

Introducing Proficiency Badges for Energy and Resource System Modelling

We are pleased to announce the launch of the Energy and Resource System Modeling Proficiency Badge Scheme, a collaborative initiative born from the partnership between RE-INTEGRATE and Climate Compatible Growth (CCG). This innovative certification system aims to standardise and recognize modelling proficiency across various tools and institutions, with an initial focus on OSeMOSYS and CLEWs.

RE-INTEGRATE, an EU Horizon Europe programme, is dedicated to re-thinking approaches for transdisciplinary integrated assessment of climate-compatible energy strategies from the African Union to the European Union; joins with CCG, a UK aid-funded research programme helping countries in the Global South pursue low carbon development. Together, we present this badge scheme as a transparent and community-driven endeavour.

It is crucial to emphasise that while this initiative emerges from our partnership, its true strength and longevity lie in the hands of the wider energy modelling community. We envision this proficiency badge scheme as a living, evolving system owned and driven by practitioners, researchers, and institutions across the globe. Our role is to initiate and facilitate, but the scheme's success and relevance will depend on the active participation and input from the entire energy modelling ecosystem.

We invite all stakeholders - from individual modellers to academic institutions, research organisations, and industry partners - to engage with this scheme, provide feedback, and help shape its future. By fostering a collaborative approach, we aim to create a certification system that reflects the needs and aspirations of the global energy modelling community.

This badge scheme represents a step towards creating a more interconnected, skilled, and recognized community of energy system modellers. It offers a clear pathway for skill development, encourages continued learning, and provides a standardised means of acknowledging expertise across different tools and contexts.

Objective: To establish a standardised certification system that benchmarks modelling proficiency in energy and resource system modelling tools - initially OSeMOSYS and CLEWs but with plans to incorporate other tools too - through a tiered badge system: Bronze, Silver & Gold that signifies modelling competency. An additional two-levelled 'Instructors' badge is also included to denote capacity building and instructing competence. Initially, this system will be

deployed in a CCG/RE-INTEGRATE context - with a longer term aim of the badge system to become relevant for practitioners beyond these organisations.

Benefits of a digital badge system:

- Standardised recognition of modelling proficiency across institutions and tools
- Clear pathway for skill development and career progression in energy and resource modelling
- Encouragement of continued learning and contribution to the field; a convenient and effective means of recognising and rewarding accomplishments.
- Aid towards a creation of a community of practice around energy and resource system modelling (alongside CCGs's Energy Modelling Community (EMC) initiative)
- Flexibility to incorporate various modelling tools and approaches within the same framework
- Can increase awareness about RE-INTEGRATE activities, CCG's Energy Modelling Platform (EMP) events and other similar capacity building programs.

Implementation:

1. Utilise the Open University (OU) platform to enable: digital badge application, assessment, and issuance via LinkedIn's digital badge system ([LinkedIn Badge system](#)) (Badge holders will have the icon in their linkedin profile with a description of what badge represents)
2. Design clear and transparency metrics for a OSeMOSYS and CLEWs badge system
3. Align Badges with CCG tools and processes- namely CCGs's Energy Modelling Community (EMC) initiative and EMP summer school events
4. Award inaugural badges to relevant RE-INTEGRATE participants
5. Create a peer review/ peer endorsement system to assess Gold/Silver badge applications. For example:

- Applicants will submit their badge applications through the Open University website.
- As part of the application process, the OU system will request endorsement from higher-level badge holders.
- The system will automatically notify these endorsers via email, requesting their evaluation of the applicant's qualifications + the relevant tool's track/community lead who will be acting as a 'badge manager' (This role of badge manager is TBC, but will likely be from CCG).

Eg. In the case of Silver badges this endorsement will be from at least one Gold badge holder. For Gold badges, endorsement from another Gold badge holder and the badge 'manager'.

- Endorsers will assess the applicant's submitted/uploaded evidence (e.g., project reports, publications) against the badge criteria and decide to endorse/not endorse
- The Open University will review the completed application, including endorsements, before confirming badge issuance.

Implementation 2nd phase

6. Establish partnerships with universities, research institutions, relevant industries, to recognize and integrate the badge system i.e. institutions within the OpTIMUS Community and relevant international organisations (e.g. GIZ, IAEA, IRENA, UNDEP, UNDESA, IEA, UNECA); and the OpenMod community ([openmod-initiative](#)).
7. Expand badges to accommodate additional modelling tools
8. Organise annual conferences or workshops where Gold badge candidates can present their work
9. Develop a mentorship program connecting Gold/Silver badge holders with Bronze & Silver-level learners (Links to CCG's EMC)

Badge Levels:

The Intended Learning Objectives (ILO) will be specific to each tool; but should be similar across the board in terms of expectations i.e. similar requirements for knowledge & understanding, cognitive skills, and practical skills.

Bronze Badge

The Bronze Badge represents an Intermediate level of proficiency in energy and resource system modelling.

Upon achieving the Bronze Badge, holders should be able to:

- Understand and apply the principles of basic national-scale energy system modelling
- Construct and run models using the chosen tool
- Identify and resolve common model debugging issues
- Analyse and interpret results from different modelling scenarios
- Explain how modelling results can inform policy decisions in the energy sector
- Demonstrate awareness of the limitations and assumptions in basic energy system models

Requirements/ Certification Process:

- Complete an intermediate-level in-person course (e.g., EMP summer school or equivalent)
- Submit a project report or modelling case study demonstrating the application of learned skills
- Receive approval from an OSeMOSYS Silver or Gold badge holder

Validity: 2 years, with re-application required if progression to Silver is not made

Silver Badge

The Silver Badge signifies advanced proficiency and the ability to apply modelling skills to real-world scenarios.

Upon achieving the Silver Badge, holders should be able to:

- Design and develop complex energy/resource system models addressing specific real-world issues
- Implement advanced debugging techniques for more sophisticated models
- Critically evaluate scenario modelling results and their policy implications

- Communicate and document modelling outcomes effectively
- Adapt models to different geographical and socio-economic contexts

Requirements Certification Process:

- Demonstrate 2 years of work/project experience with the chosen modelling tool, OR
- 1 year of work/project experience plus either a completed Master's thesis OR a published peer-reviewed paper (as 1st or 2nd author) OR a published report that 'uses' the chosen modelling tool
- Submit a portfolio of work demonstrating achievement of the learning objectives
- Receive endorsement from a Gold badge holder or a Lead Instructor badge holder

Validity: 4 years, with re-application required if progression to Gold is not made

Gold Badge

The Gold Badge represents mastery in energy and resource system modelling, including leadership and innovation in the field.

Upon achieving the Gold Badge, holders should be able to do all silver level requirements and demonstrate at least **TWO** of the following:

- Create innovative improvements and critical assessments of relevant modelling techniques and methodologies
- Manage and develop highly complex energy/resource models that are able to solve critical real-world problems
- Apply advanced coding and debugging skills to resolve intricate modelling challenges
- Translate complex modelling results into actionable policy recommendations for senior decision-makers

Requirements/Certification Process

- Minimum 5 years work/project experience with modelling tool **OR** relevant PhD with two years project experience
- Obtain endorsement from another Gold holder and the relevant tool's 'badge manager'.
- Present a comprehensive case study at a conference, demonstrating advanced application of modelling frameworks to real-world problems
- Publish peer-reviewed article(s) as lead author, utilising the modelling frameworks or case studies

Validity - 10 years (before re-application required)

Instructor Badges

The Instructor Badge system recognizes the crucial role of trainers in capacity building for energy and resource system modelling. This two-tier system acknowledges the diverse skills required to effectively train others, and the different levels of engagement an instructor may have in a training (e.g. whether they are taking a leading or supporting role). Instructor Badges are tool specific and are valid in conjunction with an active proficiency badge in that tool.

1. Associate Instructor Badge

The Associate Instructor Badge recognizes individuals who can effectively support and deliver specific components of training programs.

Upon achieving the Associate Instructor Badge, holders should be able to -

- Design and deliver focused training modules on specific aspects of energy system modelling
- Adapt teaching methods to accommodate diverse learning styles and needs
- Provide constructive feedback to learners on their modelling exercises
- Effectively communicate complex modelling concepts to novice learners
- Support lead instructors in the overall delivery of training programs
- Demonstrate awareness of ethical considerations in energy system modelling instruction

Requirements:

- Hold at least a Bronze proficiency badge in any covered modelling tool
- Complete 40 hours of assisting or co-teaching with a Lead Instructor
- Receive a positive evaluation from a Lead Instructor
- Successfully lead one full training session independently

Certification Process:

- Provide documentation of training hours and lead instructor evaluation
- Present a sample training session 'lesson plan' for assessment

Validity: Linked to the holder's proficiency badge validity

2. Lead Instructor Badge

The Lead Instructor Badge recognizes individuals capable of designing, organising, and leading comprehensive training programs in energy and resource system modelling.

Intended Learning Objectives: Upon achieving the Lead Instructor Badge, holders should be able to -

- Design comprehensive, multi-level training programs in energy system modelling

- Develop advanced training materials and exercises that address real-world modelling challenges
- Evaluate and assess learners' modelling competencies across various skill levels
- Adapt training programs to suit diverse cultural and professional contexts
- Mentor Associate Instructors and support their professional development
- Integrate cutting-edge developments in energy modelling into training curricula
- Integrate ethical and cultural considerations into modelling instruction

Requirements:

- Hold at least a Silver proficiency badge in any covered modelling tool
- Demonstrate previous experience as an Associate Instructor
- Design and lead a full training program independently
- Develop comprehensive course materials
- Receive endorsement from another Lead Instructor - who has observed at least one component of training program- and EMC Track Lead ('course manager')

Certification Process:

- Submit a detailed portfolio showcasing designed training programs and materials
- Provide evidence of successful delivery of a comprehensive training program (i.e. a EMP track or University Module)
- Submit endorsement (evaluation form) completed by another Lead Instructor
- Present a strategy for adapting training to different contexts and learner groups

Validity and Renewal:

- To maintain the badge, instructors must engage in a minimum of 40 hours of training activities every four years
- Renewal requires re-submission of a brief portfolio showcasing recent training activities (ideally with participant feedback).

Inaugural Badge Holders

To initiate the Energy and Resource System Modeling Proficiency Badge Scheme and acknowledge the existing expertise in the field, we have identified a select group of individuals whose extensive experience and contributions align with the criteria outlined for each badge level. These inaugural badge holders have been carefully selected based on their demonstrated proficiency, significant contributions to the field, and leadership in energy and resource system modelling.

In the interest of transparency and to maintain the integrity of the badge system, we provide below a brief overview of each inaugural badge holder's qualifications. This information demonstrates how their existing expertise and accomplishments meet or exceed the criteria established for their respective badge levels, even in the absence of the formal certification process that future badge earners will undergo.

It is important to note that these individuals serve as benchmarks for the level of expertise each badge represents. Their inclusion as inaugural badge holders not only recognises their achievements but also helps to establish a clear standard for future applicants.

List of inaugural badge holders: TBC