



# OHIO COAL DEVELOPMENT OFFICE **Request for Proposals 2005** CLEAN COAL ENERGY PRODUCTION TECHNOLOGIES PROJECTS SOLICITATION

**PROPOSAL DUE DATE: Friday, March 18, 2005**

The Ohio Air Quality Development Authority's (OAQDA) Ohio Coal Development Office (OCDO) is issuing this limited-scope Request for Proposals. Interested and qualified parties are invited to submit project proposals focused on the clean use of Ohio coals in one of the following categories, listed in priority order. Furthermore, strong preference is given to those projects that also include significant federal or private funding.

**Category 1**—deployment of an **innovative, cost-effective clean coal technology, at full scale** (commercial, industrial or utility application) in a retrofit, repowering or new installation, for final testing, process optimization and long-term application;

**Category 2**—development/demonstration of technologies and techniques for **reducing or mitigating emissions of greenhouse gases or sequestering greenhouse gases** as a way of permanent removal from the atmosphere;

**Category 3**—development of **advanced steam turbine materials that can be matched with an ultrasupercritical coal-fired boiler**;

**Category 4**—demonstration of an **advanced clean coal technology at pilot scale or larger** (projects must cost-effectively combine several of the following: SO<sub>2</sub>/NO<sub>x</sub> removal, mercury removal, improved combustion and/or electric generating efficiency, reduction of PM<sub>2.5</sub> emissions and production of minimal amounts or high-value coal combustion products. Also of interest are processes that use high-sulfur coal as a feedstock.);

**Category 5**—demonstration and technology transfer of **coal combustion product management processes and techniques**.

The OCDO seeks to be a financial co-sponsor of the installation of most beneficial and promising clean coal technologies, in cooperation with Ohio research institutions and businesses, including other public entities. Consistent with this intent, multi-participant, jointly funded projects are specifically encouraged. OCDO expects all proposers and participants, particularly the technology developer, to share a significant portion of the cost of the proposed project. OCDO expects that continued and/or increased, cleaner and economical use of Ohio coal and/or its combustion products will be major results of the project.

## Discussion of Purpose

OCDO's focus is on use of coal versus its production. Given ever increasing environmental restrictions, problems associated with coal's use are much greater, and therefore much more of a concern than improvements in production. If coal can't be used, it won't be produced.

Over the past twenty years, considerable coal research and development work has been accomplished. While OCDO has supported projects ranging from applied research to the demonstration and deployment of clean coal technologies, its priority is to assist in the deployment of cost-effective technologies that can enable the use of high-sulfur Ohio coal in compliance with current and future environmental limits.

Although sulfur removal and sulfur dioxide control remain as primary interests of the OCDO, the new National Ambient Air Quality Standards for ozone and particulates focus new attention on nitrogen oxides and fine particulate emissions (particulate matter less than 2.5 microns in diameter or PM<sub>2.5</sub>). Also, with increasing interest in hazardous air pollutants (air toxics), OCDO is interested in the development of processes that will reduce such emissions, especially mercury. Given escalating international attention directed toward the reduction of greenhouse gas emissions, OCDO is interested in technologies and processes that can reduce or mitigate emissions of CO<sub>2</sub> from coal combustion. It is also interested in the development of ways to sequester greenhouse gases emissions from coal, especially where they can be quantified to the coal user's economic benefit in a CO<sub>2</sub> trading market.

There are several pathways by which coal can continue as a predominant, reliable and relatively inexpensive fuel for electricity generation. First, the large inventory of existing coal-fired power plants can benefit from efficiency improvements, life-extension measures and emission reductions from the retrofit of advanced clean coal technologies. Second, near-term advanced generating technologies such as circulating fluidized-bed combustion (CFBC) and integrated coal gasification, combined-cycle (IGCC) can produce cleaner power with significant improvements in efficiency. Potential longer-term improvements include advanced ultra-supercritical steam cycle generation, oxygen combustion systems, circulating, moving-bed technology, and coal-powered fuel cell technologies. In order to advance along these pathways, a number of ancillary developments are also necessary to more efficiently produce cleaner electricity from coal. These include continued advances in the removal of sulfur dioxide, nitrogen oxides and fine particulates; the development of efficient technologies for removing mercury; the development of high-temperature sorbents and hot-gas cleanup systems; the development of systems for capturing and sequestering greenhouse gas emissions; continued development of methods for re-using rather than disposing of coal combustion products. This solicitation specifically invites proposals that address one or more of the above advances.

OCDO supports the Clean Coal Technology Roadmap, which was developed jointly by the U.S. Department of Energy (DOE), the Electric Power Research Institute (EPRI) and the Coal Utilization Research Council (CURC). Further information on the Clean Coal Technology Roadmap may be found at <http://www.netl.doe.gov/coal/CCPI/index.html> .

## Discussion of Priorities

By constitutional requirement, OCDO may only award funds to projects that qualify as "coal research and development" (emphasis added). OCDO primarily seeks projects that—following final stages of testing—will result in a permanent installation using Ohio coal. This may be done in accordance with Ohio Revised Code, §1555.01(B), which states in part "... when necessary or appropriate to demonstrate the commercial acceptability of a specific technology, up to three

installations within this state utilizing the specific technology ... (may qualify for grants, loans or loan guarantees under OCDO's program)."

The projects in which OCDO is currently interested may be associated with new or existing facilities, and located at private or municipal electric utility plants, at independent power producer facilities, at co-generation facilities, non-utility generating facilities, qualifying facilities, or at other commercial or industrial facilities in Ohio. Projects must use Ohio-mined coal and be located within Ohio.

**Category 1** projects must offer innovative and significant advances over current commercially available technologies, and must be capable of major reduction of sulfur dioxide and nitrogen oxides emissions. Strong preference will be given to technologies that concurrently remove other pollutants such as mercury and fine particulates and produce reusable combustion products or otherwise produce no waste. The host unit should be committed to the continued use of Ohio coal, including after the successful completion of demonstration testing.

**Category 2** projects include those that are directed at the reduction or mitigation of greenhouse gas emissions. Such projects might include the development of economically viable technologies for concentrating and/or reducing CO<sub>2</sub> emissions from Ohio coal-fired boilers. Also of interest are projects that demonstrate co-firing of cleaner fuels such as biomass or natural gas with Ohio coal. It is important to note, however, that such projects must clearly offer a demonstrable, quantifiable, long-term advantage to the use of Ohio coal. Also of interest in this category are projects that are designed to develop and demonstrate techniques for sequestering or re-using captured CO<sub>2</sub> emissions.

**Category 3** projects must be designed to develop materials for steam turbines that can be matched with an ultrasupercritical coal-fired boiler, as is being developed under OCDO project D-00-20 (see <http://www.ohioairquality.org/ocdo/pdf/2003D-00-20.pdf>). The ultrasupercritical boiler will be designed to produce steam at approximately 1350/1400 F and 5000 psi. Also, the boiler will be designed for firing with oxygen rather than air. The steam turbine must be designed to handle the output of the ultrasupercritical boiler.

**Category 4** projects may include pilot or large-scale demonstration of multi-pollutant removal clean coal technologies that are not yet ready for full-scale installation. Preference will be given to technologies which have promise of commercial application within four years, or which may allow for the use of high-sulfur coal in new or repowering applications within the next five to ten years and that are multiple pollutant reduction technologies. Also, preference will be given to technologies that are capable of improved combustion and/or electric generating efficiency, and are capable of high removal rates for SO<sub>2</sub>, NO<sub>x</sub> and mercury. OCDO is further interested in processes that minimize or eliminate the production of throwaway coal combustion products. Finally, OCDO is interested in near-commercial processes that use high-sulfur Ohio coal as a feedstock.

**Category 5** projects include the management or reuse of SO<sub>2</sub> or sulfur removal products and other coal combustion products resulting from the use of existing or advanced coal cleanup technologies. Also included in this category are projects that facilitate the technology transfer of coal combustion product management and reuse processes. The products of interest may result from flue gas cleanup technologies such as wet scrubbers, dry sorbent injection technologies, and from fluidized-bed combustors. Also of interest are projects that address the high carbon content of coal ash produced by some low-NO<sub>x</sub> emitting boilers, and the byproducts of mercury removal processes. Preference will be given to projects that demonstrate and promote the marketing and reuse of coal combustion products.

## Proprietary and Trade Secret Information

OCDO has the authority and responsibility to protect and keep confidential trade secrets and other proprietary information. In the event that the materials or data submitted are deemed to consist of trade secrets or other proprietary information, as defined by the Ohio Revised Code, Sect. 1333.61 and as set forth in Ohio Revised Code, Sect. 1555.01, then only those portions of the document can be kept confidential by OCDO. It is solely the proposer's responsibility to conspicuously mark such items. A proposal may be submitted with certain sections labeled as confidential. However, only that information that is deemed to be trade secret under the Ohio Revised Code shall be required to be kept confidential. Entire proposals or entire pages so labeled shall not be deemed as proprietary and confidential. The public abstract must not contain any trade secret information.

## Eligibility

Under provisions of the Ohio Revised Code, Sect. 1555.03(A), only persons (individuals and businesses) doing business in Ohio or educational or scientific institutions located in Ohio are eligible to receive grants, loans or loan guarantees from OCDO. This does not preclude, however, cost-sharing and project participation by entities doing business or located outside the state of Ohio. Proposals submitted by applicants who do not meet these criteria will not be considered.

## Proposal Application Fee

OCDO requires an application fee to partially defray the cost of the technical review of the proposal. **The Proposal Application Fee must be submitted with the proposal.** The fee for companies with fewer than 50 employees is \$400. The fee for companies with 50 or more employees is \$675. All fees must be submitted as checks made payable to: "OAQDA." Proposals submitted to OCDO without the application fee will be returned, unreviewed, to the proposer.

The application fee is non-refundable regardless of whether the project is ultimately reviewed or approved for funding. As is OCDO's standard practice, the proposer will receive a compilation of reviewers' comments prior to the Technical Advisory Committee meeting. Copies of all proposals become the property of the State of Ohio and will not be returned. In the event a proposal is deemed ineligible and is not reviewed, one copy will be retained by OCDO for its files. All remaining copies of the proposal and the application fee will be returned to the proposer.

## Proposal Submittal and Review

A total of eight (8) full and complete copies, plus one electronic copy (as an Adobe Acrobat or MS Word file) of each competitive project proposal must be received by the **Ohio Coal Development Office, Ohio Air Quality Development Authority, 50 West Broad Street, Suite 1718, Columbus, Ohio 43215-5910, by 5:00 P.M., EST, Friday, March 18, 2005**. Proposals may not be submitted by fax or e-mail.

Upon receipt of the proposals, OCDO will conduct reviews through its proposal review team, which is composed of independent, experienced coal professionals under contract to OCDO. The comments of these reviewers will be compiled and sent to proposers and to OCDO's Technical Advisory Committee approximately two weeks before the Technical Advisory Committee meeting.

Following this, proposers who comply with the Specific Proposal Requirements (defined later in this Solicitation) may be invited to make a 12-minute presentation before the Technical Advisory Committee at its meeting in Spring, 2005 (the exact date and time of the meeting will be made available to all eligible proposers). Subsequently, the Technical Advisory Committee will determine which proposals it recommends to OCDO staff for funding to the Ohio Air Quality Development Authority, which has the final approval authority. The decision of the OAQDA is expected at their first meeting following the Technical Advisory Committee meeting. At that point, negotiation of the legal agreements will commence. Successful proposers should anticipate a project start date of not earlier than May 2005.

Proposers should know that awards are dependent upon the issuance of general obligation bonds by the State of Ohio. OCDO can only make awards when the Treasurer, State of Ohio has deposited sufficient monies in the Coal Research and Development Fund, from general obligation proceeds.

OCDO may find it necessary to seek additional information from a proposer to aid in the review. However, once a proposal is submitted, do not send supplements to it, unless asked. Proposals are mailed to reviewers shortly after receipt, and unexpected supplements to the proposals cannot be accommodated. Be certain that the proposal is complete and correct before submitting it.

### **Co-sponsorship**

Applicants are strongly encouraged to join with other sponsors such as the U.S. Department of Energy (USDOE), the Electric Power Research Institute (EPRI), the U.S. Environmental Protection Agency (USEPA) and others when submitting a project proposal to OCDO. In the event of such co-sponsorship, the proposer should submit to OCDO a copy of the federal or other solicitation to which it has responded, and a copy of its proposal to that agency. Signed, conditional letters of intent from anticipated co-sponsors should be included in the proposal.

### **Alignment with Other Ohio Programs**

In addition to seeking co-sponsorship in the private sector, and in the public sector outside Ohio, successful grantees will be required to explore and report on existing, planned, or possible relationships with other research and development programs sponsored by the State of Ohio. If any of these other programs is pertinent to the Grantee's area of research and development, the grantee must pursue contact, funding, technical and/or other assistance from these programs.

### **Causes for Rejection**

OCDO reserves the right to accept or reject in whole or in part—without incurring liability of any kind—any or all proposals submitted pursuant to this solicitation. Incomplete proposals, including proposals which do not include the required Proposal Application Fee, will be automatically rejected without review. Other specific causes for rejection without additional review include, but may not be limited to:

1. project is not a coal research and development project (as required by the Ohio Constitution);
2. project does not advantage Ohio coal;
3. project does not use Ohio coal;
4. project is not located within Ohio;
5. applicant is ineligible for OCDO funding;

6. the project budget is inadequate or incomplete;
7. applicant failed to meet all requirements of a previous loan or grant agreement from OCDO or other agency of the State of Ohio;
8. maximum OCDO dollar and/or percentage cost share limits are exceeded or the proposer's cost-share is insufficient;
9. proposer is not financially strong enough to sustain the project;
10. proposer's team does not have the technical capability to sustain the project;
11. proposer owes outstanding taxes or other debt to the State of Ohio;
12. the statement of work is inadequate or incomplete;
13. proposal represents a duplication of effort (work must not duplicate efforts previously sponsored by USEPA, USDOE, EPRI or others);
14. proposal is not responsive or does not address at least one area of interest described in this solicitation;
15. proposal not received by OCDO deadline;
16. proposal is for a commercially guaranteed, "off-the-shelf" technology for its normal, usual use (however, application of an existing technology in a new, unique, improved manner may be considered);

### **Funding Agreement Requirements**

In the event of selection, proposers should be aware of some of the basic requirements of a grant, loan or loan guarantee agreement from OCDO.

#### Royalty/Payment Agreement

Before a grant agreement for a pilot or demonstration-scale project can be affected, it is necessary to negotiate a royalty/payment agreement. Through such agreement, the State of Ohio, through the Ohio Air Quality Development Authority/OCDO will be paid, over an extended period of time, a commercially reasonable portion of gross revenues, including but not limited to those revenues derived from the sales of equipment, services or patents, equipment leases or a portion of royalties and licensing fees. Such payment is in recognition of the risk the State of Ohio takes in granting research and development funding.

#### Award Deliverables

1. Status reports, describing technical progress, must be prepared monthly according to a prescribed format and received by OCDO by the 5<sup>th</sup> day of the following month.
2. Financial reports, in a standard OCDO format, must be submitted summarizing the project financial status, including actual expenditures to date, and grantee cost share. These may be submitted with periodic invoices or as part of the monthly project status reports. Invoices may be submitted no more frequently than monthly and no less frequently than quarterly. All invoices must bear sufficient documentation to validate both charges to the grant and the total cost share expended.
3. Milestone plans and reports may be required for OCDO approval prior to initiating work for particular phases of a project. These must also conform to a specified format.
4. Administrative reports, indicating project employment and cost projections, must be submitted semi-annually.
5. An end-of-year project abstract must be submitted annually.
6. A comprehensive final report, in a standard OCDO format, is due upon completion of the project, and is subject to review and comment prior to acceptance.
7. An audit report of the project, conducted by an independent CPA company, is due within six months after the project completion.

## General Terms and Conditions for Project Awards

1. Grant agreements, loan agreements or loan guarantees must be construed, interpreted and the rights of parties determined in accordance with laws of the State of Ohio.
2. All information, data, materials, patents, copyrights and royalties developed under grant awards belong to the State of Ohio unless negotiated otherwise in the applicable agreement.
3. Wages paid to laborers and mechanics under any grant or loan agreement must be paid at the prevailing rate of wages of laborers and mechanics for the class of work called for in the proposed project. Prevailing wage rates are determined by the Ohio Department of Commerce, and applied to the project in accordance with the requirements of Chapter 4115 of the Ohio Revised Code or as otherwise provided by law.
4. Proposers are strongly encouraged to include, as appropriate, Ohio-based providers of goods and services as part of their projects.
5. Expenses for travel, including lodging and meals, will be reimbursed at rates not higher than those prescribed by the Director of Ohio's Office of Budget and Management. In no event will international travel be eligible for reimbursement.
6. The awardee must agree to comply with all federal, state and local laws and regulations in the conduct of work performed on the project, and is responsible for obtaining any and all permits required to install and operate the project.
7. The awardee must not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, disability or age and shall take affirmative action to ensure that applicants are employed and that employees are treated during such employment without regard to race, sex, national origin, disability or age. The grantee must have an affirmative action program and must so state in the proposal.
8. The awardee must perform the project in the manner set forth in its statement of work, and for not more than the amount set forth in the proposal.
9. No pre-award, proposal preparation or grant or loan negotiation costs are eligible for reimbursement under OCDO grants. No expenses for lobbying before or during the agreement period are eligible for reimbursement with state of Ohio funds.
10. If the host site is a state-owned facility and the project will involve construction, then the awardee shall bid the construction work in accordance with Ohio Department of Administrative Services procedures.
11. An awardee may be subject to a financial audit by the State of Ohio only as it pertains to the project for which it received OCDO funds.

## **Potential Host Sites**

OCDO is frequently asked if it is aware of host sites. A list of potential host sites is included in Attachment 3. If a proposer is interested in one of the listings, please contact Howard Johnson at OCDO ([hjohnson@aqda.state.oh.us](mailto:hjohnson@aqda.state.oh.us) or 614/644-8368), who will arrange a meeting between the plant owner and/or the plant manager. OCDO will not necessarily be present at these meetings. It is up to the proposer to present its technology to the plant owner and manager and to demonstrate how the pilot/demonstration of the technology in question at this unit will advantage their operations and Ohio coal. It is the plant owner's/manager's sole decision as to whether or not they choose to participate in the project.

The proposal must contain a letter from an appropriate authority of the potential host site, stating that if this proposal is selected for funding, then the entity authorizes this unit/station as the host site. This letter should also note the estimated in-kind contribution the host site entity will be making to the project. Specifically, this does not include the value of the facility, but rather any

labor costs, maintenance costs, etc., that are anticipated to be paid by the host site over the course of the pilot or demonstration's operations.

The list in Attachment 3 is not exhaustive. If a proposer finds another suitable site in Ohio not on this list, it is acceptable as long as the proposal contains a letter from an appropriate authority of the host site authorizing the site's use (and the in-kind cost share) in the event the project is approved for funding.

## Useful References

Further information on OCDO's overall program, previously funded projects, this solicitation and other information can be obtained by reviewing OCDO's site on the Web:

<http://www.ohioairquality.org/coal>

Other websites that provide information coal and on coal combustion products are listed below. (This is not intended to be an exhaustive listing.)

USDOE National Energy Technology Laboratory

<http://www.netl.doe.gov/>

Electric Power Research Institute

<http://www.epri.com/>,

Coal Utilization Research Council

<http://www.coal.org/>

USDOE Energy Information Administration coal site

<http://www.eia.doe.gov/fuelcoal.html>.

CCP Ohio

<http://ccpohio.eng.ohio-state.edu/ccpohio/>

American Coal Ash Association

<http://www.aaaa-usa.org/>

World Coal Institute

<http://www.wci-coal.com>

International Energy Agency Coal Research

<http://www.iea-coal.org.uk/>

Ohio Coal Association

<http://www.ohiocoal.com>

## **SPECIFIC PROPOSAL REQUIREMENTS**

### **Definition of Project “Scale”**

Projects under this solicitation, except for those in Category 5, should incorporate testing at facilities that range from pilot-scale to full-scale. Pilot-scale facilities generally are approximately one-tenth of a typical commercial size. Work to be performed in larger-scale projects should build upon and extend the development of processes or technologies that have already been demonstrated in bench or pilot-scale facilities. OCDO’s explicit preference is for technologies that are nearest to full-scale commercial application and long-term installation and use. Proposals for such projects must document and supply data on prior development work that warrants a demonstration or full-scale test. OCDO reserves the right to recategorize proposals, if it deems necessary.

### **Project Objectives**

**Category 1** proposals must involve the final testing and permanent installation and use (pending successful demonstration) of clean coal technologies that accomplish significant removal of sulfur dioxide and nitrogen oxides such that the unit on which it is installed will be in compliance with the requirements of the Clean Air Act. Furthermore, the proposed installation must maintain or increase the use of high-sulfur Ohio coal at the host site during and after the successful demonstration program. In addition, proposals must demonstrate two or more of the following OCDO objectives.

- ✓ Innovative application of integrated gasification, combined-cycle (IGCC) technology or circulating fluidized-bed technology.
- ✓ Improved cost-effectiveness over alternative emission reduction techniques.
- ✓ Reduced emission of other pollutants, including fine particulates, mercury, and/or CO<sub>2</sub>.
- ✓ Improved overall plant operating or generating efficiency.
- ✓ Production of products that have immediate commercial re-use applications (e.g., elemental sulfur, sulfuric acid, gypsum, fertilizer, etc.), or minimization of the production of clean coal technology byproducts.

**Category 2** proposals must incorporate the use of Ohio coal and must include a clear demonstration that the work will benefit the use of Ohio coal. Also, proposals in this category must include an estimate of the tons per year of CO<sub>2</sub> and other greenhouse gas emissions that are avoided or sequestered. Finally, proposals must address one or more of the following OCDO objectives.

- ✓ Development or demonstration of CO<sub>2</sub> separation technologies.
- ✓ Development or demonstration of long-term carbon sequestration techniques.
- ✓ Development or demonstration of new methods for reusing large volumes of captured CO<sub>2</sub>.
- ✓ Development or demonstration of technologies or techniques for concentrating CO<sub>2</sub> emissions for more effective removal from flue gases.
- ✓ Development or demonstration of efficiency improvements and/or emission reduction techniques that can reduce CO<sub>2</sub> emissions by at least 20% from baseline levels.
- ✓ Demonstration or development of co-firing technologies as long as it can be clearly demonstrated that greenhouse gas emissions are reduced and Ohio coal use can be maintained and/or increased with the widespread application of the technology.
- ✓ Development or demonstration of greenhouse gas mitigation techniques that can significantly and permanently offset the greenhouse gases emitted in the combustion of Ohio coal.

**Category 3** proposals must include the development of turbine materials that can be matched with the output of an ultrasupercritical, coal-fired boiler producing steam at approximately 1350/1400 F and 5000 psi, and fired with oxygen. The design of the boiler is the subject of OCDO project D-00-20 (<http://www.ohioairquality.org/ocdo/pdf/2003D-00-20.pdf>).

**Category 4** proposals must involve pilot or large-scale development/demonstration of technologies or processes. They must involve the use of Ohio coal as a fuel or feedstock, and must respond to one or more of the following OCDO objectives.

- ✓ Development of cost-effective processes for the removal of sulfur from Ohio coal, or the substantial reduction of sulfur dioxide and nitrogen oxides emissions resulting from the combustion of high-sulfur Ohio coal.
- ✓ Development of techniques/technologies that result in increased thermal or electricity generating efficiency of a boiler or electricity-generating unit, in conjunction with emission reduction processes.
- ✓ Development of expanded markets and new process uses for Ohio high-sulfur coal.
- ✓ Reduction of the emission of air toxics (including mercury), PM<sub>2.5</sub> and/or carbon dioxide from the exhaust gases of combustion sources burning Ohio high-sulfur coal.
- ✓ Minimization of coal combustion waste and products through the use of sorbent recycle, sorbent regeneration and other methods integral to an emission reduction technology.

**Category 5** proposals must be directed at the coal combustion products resulting from the use of Ohio coal, and must be responsive to two or more of the following OCDO objectives.

- ✓ Development, demonstration and/or technology transfer of novel, cost-effective technologies or systems that produce salable commodities from clean coal technology products, and/or that use clean coal technology products directly for beneficial purposes.
- ✓ Development, demonstration and/or technology transfer of techniques and technologies for removing unburned carbon from the high-carbon ash that results from the use of some NO<sub>x</sub> reduction processes.
- ✓ Development, demonstration and/or technology transfer of coal combustion product reuse techniques that are more cost-effective and environmentally acceptable than currently available landfill technology.
- ✓ Verification that the techniques being developed/demonstrated are capable of being sited and operated in the current and anticipated regulatory environment.
- ✓ Demonstration that the disposal or reuse techniques being developed are adaptable to products derived from one or (preferably) more clean coal technologies and/or Ohio coals.
- ✓ Identification of ways of reducing regulatory or marketing impediments to the use of clean coal technology products.
- ✓ Acceleration to commercial adoption and availability of improved clean coal technology product management techniques, especially those with significant and demonstrated near-term potential to expand markets for Ohio coal.

OCDO is particularly interested in projects that promise near-term (by year 2008) application of emission reduction technologies or technologies that use high volumes of Ohio coal as a feedstock to commercial-sized coal combustion facilities. Also, OCDO is interested in projects which develop and demonstrate technologies which exhibit superior environmental performance with Ohio high-sulfur coal, and which will allow the use of Ohio high-sulfur coal under current and future mandates of the Clean Air Act.

### **Nonduplication of Effort**

Work in these areas must not duplicate efforts sponsored by the Electric Power Research Institute, the U.S. Department of Energy, the U.S. Environmental Protection Agency, the American Coal Ash Association, or others.

### **Project Duration**

A major objective of OCDO is to develop technologies that have near-term applicability. Thus the project duration should be minimized. The total project duration for **Category 1 and Category 3** proposals should not exceed four years. **Category 2 and Category 4** proposals should not exceed a duration of three years. **Category 5** proposals should not exceed a duration of two years. Consideration will be given to projects that exceed these lengths only if they provide the advantage of long-term testing or field studies.

### **OCDO Funding Limitations**

For full-scale projects in Category 1 OCDO funds are limited to no more than \$5.0 million, or one-third of the total project cost, whichever is less.

In **Category 2**, field demonstrations projects OCDO funds are limited to no more than \$2.5 million, or one-third of the total project cost, whichever is less. Other proposals in this category are limited to \$1.25 million or one-half of the total project cost, whichever is less.

**Category 3** projects are limited to no more than \$2.0 million in OCDO funds, or one-third of the total project cost, whichever is less.

For **Category 4**, large-scale projects are limited to \$5.0 million and no more than one-third of total project cost, and pilot-scale projects in this category are limited to \$2.5 million or one-third of total project cost, whichever is less.

**Category 5** field demonstration projects are limited to \$500,000 and no more than one-third of total project cost, and all other proposals in this category are limited to \$250,000 or one-half of total project cost, whichever is less.

Combined co-sponsor(s)' cost-share may be cash or a combination of cash and in-kind. However, at least one-half of the total cost share amount should be cash, and the technology developer must contribute a significant portion. Proposers must make their commitments clear when completing Attachment 2. Also, proposers must note whether they are applying for a grant, loan or loan guarantee. Those seeking grants should justify why this is more appropriate than a loan or a loan guarantee.

If a loan or loan guarantee is sought, proposers must contact OCDO to obtain an application, which must be used to supply additional financial information, along with information on collateral or, in the absence of collateral, personal guarantees.

Monies expended or costs incurred prior to OCDO award—including the proposal preparation and grant/loan negotiation costs—shall not be charged to OCDO nor count toward the proposer/co-sponsor cost share. In no event shall OCDO reimburse any lobbying costs.

### **Proposal Format and Content**

A total of seven (7) full and complete copies, plus one electronic (Adobe Acrobat or MS Word file) of the proposal, prepared in accordance with the following content requirements, must be delivered to the Director, Ohio Coal Development Office by the stated deadlines. The proposal must include the following four sections.

- I. General Information
- II. Technical Proposal
- III. Management and Budget Discussion
- IV. Marketability Discussion

Specific requirements for these sections are set forth below. The proposal must be typed, paginated, contain a table of contents, and attachments as discussed below. A successful proposal will adhere closely to these requirements.

All proposals shall become the property of the State and will not be returned.

## **I. General Information**

This section of the proposal must include two elements.

A. Proposal Summary The summary sheet enclosed as Attachment 1 of this solicitation must be completed and included as the first page of the proposal. Instructions for completing the summary sheet are included in Attachment 1. Someone authorized to legally bind the proposer must sign Attachment 1.

B. Public Abstract Immediately following the summary sheet, a public abstract of not more than 500 words must be included. The abstract must contain the project objective, the specific technology/technique to be studied, a description of the project (including the size and location), the type(s) and tonnage per year of Ohio coal to be used, the sponsoring organization(s), the project duration, the total cost and the anticipated contributions of each project participant. Up to two 8.5 in. by 11 in. diagrams may be included in the abstract. This abstract may be released to the public in whole or in part at any time. It is therefore required that the abstract contains no trade secret data or confidential business information.

## **II. Technical Proposal**

This section **must** include the following.

A. Project Objective The **specific technical objective(s)** of the proposed project, its expected results and overall benefits to Ohio coal, to the environment, to the user and/or ratepayer, and to the state-of-the-art, must be clearly and logically detailed. The **relevance to the OCDO objectives** described above, and the potential for increased use/markets for Ohio coal (in tons per year) because of this process or technology, **must** be discussed.

B. Technical Readiness Discussion A detailed discussion of the readiness of the technology or techniques for implementation, demonstration or scale-up must include, as appropriate, a thorough discussion of technical achievements and environmental performance to date. Prior applicable work must be summarized, with information on the size, the conditions of operation, and duration of testing. Summarized, but sufficiently detailed data and test results from such work must be included. (Failure to include hard data from such prior work will seriously jeopardize a proposal's chances for selection.) This discussion must also identify all of the significant

process/equipment items which have not operated previously at the proposed scale and operating conditions.

C. Technical Approach The proposal must contain a full description of the technology or technique(s) and the proposed project. At a minimum, the detailed technical discussion **must** contain:

1. process flow diagrams;
2. energy and mass balances;
3. equipment layout schematics;
4. general and unique design specifications;
5. detailed description of quality assurance/quality control procedures to be followed in the project;
6. detailed description of the monitoring and sampling procedures to be followed;
7. discussion of procedures for establishing baseline data, where appropriate.

Also included must be a discussion of the unresolved technical, economic and environmental factors that are proposed for investigation in this project, and the target goals this project anticipates answering. This must include a discussion of the wastes or products generated by the process, and their disposal or reuse. The identified specific technical risks inherent in the project must be described, along with a discussion of the specific evaluation criteria for determining their resolution.

Finally, this section must include a discussion, where appropriate, of the scale-up required in order to move to a larger-sized application. The significance of data (technical performance, environmental and economic) obtained in this project should be discussed relative to market commercialization.

D. Statement of Work This is a logically sequenced, detailed step-by-step presentation of the project phases and their work tasks, including major milestones which are necessary in order to successfully complete the work. A detailed statement of work is critical to the successful review of a proposal. It is also the basis for negotiations of a legal agreement, should the proposal be accepted for funding. Thorough, complete statements of work will hasten the legal agreement process and therefore the project's start date. Conversely, vague or incomplete statements of work will damage a proposal's chances for selection and will extend legal agreement negotiations. For each of the phases, the following must be specified.

1. The quantified goal and objective(s) and the general nature of the work to be performed, including the location and the responsible party(ies).
2. The sequence and timeline chart showing the tasks, phases and significant milestones.
3. A detailed description of the major tasks which comprise the phase, and, where applicable, a description of the diagnostic and data collection equipment and techniques which are part of the task. Test matrices should be included where appropriate.
4. Discussion of the evaluation parameters that are proposed for assessing the results and success of the work in the phase.
5. Description of the deliverables and accomplishments resulting from the completion of the phase.
6. The estimated cost of the phase.
7. A list of major equipment items to be purchased, the estimated cost of each piece, and a justification for each piece.

### III. Management and Budget Discussion

This section of the proposal must include the following elements.

A. Project Participants All institutional and corporate participants in the proposed project must be identified. For each, the institution or company name, address, contact person and telephone number must be specified. The role and extent of participation of each party, both technical and financial, including all co-sponsors and major sub-contractors must be described. For each co-sponsor, documentation of contributions (financial, personnel, equipment, etc.) must be included, along with a letter-of-intent signed by an authorized official validating such contributions.

B. Project Personnel The proposal must include for the prime sponsor and each of the co-sponsors, key project personnel, their general duties and responsibilities, and their qualifications (e.g., résumé or *curriculum vitae*) relative to this project.

C. Project Management Experience The experience (including results) of the prime sponsor with projects involving similar or related technologies or techniques, and other projects of similar complexity and scale must be described. This should include relevant experience in the development of commercial technologies preceded by pilot or demonstration plant work.

D. Detailed Project Budget All proposers and project participants are expected to provide significant cost-sharing in the project. The budget discussion must describe the type and amount of participation of the prime sponsor and each co-sponsor. To the extent that in-kind contributions, such as existing equipment, are included, the source, percentage of use in the project, date of acquisition, original cost, present value and depreciation status must be included. Zero value must be ascribed to fully amortized or expensed facilities and equipment.

A full, detailed project budget must be included with the proposal. It must show the total project budget, the prime sponsor's (awardee) budget, each co-sponsor's budget, and the proposed OCDO budget. The summary format shown in Attachment 2 must be used, although additional pages providing further detail to aid in review and understanding of the budget are encouraged. The budget must be prepared in line-item (e.g., personnel, overhead, equipment, supplies, etc.) detail. OCDO will not reimburse a fee or a profit, nor will it reimburse any costs incurred due to lobbying or proposal preparation. Overhead and general/administrative charge rates will be carefully scrutinized and should be kept to a minimum.

E. Financial History If the prime sponsor is other than an institution of higher learning, certified financial statements for the past two years must be included. Financial statements for the past two years must also be included for each major contributor to the project also, if other than an institute of higher learning.

F. Audit A copy of the latest audit for each major participant must be included as an attachment to the proposal.

#### **IV. Marketability Discussion**

This final section of the proposal must include the following.

A. Environmental, Health and Safety Aspects This section must contain a discussion of the anticipated environmental benefits of the proposed project, including a comparative risk assessment with currently available technology. This comprehensive discussion should address not only the pilot or demonstration project, but also subsequent commercial applications. The following topics should be included in the discussion.

1. Identification of hazardous or toxic gaseous, liquid or solid substances integral to the process, and the safeguards proposed for their containment and ultimate disposal.
2. The compatibility of the proposed process with existing and anticipated environmental laws and rules.
3. Identification of all process products, their classification with respect to environmental and health and safety rules, and methods proposed for their disposition.
4. Compatibility of the technology/technique with other emission control technologies and the anticipated emission reduction performance when combined with such technologies.

B. Technology/Process Economics The anticipated cost of the commercial application of the technology or process must be estimated, in dollars per ton of pollutant reduced at the source (power plant). Product or reuse credits and energy efficiency improvement credits, where applicable, should be specifically identified. The calculated costs should be compared to competing existing or emerging technologies. Also, where appropriate, the levelized busbar cost (mills/kilowatt-hour) must be estimated. All cost-estimation assumptions and procedures must be clearly detailed.

C. Market Application, Penetration, and Ohio Applicability

The proposal must include a quantified discussion of the proposed technology's marketability and commercialization, particularly in Ohio, and how the technology's application will affect the continued and increased use of Ohio coal, on an estimated tonnage per year basis. Items to be discussed include the following.

1. Description of competing technologies and fuels that will be displaced by the proposed technology, including cost comparisons of the technologies.
2. Potential total market geographic distribution of the market, with particular emphasis on Ohio. Specific attention should be given to Ohio's boiler stock, and to existing Ohio sources using high-sulfur Ohio coal, identifying equipment types amenable for retrofit or repower applications with this technology.
3. Expected technology characteristics that will facilitate commercial plant construction, such as use of shop fabrication, modular construction, siting flexibility, etc.
4. Projected penetration of the proposed technology into the market described above, including a time-phased estimate in terms of relative (percent) penetration and absolute penetration (e.g., tons of Ohio coal per year, MW<sub>e</sub> generated per year, etc.).
5. Discussion of how the Clean Air Act, including the 1990 Clean Air Act Amendments, will affect the commercial adoption of the technology.
6. Types of Ohio coal that can be commercially utilized by this technology, and the potential increase in the use of Ohio coal in tons per year.
7. Characterization of the energy or clean fuel product (if applicable).
8. Amount and characteristics of products and by-products, and how they will affect the marketability of the technology.
9. Discussion of the participant's marketing plan for the technology.

D. On-going Commitment to Ohio Coal Use

The proposal must include a description of the long-term commitment to Ohio coal at the host site, including estimated life of the unit and anticipated annual tonnage of Ohio coal to be used.

**Criteria for Project Evaluation by OCDO (not rank ordered)**

### Technical

- Ø OCDO Objectives The proposed technology clearly meets the objectives stated in the RFP; objectives are well defined and realistic and will advance the state-of-the-art; objectives are likely to be achieved in a cost-effective manner.
- Ø Use of Ohio coal The technology will maintain or increase the use of Ohio coal.
- Ø Technical merit Proposal thoroughly and clearly discusses significant technical issues and/or risks/opportunities associated or anticipated with this technology or process; a thorough background discussion is provided describing the technology's development to date; the project will build upon and not duplicate prior work; the level of proposed scale-up is appropriate and not over-reaching. Sufficient technical support is provided to substantiate a high probability of success; the proposal contains a very clear, detailed, logically sequenced statement of work with specific performance targets or ranges and identified QA/QC methods; the technology is not "off-the-shelf" or commercially guaranteed for the particular application for which it is proposed; the project will be completed in a reasonable time frame.
- Ø Environmental performance The project/technology identifies significant environmental issues associated with its commercial use; the technology is superior in environmental performance to competing technologies; valid performance claims are presented; the technology will meet or exceed requirements of the Clean Air Act and other appropriate laws and regulations; the technology addresses a current or anticipated environmental issue; related issues such by-products, parasitic power use and associated ancillary costs are addressed; the project recognizes and includes any necessary permitting and provides sufficient time in project for same.
- Ø Technical and management competence Project sponsor(s) and key personnel have relevant experience and depth and possess the capability both corporately and in personnel knowledge/ability to ensure the project is properly managed (technically and financially), engineered, constructed, operated, documented and reported within budget. The project team has sufficient technical, managerial and marketing capabilities and skills to undertake a project of this magnitude. The company has enough depth of personnel, funding, and resources to handle a project of this scale, especially if unforeseen problems arise.

### Marketability

- Ø Applicability to Ohio This project/technology is applicable to Ohio coal-consuming facilities or is a technology/process likely to be used in Ohio using Ohio coal as a fuel or feedstock; there is likelihood of near-term adoption in the marketplace for demonstration and pilots projects.
- Ø Competition and Market The proposer exhibits a full understanding of the implementation constraints applicable to commercial processes. The proposer demonstrates a clear understanding of the market and this technology's competition in that market and how this technology surpasses the competition in performance and cost. The proposer is experienced in commercialization of new technologies and presents evidence of same.
- Ø Cost-effectiveness Application of the technology is likely to meet or exceed environmental requirements as established by current and expected law and regulation at an overall cost below that of currently available technologies. The proposer identifies the cost or credit associated with byproduct disposal or sale. The proposer demonstrates a clear understanding of the economic issues that must be addressed in the technical development.
- Ø Business/Marketing Plan Given the level of development (i.e., pilot, demonstration, deployment, etc.) of the technology, an appropriate business/marketing plan is presented. The proposer demonstrates knowledge of the Ohio and overall market, how this will advantage Ohio coal, and how to penetrate the market. Clear step/plans are presented to commercialize the technology.

## Financial

- Ø Financial ability The proposer is financially stable and has sufficient depth of resources to support the project, especially if unforeseen problems arise.
- Ø Reasonableness of budget The budget is reasonable for the tasks proposed. The ratio of OCDO funds to private and other public contributions (cash and in-kind) is not excessive and is within limits set elsewhere in this document. The project cost and relative investment by the State of Ohio is appropriate to the risk undertaken by the State. The proposer and co-sponsors bear an appropriate share of the risk.
- Ø Cost-share Proposer bears a significant portion of the project's total cost, with cash and, where appropriate, in-kind contributions.
- Ø Past performance as an OCDO or other Ohio agency grant or loan recipient For those proposers who have previously received support from OCDO or another State agency, the adherence to and completion of the requirements of the previous agreement(s) was acceptable. No taxes or other debts to the State of Ohio are outstanding.

Issued 01/13/05

Indicate into which one category this proposal falls:

- Category 1 Deployment
- Category 2 Greenhouse gas control
- Category 2 Greenhouse gas sequestration
- Category 3 Ultrasupercritical turbine materials
- Category 4 Pilot scale
- Category 4 Large scale
- Category 5 Field demonstration
- Category 5 Other


Indicate the one type of assistance sought:

- Grant
- Loan
- Loan Guarantee


<b>OCDO ID#</b> <div style="text-align: center; font-size: 1.2em;"> <b>05-</b> <span style="border-bottom: 1px solid black; display: inline-block; width: 100px;"></span> </div> <p style="text-align: center; font-size: 0.8em;">(Leave blank)</p>
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<input type="checkbox"/>	<b>Application Fee enclosed</b>  \$675.00 if at least 50 employees \$400.00 if fewer than 50 employees Payable to <b>State of Ohio/OCDO</b>
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**Proposal Summary**

1.	<b>Project Title</b>						
2.	<b>Prime Sponsoring Agency</b>						
	<b>Address</b>						
	<b>City/State/Zip</b>						
	<b>Authorized Signature</b>		<b>Title</b>				
3.	<b>Co-sponsoring Agency</b>						
	<b>Address</b>						
	<b>City/State/Zip</b>						
	<b>Authorized Signature</b>		<b>Title</b>				
3.	<b>Primary Contact Person</b>		<b>Title</b>		<b>E-mail address</b>		
	<b>Phone</b>	(   )	<b>Fax</b>	(   )			
3.	<b>Alternate Contact Person</b>		<b>Title</b>		<b>E-mail address</b>		
	<b>Phone</b>	(   )	<b>Fax</b>	(   )			
4.	<b>Project Location</b>						
	<b>Prime Sponsoring Agency Location</b>						
5.	<b>Proposed Start Date</b>		<b>Duration</b>				months
	<b>Does the proposal contain proprietary or trade secret information?</b>	No	<b>Yes</b> , proprietary or trade secret information contained on these pages				
7.	<b>Type(s) of Ohio coal to be used</b>	Sulfur & ash cont.					
8.	<b>Technology to be used</b>						
9.	<b>Primary application(s) of the technology</b>						
10.	<b>Project Size (indicate units of measure)</b>						

**11. Budget Summary**

	<b>Contributor</b>	<b>Dollar Contribution</b>	<b>Percentage of Total</b>
	OCDO *		
Prime Sponsor **			
Co-sponsor #1 **			
Co-sponsor #2 **			
Co-sponsor #3 **			
Co-sponsor # 4 **			
Total Project Cost			

- ✓ For Category 1 proposals, OCDO funds are limited to \$5.0 million or one-third of total project cost, whichever is less.
- ✓ For Category 2 proposals, OCDO funds are limited to no more than \$2.5 million or one-third the total project cost, whichever is less for field projects and \$1.25 million or one-half of total project cost for all others.
- ✓ For Category 3 proposals, OCDO funds are limited to \$2.0 million or one-third of total project cost, whichever is less.
- ✓ For Category 4 proposals, OCDO funds for large-scale projects are limited to \$5.0 million and one-third of the total cost, whichever is less, and for pilot-scale projects to \$2.5 million and one-third of the total project cost, whichever is less.
- ✓ For Category 5 proposals, OCDO funds are limited to \$500,000 for field demonstration projects and no more one-third of total project cost, whichever is less, and to \$250,000 for all other proposals, or one-half the total project cost, whichever is less.

\*\* Note below in item 13 how much of the cost-share is cash and how much is in-kind.

**12. Cost by Phase** (use only those lines which are necessary)

	<b>Dollar Amount</b>	<b>Percentage</b>
Phase I		
Phase II		
Phase III		
Phase IV		
Phase V		
Phase VI		
Phase VII		

**13. Cost-share**

**Breakout**

	<b>Name</b>	<b>Cash</b>	<b>In-kind</b>	<b>Total</b>
Prime Sponsor				
Co-sponsor #1				
Co-sponsor #2				
Co-sponsor #3				
Co-sponsor #4				

## PROPOSAL SUMMARY INSTRUCTIONS

Fully complete Sections 1 through 13 of the **two-page Proposal Summary**; do not leave any blank sections. If a line is not applicable to your project, enter "N/A" on that line.

**OCDO ID#.** Leave blank. This will be completed by OCDO.

Indicate the proper category for this proposal by checking the appropriate box. (See page 1 of this solicitation for a description of proposal categories.)

Also, please check the box at the top of the form to indicate payment of the proper **Application Fee**.

1. **Project Title:** Self-explanatory.
2. **Prime Sponsoring Agency:** This is the entity with which OCDO will enter into legal agreement and to which funds will be granted should the project be selected. It will be the entity responsible for insuring the project is conducted fully, efficiently, and in a timely manner. The prime sponsoring agency must be located in or doing business in the state of Ohio. An authorized agent of the prime-sponsoring agency must endorse the project's submittal by signing the first copy of this attachment (the remaining copies may bear photocopy of the signature).

**Co-Sponsoring Agency:** The prime-sponsoring agency may have one or more entities supporting, participating, or contributing to the project. They should be identified and that entity's endorsement of its participation verified by the original signature of an authorized agent on the first copy of this attachment (the remaining copies may bear a photo of the signature).

3. **Primary Contact Person:** List the name, title, and telephone, fax number and e-mail address of a person OCDO may contact should it have any questions about the project/proposal. All correspondence will be addressed to this individual.

**Alternate Contact Person:** List an alternate contact should the primary contact be unavailable.

4. **Project Location:** Identify the city, county, and state in which the project will be performed.

**Prime Sponsoring Agency Location:** Identify the city, county, and state in which the prime-sponsoring agency is located.

5. **Proposed Start Date:** List the project's proposed start date. Note that unless it is submitted before the deadline, no project should be scheduled to start prior to May 1, 2005.

**Project Duration:** List the number of months it is expected to take to complete the project.

6. **Proprietary Information:** State whether or not proposal contains proprietary or trade secret information. If it does, identify the pages where such information is contained (those pages must also be clearly marked to pinpoint the proprietary or trade secret information).

7. **Ohio Coals:** Identify the type(s) of Ohio coals to be used in the project. Example: Pittsburgh #8. Include the approximate sulfur and ash content of the coals to be used.

8. **Technology To Be Used:** Give a brief description of the technology or technologies to be incorporated.

9. **Application(s):** Describe the primary application of the technology.

10. **Project Size:** Identify the size of the project in common, clearly understood terms. For a post-combustion process, for example, the size may be in MW<sub>e</sub> of capacity or in ACFM; for by-products

projects, size may be in terms of the tons of by-product handled per day; for air toxics projects, the size may be in terms of the capacity of the unit or flue gas cleanup device tested.

11. **Budget Summary:** Enter dollar amount requested of OCDO, and the percentage of the total project cost that amount represents. Note carefully the funding limitations.

Enter the amount the prime sponsor is going to contribute; this amount may represent a cash or in-kind contribution, or a combination thereof. Enter the prime sponsor's percentage of cost share.

Enter the amount a co-sponsor is going to contribute, either in cash, in-kind services, or a combination thereof. If there is more than one co-sponsor, add their contributions together and enter it on this line. Enter the co-sponsor's percentage of cost share.

Add the amounts from OCDO, prime sponsor, and co-sponsor(s), and enter the sum for total project cost. Add the percentages of the same three entities to be sure they total 100 percent.

12. **Cost by Phase:** Give the total project cost breakdown by project phase.
13. **Cost-share Breakout:** Enter the name of the Prime Sponsor and each Co-sponsor. Denote the amount of cash and in-kind contribution each is pledging toward the project. The Total column for each must equal the amounts entered into the Dollar Contribution column in number 11, Budget Summary.

## Project Budget Summary<sup>1</sup>

Categories	Phase 1	Phase 2	Phase 3	Phase 4	Total
<b>Total Personnel</b>					
OCDO					
Prime Agency					
Participant 1 <sup>2</sup>					
Participant 2 <sup>2</sup>					
<b>Total Equipment</b>					
OCDO					
Prime Agency					
Participant 1 <sup>2</sup>					
Participant 2 <sup>2</sup>					
<b>Total Supplies</b>					
OCDO					
Prime Agency					
Participant 1 <sup>2</sup>					
Participant 2 <sup>2</sup>					
<b>Total Contractual</b>					
OCDO					
Prime Agency					
Participant 1 <sup>2</sup>					
Participant 2 <sup>2</sup>					
<b>Total Travel</b>					
OCDO					
Prime Agency					
Participant 1 <sup>2</sup>					
Participant 2 <sup>2</sup>					
<b>Total Other</b>					
OCDO					
Prime Agency					
Participant 1 <sup>2</sup>					
Participant 2 <sup>2</sup>					
<b>Total Indirect Costs</b>					
OCDO					
Prime Agency					
Participant 1 <sup>2</sup>					
Participant 2 <sup>2</sup>					
<b>Total Project Cost</b>					
OCDO					
Prime Agency					
Participant 1 <sup>2</sup>					
Participant 2 <sup>2</sup>					

<sup>1</sup> Add pages as necessary to fully disclose the budget.

<sup>2</sup> All participants must be identified by name.

## Potential Host Sites

The owners of the following facilities have indicated that these sites may be available as host sites for the demonstration of new clean coal technologies. This list is not intended to be a complete list of available host sites in Ohio, and listing of a potential site here is not a guarantee that the site is available for a particular technology demonstration project. In order to determine if one of more of these sites might be suitable for a proposed demonstration project, please contact Howard Johnson of OCDO at [hjohnson@odod.state.oh.us](mailto:hjohnson@odod.state.oh.us) or (614) 644-8368.

### Municipal Utilities

Dover	247 MMBtu/hr stoker boiler
Gorsuch Station	4 B&W wall-fired PC boilers at 830 MMBtu/hr each
Hamilton	1 B&W PC boiler at 250,000 # steam/hr 1 CE PC boiler at 550,000 # steam/hr
Orrville	1 spreader-stoker boiler at 108.4 MMBtu/hr 1 spreader-stoker boiler at 170 MMBtu/hr 2 frontwall-fired dry bed boilers at 307.5 and 365.4 MMBtu/hr
Painesville	1 wall-fired PC boiler at 250 MMBtu/hr 1 Riley Stoker boiler with traveling grate at 393 MMBtu/hr 1 Riley Stoker boiler with traveling grate at 219 MMBtu/hr
Piqua	1 stoker boiler at 299.7 MMBtu/hr 1 stoker boiler at 254 MMBtu/hr 1 stoker boiler at 256 MMBtu/hr
St. Marys	1 chain-grate stoker boiler at 83 MMBtu/hr 1 wall-fired PC boiler at 160 MMBtu/hr
Shelby	1 Combustion Engineering wall-fired PC boiler at 223.3 MMBtu/hr 1 Zurn wall-fired PC boiler at 228 MMBtu/hr 1 Kennedy Van Saun wall-fired PC boiler at 133 MMBtu/hr

### Universities

Miami University	3 Keeler Vibra-grate boilers at 80,000 # steam each, with in-flue cyclone separators and solid electrode ESP
Denison University	B&W coal-fired boiler at 50,000 # steam per hour, with AAF dry centrifugal dust collector.
Wright State University	No coal-fired boilers, but interested in developing coal-fired steam and electricity capacity. Currently consume about 58,000,000 kwhr of electricity and 180,000 MMBtu of natural gas per year.

### Industrial Facilities

Miller Brewing Company	2 DB Riley RX-16 wall-fired PC boilers at 180,000 # steam/hr each, with 4 burners per boiler, and a baghouse. Annual coal consumption about 80,000 tons.
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