# Conventional Power Generation

**Call type: Invitation for proposals**

**Closing date: 16:00 on 16 July 2014**

**Related themes: Energy**

## Summary

EPSRC, as part of its contribution to the RCUK Energy Programme, invites proposals for collaborative research projects to undertake fundamental research to tackle challenges in Conventional Power Generation. The remit of this call is derived from the outputs of a scoping workshop which was held on 15 April 2014. We invite proposals in the areas of:

1. Step change technologies and materials for future plant design
2. Integration of conventional plants with future technologies

The call closes at 16:00 on 16 July 2014. Funding of up to £3M is available from EPSRC for this call; up to £2M for area 1 and up to £1M for area 2. We expect to fund up to 3 projects. Cross-institutional bids are welcome, but there must be a single submission for each application, led by a single principal investigator, with only one proposal form. Projects may be for up to 4 years.

Anyone intending to submit a proposal to this call must register their interest by email to laura.sewell@epsrc.ac.uk by 16 June 2014, including in this email:

- Name and institutions of the principal and co-investigators
- Any non-academic project partners
- The subject area (see call remit outlined below)
- The approximate value of the funds to be requested

Please note that this is not intended to restrict detail in the final submission as changes will be allowed, but will give us an indication of the level of interest and enable us to identify peer reviewers quickly. **Applicants that do not register their intent to submit will have their applications rejected.**

## Background

The RCUK Energy Programme is bringing together engineers and scientists from many areas to tackle the research challenges involved in creating new energy technologies and understanding their social, economic and environmental implications. EPSRC leads the Energy Programme, in which BBSRC, ESRC, EPSRC, NERC and STFC work together to develop and deliver energy research

and training within a common strategic framework, using a whole systems approach.

Around two-thirds of the world's electricity is generated from the combustion of fossil fuels. The UK Government has targets to reduce $CO_2$ emissions by 80% by 2050. This will involve a substantial move away from fossil fuels but credible forecasts of the future energy mix still allow for a significant contribution from conventional power. How do we deliver this contribution in a low-carbon context? Fundamental research has much to offer in terms of increased efficiency, flexibility, use of alternative fuels and integration of technologies for carbon abatement.

In 2013, EPSRC committed £4.0M to support two Future Conventional Power Research Consortia. This current call in Conventional Power Generation aims to complement the consortia, and to build on our previous activities within the area.

The remit of this call is derived from the outputs of a scoping workshop which was held on 15 April 2014. The relevant workshop outputs can be found as an annex to this call document.

For more information about EPSRC's portfolio and strategies, see our website: http://www.epsrc.ac.uk/ourportfolio/

## Funding available

EPSRC has up to £3M available to support projects for this call under the areas outlined below; we aim to support £2M in area 1 and £1M in area 2 if quality allows. It is envisaged that up to 3 projects will be funded under this call. It is expected that, where appropriate, proposals will have non-academic partners who are contributing and actively involved in the project.

## Remit of the Call

EPSRC is looking to support up to 3 novel research projects covering challenges in conventional power generation. A scoping workshop was held on 15 April 2014 to identify the priority areas for this call. The workshop identified a number of research challenges – more than it would be possible to support within the funds available. These challenges have been further prioritised according to their fit with EPSRC's priorities as well as their complementarity to our Conventional Power Generation portfolio. Proposals are therefore invited in the following areas:

## 1. Step change technologies and materials for future plant design

The development of next generation technologies and novel materials is essential to ensure the efficiency and flexibility of future plants to cope under conditions of increased penetration of intermittent renewables and varied fuel sources.

Areas that this challenge may wish to address include:

- Design of advanced or novel steam cycles
- Use of alternative/mixed fuels, their potential impact on the plant/process/emissions and methods to mitigate these impacts

- Advanced sensors and diagnostics
- Development of materials which have a better thermal performance or higher temperature capability (e.g. lightweighting)
- Advanced steam and gas turbine technologies and materials
- System modelling and simulation

Applicants may also wish to consider how the outcomes of the above could be applied to the optimisation of existing power plants to aid in the reliability, availability, maintainability and/or operability of these plants.

## 2. Integration of conventional plants with future technologies

Current and next generation power plants are likely to have to integrate more closely with future technologies such as carbon capture and storage, energy storage and variable fuel mixes. This topic seeks to address the challenges associated with this integration.

Note that this topic is not to address CCS or energy storage as these are covered by separate research areas but to address how conventional power plants can be more closely integrated with these future technologies. Applicants should be aware of research occurring within these areas.

Topics this challenge may wish to address include:

- System modelling and simulation
- Steam cycle integration
- On-line monitoring techniques
- Sensors and diagnostics

Social, economic and behavioural aspects were also identified as an issue relevant to the future of Conventional Power Generation. Although projects focusing entirely on these aspects are not invited in this call, proposers should consider the need to address this as part of their project.

To avoid duplication of effort, applicants should take into consideration the work that is being undertaken by the Future Conventional Power Consortia (Flex-E-plant led by Prof Rachel Thomson at Loughborough and Future Conventional Power led by Prof Simon Hogg at Durham). Applicants are also asked to demonstrate an understanding of the wider research landscape in the area and the issues that conventional power faces when developing their proposals.

Other areas detailed in the workshop report are **not** included in the remit of this call. These areas may form the basis of subsequent calls or where they fall outside of EPSRC's remit we will explore how they can be taken forward by the most appropriate research council(s) and/or other funding bodies. Proposals outside the scope of this call are welcome at any time through the Standard Research scheme.

Carbon capture and storage (CCS) is a major theme of the Energy Programme, and receives a substantial amount of support, including for the UK CCS Research

Centre. Proposals focusing mainly on CCS are therefore not within the scope of this call.

## Resources requested

We wish to foster collaboration and knowledge-sharing across the projects we support through this call. Each project team should therefore be prepared to host at least one workshop during the lifetime of the grants to foster synergies and share learning. Please include sufficient funds in your proposal to host one workshop to which all the funded project teams will be invited, and to cover travel costs for your project team to attend the other teams' events. The Future Conventional Power Research Consortia should be involved as appropriate.

Further guidance on the types of support that may be sought and advice on the completion of the research proposal forms are given on the EPSRC website (www.epsrc.ac.uk/funding/guidance/) which should be consulted when preparing all proposals.

## Equipment

Where possible, researchers are asked to make use of existing facilities and equipment, including those hosted at other universities. If equipment is needed as part of the research proposal, applicants must follow EPSRC's rules for requesting equipment over £10,000 in value. Individual items of equipment up to the current OJEU (Official Journal of the European Union) procurement threshold can be included on research proposals submitted through this call, but research organisations will be expected to make a contribution to the cost. All requests for single items of equipment above the current OJEU threshold will need to go through a separate process which will assess the strategic need for the equipment and how to ensure maximum usage. These proposals will be assessed through the separate Strategic Equipment peer review process.

For more information on equipment funding, please see: http://www.epsrc.ac.uk/research/ourportfolio/themes/researchinfrastructure/subthemes/equipment/.

## Eligibility

For information on the eligibility of organisations and individuals to receive EPSRC funding, see the EPSRC Funding Guide: http://www.epsrc.ac.uk/funding/guidance/fundingguide/

As this call is a targeted funding opportunity provided by EPSRC, higher education institutions, and some research council institutes and independent research organisations are eligible to apply. A list of eligible organisations to apply to EPSRC is provided at: http://www.rcuk.ac.uk/funding/eligibilityforrcs/

For an application to be considered it must also meet the following criteria:

- The majority of the proposed research must be within EPSRC's remit, but can include work packages that span into other Council's remits.
- Proposals must be within the remit of the call as listed above.
- Proposals must be for a maximum of 4 years in duration.

- Proposals should be an effective fit to the existing research supported by the Energy Programme and EPSRC.

## How to apply

Anyone intending to submit a proposal to this call must register their interest by email to Laura.Sewell@epsrc.ac.uk by 16 June 2014, including in this email:

- Name and institutions of the principal and co-investigators
- Any non-academic project partners
- The subject area (see call remit outlined above)
- The approximate value of the funds to be requested

## Submitting application

You should prepare and submit your proposal using the Research Councils' Joint electronic Submission (Je-S) System (https://je-s.rcuk.ac.uk/).

When adding a new proposal, you should select:

- Council 'EPSRC'
- Document type 'Standard Proposal'
- Scheme 'Standard'
- On the Project Details page you should select the 'Conventional Generation' call.

Note that clicking 'submit document' on your proposal form in Je-S initially submits the proposal to your host organisation's administration, not to EPSRC. Please allow sufficient time for your organisation's submission process between submitting your proposal to them and the call closing date. EPSRC must receive your application by **16:00** on **16 July 2014**.

Guidance on the types of support that may be sought and advice on the completion of the research proposal forms are given on the EPSRC website (http://www.epsrc.ac.uk/funding/guidance/) which should be consulted when preparing all proposals.

## Guidance on writing application

If the attachments are uploaded as Word documents, please be aware that once the application has been submitted to the Council/Funder, all the attachments will be converted and held as an Adobe Acrobat file (PDF). Also please note, that whilst we support a wide range, **we do not support all MS Word font types**. Therefore if an unsupported font type is used a different font type may be substituted which may result in changes to the layout of the document. For this reason we recommend that the documents are converted to PDF files before uploading.

For advice on writing proposals see:
http://www.epsrc.ac.uk/funding/guidance/preparing/

# Assessment

## Assessment process

Proposals will be assessed using postal peer review, followed by a prioritisation panel. The reviewers and panel will be asked to assess the proposals against the fit to the call and the usual EPSRC assessment criteria as listed below. A rank-ordered list will be generated and only the top ranked proposals will be funded. Please note that if two or more proposals are received in the same research area EPSRC reserves the right to fund only the highest ranked of those proposals in order to avoid duplication of effort.

## Assessment criteria

The proposals will be assessed on their fit to the scope of the call and to the following standard criteria:

### Quality

- The novelty, relationship to the context and timeliness
- The ambition, adventure, and transformative aspects identified
- The appropriateness of the proposed methodology

### Importance

- National importance of this research on a 10-50 year timescale
- Contribution to other research areas, societal challenges, success of the UK economy, emerging industries

### Impact

- The relevance and appropriateness of any beneficiaries or collaborators
- Whether appropriate routes and resources have been identified for dissemination and knowledge exchange

### Applicants' ability to deliver the proposed research

- Appropriateness of the track record of the applicants
- Balance of skills of the project team, including academic and non-academic partners

### Resources and management

- The effectiveness of the proposed planning and management
- Appropriateness and justification of the requested resources

### Fit to the call

- Understanding of the conventional power research landscape
- Appropriate engagement with other stakeholders and activities

# Guidance

## Guidance for reviewers

Information about the EPSRC peer review process and guidance for reviewers can be found at: http://www.epsrc.ac.uk/funding/peerrev/review/

## Additional grant conditions

In addition to the standard terms and conditions for grants, the following additional conditions will apply to projects funded under this call:

GAC 01 Collaborative Agreement

In accordance with GC 21, a Collaborative Agreement is required for this project. This must be in place before the start of the project.

Each collaborative project will be funded as a single grant only, held by the lead organisation. It will be the responsibility of this grant-holding Research Organisation to advise the EPSRC that the agreement has been signed by all partners.

Confirmation that the agreement is in place must be sent to: laura.sewell@epsrc.ac.uk before the start of the project.

GAC 02 Management Committee

The project must have a management committee, or equivalent body to oversee the day to day running of the project. The terms of reference of this Committee should be agreed with ESPRC. EPSRC should be invited to attend the meetings and receive all papers.

GAC 03 User Engagement Strategy

The grant holders must develop and execute a strategy for engaging with potential users of the research funded in the project (any resources required for this should be included and justified in the application). This strategy should be reviewed and updated regularly as part of the formal management of the grant.

The strategy should cover:

- how and when potential users have been / will be identified;
- what form the engagement will take;
- what steps will be taken to ensure that outputs of the research are made available to potential users;
- suitable metrics for determining the success of the strategy in delivering value to users.

## Key dates

| Activity | Date |
|---|---|
| Scoping workshop | 15 April 2014 |
| Call open on Je-S | 30 April 2014 |
| Email expression of interest to EPSRC | 16 June 2014 |
| Call closes | 16 July 2014 |
| Panel | December 2014 |

## Contacts

Any enquiries related to this call should be directed to:

Laura Sewell
E: laura.sewell@epsrc.ac.uk
T: 01793 444099

Any queries regarding the submission of proposals through Je-S should be directed to:

The Je-S helpdesk
E: JeSHelp@rcuk.ac.uk
T: 01793 444164

Please contact your university research office for help and advice on writing your proposal and allow enough time before the closing date for your organisation's submission process.

## Change log

| Name | Date | Version | Change |
|---|---|---|---|
| Laura Sewell | 07/04/14 | 1 | N/A |
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