# Position Details

## CSIRO Early Research Career (CERC) Postdoctoral Fellowship– CSOF4

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| The following information is for applicants | |
| Advertised Job Title | CSIRO Postdoctoral Fellowship in Renewable Energy Substitutes for Energy Storage |
| Job Reference | 76765 |
| Tenure | Specified Term of 3 years  Full-time |
| Salary Range | AU$ 88,163 to AU$ 96,573 pa (pro-rata for part-time) + up to 15.4% superannuation |
| Location(s) | Newcastle, NSW |
| Relocation Assistance | Will be provided to the successful candidate if required |
| Applications are open to | * Australian/New Zealand Citizens and Australian Permanent Residents * Australian temporary residents who are currently residing in Australia (visa sponsorship may be provided to eligible candidates) |
| Position reports to the | Team Leader of Energy Modelling in the Energy Systems Program |
| Client Focus – Internal | 80% |
| Client Focus – External | 20% |
| Number of Direct Reports | 0 |
| Enquire about this job | Contact Sam West via email Sam.West@csiro.au |
| How to apply | Apply online at <https://jobs.csiro.au/>  Internal applicants please apply via **Jobs Central**  If you experience difficulties when applying, please email [careers.online@csiro.au](mailto:careers.online@csiro.au) or call 1300 984 220. |

### Role Overview

**CSIRO Early Research Career (CERC) Postdoctoral Fellowships** provide opportunities to scientists and engineers who have completed their doctorate and have less than three years relevant postdoctoral work experience. These fellowships aim to develop the next generation of future leaders of the innovation system through:

* A differentiated career development program to deliver capability excellence and breadth across all facets of the national innovation system.
* Research training via strategic research and development projects with a clear focus that will deliver real impact through science and engineering excellence;
* An innovative culture supporting the development and demonstration of original thinking and expertise leading to peer-recognition; and
* Opportunities to develop skills and experience in collaborative research teams to effectively work within national and global multi/transdisciplinary and multi-stakeholder environments.

CERC Postdoctoral Fellows **are appointed for three years or part time equivalent.**

The Postdoctoral Fellow will join a team of scientists who are investigating ways to use renewable energy substitutes for energy storage. Renewables are now the cheapest source of electricity, but variability creates challenges at higher penetrations. Energy storage is usually considered the best way of firming renewables as we approach 100%, but there may be cheaper and more effective methods. This project aims to investigate, model and compare several.

Building extra renewable generation capacity (*overbuild*) and proactively curtailing/uncurtailing it to meet demand fluctuations or provide ancillary services may be a more economical solution and help stabilise a largely fossil-fuel free grid. Several recent studies have indicated that building up to 4 times more renewable generation capacity than is required to meet peak demand (o*verbuilding*) and devising a control scheme which curtails their output, may be the least-cost option in several small grids worldwide.

Similarly, increased geographic diversity of renewable generators’ locations decreases variability, and the daily/seasonal *anticorrelation* between wind and solar power is helpful but does not fully mitigate supply variability. However, locating sites with *anti-correlated* renewable resources (and proximity to transmission and loads) would help to inform future generation builds be located to further decrease variability of renewable energy supply to the grid.

In this role, you will research and develop technical and financial models of renewable power systems, using large electrical, power and geographical (GIS) datasets. High performance computing, big data and computer science techniques will utilise these models to test and cost new methods of integrating renewables into Australia’s energy grid while reducing energy and grid costs and minimising the need for fossil fuels, spinning machines and large-scale storage.

### Duties and Key Result Areas:

The Postdoctoral Fellow will be expected to conduct the following specific activities:

* Initially perform a detailed literature review, identify specific knowledge gaps, and prepare a project plan with concrete milestones.
* Acquire and curate large datasets of renewable energy resource, load profiles and energy market data.
* Compare renewable overbuild scenarios by measuring decreases in variability and build/operating costs via technical and economic modelling and optimisation.
* Conduct a continent-wide renewable resource study to locate pairs or sets of sites with anticorrelated wind/solar availability close to transmission infrastructure and model the potential improvement in variability.
* Write high quality, reusable software simulation and modelling tools for large data processing on modern high-performance computing systems.
* Produce a re-usable multi-objective optimisation dataset and model as a software service to assist renewable developers to evaluate the optimal balance of overbuild cost, storage capacity, generation firmness and revenue when planning and designing a new generation/storage project.
* Deliver a technoeconomic costing model to allow overbuild to be factored into future economic modelling projects and compared to other technology mixes.
* Liaise with external stakeholders to understand the availability and limitations of input datasets, and communicate key findings and results.

Under the direction of senior research scientists and engineers, CERC Postdoctoral Fellows:

* + Carry out innovative, impactful research of strategic importance to CSIRO that will, where possible, lead to novel and important scientific outcomes.
  + Recognise and exploit opportunities for innovation and the generation of new theoretical perspectives, and progress opportunities for the further development or creation of new lines of research
  + Utilise design thinking methodology to plan and prepare research proposals, and apply non-academic impact methodology to research projects
  + Carry out research investigations requiring originality, creativity and innovation
  + Record, manage, and analyse data/information using relevant domain data science techniques.
  + Proactively undertake development to grow effective researcher capabilities to support career goals.
  + Adhere to the spirit and practice of CSIRO’s Code of Conduct, Health, Safety and Environment procedures and policy, Diversity initiatives and Making Safety Personal goals.
* Other duties as directed.

[**The CERC Postdoctoral Fellow learning and development program**](http://www.csiro.au/en/Careers/Student-and-graduate-programs/Postdoctoral-fellowships)is developed between the CERC Postdoctoral Fellow and their CSIRO supervisor. The program will focus on enhancing the Fellows’ capabilities to the level expected of an independent researcher and will include on-the-job and course-based development encompassing:

* Discipline-specific techniques and protocols
* Professional growth
* Project management
* Communication and influencing skills
* Working and collaborating with others

## **Required Competencies:**

* **Teamwork and Collaboration:** Cooperates with others to achieve organisational objectives and may share team resources in order to do this. Collaborates with other teams as well as industry colleagues.
* **Influence and Communication:** Uses knowledge of other party's priorities and adapts presentations or discussions to appeal to the interests and level of the audience. Anticipates and prepares for others reactions.
* **Resource Management/Leadership:** Allocates activities, directs tasks and manages resources to meet objectives. Provides coaching and on the job training, recognises and supports staff achievements and fosters open communication in the team.
* **Judgement and Problem Solving:** Investigates underlying issues of complex and ill-defined problems and develops appropriate response by adapting/creating and testing alternative solutions.
* **Independence:** Recognise and makes immediate changes to improve performance (faster, better, lower cost, more efficiently, better quality, improved client satisfaction).
* **Adaptability:**Copes with ambiguity or situations that lack clarity. Adapts readily to changing circumstances and new responsibilities (which may include activities outside own preferences) in the interests of achieving team objectives. Recognises the need for and undertakes personal development as a result of changes.

## **Selection Criteria**

#### Essential

*Under CSIRO policy only those who meet all essential criteria can be appointed.*

1. A doctorate (or will shortly satisfy the requirements of a PhD) in a relevant discipline area, such as engineering, computer science, software engineering, applied physics, mathematical modelling, data science, applied statistics, or equivalent.
2. Research or professional experience in software engineering, data driven modelling, high performance computing, Geospatial Information Systems (GIS) and/or statistics.
3. Experience exploring, manipulating and cleaning dynamic and incomplete real-world datasets, for use with mathematical or machine learning models.
4. Experience with data manipulation, modelling and software deployment in languages such as Python, R, Julia, Java etc.
5. High level oral and written communication skills with the ability to represent the research team effectively internally and externally, including the presentation of research outcomes at national and international conferences.
6. A history of publication in peer reviewed journals and/or authorship of scientific papers, reports, grant applications or patents.
7. A record of science innovation and creativity, including the ability & willingness to incorporate novel ideas and approaches into scientific investigations.

## **Desirable:**

1. Experience in big-data, high performance computing and parallel processing.
2. Experience developing and maintaining high quality, well documented reusable code, APIs and software services.
3. Experience in distributed energy generation systems financial modelling, and/or power system control.
4. Remain productive, positive, and resilient in complex, ambiguous and/or uncertain environments.
5. **The ability to work effectively as part of a multi-disciplinary, potentially regionally dispersed research team, plus the motivation and discipline to carry out autonomous research.**

To be appointed as a CERC Postdoctoral Fellow within CSIRO, candidates are required to have **submitted** their PhD at the time of commencement, as a minimum requirement, if PhD conferment has not been obtained. If a candidate has submitted, but their PhD has not yet been formally attained, the starting salary will be CSOF4-1 ($85,361). Upon CSIRO receiving written confirmation that the PhD has been awarded (within a six month period from commencement date), the salary will be increased to the negotiated level and the difference will be back-paid to the Officer’s start date.

Special Requirements

Appointment to this role may be subject to conditions including provision of a national police check as well as other security/medical/character clearance requirements.

* The successful candidate will be asked to obtain and provide evidence of a National Police Check or equivalent. Please note that people with criminal records are not automatically deemed ineligible. Each application will be considered on its merits.
* If the successful candidate is not an Australian Citizen or Permanent Resident, they may be required to undergo additional security clearances, which may include medical examinations and an international standardised test of English language proficiency (i.e. IELTS test).- https://ielts.com.au/

**Our value proposition**

We want CERC Postdoc Fellows to join our world class science, engineering and digital teams to solve big, complex problems that make a real difference to the future of Australia and the world.

You'll get to work with some of the most talented minds in their fields, not just in Australia, but in the world. At CSIRO, we spark off each other, learn from each other, trust each other and collaborate closely to achieve more than we could individually.

CSIRO Early Research Career (CERC) Postdoctoral Fellow Experience Employee Value Proposition (EVP). Find out more [here](https://www.csiro.au/en/careers/postdoctoral-fellowships)!

## **About CSIRO:**

We solve the greatest challenges through innovative science and technology. To find out more visit us [online](http://www.csiro.au/)!

CSIRO is a values-based organisation.  In your application and at interview you will need to demonstrate behaviours aligned to our values of:

* 1. People First
  2. Further Together
  3. Making it Real
  4. Trusted

Find out more about CSIRO [Energy](https://www.csiro.au/en/Research/EF)