



**U.S. Department of Energy**  
**Advanced Research Projects Agency – Energy**  
**Announcement of Teaming Partner List**  
**for an upcoming Funding Opportunity Announcement:**  
**PLANT ROOT PHENOTYPING FOR SOIL CARBON**  
**SEQUESTRATION**

The Advanced Research Projects Agency – Energy (ARPA–E) intends to issue a new Funding Opportunity Announcement (FOA) in February, 2016 for technologies that measure structural and functional properties of plant roots and soils that lead to the development of improved root traits. Specifically, ARPA-E is interested in traits that reduce atmospheric greenhouse gas concentrations and energy used for crop production by increasing soil carbon storage and improving fertilizer efficiency (N<sub>2</sub>O emission reduction). These traits are expected to create grower value by improving soil quality (i.e. soil organic carbon content), nutrient use efficiency (i.e. Nitrogen) and water use productivity (i.e. Drought and heat tolerance). To select and breed for these traits, teams should develop new, innovative systems (i.e. imaging technologies, sensors, models, analytics, etc.) for the characterization of below ground plant growth and development. Technology platforms should have demonstrated utility for field deployment and/or lab environments translatable to the field. In order to augment limitations in sensor resolution, throughput, and cost, ARPA-E encourages augmenting imaging technologies with functional modeling approaches that predict root system properties from the measurement of above ground or near surface traits. Using imaging and sensor technologies and parameterized models, the program will support trait discovery, gene identification, and high throughput screening efforts that maximize the root traits described above. This program will encompass imaging and sensor technology development, functional modeling, genomics, plant breeding, and field screening for advanced cultivars. ARPA–E held a workshop on this topic in July 2015; information on this workshop can be found at the webpage (<http://arpa-e.energy.gov/?q=workshop/novel-methods-phytosequestration-workshop>)

Currently, ARPA–E anticipates that this program will have four areas of interest.

1. Field and lab based plant and soil imaging technologies with sufficiently high resolution to determine desirable root traits;
2. Parameterized root growth models that predict system growth for ideotype design. These models should be compatible with advanced shoot/canopy models and ecosystem models;
3. Identification of causative loci for desirable root traits and modern breeding methods such as genomic selection for rapid cultivar development; and
4. High throughput field environmental sensors and imaging techniques that allow for selection of desirable below ground traits

In order to realize the goals of this program, expertise in the following areas may be useful: (i) sensor/imaging engineering (ii) functional modeling (iii) genomics (iv) plant physiology (v) soil science (vi) biogeochemistry (vii) plant breeding (viii) field phenotyping (ix) etc.

As a general matter, ARPA–E strongly encourages outstanding scientists and engineers from



different organizations, scientific disciplines, and technology sectors to form new project teams. Multidisciplinary and cross-sector collaboration spanning organizational boundaries enables and accelerates the achievement of scientific and technological outcomes that were previously viewed as extremely difficult, if not impossible.

The Teaming Partner List is being compiled to facilitate the formation of new project teams. ARPA-E intends to make the Teaming Partner List available on ARPA-E eXCHANGE (<http://ARPA-E-foa.energy.gov>), ARPA-E's online application portal, in December 2015. Once posted, the Teaming Partner List will be updated periodically, until the close of the Full Application period, to reflect new Teaming Partners who have provided their information.

Any organization that would like to be included on the Teaming Partner list should complete all required fields in the following link: <https://ARPA-E-foa.energy.gov/Applicantprofile.aspx>. Required information includes: Organization Name, Contact Name, Contact Address, Contact Email, Contact Phone, Organization Type, Area of Technical Expertise, and Brief Description of Capabilities.

By submitting a response to this Notice, you consent to the publication of the above-referenced information. **By facilitating this Teaming Partner List, ARPA-E does not endorse or otherwise evaluate the qualifications of the entities that self-identify themselves for placement on the Teaming Partner List.** ARPA-E will not pay for the provision of any information, nor will it compensate any respondents for the development of such information. Responses submitted to other email addresses or by other means will not be considered.

**This Notice does not constitute a FOA. No FOA exists at this time.** Applicants must refer to the final FOA, expected to be issued in February 2016, for instructions on submitting an application and for the terms and conditions of funding.