

U.S. DEPARTMENT OF ENERGY SOLID-STATE LIGHTING PROGRAM

COLLABORATIVE R&D TESTING OPPORTUNITY: ORGANIC LIGHT-EMITTING DIODES TESTING APPLICATION GUIDELINES AND REQUIREMENTS

U.S. Department of Energy Solid-State Lighting Program

The U.S. Department of Energy (DOE) Solid-State Lighting (SSL) Program has engaged in ongoing discussions with the U.S. organic light-emitting diodes (OLED) lighting community regarding the need for an OLED collaborative research and development (R&D) framework to accelerate developments in OLED lighting technology and manufacturing.

DOE implemented the collaborative R&D testing opportunity to enable U.S.-based OLED component developers and manufacturers to incorporate various R&D-stage components into a high-quality baseline OLED device. The results of the testing will lead to the identification of high-performing components with the ability to advance OLED technology performance and efficiency while reducing cost.

OLED Testing Application Guidelines and Requirements

Eligible companies/organizations must (1) be incorporated in the United States and (2) have conducted the technology development effort in the United States. Acceptable OLED components for testing include, but are not limited to: substrates/integrated substrates, extraction layers, metallic grids, single and multilayer barrier structures, light extraction approaches, color emitters, OLED pixel schemes, OLED drivers, and OLED layers (e.g., cathode, emissive layer, anode).

It is the expectation of the DOE SSL Program that the OLED component developer or manufacturer will have conducted preliminary testing on the component prior to applying to this process. DOE's testing serves to move the base of OLED knowledge beyond the potentially limited capabilities of the OLED component developer or manufacturer by incorporating the technology into a high-quality baseline OLED device. This testing opportunity is not intended to be used by the applicant solely for the purposes of generating commercial data for potential customers, nor is it intended to be used for developing data to apply for, or complete the terms of, competitive solicitations/awards.

To be considered, the following information should be provided (approximately five pages) via email to OLED-Testing@netl.doe.gov:

- Describe the technology/component, its anticipated use in the OLED, and any known restrictions, shortcomings, or design considerations that must be considered when incorporating it into an OLED stack.
- Provide narrative, data, and/or results from preliminary tests of the technology/component in a complete OLED device.
- Describe your organization's current test capabilities.
- Detail the anticipated performance enhancement(s) of the technology with an emphasis on efficiency, quality, or cost. Include relevant sub-level metrics (e.g., voltage, extraction efficiency, transparency) where necessary.
- Describe the maturation stage of the technology. Provide supporting graphics and figures to justify

its tested performance and suitability. Describe what additional information is expected to be gained through testing on high-quality devices. (Testing will be conducted as small-scale/proof-of-principal or manufacturing scale, depending upon the technology maturation.)

- Include the number of tests requested, the goal of each test run, and a description of the aspects that will be tested each test run.

Please note that a follow-up conference call with DOE/National Energy Technology Laboratory (NETL) staff may be necessary to further discuss your application and proposed test plan. Please be cognizant that adequate application review time is required and initiation of the proposed work is dependent on application approval and test facility availability.

If approved for testing, proper health and safety information (e.g., Safety Data Sheets [SDS]) will be required for shipment and receiving. Testing cannot begin before receipt of the health and safety information. Shipment of the technology (including quantities) is to be worked out with the test facility and sent directly to the facility. The OLED component developer or manufacturer must bear the expense of shipment(s). In return, the OLED component developer or manufacturer will receive important information, knowledge, and recommendations that are gained from the testing. Leftover materials following testing will not be returned to the OLED component developer or manufacturer.

KeyLogic Systems, LLC (hereafter KeyLogic Systems) currently serves as a prime site-support contractor at DOE/NETL. KeyLogic Systems' role is to implement the project framework. Test facilities are subcontractors to KeyLogic Systems; subcontracts include mandatory DOE contract flow-down provisions. Note that OLED component developers and manufacturers and test facilities are welcome to negotiate their own additional confidentiality and/or non-disclosure agreements.

Please note the following items:

- **DOE/NETL Deliverable:** A final report will be sent to KeyLogic Systems after completion of the tests. Report content will identify the components tested and describe the test process, results, observations, and recommendations. The final report will not include any confidential/proprietary/business-sensitive information or identify the OLED component developer or manufacturer. The organization requesting the work must identify what information is confidential/proprietary/business-sensitive before the initiation of tests. This information will be excluded from the final report.
- The test facility will specify the minimum amount of material that will need to be supplied to complete the testing as indicated in the test plan. It is expected that your organization will provide any materials needed to complete the testing and communicate any impacts on schedule to KeyLogic Systems and the test facility. Any potential work by an external vendor (and any potential associated costs) must be brought to the attention of KeyLogic Systems before or during the kickoff conference call.
- If applicable to the testing, the OLED component developer or manufacturer will provide the substrate(s) with a patterned transparent conductor(s) and with an isolation layer(s) (or cover the cost of the patterned transparent conductor[s] and isolation layer[s]) needed to facilitate the experiment(s) at the test facility.
- Following application approval, the OLED component developer or manufacturer should (if applicable) (1) discuss substrate size and tolerance with the test facility and (2) check glass edges for flares or other non-squareness issues that may cause the samples to not fit properly into mechanical fixtures at the test facility (before shipment to the test facility).
- The OLED Testing Application Guidelines and Requirements are subject to change.