

## Quick Reference

**Please note that you must read the full Call document for guidance before submitting your proposal**

## Joint UK-China Low Carbon Manufacturing Call

**Call type: Invitation for proposals**

**Closing date: 16:00 on 19 June 2018 (UK/China time)**

**Funding Available:** up to £3.3 million is available from EPSRC and up to 3 million RMB per project will be available to Chinese applicants from NSFC

**How to apply:** UK Applicants must submit an intent-to-submit via the online form on the EPSRC website call page, by 22 May 2018. Full proposals must be submitted by 19 June 2018, via Je-S in the UK.

**Assessment Process:** Proposals will undergo postal peer review and then be assessed via a joint UK-China prioritisation panel.

### Key Dates

Activity	Date
Call for Proposals	23 April 2018
Intent to Submit Closes	22 May 2018
Deadline for Proposals	19 June 2018
UK-China Prioritisation Panel	23-24 October 2018

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## Joint UK-China Low Carbon Manufacturing Call

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**Related themes:** Energy, Manufacturing the future

### Summary

This is the third of three calls planned under the “UK-China Joint Programme in Low Carbon Innovation” memorandum of understanding (MOU) between EPSRC and NSFC. This programme builds on a successful history of collaboration between EPSRC and NSFC across a range of topics.

The programme contributes to a broader strategic portfolio of energy research including the UKRI Energy Programme and EPSRC’s ambition to develop the next generation of technologies for the safe, secure, cheap and efficient provision of clean energy. Similarly NSFC supports a range of energy research both nationally and internationally and supports basic research that meets the objectives of the NSFC 13th five-year plan, including promoting innovation and economic development through research.

A scoping workshop was held in China on 14 and 15 March, that focussed on identifying the research challenges associated with Low Carbon Manufacturing, which are of national importance to both the UK and China.

Up to **£3 million** is available to support UK researchers for up to four awards in the order of up to £800K (80% fEC), with a duration period of three years. It will be matched with NSFC funding of up to 3 million RMB per project to support Chinese researchers.

All joint proposals must be received via **both** the NSFC e-submission system by **16:00 Beijing Time**, and the Research Councils’ Joint e-System (Je-S) by **16:00 GMT on 19 June 2018**.

An Expression of Interest must be submitted to EPSRC before **16.00 GMT on 22 May 2018**.

Please note that significant interest in this call is expected. Please bear this in mind and think very seriously when considering how and whether to develop your proposal, and only take it forward if you are very sure that it will be competitive at this level.

### Background

Proposals are invited between UK and Chinese research groups which form a collaborative and coherent programme of work across the two countries.

Proposals must constitute a joined-up interdisciplinary and international programme of work.

To build on the excellent collaborative work carried out through a number of joint energy research activities over the last six years, EPSRC and NSFC have committed to a three-year, £20 million joint research programme entitled Low-carbon Innovation. This programme has the following overarching aims:

- To reduce worldwide CO2 production
- To ensure energy affordability and security for each country
- To build lasting best-with-best academic relationships between China and the UK in an area vital to both countries.

## **The research challenges**

Proposals should include one or more of the following research challenge areas and applicants must be able to justify why their programme of work is of importance to UK and China:

### **a) Thermal Energy Management, Recovery, Storage and Use**

70% of industrial energy demand is in the form of heat, 50% of this heat is wasted as processes are inefficient. Reducing or utilising this waste heat is key to reducing carbon emissions. It was noted that current solutions are considered too expensive.

The following areas were highlighted as important:

- Materials and systems to capture and use or release surplus heat.
- Energy systems that maximise heat transfer and recovery.
- High energy density materials; that is, materials that are capable of storing heat in high densities, as it is captured from waste heat streams.
- Power generation technology that utilises low grade waste heat.
- Heat storage management methods for short, medium and long term

It is expected that research in this area would deliver:

- New materials and methods to store thermal energy with minimal losses.
- New methods for waste heat recovery and use including more efficient heat exchangers
- New ways to upgrade low grade heat to higher temperatures
- New functional materials for capturing excess environmental energy e.g. in buildings.

### **b) Recycling and Remanufacturing**

3bn tonnes of waste is generated globally every year at a cost of £23bn, and the amount and cost is increasing. Life cycle efficiency improvements can be made by recycling and remanufacturing of waste or manufacturing by-products. This

area has a strong link to the circular economy which is becoming increasingly important as a research area in the UK.

The following areas were identified as important:

- End of life process technology
- Intelligent manufacturing for recycle/remanufacture
- Reverse logistics
- Re-treatment of recycled wastes to increase adaptability
- New business models to facilitate recycling and re-manufacture
- Remanufacturing process optimisation
- Disassembly for remanufacture
- Design for recycle and remanufacture based on end of life technologies to improve life cycle resource efficiency

It is expected that research in this area would deliver:

- New, energy efficient technologies and techniques
- Efficiency improvements in the processes and systems
- Enable wider recycling of things that currently cannot be recycled
- New business models and designs that enable recycling and remanufacture
- Development of internationally acceptable standards

### **c) Novel Low Carbon Manufacturing Design, Production and Optimised Systems**

In order to make a real impact on carbon emissions new systems are needed that will transform traditional processes to innovative low carbon processes and improve process capability. It is also key to ensure that Low carbon is designed in at the system level from the start. This will involve the quantification of existing manufacturing systems, the identification of opportunities for improvement, understanding of new systems and the development of new metrics to understand the systems.

The following areas were highlighted as important:

- Database of knowledge and tools, and using big data to optimise energy efficiency of equipment processes and systems
- Novel tooling
- Ultra-high speed manufacturing
- Manufacturing with light
- Heat recovery

- Novel low carbon processes and equipment
- Modelling of systems optimisation
- Material behaviour modelling and control
- Development of more robust and accurate multi scale models for energy footprint in manufacture
- Evaluation systems that can assess the C footprint of any manufacturing process.
- Decision making process analysis based on integrating production management and process planning.
- Modelling the LCA of a process and designing low carbon LCs.
- Understanding how to evaluate the system/concept design
- Integration of LCM tools with CAD CAE platforms
- Design for reconfiguration/modular design

It is expected that research in this area would deliver:

- Demonstrators and a transferable modelling framework that can be applied globally.
- Lifecycle design methodology
- Software tools including database and knowledgebase
- New Processes which have been systematically designed to be low carbon
- Material behaviour modelling and control

#### **d) Low Carbon Manufacturing of Bulk Materials and Chemicals**

This is an important area as the overall energy efficiency in all materials and chemical production/manufacturing is low and it is a significant CO<sub>2</sub> emitter. Bulk materials form the foundation for all infrastructure and will continue to do so, therefore improvements in efficiency of producing those materials can have a big impact on CO<sub>2</sub> reduction. The chemical sector currently relies almost totally on fossil fuel for its energy needs and often fossil fuels make the bulk of the raw material feedstocks. Substitution with biodegradable products and by-products can therefore offer significant pollution reduction.

The following areas were highlighted as important:

- Need to make energy efficiency improvements in all aspects of materials and chemical manufacture in order to substantially reduce CO<sub>2</sub> emissions, including in the manufacture of;
  - Concrete/Cement
  - Ceramics
  - Steel

- Pharmaceuticals
- Bulk chemicals
- Novel utilisation of CO<sub>2</sub> or CO<sub>2</sub> containing materials including the development of novel biocatalysts
- Utilisation of industrial waste streams and Integration of the waste cycle into the manufacturing system
- Methodologies to quantify the carbon intensity of a product/process
- Catalysis and atomic level understanding of materials and chemicals
- Process electrification
- Integrated approach to systems design including technological and empirical advances as well as systems engineering modelling.
- Biological resources as feedstocks.

It is expected that research in this area would deliver:

- Strong collaboration between the UK and China in low carbon manufacturing research and development that will develop new lower carbon intensity manufacturing processes with lower embedded carbon.
- New industrial processes that can produce low embedded carbon materials and chemicals at the quality/functionality the market demands
- Lab scale new knowledge and technology ready for scale up to demo/pilot processes
- New alternative materials with lower embedded carbon

It is worth noting that EPSRC has a number of existing major research investments relevant to this research area, including the End Use Energy Demand (EUED) Centres and the UK Energy Research Centre (UKERC).

This activity aims to build on these investments and advance UK-Chinese collaboration in this important research area. Proposals submitted to the call following this workshop should aim to collaborate with existing projects where appropriate, but should not duplicate research already underway through these or other projects.

For more information about EPSRC's portfolio and strategies, see our website: <http://epsrc.ukri.org/research/ourportfolio/>

## **Governance and networking**

Each UK application must put aside £65K in their proposal earmarked to work with the other successful grant PIs to assemble a network. This network will help to develop the interface between researchers and the user community in government and businesses outside the programme membership, and to share research outcomes, data resources and best practice between the grants – all designed to maximise impact. This pot will also be used to fund a kick-off event

in year one and an impact event towards the end of the grants. These events should include key UK and Chinese stakeholders and the successful PIs should work with the EPSRC / NERC communication teams, or the RCUK China team in Beijing, for press coverage.

Once funded, the successful PIs must assemble a joint, independent, High Level Board. This will function to oversee the programme activities, offer an advice stream and to ensure maximum impact. Membership of this board must be approved by funders (EPSRC / NERC) and funders must be invited to meetings.

Each project will need to provide a brief two-page report to this board, annually (kick-off, midterm and impact) and will be asked to provide case studies at the end of the project.

These will be grant conditions on successful proposals.

## **Funding available**

Up to **£3 million** is available from EPSRC for this call and up to 3M RMB per project will be available to Chinese applicants from NSFC. It is expected that this competition will make up to **four** awards. UK projects may be up to 36 months in duration. For each project there should be a single Je-S form submitted although the project can be multi-institutional. Each proposal must include at least one UK and Chinese academic.

In order to focus effort applicants are only permitted to be involved in a maximum of two proposals; as a Principle Investigator (PI) on one proposal and a co-investigator on another proposal or as a co-investigator on a maximum of two proposals.

Guidance on the types of support that may be sought from EPSRC is given on the EPSRC website (<https://epsrc.ukri.org/funding/howtoapply/>) which should be consulted when preparing all proposals.

Each UK application must put aside £65K in their proposal earmarked to work with the other successful grant PIs to assemble a network. (See Governance and networking)

## **Equality, Diversity and Inclusion**

The long term strength of the UK research base depends on harnessing all the available talent and the Research Councils have together developed the ambitious RCUK Equality, Diversity and Inclusion Action Plan <http://www.rcuk.ac.uk/funding/diversity/>

In line with the RCUK Diversity Principles, EPSRC expects that equality and diversity is embedded at all levels and in all aspects of research practice. We are committed to supporting the research community in the diverse ways a research career can be built with our investments. This includes career breaks, support for people with caring responsibilities, flexible working and alternative working patterns. With this in mind, we welcomes applications from academics who job share, have a part-time contract, need flexible working arrangements or those currently committed to other longer, large existing grants. Please see our Equality and Diversity webpages <https://epsrc.ukri.org/funding/equalitydiversity/> for further information.

## Equipment

Equipment over £10,000 in value (inc. VAT) is not available through this call. Smaller items of equipment (individually under £10,000) should be in the Directly Incurred - Other Costs heading.

For more information on equipment funding, please see:  
<https://epsrc.ukri.org/research/facilities/equipment/>

## Eligibility

All applications must be collaborations between UK and Chinese researchers. The UK team on a joint proposal may consist of researchers from more than one eligible UK research organisation.

Standard EPSRC eligibility requirements apply for the UK team in this activity.

For information on the eligibility of organisations and individuals to receive EPSRC funding, see the EPSRC Funding Guide:  
<https://epsrc.ukri.org/funding/howtoapply/fundingguide/>

A list of eligible organisations to apply to EPSRC is provided at:  
<https://www.ukri.org/funding/how-to-apply/eligibility/>

For the Chinese partners, eligibility rules follow the standard for NSFC international programmes. Applicants who are not clear on these should contact NSFC Bureau of International Cooperation (<http://www.nsf.gov.cn/publish/portal2/>).

## How to apply

**As this is a joint application via EPSRC and NSFC**, applicants must ensure that joint proposals are submitted by the closing date to both EPSRC and NSFC. The UK application should be submitted through the Research Councils' Joint electronic Submission (Je-S) System as detailed below. The NSFC application should follow the instructions in their call document.

The UK-based lead partner must complete an "intent to submit" form via the EPSRC call page (<https://epsrc.ukri.org/funding/calls/ukchinalowcarbonmanufacturing/>) by **16:00 on 22 May 2018**. This will require inputting the UK investigators involved in the grant, the China-based lead partner and a brief description of the project.

A **UK-based lead partner** and a **China-based lead partner**, should be identified in the case for support – each of whom will lead on interaction with the funding agency in their respective countries.

The **UK-based lead partner** should ensure the application is submitted via the Je-S system. If the UK application comes from multiple institutions, then the application should be made on a single Je-S form from the UK-based lead partner's host institution.

The **China-based lead partner** will apply through NSFC's system and follow NSFC's proposal format. The NSFC application should follow the instructions in



the NSFC version of this call document and received through the NSFC e-submissions system.

The NSFC application must use the correct application subject code in order to be eligible for this call.

Proposals involving industrial collaborators are welcomed but costs for these partners will not be covered by NSFC/ EPSRC through this call.

**Please note:** EPSRC does not require full CVs, supporting technical annexes or separate lists of publications. Any excess material will be removed from your application.

For details of the NSFC-required documents please refer directly to guidance provided by NSFC (<http://www.nsf.gov.cn/publish/portal0/tab442/module1178/page1.htm>).

Both applications should feature an identical Case for Support written in English attached in each system.

## Submitting an 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 'UK-China Low-Carbon Manufacturing Call' 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 19 June 2018**.

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 (<https://epsrc.ukri.org/funding/howtoapply/>) which should be consulted when preparing all proposals.

## Guidance on writing an application

**Joint Case for support** - For each collaborative project proposal, the UK and Chinese investigators should prepare a single case for support in English that should be submitted to both EPSRC and NSFC as detailed above. This common case for support will allow for EPSRC and NSFC to obtain reviews of the same document, coming together in a single joint assessment panel meeting. Applicants to EPSRC will also need to include a pathways to impact plan, a work plan, a justification of resources and a joint proposal form.

The submission to EPSRC should provide full budget information for the UK costs and must have a single proposal form covering all UK partners. The submission to NSFC should include full budget information for the Chinese costs. We expect that each nation will request for travel and subsistence only for their own investigators and researchers.

Proposals on the UK side should follow the standard EPSRC format and guidelines on proposal preparation, but should also include information tailored to this call as specified below.

**Previous Track Record (maximum 2 sides of A4)** - Please ensure you also outline the specific expertise of all the UK and Chinese applicants in this subject area, and the expertise available at the UK and China host organisations.

**Proposed Research and its Context section (maximum 6 sides of A4)** – Please prepare according to the standard guidance but you should ensure that the case covers the whole project and team such as:

- Introduce the topic of research and explain its academic and industrial context, demonstrating how it relates to leading research in the UK, in China and worldwide;
- Detail why the research proposed is of national importance to both the UK and China.
- Describe the overall programme of work, indicating the research to be undertaken, and the milestones that will be used to measure its progress. You should describe the roles of each member of the research teams in the UK and China;
- Detail how the proposed project will be managed across the two countries, with particular demonstration of the added benefits to each party due to the collaboration.

**Pathways to Impact Plan (up to two sides of A4)** – In this section you should describe how the potential impacts of the proposed research will be realised and this should cover the project as a whole.

**Work Plan (one page diagrammatic work plan, for example, a PERT or Gantt chart)** – This should cover the project as a whole, detailing significant milestones and showing how different aspects of the project will link together and be managed.

**Justification of Resources (up to two sides of A4)** – This should detail the resources requested for the UK-China project as a whole. You should justify everything requested on both proposals, so that peer reviewers have enough information on the project as a whole to understand why the resources requested are necessary for your proposed project.

**CVs (up to 2 sides of A4 each)** – for named researchers, visiting researchers and researcher co-investigators

**Project Partner Letters of Support** – from any project partners (no page limit).

**Joint proposal form** – detailing the funding requested from NSFC and other details on the Chinese partners; this is available on EPSRC’s website. This document enables reviewers to have an overview of the complete project. The form should be attached to the end of the case for support and uploaded as a single document. The pages used for the Joint proposal form will be additional to the eight-page limit for the case for support.

Applicants should use the Ethical Information section on the Je-S form to demonstrate to peer reviewers that they have fully considered any ethical issues concerning the material they intend to use, the nature and choice, current public perceptions and attitudes towards the subject matter or research area. EPSRC will not fund a project if it believes that there are ethical concerns that have been overlooked or not appropriately accounted for. All relevant parts of the Ethical Information section must be completed. If the research will involve human participation or the use of animals covered by the Animals (Scientific Procedures) Act 1986 it is recommended that applicants pay particular attention to the guidance highlighted below. EPSRC reserves the right to reject applications prior to peer review if the Ethical Information sections are not completed correctly.

Further guidance on completing the Je-S form can be found at <https://je-s.rcuk.ac.uk/Handbook/pages/GuidanceonCompletingaStandardG/EthicalInformation.htm>. Other relevant guidance includes: EPSRC’s policy on animal use in research (<https://epsrc.ukri.org/about/standards/animalresearchpolicy/>) and the Responsible Innovation Framework (<https://epsrc.ukri.org/research/framework/>).

Please note that on submission to EPSRC **all** non-PDF documents uploaded onto Je-S are converted to PDF, the use of non-standard fonts may result in errors or font conversion, which could affect the overall length of the document.

For advice on writing proposals see:

<https://epsrc.ukri.org/funding/howtoapply/preparing/>

## **Assessment**

### **Assessment process**

The common case for support across the whole UK-China project allows for a joint peer review via the process below.

Proposals will undergo postal peer review within the country they were submitted.

The Joint UK-China Prioritisation panel will be asked to assess the proposals against the fit to the call and the standard EPSRC assessment criteria, which are available on our website and described below.

Please note that if two or more proposals are received in the same research area EPSRC and NSFC reserve the right to fund only the highest ranked of those proposals in order to avoid duplication of effort. Funding decisions will be made by November 2018.

## **Assessment criteria**

The proposals will be assessed on their fit to the scope of the call and the standard EPSRC criteria as outlined in the reviewer form on the EPSRC website here:

<https://epsrc.ukri.org/funding/assessmentprocess/review/formsandguidancenotes/standardcalls/>

### **Fit to the call**

- The relevance of the proposal to the priority areas identified.
- The appropriateness and strength of the collaboration between the UK and Chinese research.

### **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

### **Feedback**

Feedback will only be provided if requested by the panel.

### **Guidance for reviewers**

Information about the EPSRC peer review process and guidance for reviewers can be found at: <https://epsrc.ukri.org/funding/assessmentprocess/review/>

Guidance for reviewing standard grants can be found here:

<https://epsrc.ukri.org/funding/assessmentprocess/review/formsandguidancenotes/standardcalls/>

This call is for collaborative proposals between UK and Chinese academics. The quality of this collaboration should be assessed in the fit-to-call criteria.

## **Additional grant conditions (AGCs)**

Grants will be subject to the standard RCUK grant conditions however the following additional grant conditions will be added to this call: A fixed start date of 01 January 2019, the requirement for £65K allocated for networking activities and the formation of a high level advisory board.

## **Moving forward**

Submissions to this call will count towards the Repeatedly Unsuccessful Applicants Policy. Further information about the policy can be found at: <https://epsrc.ukri.org/funding/howtoapply/basics/resubpol/rua/>

## **Key dates**

<b>Activity</b>	<b>Date*</b>
Call for Proposals	23 April 2018
Intent to Submit Closes	22 May 2018
Deadline for Proposals	19 June 2018
UK-China Prioritisation Panel	23-24 October 18
Grants Issued	November 2018
Start Date	01 January 2018

\*EPSRC aims to adhere to the key dates as published, however there may be exceptions where prioritisation meeting may have to change due to panel member availability.

## **Contacts**

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## **Change log**

<b>Name</b>	<b>Date</b>	<b>Version</b>	<b>Change</b>
Shyeni Paul	[when created]	1	N/A

## **Appendices** (includes Attachment Checklist and Fund Headings)

### **Je-S attachments Check List**

#### **Standard:**

<b>Attachment Type</b>	<b>Maximum Page length</b>	<b>Mandatory/Optional</b>	<b>Extra Guidance</b>
Case for Support	8 pages	M	Comprising up to two A4 sides for a track record, and six A4 sides describing proposed research and its context.
Pathways to Impact	2 pages	M	
Workplan	1 page	M	
Justification for Resources	2 pages	M	
CVs	2 pages each	As Required by EPSRC	For named and visiting researchers, and researcher co-investigators only.
Project Partner Letters of Support	No page limits	As Required by EPSRC	Must be included from all named project partners. Must be on headed paper, and be signed and dated within six months of the proposal submission date.
Letters of Support	No page limits	As Required by EPSRC	In exceptional circumstances a maximum of three letters can be submitted.

Equipment Quotes	No page limits	As required by EPSRC	
Equipment Business Case	2 pages each	As required by EPSRC	Required for any items or combined assets with a value above the OJEU limit.
Technical assessment	No page limit	As required by EPSRC	
Proposal Cover Letter	No page limit	Optional	The cover letter can be used to highlight any important information to EPSRC. This attachment type is not seen by reviewers or panel members.
Joint Proposal Form	No page limit	As required by EPSRC	Submit by combining with case for support.
Other attachment	No page limit	As required, at EPSRC request only	This can be used for a document that does not fit under any of the headings above. This attachment type is not seen by reviewers or panel members.

Please ensure you adhere to the above attachment requirements when submitting your proposal. Any missing, over-length or unnecessary attachments may result in your proposal being rejected.