

Societal Readiness Levels (SRL)

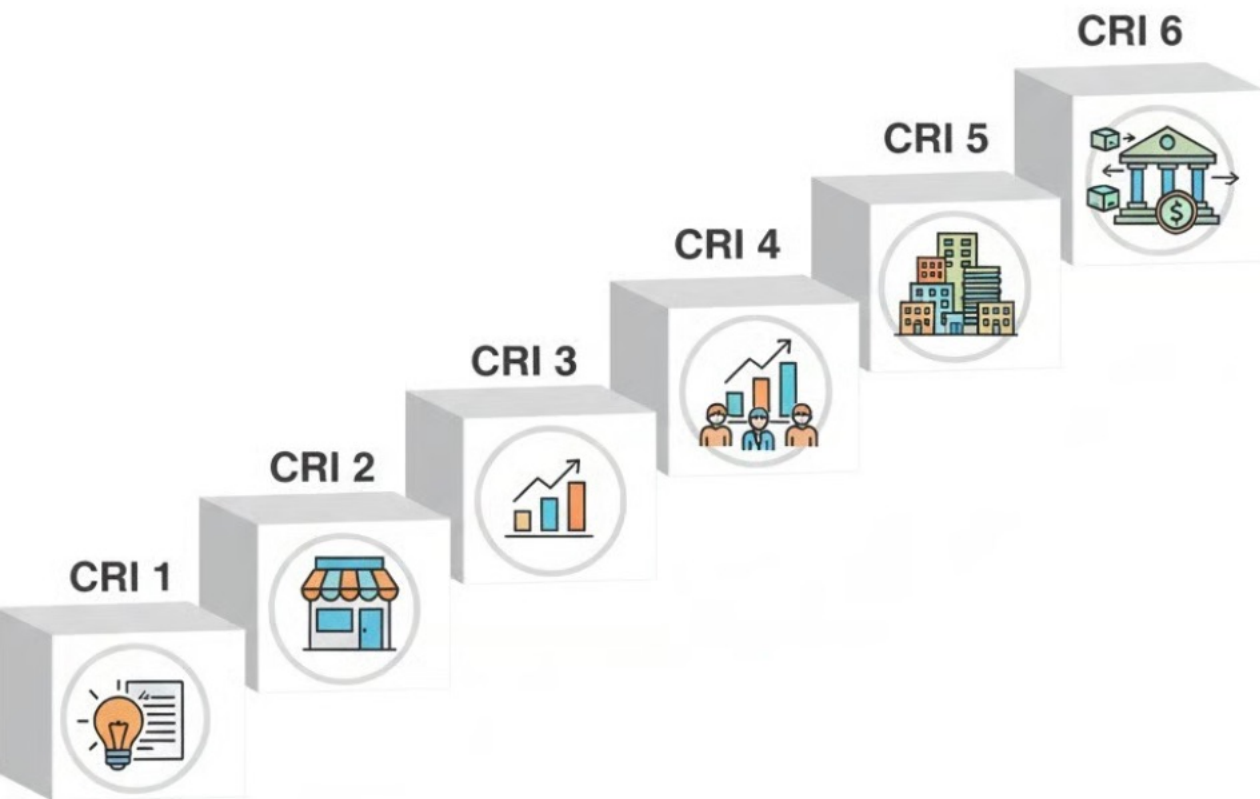




Societal Readiness Levels (SRL)

- **Origin:** Introduced as a pilot in the European Union's Horizon Europe program in 2024-2025 (specifically in the Cluster 5 2025 Work Programme) to address societal impacts in research and innovation.
- **Definition:** A scale to evaluate how ready society (users, institutions, and communities) is to adopt and integrate a technology, considering ethical, legal, social, economic, and cultural factors. It complements TRL by ensuring innovations are not just technically viable but socially acceptable and beneficial.
- **Scale:** Ranges from 1 to 9 (mirroring TRL structure for integration):
 - SRL 1: Initial societal implications identified.
 - SRL 2-3: Societal adaptation concepts formulated and explored.
 - SRL 4-6: Validation through stakeholder engagement, pilots, and assessments (e.g., ethical reviews).
 - SRL 7-8: Demonstration of societal acceptance in real contexts.
 - SRL 9: Proven societal integration and widespread adoption.

Commercial Readiness Index (CRI)

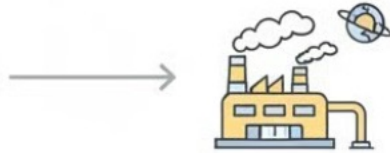




Commercial Readiness Index (CRI)

- **Origin:** Developed by the Australian Renewable Energy Agency (ARENA) in 2014 to assess renewable energy technologies' path to market.
- **Definition:** An index that evaluates the commercial viability and deployment risks of a technology, complementing TRL by focusing on market readiness, financial aspects, and stakeholder acceptance after technical maturity is achieved.
- **Scale:** Ranges from 1 to 6:
 - CRI 1: Hypothetical commercial proposition (technology ready but untested in market).
 - CRI 2: Commercial trial at small scale (initial funding and pilots).
 - CRI 3: Commercial scale-up (specific policies and emerging financing).
 - CRI 4: Multiple commercial applications (still subsidized, with public data).
 - CRI 5: Market competition driving broad deployment (commoditization).
 - CRI 6: Bankable asset class (mature, competitive without subsidies).

TRL



Actual system proven in operation



Actual system completed

TRL 9

TRL 6



System prototype in operational environment



TRL 5



Prototype demonstration in relevant environment

TRL 5



Experimental proof of concept

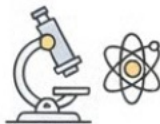
Validation in lab

TRL 4



Validation in relevant environment

TRL 1



Basic principles observed

Manufacturing Readiness Levels (MRL)

MRL 1



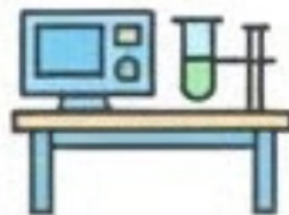
MRL 3



MRL 4



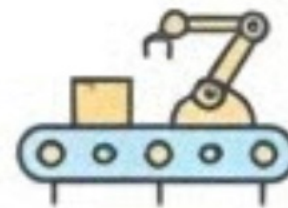
MRL 5



MRL 7



MRL 9



MRL 10





Manufacturing Readiness Levels (MRL)

- **Origin:** Developed by the US Department of Defense (DoD) and formally adopted in 2005 to improve manufacturing outcomes for defense systems, building on TRL concepts.
- **Definition:** A framework to assess the maturity of manufacturing processes, risks, and capabilities, ensuring a technology can be produced at scale efficiently and cost-effectively.
- **Scale:** Ranges from 1 to 10:
 - MRL 1: Basic manufacturing implications identified.
 - MRL 2-4: Manufacturing concepts explored and feasibility assessed.
 - MRL 5-7: Capability to produce prototypes in lab (MRL 5) and relevant environments (MRL 6-7).
 - MRL 8: Pilot line capability demonstrated.
 - MRL 9: Low-rate production demonstrated.
 - MRL 10: Full-rate production with lean practices and continuous improvement.



TRL - Technical readiness Level

- **Origin:** Developed by NASA in the 1970s (specifically formalized around 1974) for assessing space technology maturity.
- **Definition:** A systematic, metric-based method to evaluate the maturity of a technology, focusing on its technical feasibility from basic research to operational deployment. It helps identify risks and guide development in fields like aerospace, defense, and energy.
- **Scale:** Ranges from 1 to 9:
 - TRL 1: Basic principles observed (fundamental research).
 - TRL 2-3: Technology concept formulated and analytical/experimental proof of concept.
 - TRL 4-6: Validation in lab (TRL 4) and relevant environments (TRL 5-6), including prototypes.
 - TRL 7-8: System prototype demonstration in operational environment.
 - TRL 9: Actual system proven through successful mission operations.