited to actual travel necessary to complete the project (example: a car trip between one school and another in order to collaborate/research, or a trip to a consortium meeting). With the possible exception of Canada (with strong justification), no international travel will be reimbursed by ODSA. If "travel expenses" as defined in Ohio Administrative Code Section 126-1-02, are a cost of the project eligible for reimbursement with grant funds, grantee shall be reimbursed for those permissible travel expenses in amounts in accordance with Ohio Administrative Code 126-1-02, as updated from time to time (the "Expense Rule") and grantee agrees that it shall not be reimbursed and grantor shall not pay any items that are deemed to be "non-reimbursable travel expenses" under the Expense Rule, whether by the grantee or grantor or their respective employees or agents.
5. Overhead charges shall be kept to a minimum. However, overhead charges may be used as part of an institution's cost share commitment, provided that federally approved overhead rates are used. Overhead charges, if any, to ODSA cannot exceed the college/university's federally negotiated indirect rate for research.
6. All ODSA grant agreements include clauses that make grant awards and continuations contingent upon both availability of funds and appropriation authority.
7. Applicants may not submit the same project to ODSA more than once per funding cycle. This includes submitting the same project to both the 2015 OCRC and the 2015 Demonstration and Pilot Program RFP. Whichever application is received later will be rejected and returned to the applicant.

## SECTION III. APPLICATION INSTRUCTIONS

### A. Proposal Submission Format and Requirements

Proposals must be submitted by a designated PI, who is a Professor, an Associate Professor, or an Assistant Professor.

Six paper copies of the proposal and one Adobe Acrobat PDF copy and one Microsoft Word copy on a CD shall be submitted to:

Ohio Development Services Agency  
Attn: Ohio Coal Development Office — OCRC 2015 RFP  
77 South High Street  
P.O. Box 1001  
Columbus, OH 43216-1001

- Proposals must be received at the location specified above on or before the last day proposals are accepted.
- No alterations or addenda to a proposal shall be permitted after the deadlines.
- Proposals may not be submitted by fax or email.
- Proposals are to be submitted on 8.5 x 11-inch paper.
- Margins must not be less than  $\frac{3}{4}$  of an inch on all sides.
- Font must be 11 point or larger with no more than six lines per inch.
- All pages must be numbered consecutively using the format —Page [#] of [total number of pages] (e.g., Page 2 of 25).
- The proposal title, PI name, must appear at the bottom of each page.
- Proposals should not include color figures that cannot be understood when photocopied in black and white.
- Proposals must be stapled once in the upper left hand corner and must not be bound.
- ODSA is not responsible for proposals not received.

PIs are advised there will be no opportunity to correct mistakes or deficiencies in their proposals after the submission deadline. Further, incomplete proposals will not be scored. It is the PI's responsibility to ensure timely submission of a complete proposal. ODSA is under no obligation to consider a proposal which is received after the deadline, that is incomplete, or that is submitted after the RFP has closed. Late proposals will not be scored. No supplementary or revised materials will be considered after the scheduled date for submission unless specifically requested by ODSA. ODSA reserves the right to close this RFP early.

All information submitted in response to this RFP shall be public information unless a statutory exception exists which would exclude the information from being released to the public. All proposals submitted will become the property of ODSA and any information submitted in response to this RFP will not be returned to the PI.

ODSA reserves the right to:

- Accept or reject any and all proposals if ODSA determines that it is in its best interest to do so;
- Reissue the RFP requesting new proposals from qualified parties;
- Waive or modify minor irregularities in proposals received;
- Negotiate with PIs, within the requirements of the RFP, to best serve the interests of the state of Ohio;
- Require the submission of modifications or additions to proposals as a condition of further participation in the selection process;

- Fund any proposal in full or in part; and
- Adjust the dates for whatever reason it deems appropriate.

After the proposals are submitted for this program, ODSA reserves the right to request additional information from any or all PIs, sponsoring college/university, collaborators or others acting on their behalf to assist in its evaluation process.

PIs may make inquiries or seek clarifications regarding this RFP any time after the RFP is released, but questions must be received 14 days before the last day proposals are accepted (subject to change). To make an inquiry, PIs must submit written questions to ODSA to the email address or fax number indicated below:

Subject: Consortium RFP Question  
Email: [EnergyRFP@development.ohio.gov](mailto:EnergyRFP@development.ohio.gov)  
Fax: (614) 466-1864

The ODSA accepts no responsibility for faxes or emails that are not delivered. PIs who submitted the inquiry will not receive an email response to the question. The questions and answers will be posted with a link on the ODSA website at: [http://www.development.ohio.gov/bs/bs\\_ohiocoaldev.htm](http://www.development.ohio.gov/bs/bs_ohiocoaldev.htm). ODSA reserves the right to edit questions for brevity and clarity and to consolidate the same general question if received from more than one individual. The ODSA will try to respond to inquiries within seven business days.

No other form of communication is acceptable. This includes: PI, sponsoring college/university, collaborator or others acting on their behalf contacting any committee member, the CRC, and/or ODSA staff during the proposal period regarding this RFP (other than through the approved inquiry process identified above). The proposal period is considered to be the date of submission for this RFP through the date of the ODSA award. Current PIs responding to this RFP are expected to limit their contact to those ODSA staff with whom they ordinarily interact regarding the administration of OCDO programs and outstanding grants. PIs, collaborators and others acting on their behalf are to avoid direct contact with committee members or other ODSA staff during the proposal period, other than that which might occur at regularly scheduled meetings.

If a PI, sponsoring college/university, collaborator and/or others acting on their behalf makes prohibited contact, ODSA in its discretion may subject the PI, sponsoring college/university, and/or proposal to elimination from the RFP process.

#### **B. Financial and Trade Secret Information**

Any information submitted with the proposal, which the PI feels is a trade secret as that term is defined in Ohio Revised Code § 1331.61 or financial or commercial information under Ohio Revised Code §122.36, must be conspicuously designated as such.

ODSA has the authority and responsibility to protect trade secrets and other financial or commercial information. In the event that the materials or data submitted are deemed to consist of trade secrets or other financial or commercial information, as defined by the Ohio Revised Code, Sect. 1333.61 and as set forth in Ohio Revised Code, Sect. 122.36, then only those portions of the document can be protected from disclosure by ODSA and duly noted as such.

**It is sole responsibility of the PI to conspicuously mark such items as a trade secret or financial or commercial information.** Attach a summary sheet in your proposal that lists each page that includes such information and the number of occurrences of such information on that page.

If any information in the proposal is to be treated as a trade secret or commercial or financial information, the proposal must: Identify each and every occurrence of such information within the proposal with an asterisk before and after each line containing such information and underline the specific information itself.

- Respond positively to Question Number 6 on the Proposal Summary, Attachment 2, disclosing that the proposal contains trade secret or commercial or financial information.
- Include a page immediately after the Proposal Summary, Attachment 2 that lists each page in the Proposal that includes trade secret or commercial or financial information and the number of occurrences of such information on that page.

The public abstract must not contain any trade secret or financial or commercial information.

### **C. Eligibility Guidelines and Restrictions**

Only projects that meet all the requirements of the Program as stated herein will be considered for assistance.

This solicitation is limited to colleges/universities located within the state of Ohio. Causes for rejection of a proposal without detailed review (in no particular order) include, but are not limited to:

1. Sponsoring college /university is not located in Ohio;
2. Proposal is not received by the 5:00 p.m. submission deadline;
3. Proposal does not contain Attachment 2 or an original signature by a sponsoring college/university authorized individual;
4. Proposed work is outside the topic area of this solicitation;
5. Proposed work is too broad and not focused;
6. Proposal fails to meet the solicitation format requirements;
7. Proposal duplicates other work previously completed or currently underway by another organization (EPRI, U.S. DOE, U.S. EPA or others);
8. Proposals for continuation of active projects did not demonstrate progress in the prior year;
9. Proposed work and associated budget is not feasible or reasonable;
10. Proposed budget does not meet the required cost share;
11. Budget otherwise fails to conform to requirements set forth in this solicitation;

### **D. Restrictions on Numbers of Proposals a PI May Submit**

It is the goal of the RFP that PIs only submit their best concepts for consideration. The submittal of numerous proposals by one PI is not acceptable and therefore, the following restrictions will be placed on the number of proposals a PI can submit.

1. A PI must be a Professor, Associate Professor, or an Assistant Professor. Post-Doctoral students and administrators of laboratories can serve as Co-PIs but they may not submit proposals nor serve as PIs on a project.
2. A PI may submit only one proposal, unless they are proposing a continuation of existing or previously funded OCRC project(s). In which case, they may submit proposal(s) to continue funding for their existing project(s) and one additional proposal for their new project.
3. PIs who submit more than two proposals are required to rank the preference of their proposals (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup> etc.) on the Proposal Summary page. If project recommendations for funding exceed the available funds listed in Section II, PIs who submit more than two proposals will have their 3<sup>rd</sup> and subsequent proposals removed from consideration.

**E. Collaboration**

Collaboration with industry partners is encouraged. Partnerships should demonstrate increased likelihood that technology/results of the project are relevant to producers and/or end users of Ohio coal, and/or have a pathway towards further development and eventual field deployment. International collaboration may be counted as match, but ODSA funds must be used to support only domestic work.

## SECTION IV. PROPOSAL CONTENT

### A. Proposal Content

The total length of the proposal should not exceed **10 pages plus Attachment 2.**

The sections of the proposal must include the following:

1. Cover Page and Letter – complete all sections of Attachment 2 and attach it as the top page of the proposal. Attachment 2 must have an original signature by a sponsoring college/university authorized individual. All proposals must acknowledge in the cover letter that their school is not in arrears for federal, state, or local taxes of any type, and that there are no outstanding liens, levy, lawsuits or investigations of any type pending against their organization. If such an acknowledgement cannot be provided, the sponsoring college/university must provide detailed information explaining such lien, levy, lawsuit, or investigation. The sponsoring college/university shall state in the cover letter that it will comply with all applicable federal, and state laws regarding equal employment opportunity, and anti-discrimination and intimidation laws on account of race, religion, sex, disability, national origin or ancestry. The cover letter and Attachment 2 must bear the original signature of an authorized authority of the school. Attachment 2 and the cover letter does not count toward the 10-page text limit.
2. The Objective – a brief statement should be presented of the specific goals for each year of a two-year project (approximately one page). It is essential that the proposal clearly state the objectives and the basis of the proposed work and very preliminary economic rationale for the proposed work (what is the economic justification to support the benefits of the proposed research), including specifically a paragraph about how the project increases the utilization of Ohio coal in an environmentally acceptable manner as a fuel or as a chemical feedstock.
3. Background and literature review – this discussion should define the current state of the proposed concept, process, etc., covering only the most important points and showing how the proposed work is a logical next step forward. This discussion should include key chemical reactions, or process concepts to be studied (approximately two pages). For proposals that are requesting continuation of current consortium projects, this section should also include a road map to commercialization, i.e. where is the work at the present time and what steps remain to be completed before commercialization is possible.
4. Statement of Work – a detailed discussion should be presented on tasks to be completed in a two-year project. The information should be clearly divided into two sections, one for year one and a second for year two (approximately two pages) and include methodologies, designs, and techniques proposed to be used by the PI.
5. Discussion and Anticipated End Result – this section should also identify the end users of the results of projects and address how the project could eventually be transferred or scaled up to impact end users.
6. Reference list – brief (approximately one page).
7. Project Personnel and Responsibilities – identify the PI and Co-PI, if any, who will be the person directly responsible for the completion of the project within the grant agreement's parameters, including adherence to the scope of work and project budget. Provide

curriculum vitae (CV) of the PI and Co-PI and other major project personnel as an appendix to the proposal. While the CVs will not count toward the 10-page limit, CVs exceeding one page are discouraged – include what is appropriate to this proposal.

8. Publications and Patent Applications – attach abstracts of published, peer-reviewed papers and abstract of patent applications filed, based upon past consortium projects, or relevant to the new proposal. These attachments will not count toward the 10-page limit or the proposal patent applications will be protected if noted.
9. Project Budget – a budget specifying ODSA and the PIs cost share must be presented by line item using Attachment 3 (the total ODSA funds and college/university cost share should be the same as on the Attachment 2 of the proposal). In addition, a budget justification section should be presented defining the following: a) all PI, Co-PI, and student time charged to ODSA and/or provided as cost share; and b) an equipment list and justification for each piece of equipment to be purchased. Additional sheets may be included in order to clarify the budget if necessary. Attachment 3 and the budget justification will not count toward the 10-page text limit.
10. Gantt Chart – a detailed Gantt chart with a time line for each task and subtask of the scope of work should follow the scope of work. This chart will not count toward the 10-page limit.
11. Leveraging of ODSA Funds – describe any opportunities to find synergy among potential sponsors. PIs should attempt to use grants from ODSA in leveraging co-funding from other sources such as federal funds or other state or private funds for the project. An executive summary of any companion proposal(s) submitted to U.S. DOE, other federal, state or private entity or funding program should be attached as an appendix to the proposal. The anticipated decision date and funding timeframe of companion proposals should be included. This will not count toward the 10-page limit of the full proposal.
12. Litigation – please describe any material litigation to which your institution/company is currently a party regarding coal or any type of coal technology. In addition, please describe any material litigation that your institution/company has been involved in over the last three years regarding coal or coal technology (Attachment 5 Required Forms and Questions). Finally, please provide (as an appendix) a list and describe litigation brought or threatened against your institution/company by existing or former clients over the past five years regarding coal or coal technology.
13. Affirmation – please affirm that this proposal does not represent a duplication of effort as described in Section III. C. 7, on page number 11.

#### **B. Attachment 1**

This contains typical operating ranges for a large-scale pulverized coal (PC) fired power plant. Specifically, for the process being investigated, describe the anticipated location in the gas train and the appropriate range of temperatures, gas composition, residence times, pressure drop, etc. Proposals should contain citations and specific information from accepted industry standards, such as those found in Babcock & Wilcox's STEAM, to corroborate the proposal's assumed operating conditions of the proposed process or concept. It is acceptable for the technology to be aimed at a smaller scale plant as long as the proposal cites typical operating conditions found in such units.

## SECTION V. CRITERIA FOR SELECTION

These criterion points are a guide for the CRC, but not determinative.

### Criterion 1:

The overall merit of the proposed project (0 to 5 points). The research represents a significant contribution to expanding the base of knowledge in the defined focus area. The proposed approach is innovative and represents a significant departure from state-of-the-art approaches to the described problem and has the potential to significantly increase the use of Ohio coal in an environmentally acceptable manner. An awareness of the current state-of-the-art in related areas of coal research is demonstrated.

### Criterion 2:

The proposal contains a preliminary capital and total annual cost analysis of the process as configured (0 to 5 points). The basis shall be 7,446 hours of operation per year, 500 MW equivalent if electric generation is the purpose or 250 tons of coal per hour if a byproduct or other product is the objective.

### Criterion 3:

The stated objectives and feasibility of achieving those objectives (0 to 5 points). The application clearly addresses a problem, concept or question described within the research areas defined above. A well-defined, logical statement of work is provided to effectively address the technical issues. An approach is described that is scientifically sound, well planned and uses current methods (or methods adequate to solve the problem) in the investigation.

### Criterion 4:

Leveraging of cost sharing funds from industry or government sources (0 to 3 points). One goal of the OCRC program is that OCRC support will be used as cost share in proposals submitted to other sources of government and industrial funding. The college/university would be expected to maintain its cost share at 20 percent (or greater) of ODSA's contribution to the project. The outside funds would be used to either expand the program or reduce ODSA's contribution to the project. Executive summaries of companion proposals must be attached as an appendix to demonstrate the attempt to leverage third party funding. ODSA staff will assign scores on this criterion as follows:

Points	Criteria Description
0	No effort was made to obtain outside funding
1	Project can demonstrate attempt(s) were made to receive outside funding, but were declined
1	Project can demonstrate attempt(s) were made to receive outside funding, but have not received a decision
3	Project has received outside funding

### Criterion 5:

The facilities or specialized equipment and techniques are available to the PIs to meet the project objectives (0 to 2 points). Zero if key equipment or techniques are not available or not included in the list of equipment to be purchased by the project. Two points if equipment is available.

### Criterion 6:

Publication of research in peer-reviewed journals and applications for patents (0 to 2 points). For projects that have received OCRC funding for a number of years, it is expected that by the end of the third year that a paper has been submitted to a peer-reviewed journal for publication

and/or a patent application has been filed. Reviewers will assign scores on this criterion as follows: two for the filing of a patent application; or two for peer-reviewed paper submissions for publication; and zero if after completion of three years of work, no patent application has been filed and a peer-reviewed paper has not been submitted for publication.

**Criterion 7:**

Relevance (0 to 3 points). The project has a high transferability to consumers of Ohio coal, will lead to increases in the use of Ohio coal in an environmentally acceptable manner and has the potential to improve Ohio’s economy.

**Criterion 8:**

Applicability (0 to 2 points). Overall how well the project relates to each the four purposes of the OCRC listed on page 2 of the RFP.

**Criterion 9:**

Collaboration (0 to 2 points). Demonstrated financial and/or strategic partnerships with industry producers and/or end users that will increase the likelihood that the technology/results of the project will have a pathway towards further development and eventual field deployment.

<b>Final Scoring – based upon completeness of proposal and supporting documentation provided</b>	
1. Overall merit	___ (0 to 5 Points)
2. Capital and total annual cost analysis	___ (0 to 5 Points)
3. Objective feasibility	___ (0 to 5 Points)
4. Leveraging	___ (0 to 3 Points)
5. Equipment and techniques availability	___ (0 to 2 Points)
6. Publication and patent applications	___ (0 to 2 Points)
7. Relevance	___ (0 to 3 Points)
8. Applicability	___ (0 to 2 Points)
9. Collaboration	___ (0 to 2 Points)
<b>Total Score</b>	___ <b>(0 to 29 Points)</b>

## **SECTION VI. FUNDING AGREEMENT REQUIREMENTS**

### **A. ODSA Funding Limitations**

All costs incurred in the preparation of the proposal and negotiation of subsequent legal agreements shall be borne by the PI. ODSA shall not contribute in any way, including cost share, for the cost of the preparation of the proposal.

At any point during the selection process, ODSA (which includes the CRC) reserves the right to request additional information to assist in the review process, and the PI may be asked to provide additional information/clarification.

### **B. Award Deliverables**

Some of the basic requirements of the sub-grant agreement are as follows:

1. Quarterly status reports, describing technical progress, must be prepared covering the periods September 1 – November 30; December 1 – February 28; March 1 – May 31; June 1 – August 30 for each of the two years of the project. A final project report will also be required, which summarizes accomplishments over the two years of the project. These reports must be completed according to a format to be specified in the grant agreement. Reports are to be submitted to ODSA, including one paper copy and an Adobe Acrobat PDF file on CD.
2. Financial reports, in a standard ODSA format, must be submitted summarizing the project financial status, including actual project expenditures to date, and grantee cost share. Invoices must be submitted quarterly, for periods corresponding to the project performance period. All invoices must bear sufficient documentation to back up both charges to the grant and the total cost share expended.
3. Administrative reports, indicating project employment and cost projections, must be submitted.
4. PI should plan to attend up to one mandatory meeting with the full OCRC each year to present the progress to date on their project, to collaborate with others in the OCRC, and to review various on-site demonstration projects.
5. Each college/university shall execute a payment agreement with ODSA that enables the state of Ohio to receive a commercially reasonable portion of any revenue stream (via the sale, lease, license, etc.) derived from the work supported by ODSA funds.

### **C. Grant Agreement Procedure**

ODSA's standard grant agreement template is included as part of this RFP (Attachment 6). Also included are Exhibits that are attached to a final Agreement ("Agreement") and become as legally binding as the Agreement. Most notable among the Exhibits is the Exhibit H, "Royalty/Payment Agreement." Any PI is advised to review all of these documents prior to preparing a proposal to ODSA.

Please note: ODSA understands that the grant agreement template is a model and it may be necessary to make minor modifications to meet the needs of individual projects. By identifying possible changes in the template early, ODSA hopes to significantly shorten the grant negotiation process. Resolving requested exceptions before any action by ODSA will allow final negotiations to focus on substantive work statement and budget issues. If you choose to request exceptions, please remember that ODSA will consider them with an eye toward balancing the needs of the project and the stewardship responsibilities of ODSA for its public funds.

Article 8.15 of the Ohio Constitution authorizes the ODSA Director to include provisions to share in any royalties, profits, or other financial gains resulting from the research and development conducted and supported by this program. The details of which can be found in Exhibit H, Royalty/Payment Agreement. .

**D. Requests for Exceptions to the Grant Agreement**

Exceptions (including minor alterations, additions or deletions) must include an explanation of why the exception is being sought and the effect it would have on the PI's ability to perform the project. The exception must also provide suggested alternative language. Any requests for exceptions must identify the Section and Paragraph of the Grant Agreement or the Royalty/Payment Agreement, or the Exhibit by its letter.

Exceptions deemed by ODSA to be major may be reviewed by ODSA legal counsel before any technical review commences. A diligent and quick attempt will be made to resolve any differences. If, after advice of legal counsel, resolution is not possible, ODSA reserves the right to reject the proposal without further review.

Exceptions deemed by ODSA to be minor will not delay technical review and will be addressed during that review process.

After thorough discussion with the PI, ODSA will identify in writing exceptions that have been accepted, modified or rejected. If the PI wishes to continue, the proposal will proceed through the usual review and approval process.