IEEE SA
STANDARDS ASSOCIATION

IEEE P2814: RECOMMENDED PRACTICES ON TECHNO-ECONOMICS TERMINOLOGY FOR HYBRID ENERGY AND STORAGE SYSTEMS

IEEE SYSTEMS, MAN, AND CYBERNETICS SOCIETY/ STANDARDS COMMITTEE (SMC/SC)

APRIL 23, 2020

TIME: 01:00 PM (GMT)

Teleconference: Cisco Webex

IEEE

AGENDA

1. **Call to Order**
2. **Roll Call & Declaration of Affiliation**
3. **Approval of Agenda**
4. **IEEE Patent Policy:** https://mentor.ieee.org/myproject/Public/mytools/mob/slideset.ppt
5. **IEEE Copyright Policy:** https://standards.ieee.org/content/dam/ieee-standards/standards/web/documents/other/copyright-policy-WG-meetings.potx
6. **Approval of Previous Meeting Minutes**
7. **Framework and methodology**
8. **Appointment of Officers**
9. **AOB**
10. **Future Meetings**
11. **Meeting Adjourned**

IEEE PATENT POLICY

Speak up now and respond to this Call for Potentially Essential Patents

If anyone in this meeting is personally aware of the holder of any patent claims that are potentially essential to implementation of the proposed standard(s) under consideration by this group and that are not already the subject of an Accepted Letter of Assurance, please respond at this time by providing relevant information to the WG Chair

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- IEEE SA Best Practices for IEEE Standards Development
  - http://standards.ieee.org/develop/policies/best_practices_for_ieee_standards_development_051215.pdf
- Distribution of Draft Standards (see 6.1.3 of the SASB Operations Manual)
  - https://standards.ieee.org/about/policies/opman/sect6.html

WORKING GROUP COMMITTEE

Sponsoring Society and Committee:

IEEE Systems, Man and Cybernetics Society

Sponsor Chair: Prof Loi Lei Lai (P. R. China)

WG Chair: Dr Chun Sing Lai (UK)

WG Vice Chair: Vacant

WG Secretary: Mr Michael Sanders (USA)

IEEE Program Manager: Ms Christy Bahn (USA)

Approval of the minutes of the last meeting

https://sagroups.ieee.org/2814/

SCOPE

This standard defines techno-economic terminologies used in the development, construction, and operation of renewable energy and electrical energy storage systems

RECENT DEVELOPMENT

- Completed an article for IEEE Smart Cities Newsletter
- Completed an article for IEEE SMC 2020
- Sent to the SA risk department for a review (Christy Bahn)
- Nothing in the above documents should be coming from the draft (the standard) that we are working on.

IMPERIAL COLLEGE LONDON (ICL)

Imperial College London

Strategic Assessment of the Role and Value of Energy Storage Systems in the UK Low Carbon Energy Future

Report for

CARBON TRUST

June 2012

Goran Strbac, Marko Aunedi, Danny Pudjianto, Predrag Djapic, Fei Teng, Alexander Sturt, Dejvises Jackravut, Robert Sansom, Vladimir Yufit, Nigel Brandon

Energy Futures Lab, Imperial College London

Link: https://www.imperial.ac.uk/media/imperial-college/energy-futures-lab/research/Strategic-Assessment-of-the-Role-and-Value-of-Energy-Storage-in-the-UK.pdf

AIM OF ICL'S STUDY

(i) Cost and performance targets for grid-scale energy storage applications to facilitate a cost effective evolution to a low carbon future.

(ii) Sources of value of storage, i.e. savings in capital expenditure in all sectors including generation, transmission and distribution infrastructure, as well as savings in operation costs and the potential to enhance the ability of the system to accommodate renewable generation.

(iii) Impact of competing options including flexible generation, demand side response, and interconnection.

(iv) Changes in value of storage across key decarbonisation pathways including changes in fuel costs.

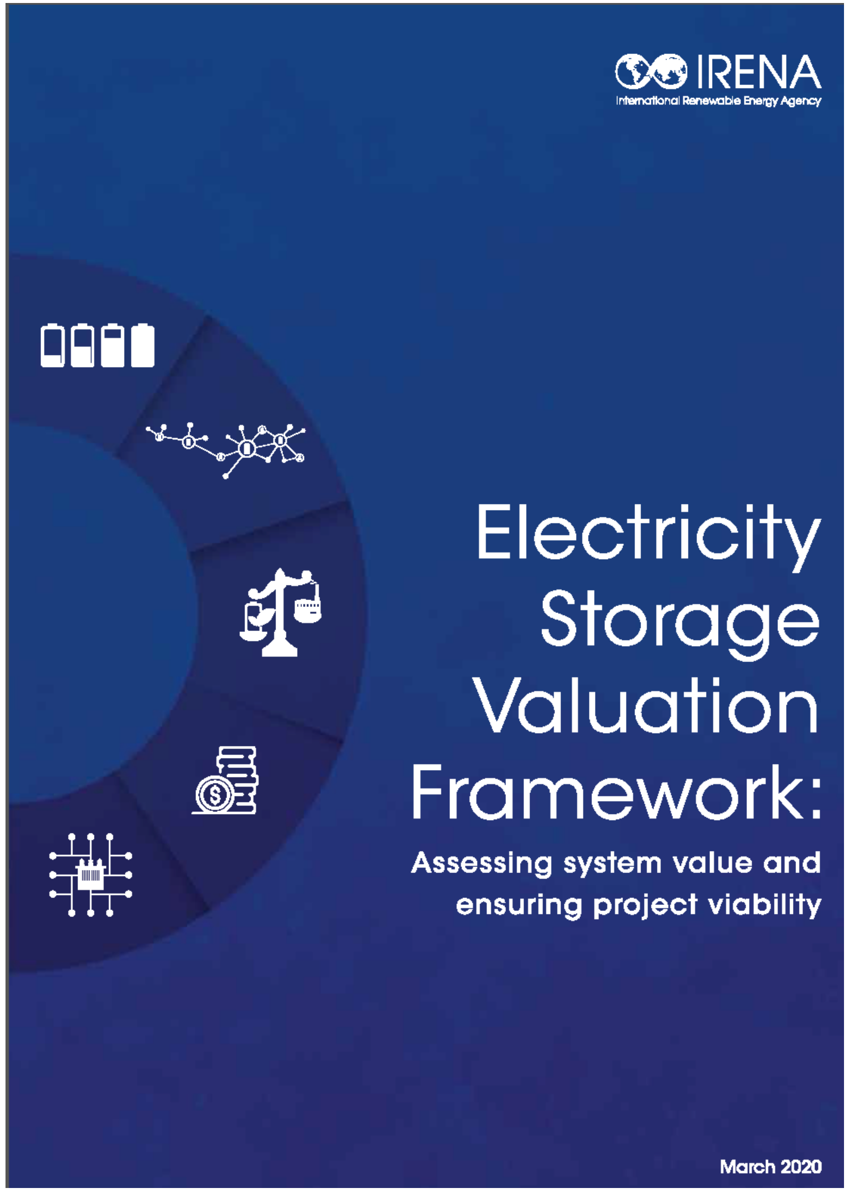
(v) Impact of various storage parameters on its value, including the importance of additional storage duration, storage efficiency and ability to provide frequency regulation services.

(vi) Impact of changes in system management on the value of storage, including generation scheduling methodology and the impact of improvements in wind output forecasting errors.

CRITICAL DISCUSSIONS FOR ICL MODEL

- **Financing conditions**
- **Environmental effect**
- **Details for cost**

INTERNATIONAL RENEWABLE ENERGY AGENCY



Link: https://www.irena.org/publications/2020/Mar/Electricity-Storage-Valuation-Framework-2020

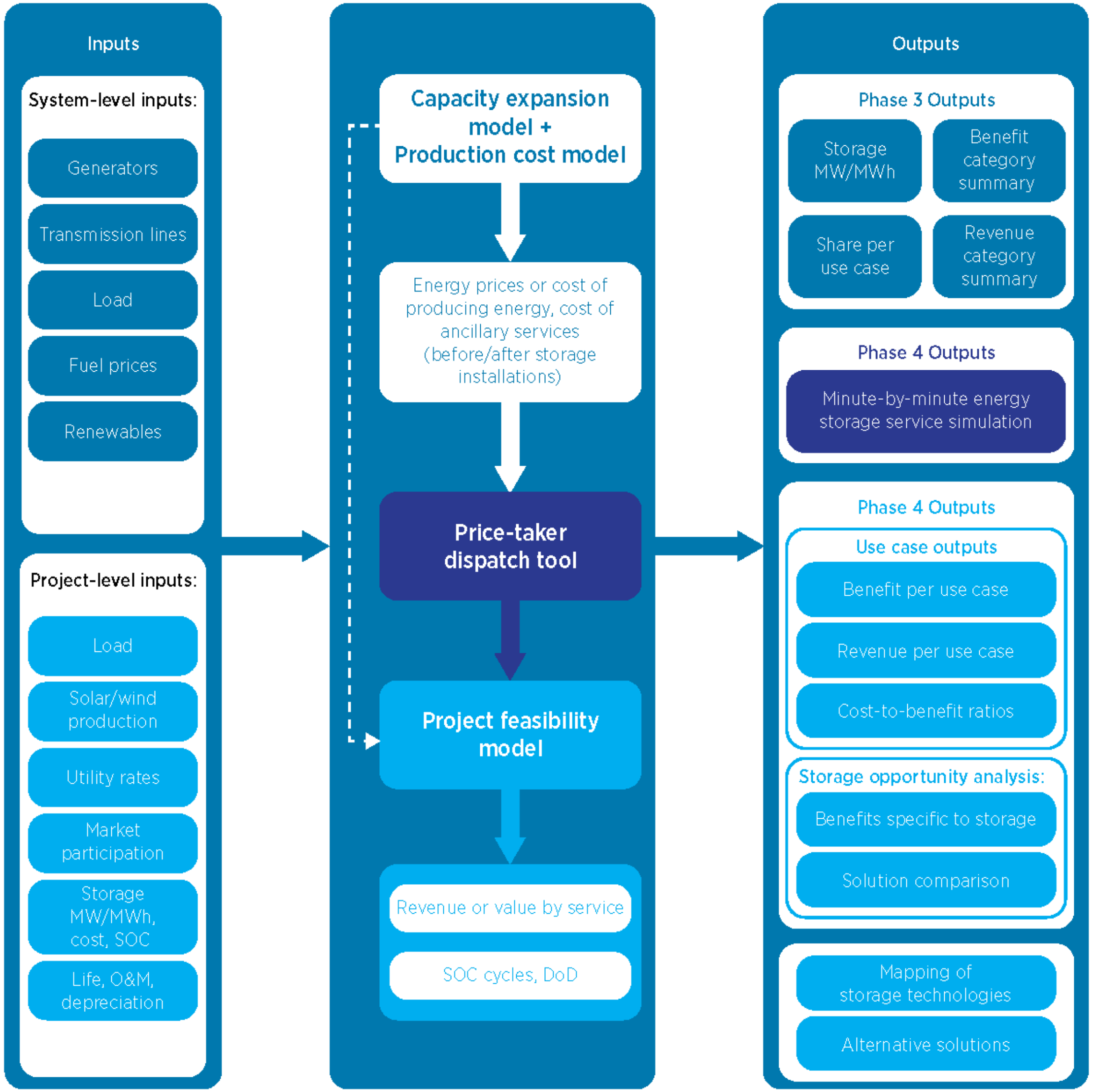
INTERNATIONAL RENEWABLE ENERGY AGENCY

The framework aims to address the following questions:

- **What services can storage provide to help integrate more VRE into the power system?**
- **What other peripheral services does the same storage provide?**
- **Which storage technologies can provide these services? What are the associated costs?**
- **How does storage compare with other alternative flexibility measures, such as demand response, more flexible generation or even stronger transmission networks, in effectively reducing total system costs?**
- **For the services that storage can cost-effectively provide, how should storage projects be deployed to realize the optimal benefits? Assuming optimal operation, would a project be financially viable under a specified market setting?**
- **Is there a missing money problem between the value storage provides to the system and the value realised by the storage owner? If yes, what are best policy recommendations to bridge the gap?**
- **How can analysis through a systematic approach support policy development to effectively answer the above questions?**

INTERNATIONAL RENEWABLE ENERGY AGENCY

Figure 10: Information flow between modelling-based phases of the framework (Phases 3–5)



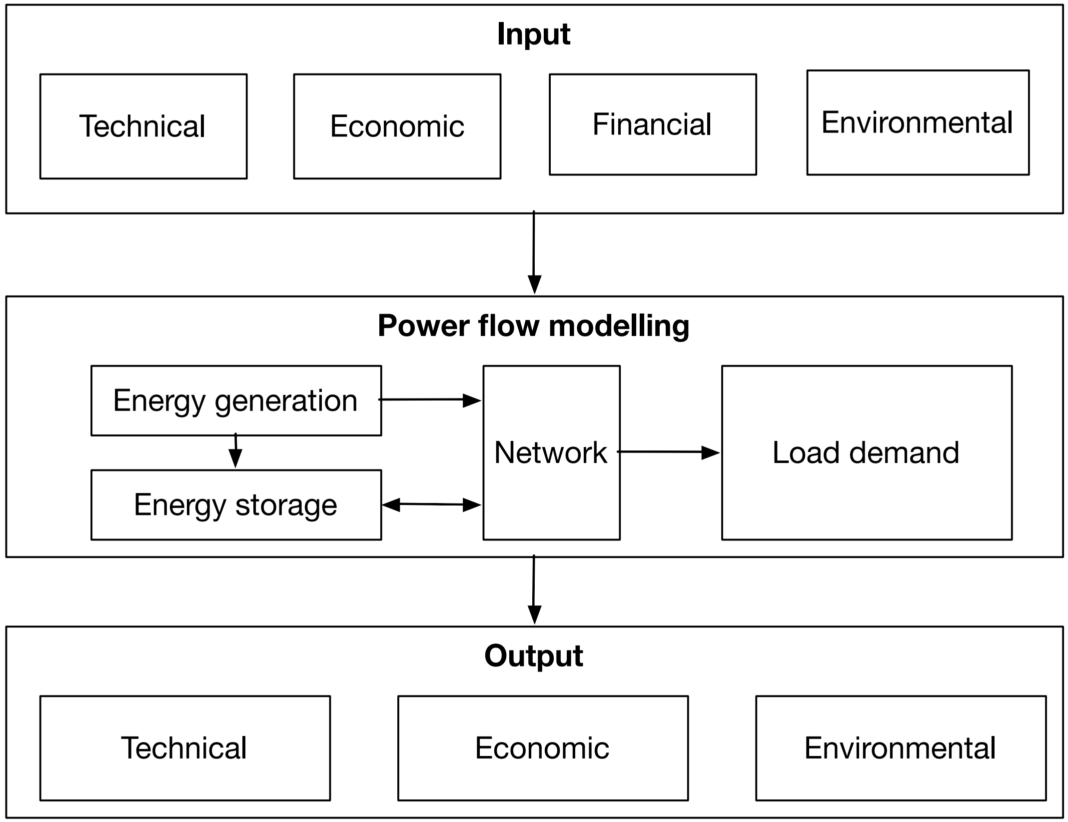
- **Limited storage options**
- **Financing options**
- **Types of cost**

TIME SCALE AND ENERGY SYSTEM

Task	Adequecy		Arbitrage	Reserve and Reponse
Task	Generation, transmission, and distribution planning	Generation and storage scheduling	Generation, storage, and demand side response scheduling	System balancing
Time scale	Years prior delivery	Months to days prior delivery	One-day to one-hour prior delivery	Real-time

Energy supply and demand balancing

TEA FRAMEWORK FOR P2814



- Possibly to Identify Subgroups

FINANCIAL MODEL TECHNICAL INPUTS USUALLY SEEN IN BESS PROJECTS (SIMÓN VALDIVIA)

- **34 technical inputs including additional maintenance, availability (%), balance of plant cost (€/MW) , and battery capacity degradation (%).**
- **Some of these definitions vary substantially depending on the battery manufacturer or EPC/O&M contractor. what should be the standard equations (availability, battery cycle, round trip efficiency (level to be quoted), among others)?**
- **"Other investment costs": what are considered to be relevant varies depending on our scope of work and service providing to the Client. For example, while being a Lender's technical advisor (LTA) for a utility-scale solar plant, we would not look at procurement/construction expenses below a certain limit (let's say $50k) and would request for the items that are below that limit to be summed up by the Contractor. This to avoid for our scope to go out of hands.**
- **Definitions for other energy storage systems (e.g. thermal and mechanical): Some of the terms could be modified to also apply to other systems as they are pretty broad and common in financial models but this working document was specifically directed at BESS definitions.**

LIFE CYCLE ANALYSIS

Life cycle assessment could help assess the potential environmental impacts, identify environmental hotspots and help improve the overall product or systems life cycle for reduced environmental impacts.

- **We need to identify experts to help on life cycle assessment**

STRUCTURE OF STANDARD

1. Overview (recommended practices), scope and purpose
2. Normative references (related standards)
3. Definitions (terms and nomenclature)
4. Need for the Recommended Practice, context of problems, outline of the recommended practice
5. Methodology
6. Examples of application of the methodology
7. Bibliography

P2814 STATUS

IMPORTANT DATES

PAR Request Date:14 Feb 2019

PAR Approval Date: 21 May 2019

PAR Expiration Date: 31 Dec 2023

TASKS

- Structuring the scope of the standard
- Initial Draft document
- Vice-Chair position
- Meeting (Webex, approx. every 1-2 months)
- Schedule of the next teleconference: May or June 2020, Time TBD

THANK YOU

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