Symposium

50yr IEA ES TCP

Overview of 50 years of ES TCP – What did we accomplish?

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Our Journey in Five Decades

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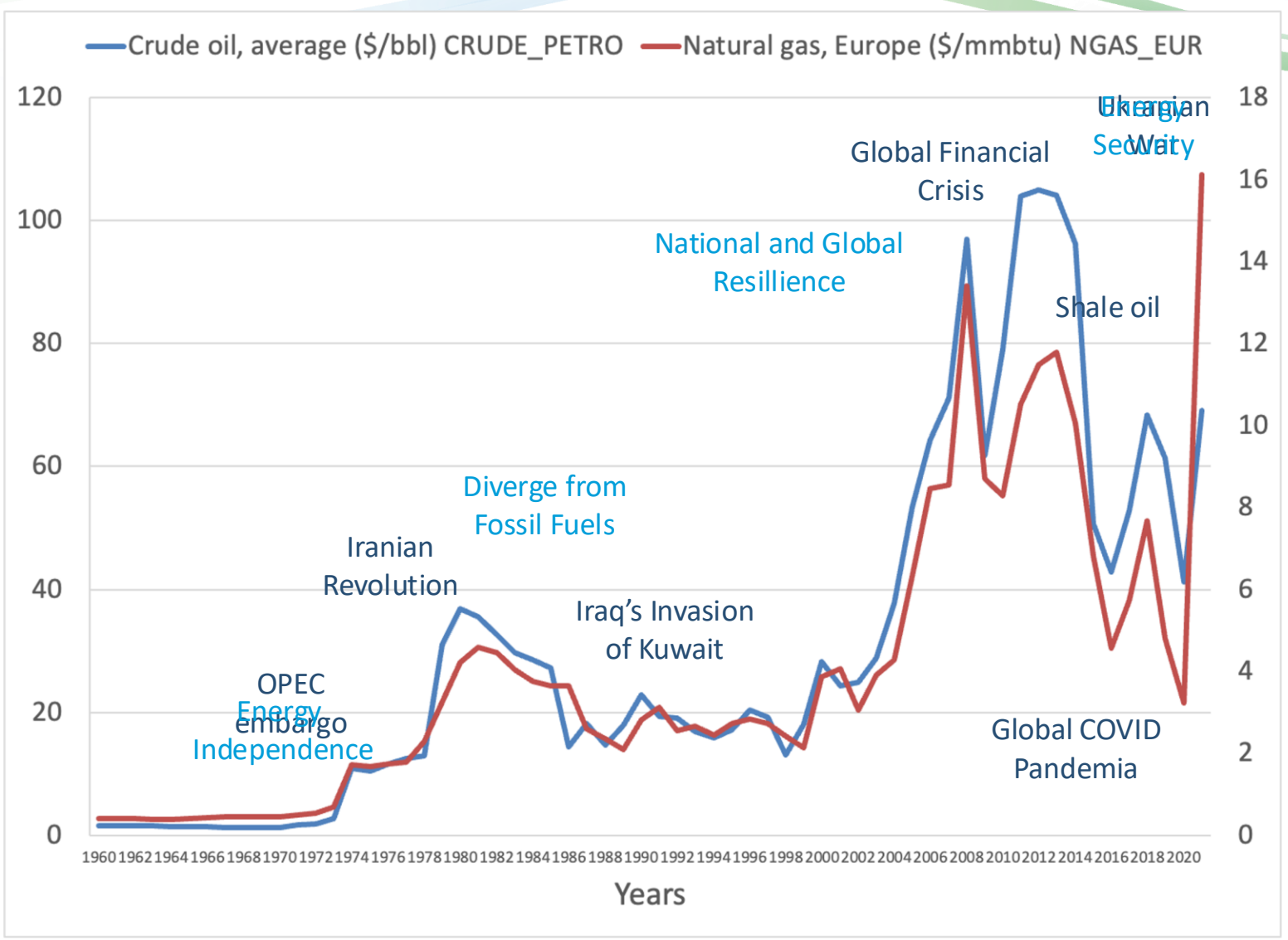
- **Introduction**
  - Historical context and beginning of journey
- **Evolution**
  - Global network
  - From materials to systems
- **Major Achievements**
  - Global impact and milestones
- **Conclusive Remarks**

Signing of ECES IA for Turkey in Paris, 1995

Historical Context: Energy Crises That Shaped Our Mission



These energy crises:

- strengthened our mission
- validated the importance of energy storage technologies

The Journey Begins

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Establishment

- The IEA's energy storage program, first known as ECES, started in 1975.
- It began because of an urgent need for energy safety and to save energy, aiming to bring countries together to improve storage technology.
- Later renamed the IEA Energy Storage Technology Collaboration Programme (ES TCP).

Our Initial Mission

… to facilitate an integral research, development, implementation and integration of energy storage technologies to optimize energy efficiency of every kind of energy system and to enable the increasing use of renewable energy instead of fossil fuels.

Global Network of Member Countries

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The ES TCP has grown into a truly global collaboration from a handful of countries to 21 countries today, bringing together leading researchers, policy makers, and industry stakeholders from across continents:

- **Europe**

  Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Israel, Italy, Netherlands, Norway, Slovenia, Sweden, Switzerland, Turkey, United Kingdom

- **Asia**

  Japan, China, Korea

- **Americas**

  USA, Canada

Early Motivation and First Steps (1970s–1980s)

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1970s Crisis Response

Highlighted the urgent need for energy conservation reducing dependence on fossil fuels, required innovative approaches to storing and managing energy resources

1

Thermal Focus

2

Initial efforts concentrated on Thermal Energy Storage (TES) for heating and cooling applications.

International Collaboration

3

Institutes across Europe, Japan, and the USA joined forces to define the program with a collaborative spirit.

Annexes (1978- 1984)

4

The first phase research priorities were on latent heat materials and sensible heat systems, and pioneering concepts in underground thermal storage.

Evolution through the Decades

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- **Expansion Era (1985-1995)**
  - Emerging key themes : solar heating and cooling, district heating systems, and building integration
  - Industrial interest in TES for process heat
  - First international workshops established knowledge-sharing traditions
- **Maturity Period (1995-2005)**
  - Scope expanded to include electrical and chemical storage technologies.
  - Early studies on large-scale seasonal heat storage emerged, alongside improved simulation and modeling tools.
  - Policy relevance strengthened considerably
- **System Integration (2005-2015)**
  - Focus shifted to combining TES with heat pumps, solar thermal, and district energy.
  - Landmark annexes addressed cooling with thermal energy storage and ultra-low energy buildings.
  - Energy storage gained recognition as critical infrastructure for renewable energy systems.
  - 2016: Updated mission statement emphasizes storage as key to energy system

Recent Transformation:
From Saving Energy to Being Flexible

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Energy Transition and Flexibility (2015–2025)

- The Paris Agreement in 2015 accelerated the global energy transition. Storage was no longer primarily about conservation—it became essential for providing the flexibility with high shares of variable renewable generation.
- The program changed from just saving energy to making energy systems more flexible. We focused on big thermal storage and helping more people use it. Our main goals became lowering costs, making things standard, and improving how well systems worked.
- Connecting energy storage with smart power grids and renewable energy sources became very important.
- In 2016, we updated our goal. It now says that storage is key to fully changing our energy system. This means storage isn't just about saving energy, but also making renewable energy systems practical and reliable.
- Different energy areas—like electricity, heating, and industrial processes—are now linked together in new ways or as we like to call it in our TCP “sector couplings”.

Major Achievements: 50 Years of Impact

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Worldwide Projects

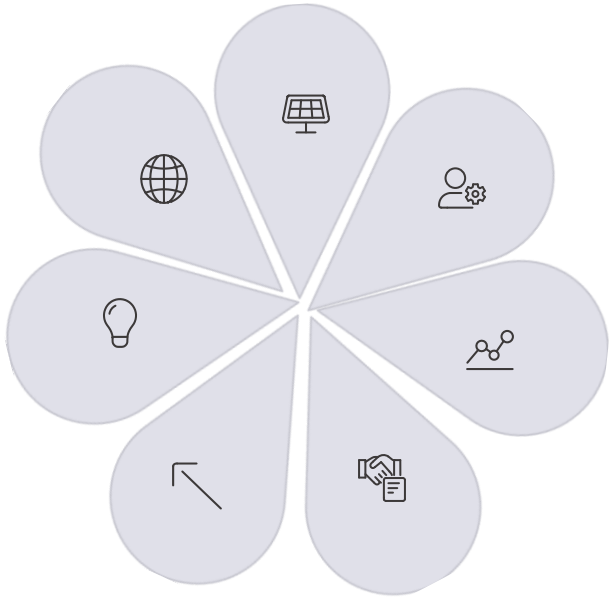
Over 100 projects globally, demonstrating real-world applications and accelerating adoption.

New Storage Ideas

Pioneered long-term underground storage and advanced latent and thermochemical materials, opening new technological options.

Renewable Integration

Successfully combined ES with renewables and energy systems, showcasing integrated solutions.



Research Industry Bridge

Improved cooperation between scientists and businesses, accelerating technology transfer from lab to market.

Set Standards

Internationally accepted testing methodologies and data standards

Mission Evolution

Led the shift from mere energy saving to decarbonization and flexible energy systems

Largest Global Network

Connecting thousands of researchers, policymakers, and industry leaders, creating an unparalleled resource for advancing energy storage technology

Tri-Annual Conferences

Stock Conferences = Our Olympic Games

- **Since 1981, the ES TCP has hosted first biannually then tri-annually international conferences in 14 countries around the world:**
  - Seasonal Thermal Energy Storage and CAES, Subsurface Heat Storage, Enerstock, Jigastock, Thermalstock, Calorstock, Megastock, Terrastock, Futurestock, Ecostock, Effstock, Innostock, Greenstock, Enerstock 2018, Enerstock 2021, Enerstock 2024
- **Technical Sessions, Industry Exhibitions, Networking**

Conclusive Remarks

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- As CO_2 emissions climb to unprecedented levels, the world is to face ever tougher years – financially and environmentally.
- We should not give up and take rapid actions now.
- IEA collaboration embodies the spirit of encouraging each other—providing the conviction that together, we can overcome any challenge.
- We've weathered crises, adapted to changing needs, and consistently delivered impact.
- **For half a century, the Energy Storage TCP has exemplified how strong partnership and innovation can make international cooperation a proven success.**

«Tough times don’t last , tough people do!»

Nassim Nicolas Taleb

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Wishing many more

50 years of innovation!

To the Energy Storage TCP

Thank you for listening!

Views, findings, and publications of the ES TCP do not necessarily represent the views or policies of the IEA Secretariat or its individual member countries.