



What are
Essential Assets?



At Tortoise, we think of essential assets as those that are indispensable to the economy and society. In this piece, we will discuss three segments of essential assets: **social infrastructure** – educating children, housing and caring for seniors, **sustainable infrastructure** – laying the foundation for clean energy and **energy infrastructure** – heating and powering homes and businesses.

Examples



SOCIAL INFRASTRUCTURE

- Education
- Housing
- Senior/assisted living

Issuers:

- Private and public nonprofits
- 501(c)(3) organizations

Assets:

- Education
- Healthcare
- Project finance
- Housing
- Human services providers



SUSTAINABLE INFRASTRUCTURE

- Wind/solar
- Water
- Power networks

Issuers:

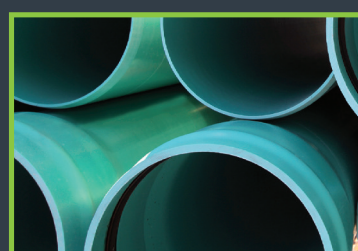
Creditworthy power purchasers

- Investment grade municipalities
- Universities
- Hospitals
- Utilities
- Corporations

Assets:

Renewable energy infrastructure

- Utility-scale and distributed solar and wind infrastructure



ENERGY INFRASTRUCTURE

- Energy pipelines
- Gathering and processing
- LNG exports

Issuers:

Midstream energy entities

- Pipeline companies
- Gathering and processing companies

Assets:

Pipelines and related assets with long economic lives and high barriers to entry

LNG = liquefied natural gas

The “essential” nature of these assets make them particularly relevant in any market environment and resilient across economic cycles. As a result, the relatively inelastic demand for these assets also makes them attractive investments.

Essential assets tend to be long-lived, tangible assets with low obsolescence risk that generate predictable cash flows as they are typically income-generating. Generally, they have idiosyncratic risk, low correlation to broad financial markets and demographic and political demand pull, including the aging population of baby boomers and the political drive for carbon emission reduction.

Essential assets require significant capital investment

This need for capital is creating investment opportunities that support ongoing growth, and the supply capital/demand imbalance has created a market dislocation across essential assets.

Changing demographics and trends are driving the need for capital across the essential assets universe.

SOCIAL INFRASTRUCTURE



- **~\$100 billion** needed to expand and enhance U.S. education and healthcare¹

SUSTAINABLE INFRASTRUCTURE



- **~\$8.4 trillion** of global investment expected in wind and solar from 2018-2050²
- **~\$14 trillion** needed to improve global water systems³

ENERGY INFRASTRUCTURE

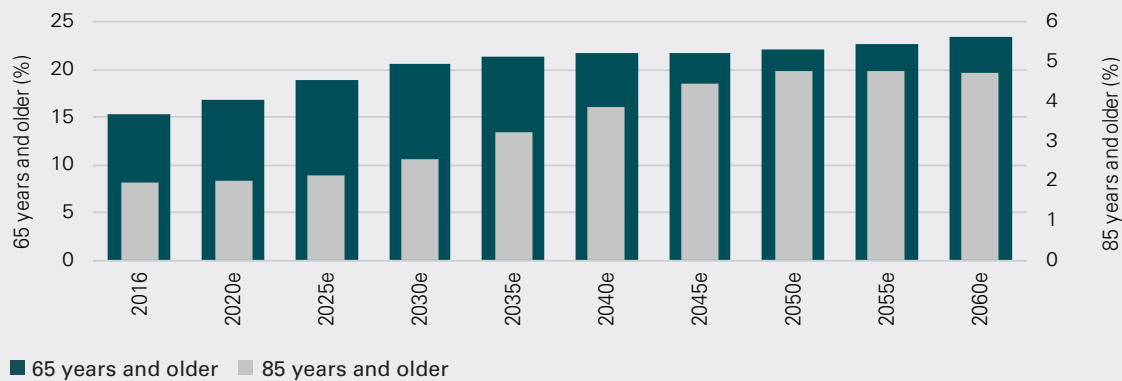


- **~\$139 billion** needed to build out U.S. energy infrastructure 2018-2020⁴
- **~\$4.8 trillion** is the expected replacement value of the current U.S. electrical grid⁵

SOCIAL INFRASTRUCTURE

According to the U.S. Census Bureau, 78 million people in the U.S. will be 65 years of age or older by 2035. Tortoise believes this aging population is creating a need for additional senior living facilities for individuals in search of inclusive, maintenance-free lifestyle and care. It is also driving demand for an increase in the number of rural hospitals to assist the elderly who choose to continue living in their own homes and long-term care facilities for residents in need of critical care.

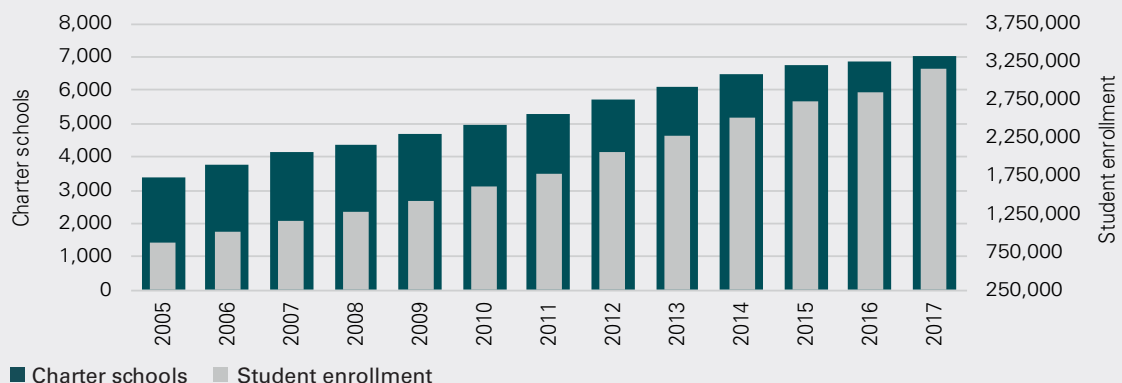
Growth of aging population



Source: U.S. Census Bureau, Population Division

Tortoise believes the underfunded U.S. education system is creating a need for more community and junior colleges, vocational and technical schools, as well as charter schools, particularly in underserved neighborhoods. One area with significant capital needs are charter schools. In our estimates, charter schools receive approximately 25% less funding per pupil than traditional public schools and have to cover facility costs. The charter school model has struck a positive chord in many communities where school choice is an option and quality traditional public school options are not keeping pace with academic standards. This growth in demand for charter schools is driving the need for additional financing.

Growth in charter schools drives need for additional financing

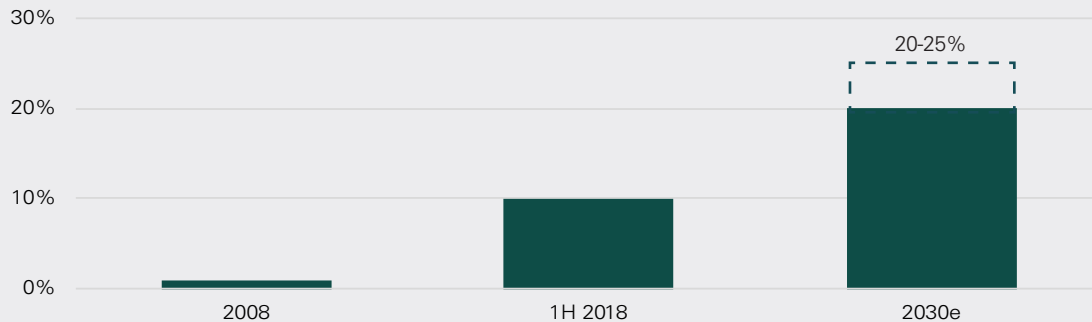


Source: U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD)

SUSTAINABLE INFRASTRUCTURE

Renewable energy is becoming a meaningful player in the energy landscape as it continues to take market share from coal and nuclear sources. There are several factors driving this shift. Energy consumers are favoring renewable energy sources due to their positive sustainable environmental impact and declining cost.

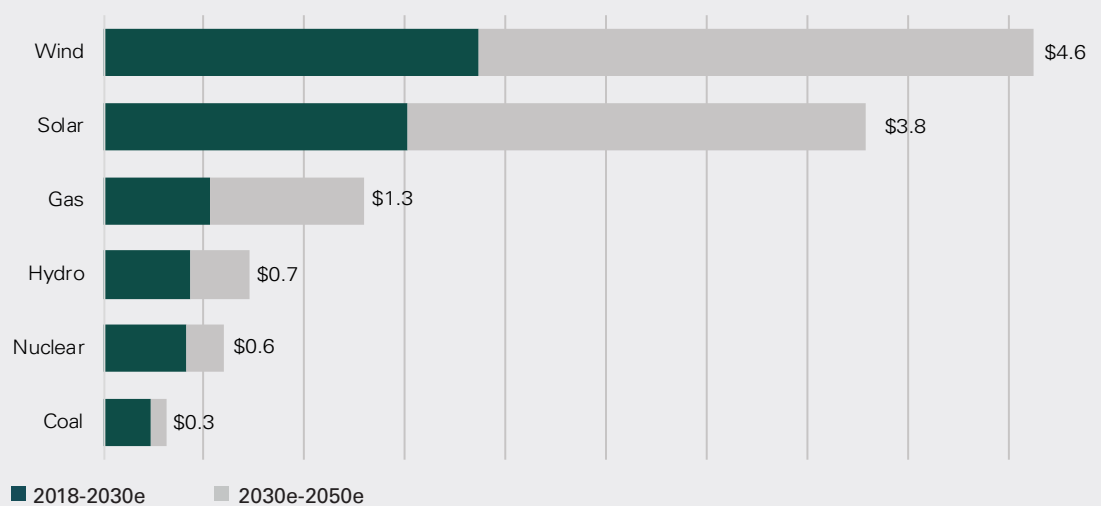
Renewables as a percentage of total electric power generation



Source: EIA (June 2018) and Bloomberg New Energy Finance. Data for U.S. renewables includes wind and solar

In addition, there has been an increased desire to decommission nuclear and coal plants. Also, the recent, dramatic cost reductions of renewable energy make it increasingly attractive relative to competing energy sources. And lastly, sustained government policy support has favored renewables.

Renewables garner the majority of investment in power generation



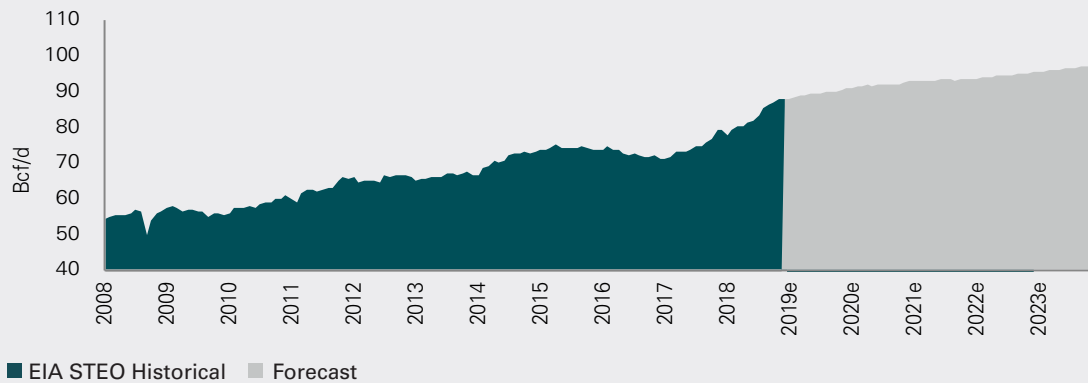
Source: Bloomberg New Energy Finance

There can be no assurance that the estimates shown above will be achieved.

ENERGY INFRASTRUCTURE

Energy demand has been at an all-time high, with natural gas leading the way to clean and reliable energy sources.

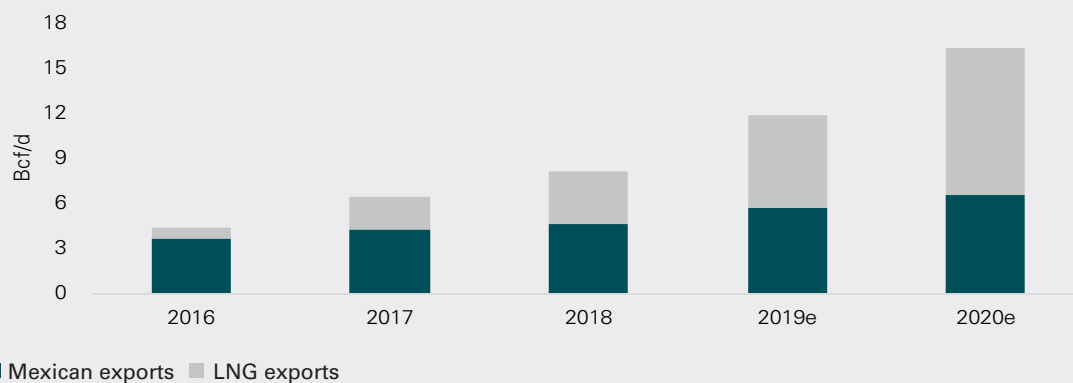
Natural gas production expected to rise



Source: Historical data - EIA, Forecast - Tortoise estimates based on industry data

Global demand for liquefied natural gas (LNG) is expected to increase by 4% annually from 2017–2035. U.S. projections show that natural gas production increased by approximately 8 billion cubic feet per day in 2018.

Natural gas exports expected to grow



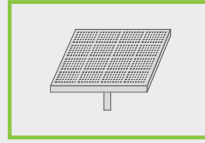
Source: EIA, Bloomberg, PIRA, BTU Analytics

This is driving the need for more energy infrastructure. Approximately \$791 billion is needed to invest in U.S. midstream infrastructure between 2018-2035.⁶

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SOCIAL INFRASTRUCTURE
Educating children and caring for seniors

Supporting underserved neighborhoods to educate children and care for the aging population


SUSTAINABLE INFRASTRUCTURE
Cleaner energy

Funding renewable energy and low carbon energy infrastructure such as wind and solar projects


ENERGY INFRASTRUCTURE
Fueling everyday life

Investing in natural gas infrastructure as a clean and reliable energy source to heat our homes and cook our food

Making a positive social and economic impact

Through our investments, we seek to make a positive social and economic impact on the economy and society. We see compelling opportunities to provide capital to organizations that are essential to the economy and make a positive social and environmental impact in communities. This continues to be an area of increased focus for investors seeking responsibility and sustainability, both fiscally and socially, from those with whom they invest. With our focus on essential assets, we aim to serve our clients as a socially responsible asset manager.

SOCIAL INFRASTRUCTURE

- Through the social infrastructure platform, 6,000 students are receiving education through our charter school investments
 - 60% average participation in National School Lunch Program
 - 66% belonging to ethnically underrepresented groups
- 673 residents are being served through senior living facilities
 - 323 residents provided 24/7 support services at assisted living facilities
 - 296 residents catered to at memory care units

SUSTAINABLE INFRASTRUCTURE

- We have a portfolio of solar assets that supplies clean energy to the power grid and powers approximately 8,200 homes
- One of our sustainable portfolios emits 63% less CO₂ than the grid in which the portfolio companies operate, representing 1,347 tons of CO₂ avoided per \$1million invested

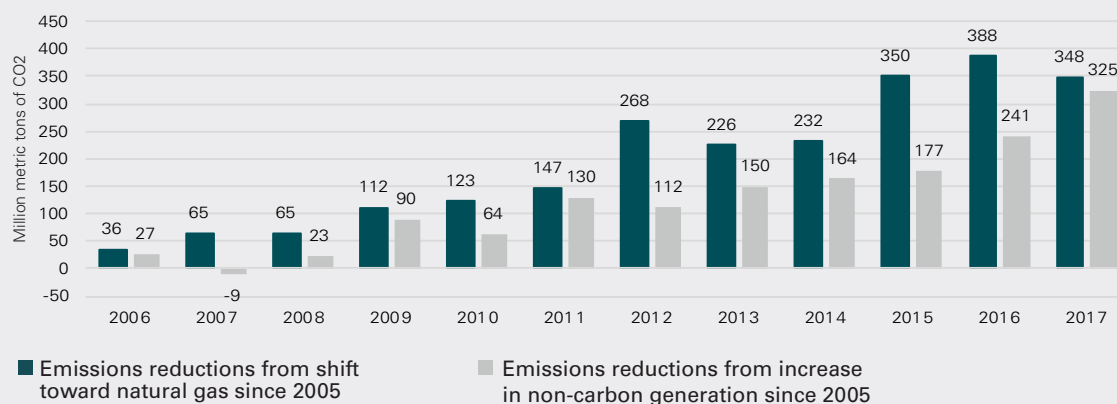
ENERGY INFRASTRUCTURE

- We believe our focus on natural gas investments is a driver for positive impact, in aggregate, the shift from coal to natural gas has led to the following results:
 - Emission reductions from the shift to natural gas have been higher than the emission reductions from non-carbon generation⁷
 - 44% of the United Nation's CO₂ emission reduction goal for 2030 could be met by converting coal consumption to natural gas⁸

Impact Spotlight

As seen in the chart below, CO₂ emissions are being significantly reduced, through both the growth of renewable energy, and even more significantly, the shift toward natural gas as a power source.

CO₂ reductions driven by changes in the electricity generation mix



Source: U.S. Energy Information Administration, August 2018 Monthly Energy Review.

Concluding thoughts

Essential assets make a positive impact on our society and the environment. They are essential – they have to exist, regardless of how the market is trading or what is going on in the world. They also resonate with investors who appreciate socially responsible investment strategies, and we believe opportunities abound.

¹ Federal Reserve and Tortoise estimates

² Bloomberg New Energy Finance “New Energy Outlook 2018”, June 2018

³ Organization for Economic Cooperation and Development, July 2017

⁴ Tortoise estimates, December 2018

⁵ University of Texas at Austin Energy Institutes “Full cost of Electricity” study, April 2018

⁶ Interstate Natural Gas Association of America, June 18, 2018

⁷ Energy Information Administration

⁸ International Energy Agency, BP Statistical Review

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