Supplementary Material A

Acceptance before deployment: a systematic review and measurement audit of public acceptance research on four emerging net-zero energy technologies — methods detail.

Contents: A1 search strings; A2 recall benchmark; A3 title–abstract screening calibration; A4 screening statistics; A5 language-criterion sensitivity tabulation; A6 country distribution; A7 SMR study list.

A1. Database search strings

Scopus (final frozen version v0.96, searched 11 July 2026), entered via Advanced document search:

```
TITLE-ABS-KEY(
  (accept* OR attitud* OR percept* OR "public opinion" OR "public
support" OR
  "willingness to pay" OR "willingness to accept" OR "contingent
valuation" OR
  "choice experiment*" OR nimby OR "social licen*" OR opposition OR
protest)
  AND (
    "small modular reactor*" OR "small nuclear reactor*" OR "modular
nuclear" OR
    (smr* W/10 nuclear) OR "advanced nuclear reactor*" OR "advanced
reactor*" OR
    microreactor* OR "micro reactor*" OR "generation IV" OR "gen IV"
    OR "green hydrogen" OR "blue hydrogen" OR "renewable hydrogen" OR
    "hydrogen econom*" OR "hydrogen energy" OR "hydrogen
infrastructure*" OR
    "hydrogen station*" OR "hydrogen refuel*" OR "hydrogen fuel
station*" OR
    "refuelling station*" OR "refueling station*" OR "hydrogen
vehicle*" OR
    "fuel cell vehicle*" OR fcev OR "hydrogen production" OR "hydrogen
storage" OR
    "hydrogen pipeline*" OR "hydrogen valley*" OR "power-to-gas" OR
"power-to-x" OR
    "e-fuel*" OR "synthetic fuel*" OR "green ammonia"
    OR "carbon capture" OR "CO2 capture" OR "carbon dioxide capture"
OR
    "carbon storage" OR "CO2 storage" OR "geological storage" OR
    "carbon utilisation" OR "carbon utilization" OR ccs OR ccus OR
beccs OR
    "direct air capture" OR daccs OR "carbon dioxide removal" OR
"negative emission*"
    OR "offshore wind" OR "floating wind" OR "floating offshore"
  )
```

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) AND PUBYEAR > 1999 AND (DOCTYPE(ar) OR DOCTYPE(re)) AND
LANGUAGE(english)
```

OpenAlex: the same four technology blocks and the acceptance-outcome block were implemented as title/abstract keyword filters via the OpenAlex works API, harvested with a versioned script (harvest script and block definitions in Supplementary Material B). Within-source deduplication by DOI and normalised title; cross-source union deduplicated by DOI, then by normalised title–year matching.

A2. Known-relevant recall benchmark (19 studies)

The frozen search strategy retrieved 19/19 of the pre-specified benchmark studies spanning all four technology families. One benchmark record (Kiviluoma et al. 2025, Energy Strategy Reviews, 10.1016/j.esr.2025.101882) was not indexed in OpenAlex at search time and was captured by the Scopus arm — the empirical motivation for the dual-source design noted in Section 2.2 of the manuscript.

SMR/advanced nuclear:

- Social acceptance of small modular reactor (SMR): Evidence from a contingent valuation study in South Korea
- Explaining public acceptance of small modular reactors in Thailand: Planned behavior, innovation attributes, moral norms, risk-benefit, and knowledge sharing
- From promise to legitimacy: a survey-based study of stakeholder engagement and public acceptance of small modular reactors in the UK
- Exploring gender insights on the perceived safety and acceptability of small modular reactors
- Nuclear reactor at home? Public acceptance of small nuclear reactors in the neighborhood

Hydrogen:

- Public acceptance of hydrogen technologies and hydrogen refuelling stations in Spain
- Hydrogen fuel station acceptance: A structural equation model based on the technology acceptance framework
- A study on public acceptance of hydrogen portfolio standard for renewable energy expansion: Comparative analysis of hydrogen production mix plans
- Community acceptance of hydrogen power plant projects: The case of South Korea
- Public acceptance of green hydrogen production in Germany
- Perceptions to connections: A multidimensional investigation of hydrogen acceptance

CCUS:

- What drives public acceptance of sustainable CO2-derived building materials? A conjoint-analysis of eco-benefits vs. health concerns
- Public perception of carbon dioxide removal in three Asian regions
- Perception spillover from fracking onto public perceptions of novel energy technologies

Offshore wind:

- Social acceptance of new floating offshore wind power: Do attitudes towards existing offshore industries matter?
- Energy crisis and social acceptance of offshore wind - A before-and-after analysis
- Public attitudes of offshore wind energy in Japan: An empirical study using choice experiments
- Public acceptance of offshore wind power: Does perceived fairness of process matter?
- Exploring the Social Acceptance of Offshore Wind Farms in Morocco

A3. Title–abstract screening calibration

A stratified random calibration sample of 200 records (50 per technology family by primary tag, fixed seed) was screened independently by the principal investigator and by the LLM screener (frozen prompt v1.0, isolated batch contexts blind to human judgements). Observed agreement 97.0% (194/200); Cohen's kappa = 0.821; prevalence-adjusted bias-adjusted kappa (PABAK) = 0.940; pre-specified proceed threshold kappa ≥ 0.75. Confusion matrix (human × LLM; order include/exclude/unsure): include [12, 0, 0]; exclude [0, 179, 4]; unsure [0, 2, 3]. Zero critical disagreements (human-include → LLM-exclude = 0); include sensitivity 12/12. All six disagreements involved the unsure category; four were conservative escalations on abstract-missing records, as instructed. Bulk screening was authorised only after this gate was passed. Complete decision logs, prompts and the calibration set are archived in the reproducibility package (Supplementary Material B and the repository deposit).

A4. Screening and selection statistics

Records identified: 20,478 raw (Scopus 12,960; OpenAlex 7,518); after within-source deduplication: Scopus 12,947, OpenAlex 7,274 (total 20,221); cross-source overlap removed: 3,415; unique records screened: 16,806. Title–abstract exclusions: 16,117. Advancing to full-text review: 689 (LLM-include 672; calibration human-include 12; human-unsure advancing per protocol 5). Full-text exclusions: 155 (full text not available 63; population not general public 43; technology out of family 23; no acceptance outcome 5; not primary empirical 4; not a peer-reviewed journal article 4; full text not in English 13, comprising eight Korean, two Japanese, two German — one mutually duplicated pair — and one Spanish report). Included studies: 534. Every full-text exclusion was individually confirmed by the principal investigator; the complete exclusion listing with per-record reasons is provided in Supplementary Material B (prisma_exclusions_155.csv).

A5. Language-criterion sensitivity tabulation

Thirteen otherwise potentially eligible non-English reports (eight Korean, two Japanese, two German — one mutually duplicated pair — and one Spanish) were excluded under criterion I5. Twelve were fully extracted before exclusion; re-including them (N = 546) shifts no headline audit estimate by more than half a percentage point:

Audit estimate	Core corpus (N = 534)	With extracted non-English studies (N = 546)
Pre-validated instrument reused	8 (1.5%)	8 (1.5%)
Study-specific / ad hoc instrument	381 (71.3%)	390 (71.4%)
One-shot cross-section	442 (82.8%)	454 (83.2%)
Familiarity not measured	188 (35.2%)	193 (35.3%)
Information provided before elicitation	353 (66.1%)	360 (65.9%)
Pre-deployment object (S0–S1)	388 (72.7%)	395 (72.3%)

A6. Country distribution of included studies

Counts credit every country in which a study collected public data; multi-country studies counted in each. Countries with at least 5 studies:

United States 80; Germany 70; United Kingdom 60; South Korea 44; Netherlands 34; China 26; Japan 25; Denmark 22; Canada 21; Australia 21; Spain 19; Norway 18; Poland 14; France 12; Switzerland 11; Greece 9; India 6; Czech Republic 5.

A7. Included SMR/advanced nuclear studies (n = 17)

- B2484 (2010, United States — Pittsburgh, Pennsylvania): Informed Public Preferences for Electricity Portfolios with CCS and Other Low-Carbon Technologies
- B136 (2019, United States): How stable are preferences among emerging electricity generation technologies
- B145 (2020, Canada — Newfoundland and Labrador; NunatuKavut, southeast Labrador, nine Inuit off-grid communities): “That’s Our Traditional Way as Indigenous Peoples”: Towards a Conceptual Framework for Understanding Community Support of Sustainable Energies in NunatuKavut, Labrador
- B155 (2020, Canada): Diverse community energy futures in Saskatchewan, Canada
- B152 (2023, Canada): Transformative power production futures: citizen jury deliberations in Saskatchewan, Canada
- B25 (2023, Czech Republic): Nuclear reactor at home? Public acceptance of small nuclear reactors in the neighborhood
- C170 (2023, Canada — Saskatchewan and Ontario): Radiation Workers and Risk Perceptions: Low Dose Radiation, Nuclear Power Production, and Small Modular Nuclear Reactors
- B7 (2024, South Korea): Social acceptance of small modular reactor (SMR): Evidence from a contingent valuation study in South Korea
- B194 (2025, Canada — Alberta, Saskatchewan, Ontario): Impact on SMR support by teaching low-dose radiation using infographics and social license in Canada

- B7928 (2025, Finland): Exploring gender insights on the perceived safety and acceptability of small modular reactors
- B81 (2025, USA): Gauging citizen preferences for the emerging energy-technology of nuclear microreactors
- B102 (2026, South Korea): Building pre-decisional trust: strategic risk communication and authenticity in the public acceptance of Small Modular Reactors
- B111 (2026, Thailand): Explaining public acceptance of small modular reactors in Thailand: Planned behavior, innovation attributes, moral norms, risk–benefit, and knowledge sharing
- B147 (2026, South Korea): The public preferences for coal-to-nuclear: A contingent valuation experiment in South Korea
- B190 (2026, United States — Alaska and Wyoming): Investigating citizens' support for the emerging innovation of nuclear microreactors
- B43 (2026, Canada): Public perceptions of low-dose radiation and small modular reactors: A survey-based social science analysis
- B99 (2026, United Kingdom): From promise to legitimacy: a survey-based study of stakeholder engagement and public acceptance of small modular reactors in the UK