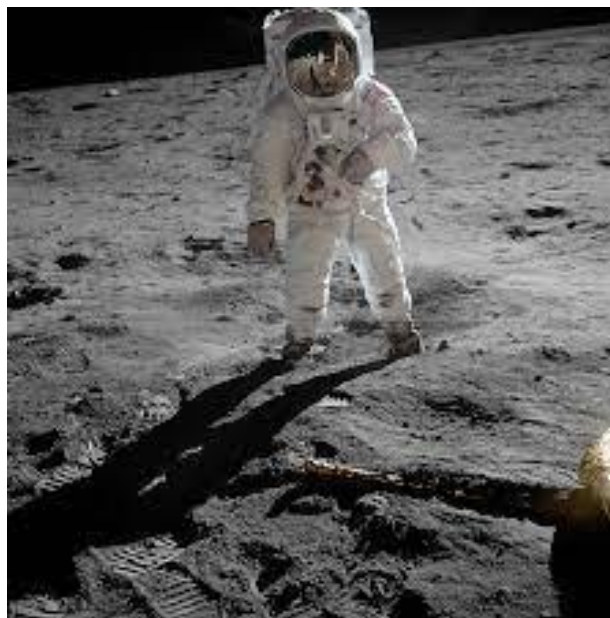


## Issues Impacting the Midstream Industry: The Real Impact of Energy Transition on Midstream

By Thomas J. Kalb, Director of the Center for Midstream Management & Science  
April 15, 2024

Two primary narratives compete for dominance in the climate change discussion. One narrative claims humanity faces an existential crisis that can only be solved by spending trillions of dollars and using regulatory measures to mitigate the effects of rising temperatures. The other insists a forced energy transition will waste national resources while increasing energy costs. Neither narrative is dominant, and rather than helping the discussion, they together cause greater uncertainty, resulting in a political and economic fog. The only certainties are a lot of money will be spent and there will be significant technological advancement, impacting not only the broader economy but also the midstream industry. It begs the question: How should companies manage this ideological conflict? The winning companies will likely be those who identify, harvest, and apply new technologies, and the midstream industry is well-positioned to do so.

In John F. Kennedy's famous speech, "[We choose to go the Moon](#)" in 1962, he said "We choose to go to the Moon in this decade and do the other things, not because they are easy, but because they are hard; because that goal will serve to organize and measure the best of our energies and skills ..." His words kicked off an acceleration of technological development that created the foundation of the modern world. His speech was important not because Apollo 11 landed on the moon, but because it began a massive national investment in the technologies necessary to get to the moon - landing on the moon was aspirational but not particularly important to the average person.



U.S. astronaut Edwin ("Buzz") Aldrin walking on the Moon, July 20, 1969.  
*Source: National Aeronautics and Space Administration*

The U.S. space program resulted in the development of materials science and computer technologies foundational to many of today's commonplace but important inventions and products. It represented the most powerful seed capital ever invested. While the result of current financial, governmental, and social dedication to energy transition may or may not save us from the feared global warming catastrophe, it will lead to technological development that will dramatically impact mankind over the next 50 years. Consider the following facts:

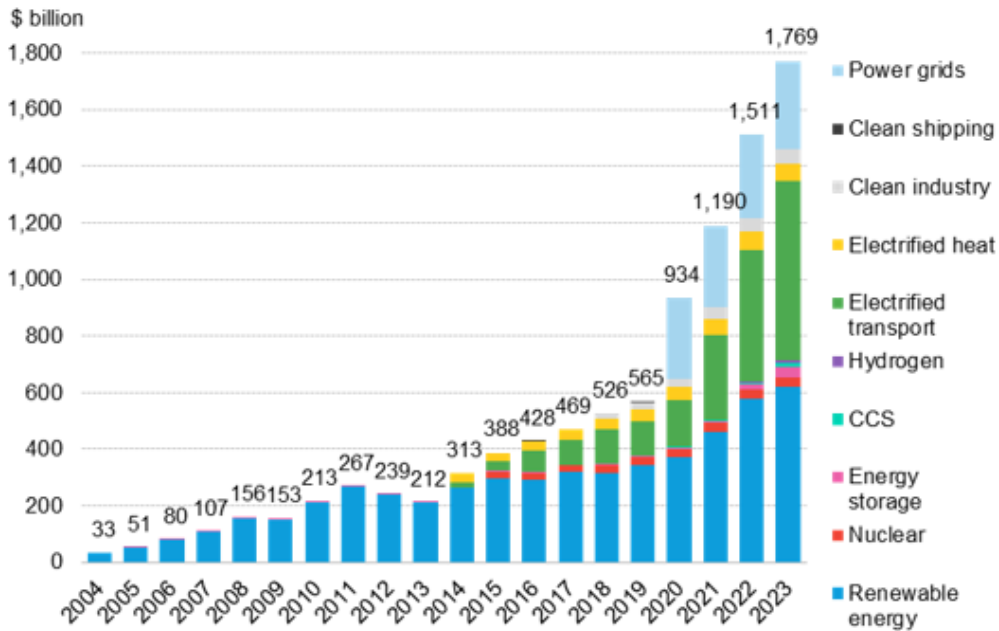
#### **U.S. Space Program - Mercury and NASA**

- The U.S. [spent \\$49.4 billion](#) (\$482 billion in current dollars) on the Gemini, robotic lunar, and Apollo programs (The Planetary Society, 2020).
- The U.S. space program investment resulted in [growth in the U.S. economy](#) of \$2.4 trillion to \$3.4 trillion (current dollars) (Jayamonhan, 2023).
- Some products or technologies [resulting from space program](#) spending include the computer mouse, portable computers, camera phones, scratch-resistant lenses, CAT scans, LEDs, land mine removal technology, athletic shoes, foil blankets, water purification systems, dust busters, infrared ear thermometers, home insulation, Jaws of Life, wireless headsets, memory foam, freeze-dried food, adjustable smoke detector, baby formula, and modern artificial limbs (NASA Jet Propulsion Laboratory, 2016).
- Other products and technologies [resulting from space program](#) spending include solar cells, insulin pumps, firefighting equipment, Lasik, improved tires, invisible braces, grooved pavement, air purifiers, workout machines, ice-resistant airplanes, and 3-D food printing (Green, 2019).
- The early U.S. space program is believed to have [advanced progress](#) in computer technology by 5 to 10 years, which led to U.S. dominance in aeronautics, computers, medicine, electronics, and other technologies (Jayamonhan, 2023).

#### **Energy Transition**

- The 2023 global [investment in low-carbon energy](#) transition achieved a new record of \$1.8 trillion, up 17% from 2022 (BloombergNEF, 2023).
- To meet the Paris Agreement's forecast and targeted net zero objectives by 2050, investment levels would have to nearly [triple from current levels](#) (BloombergNEF, 2023). It seems a lot of money has yet to be invested in energy transition.

### Global energy transition investment by sector



Source: BloombergNEF. Note: start-years differ by sector, but all sectors are present from 2020 onwards; see Methodology in the report for more detail. Most notably, nuclear figures start in 2015 and power grids in 2020. CCS refers to carbon capture and storage.

- The U.S. was the [second largest investor](#) in energy transition in 2023 at \$303 billion (BloombergNEF, 2023).
- Since 2004, [\\$1.4 trillion](#) has been invested in clean energy in the U.S. alone (Fernández, 2023).

The facts make it clear tremendous capital investment in energy transition has been taking place and continues to accelerate. This investment, as with the Mercury/Apollo programs, will lead to important scientific and technological discoveries and have a significant impact on the U.S. economy. While uncertainty remains regarding the nature of discoveries and their impact, it will become apparent in the coming decades and likely benefit society in unexpected ways - just as the early investment in space exploration did. Regardless of the outcome of the energy transition argument, companies able to promptly identify promising new technologies and materials and target applications for them will likely be the biggest winners. Midstream companies are experts in engineering, project management, operations, and problem-solving. They are well-positioned to identify these unexpected technological opportunities and be first movers with innovative applications. Maximizing success in the midstream sector will probably come from a broad focus on emerging technologies rather than a narrow focus on technologies targeting just midstream operations.

*This is the second essay of a planned series from Lamar University’s [Center for Midstream Management & Science](#) exploring issues impacting the midstream industry in the U.S.*