

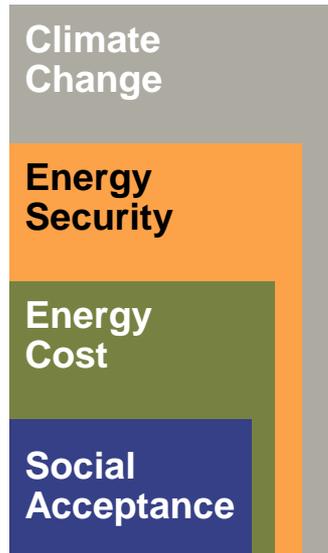


A.T. Kearney Energy Transition Institute

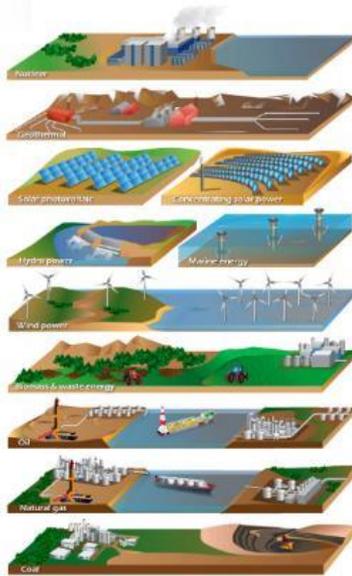
Media Presentation

Energy transition will increasingly disrupt the energy value chain as we know it, from energy sources through to consumption

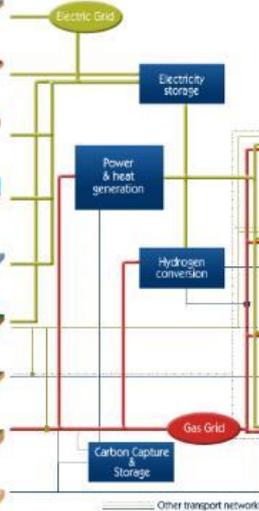
Energy Objectives



Energy Sources



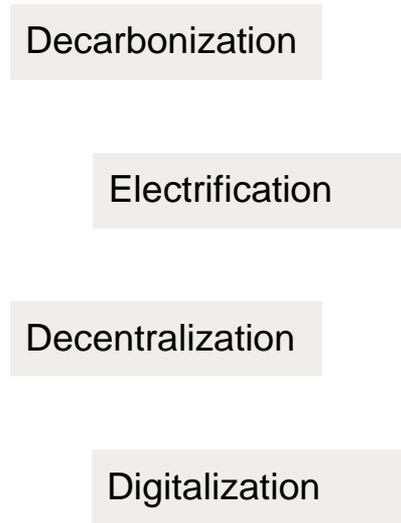
Distribution



Consumption



Energy Megatrends



Direct CO2 reduction levels: energy efficiency, renewables, fuel switching, nuclear, CCS
Indirect CO2 reduction levels: investment, regulation, consumption patterns...

The A.T. Kearney Energy Transition Institute helps companies and governments address the opportunities and challenges of energy transition

The Energy Transition Institute studies global trends in energy transition and their strategic implications for businesses and governments

A.T. Kearney Energy Transition Institute

- Created in 2011 as a non-profit and independent energy research organization, governed by its own Board
- Focus on independent energy transition research with the objective to mitigate climate change, provide safe, efficient and affordable energy while ensuring social acceptance and meeting end user demands
- Communicates its research findings to a large audience and provides insights regarding energy transition:
 - Mega trends (decarbonization, decentralization, electrification, and digitalization...)
 - Opportunities, challenges and strategic implications of energy transition for industries and governments
 - Technology deployment & RD&D, economics and key players
- Collaborates with leading academic institutions, energy stakeholders and companies
- Combines technological insights and economical perspectives with foresight and business expertise of A.T. Kearney and the Global Business Policy Council
- Open to external collaboration and joint research activities

Research and Insights



Bloomberg New Energy Finance

Published “Bringing Carbon Capture and Storage to Market” together with Bloomberg New Energy Finance

iea – International Energy Agency

Supported the iea with technology roadmaps around Energy Storage; Hydrogen and Smart Grids



Global conference presence



The Energy Transition Institute is governed by its own Board with access to global experts

Composition of the Energy Transition Institute (ETI) Board

Chairman			Secretary / Treasurer		MD		
							
Richard Forrest	Erik Peterson	Kurt Oswald	Stefan Berruti	Claude Mandil	Dr. Adnan Shihab-Eldin	Antoine Rostand	Romain Debarre
<ul style="list-style-type: none"> Chairman of the ETI Board, A.T. Kearney Energy Practice Global Leader A.T. Kearney Global Board Member 	<ul style="list-style-type: none"> Macro/Geopolitical energy expertise and connects the institute with A.T. Kearney Global Business Policy Council (GBPC) 	<ul style="list-style-type: none"> A.T. Kearney Energy Practice Partner -deep expertise on Energy Transition 	<ul style="list-style-type: none"> Legal counsel, Secretary and Treasurer of ETI 	<ul style="list-style-type: none"> Former Executive Director of the International Energy Agency (IEA) and former Chairman and CEO of IFPEN 	<ul style="list-style-type: none"> Former Acting Secretary General and Director of Research at OPEC, Director General of the Kuwait Foundation for the Advancement of Sciences (KFAS) 	<ul style="list-style-type: none"> CEO and Founder of Kayrros, former CEO and Founder of Schlumberger Business Consulting 	<ul style="list-style-type: none"> Managing Director of the ETI

Available FactBooks



Bringing Carbon Capture and Storage to Market

- This FactBook is based on the 2012 report “Bringing Carbon Capture and Storage to Market”, and has been updated in 2016 to reflect the latest changes in the CCS landscape. It summarizes the main Research & Development priorities in CCS, analyzes the economics of the technology and presents the status and future of large-scale integrated projects.
- Carbon Capture and Storage is one of the most underrated climate-change mitigation options available today. It is widely regarded as technically capable of abating vast amounts of carbon dioxide from the atmosphere at competitive costs. Yet, unless associated with a beneficial reuse of CO₂, CCS has net costs for the project owner to be borne solely for the purpose of reducing climate risk. Therefore, the CCS industry is at risk of never developing beyond the few subsidized projects, unless proper prices are associated with carbon emissions.



Hydrogen-Based Energy Conversion

- The FactBook presents the technological progress and economic reality of the role of hydrogen in the energy space and analyzes hydrogen-based solutions developed to overcome the intermittency challenge of renewable energies.
- The value of hydrogen-based energy conversion solutions lies predominantly in their ability to convert renewable power into chemical energy carriers. The main challenge for hydrogen conversion, however, lies not in its technology but in its economics and may suffer from the high number of stakeholders involved.
- Three formats have been published: A long, horizontal FactBook (300 slides) and two shorter summary: a vertical abstract (17 pages) and an executive presentation (60 slides)



Wind Power

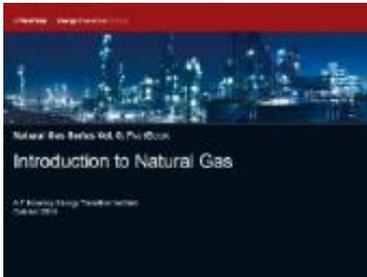
- This FactBook summarizes the status of the wind industry and its prospects, lists the main technological hurdles and principal areas for research and development, and analyzes the economics of this technology.
- Wind power is by far the largest renewable energy after hydro power. The development of wind power has accelerated over the past decade and growth is expected to continue, increasingly driven by Asia, but also by emerging markets in Latin America or Africa. It is important to distinguish onshore wind power, a mature, proved technology, from offshore concepts, which still need to overcome the deployment challenge and to demonstrate their economic viability. In the longer term, airborne wind systems may change the game by harvesting higher wind speeds, while lowering investment costs. But airborne wind remains at an early stage of development.

Available FactBooks



Introduction to Smart Grid

- The Smart Grids FactBook examines the innovations that comprise what is collectively known as Smart Grid technologies. The Smart Grids FactBook gives a comprehensive assessment of the transition to a modern, digital, and optimized electric grid.
- Numerous innovations can already contribute to the modernization of electricity networks. They aim to: enable the use of all generation and storage options; optimize energy efficiency and asset utilization; improve power quality for end-user devices; self-heal; resist physical and cyber attacks; and enable new business solutions in a more open-access electricity market. But social acceptance, cybersecurity, regulation, and international collaboration on standardization and best practices are vital to successful deployment.
- Electrons are the fastest-growing energy carrier and a pivotal element of the transformation of the energy system. Economies will become increasingly dependent on electricity, as renewable energy expands and environmental concerns intensify. As a result, electricity networks are being rapidly modernized through the introduction of smart-grid technologies.



Introduction to Natural Gas

- This FactBook assesses the reasons behind natural gas's growing importance within the global energy mix and challenges associated with gas use, as well as the current status of and likely developments in natural-gas technologies.
- Natural gas is used in power generation, for industrial applications, buildings, and transportation. Though historically it has been extracted through conventional means, unconventional extraction processes play a part in regions such as North America.
- Having long been overlooked as an energy source, natural gas has become a crucial part of the energy mix and will remain so due to its sizeable and accessible resources, low carbon foot print, and versatility. Natural gas accounts for more than 20% of the global primary energy mix. Even though complex infrastructure is needed to get natural gas to end users, global trade is increasing and the share of energy from natural gas is expected to rise in the future, especially for power generation, where it can be used to replace coal power and to fill power gaps created by intermittent renewable energy sources.



Gas Hydrates

- This FactBook seeks to provide stakeholders with a balanced, unbiased assessment of gas hydrate to determine the potential and future of this resource. It presents the key concepts; the status of exploration and production technologies; the status of research, development and demonstration (R,D&D); and the environmental and safety challenges associated with the potential exploitation of gas-hydrate resources.
- Gas hydrates are a new frontier in unconventional gas developments. There are vast quantities of hydrates on the planet, but only part of them are concentrated enough to be viable in the future. Contrary to common beliefs, the technology to find and recover gas hydrates is reasonably mature, but the understanding of the challenges to effectively produce them are still young. The viability and better understanding of gas hydrates development will depend upon upcoming extended production campaigns, with Asia at the forefront.

The A.T. Kearney Energy Transition Institute is a nonprofit organization. It provides leading insights on global trends in energy transition, technologies, and strategic implications for private sector businesses and public sector institutions. The Institute is dedicated to combining objective technological insights with economical perspectives to define the consequences and opportunities for decision makers in a rapidly changing energy landscape. The independence of the Institute fosters unbiased primary insights and the ability to co-create new ideas with interested sponsors and relevant stakeholders.

For further information about the A.T. Kearney Energy Transition Institute and possible ways of collaboration, please visit www.energy-transition-institute.com, or contact us at contact@energy-transition-institute.com.