

**nuveen**

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# Today's Global Megatrends and the Real Assets of the Future

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**April 2022**

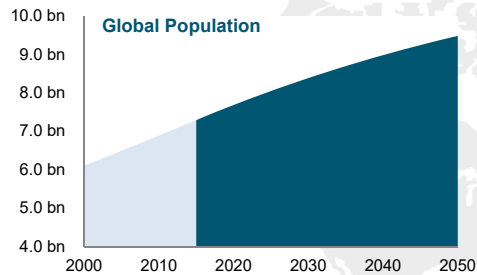
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***Texas Association of Public Employee  
Retirement Systems Annual  
Conference 2022***

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***Presenter  
Justin "Biff" Ourso, Global Head of Nuveen  
Infrastructure***

# Demand for real assets driven increasingly by structural megatrends, less by economic growth



**Global population set to exceed 9 billion by 2050<sup>1</sup>...**

*Growing populations – and larger middle class – will require more food*



**~50%**

**of the world's vegetated land is currently used for agriculture<sup>1</sup>**

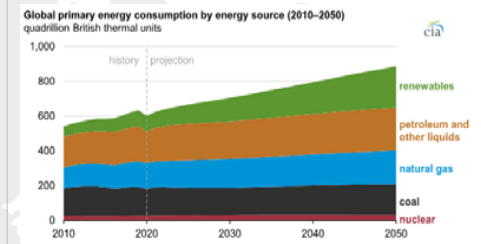
*which requires efficient, sustainable approaches*



**68%+**

**of the population in 2050 will live in urban areas**

*versus 55% today, increasing demand on infrastructure<sup>2</sup>*








**...all driving 50%**

**increase in world energy usage by 2050**  
*in a world that needs to decarbonize*

<sup>1</sup> Food and Agriculture Organization of the United Nations (UN FAO). <sup>2</sup> Source: United Nations, Department of Economic and Social Affairs. <sup>3</sup> Despite efficiency gains; Source: U.S. Energy Information Administration (EIA), International Energy Outlook 2019

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# Drivers of institutional demand for real assets

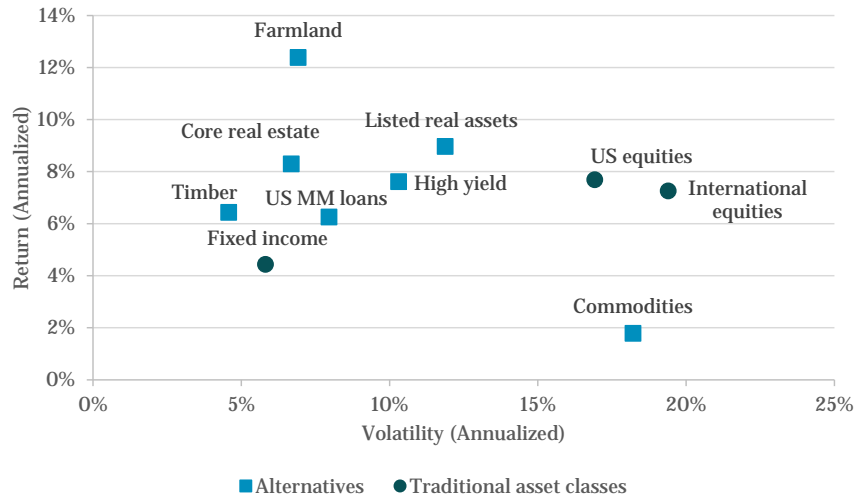
 <b>Potential for diversification</b>	 <b>Hybrid return characteristics</b>	 <b>Long-term value creation</b>	 <b>Value preservation</b>	 <b>Powerful supply/demand themes</b>
Historically low or negative correlations to traditional stocks and bonds – and to each other	Stable, bond-like current income and equity-like upside for capital appreciation	Ability to further optimize asset performance with long-term strategy and ESG value creation	Hard assets exhibit inflation hedging characteristics	Population growth, income growth, urbanization, environmental factors

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# Real assets satisfy clients' risk-return and diversification needs

## HISTORICALLY STRONG RISK-ADJUSTED RETURNS...

**Index: 20-year\* return and volatility**  
(period ending 12/31/2021)



## ...AND LOW CORRELATION TO EQUITIES AND BONDS

**20-year\* correlation**  
(period ending 12/31/2021)

	U.S. Equities <sup>8</sup>	International Equities <sup>9</sup>	Global Fixed Income <sup>10</sup>
Core Real Estate <sup>1</sup>	0.14	0.06	-0.13
Farmland <sup>2</sup>	0.09	0.11	-0.04
Timberland <sup>3</sup>	-0.04	0.02	0.02
Commodities <sup>4</sup>	0.48	0.59	0.20
Listed Real Assets <sup>5</sup>	0.83	0.82	0.37
U.S. Middle Market Loans <sup>6</sup>	0.74	0.65	-0.02
High Yield Bonds <sup>7</sup>	0.83	0.81	0.20

\*Time frames used are 12/31/2001 – 12/31/2021 unless noted below:

1 Core Real Estate: NCREIF Open-End Diversified Core Equity Index used as a proxy for calculations. 2 Farmland: NCREIF Total Farmland Index used as a proxy for calculations. 3 Timberland: NCREIF Total Timberland Index used as a proxy for calculations. 4 Commodities: Bloomberg Commodity Index used as a proxy for calculations. 5 Listed Real Assets: Nuveen Real Asset Income Fund used for calculations (9/17/2011-6/30/2018). 6 U.S. Middle Market Loans: S&P Leverage Loan Index – MM Sleeve used as a proxy for calculations. 7 High Yield Bonds: BofAML US Cash Pay High Yield Index used as a proxy for calculations. 8 U.S. Equities: Russell 3000 Index used as a proxy for calculations. 9 International Equities: MSCI ACWI ex US IMI used as a proxy for calculations. 10 Global Fixed Income: Bloomberg Barclays Global Aggregate Bond Index used as a proxy for calculations. Note: It is not possible to invest in an index. Performance for indices does not reflect investment fees or transactions costs.

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# Clean energy: new technologies will be considered

## Battery storage



- The cost of battery storage has fallen dramatically in recent years and is expected to continue downwards
- Helps to smooth out supply and demand curves and can alleviate curtailment issues
- Proven to add value to industrial scale generation projects in markets with more volatile energy prices

## Floating offshore wind



- Next generation floating foundations for offshore turbines will unlock vast new areas of the seas for renewable energy
- Able to be deployed well beyond the depths at which fixed-base is no longer feasible
- Stronger and more consistent wind yields further offshore

## Hydrogen electrolysis



- “Green Hydrogen” produced through electrolysis with renewable energy is expected to be a cornerstone of decarbonisation in several key areas
- Applications in transportation, heavy industry, heating, energy storage, chemicals, and flight



## What do they have in common?



- These technologies are very different, but all three are:
  - Based on mature technologies that are beyond the R&D phase and entering commercialisation. Further reductions in cost are expected
  - Seeing strong support from policy makers as they look to evolve and decarbonise energy systems
  - Able to unlock new areas of the energy transition and create new sources of value for investors
  - In an early enough stage of their lifecycle that a specialist investor such as Nuveen Infrastructure has a unique role to play
- This mirrors a similar path to that of wind and solar in the early 2000s

Source: Nuveen Infrastructure Date: 18/05/21

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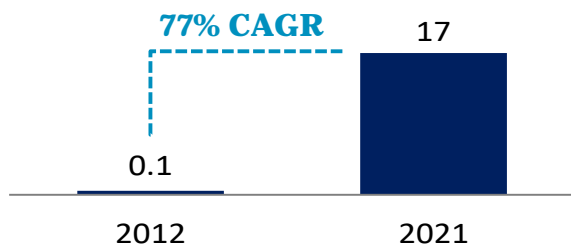
# The grid will become increasingly renewable and decentralized

## Decentralized generation



- Electric market shifting from centralized to decentralized
- Customer-oriented model displacing regulated monopolies
- Renewables now cost competitive
- Growth driven by increasing demand for low cost, sustainable, resilient energy supply as extreme weather events increase

### U.S. Corporate Renewable Procurement (GW)



Sources: Bloomberg New Energy Finance L.P. and the Business Council for Sustainable Energy, Sustainable Energy in America 2022.Factbook; International energy Agency, Net Zero by 2050, May 2021.

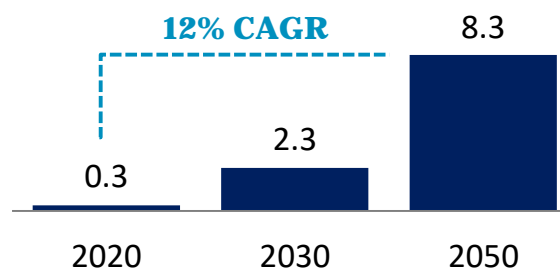
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## Carbon Neutral Fuels



- RNG's energy density is 94x that of lithium batteries; weighs less, can travel farther
- RNG is a drop-in replacement for natural gas
- Captures and beneficially utilizes fugitive methane emissions
- Growth driven by high value transportation market and expanding voluntary market

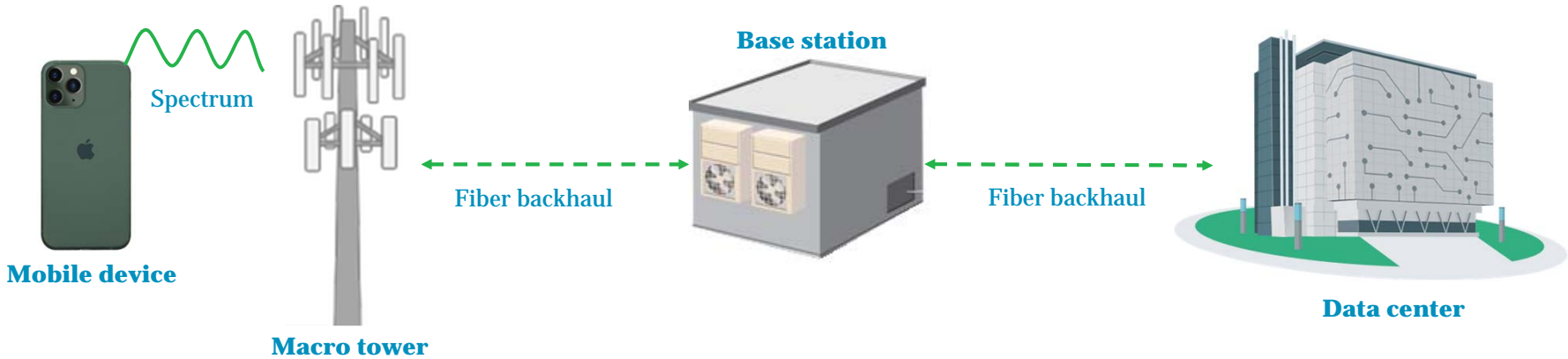
### Global RNG Production Growth - IEA Net Zero by 2050 Scenario (EJ)



# The dawn of 5G is here; digital supply chain provides multiple investment opportunities

**\$482B**  
in capital expenditures  
between 2018 and 2020 to  
support the 5G rollout alone<sup>1</sup>

**20%+**  
of the world's markets will  
have launched 5G by 2020<sup>1</sup>



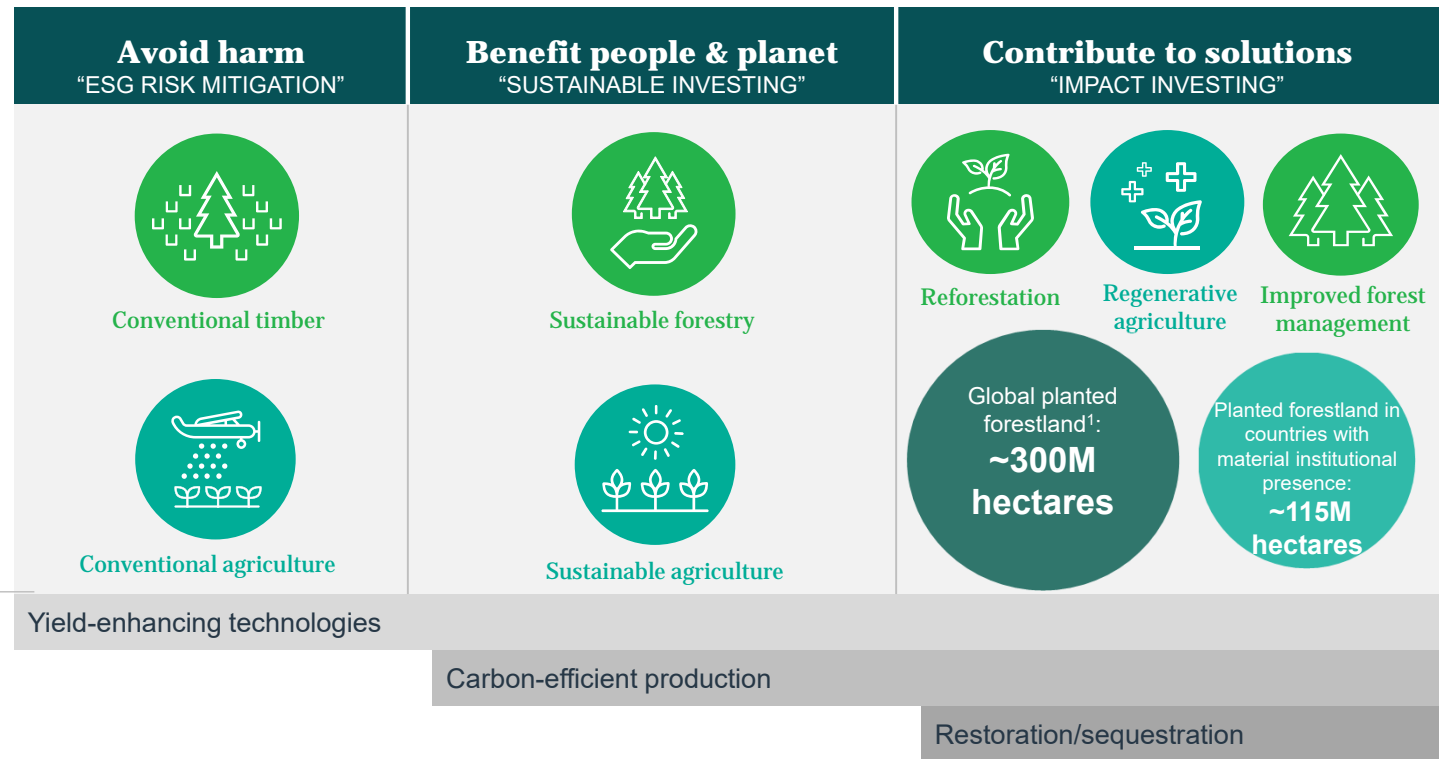
<sup>1</sup> Source: GSM Association, "The Mobile Economy 2019"

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# How do timberland and farmland mitigate climate change?

**Timberland and farmland strategies can provide 37% of emissions reductions needed by 2030 to limit global temperature increases under 2°C, by:**

- Producing more on less land
- Reducing emissions through efficient operating practices
- Sequestering and storing carbon in soil and trees



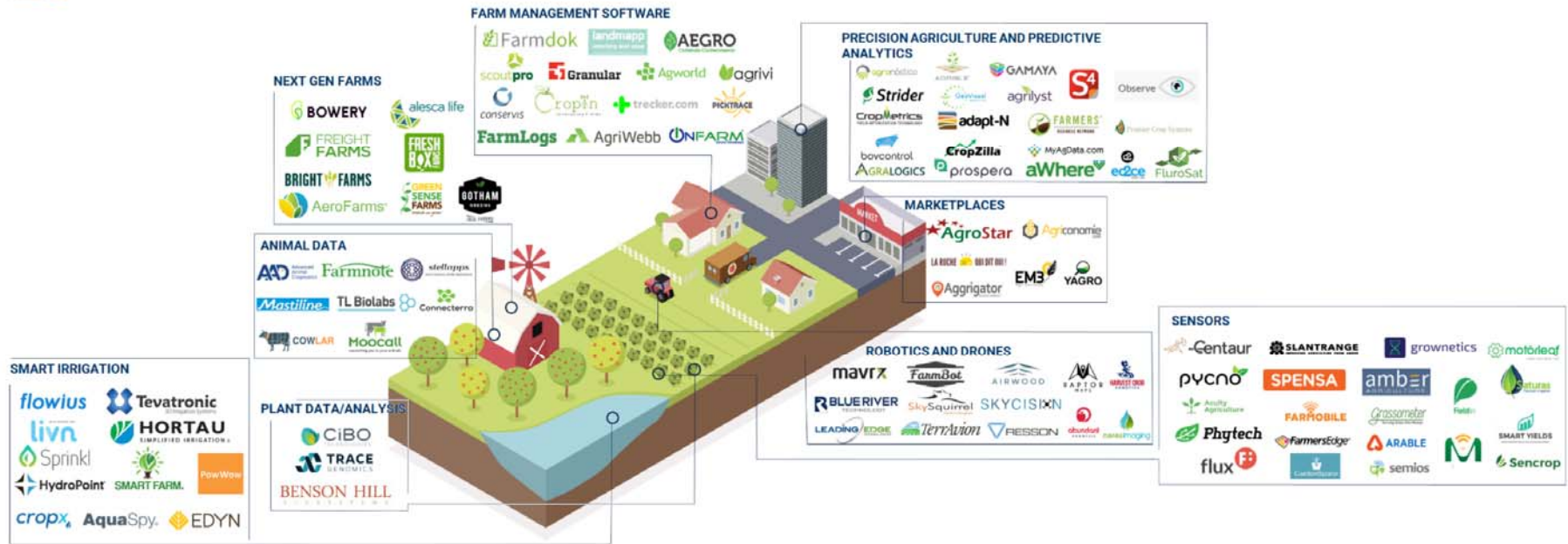
<sup>1</sup> FAO 2017

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# Technology will drive the next wave of agricultural productivity gains

**AG TECH: 100+ TECHNOLOGY COMPANIES CHANGING THE FARM**



Source: CBInsights, 2019.

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# Case study #1: Shell Rock Soy Processing

## Business overview

- Shell Rock Soy Processing is a greenfield soy crushing facility located in the Midwest
- AGR participated in the project financing capital raise alongside a strategic industry parent company to build the facility after the ownership group selected the site, negotiated all permitting, and performed all design and contractor bidding
- Targeted a growing region with little processing capacity and was developed utilizing existing technologies, managed by former industry executives, and had negotiated marketing agreements for SBM and SBO



## Capital solution

- AGR invested \$60 million of preferred equity with a 7% preference return and \$15 million of common equity
- Rank between 3-5x senior debt / EBITDA
- Investment into the project level with standard minority protections, board representation, and audit rights to ensure no “leakage” of value to the strategic parent

## Value creation plan

- Establishment of a board and best in class governance to guide transactions with affiliates
- Enabled parent to protect the core business while expanding and taking advantage of market opportunities
- Provide guidance on capital structure and banking relationships and capital redeployment

## Fit with ag infrastructure fund

- Core type grain processing in procurement area in need of additional processing capabilities
- Asset intensive business given facility investment and capex
- Soybean meal production is critical to growing protein demand worldwide
- Soybean oil utilized as a feedstock in renewable biodiesel

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# Case study #2: Enabling rural and tribal internet in the four corners of SW USA



## Overview

### Fiber network:

- Connects Salt Lake City and Denver to Phoenix
- 1,281 miles total
- 281 tribal miles

### Revenue structures:

- 20-year Irrevocable Rights of Use (“IRUs”)
- O&M service fees
- Colocation fees
- Dark fiber leases

## Key differentiators

- 1st ever fiber development rights of way signed into Navajo Nation Legislation
- Unique “Y-configuration” in Tuba City within the Navajo Nation
- Latency and route uniqueness creates advantages over existing routes
- Development of asset at cost creates higher returns in an increasingly expensive telecom market
- Strong demand from large cloud and content providers that are increasingly requiring additional route diversity and exponentially increasing capacity needs



**Revenue share:**  
3% revenue share with Navajo Nation for 50 years, extendable to 90 years



**Fiber access:**  
The Nation will receive free dark fibers and colocation for Navajo broadband at no cost



**Internet connection:**  
The Navajo will receive 2tbps of connections to global interconnection cities at no cost

Source: Nuveen internal data

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# Case study #3: German offshore wind transaction (signed)

## Transaction description

- 50% stake in a c.1GW new-build offshore wind project in Germany – expected to be the largest in the country once constructed;
- To be sold at FID / RTB stage (targeted in Q4 2021), with full operations in 2025;
- Vendor is an experienced investor in offshore wind projects across Europe and globally.



## Highlights

- Mature offshore wind market in a stable economy – Germany has the largest national economy in Europe and 4th largest nominal GDP in the world;
- Strong project fundamentals characterised by excellent wind resource, top-tier WTG supply and components;
- Strong PPA offtake structure with c.75% of volume protected through either a fixed price tranche, or collared tranche with floor
- Strong contractual protections through fixed price EPC-wrapped construction agreement.

## Developer & initial equity sponsor

- Developer and equity sponsor is a global leader in offshore wind with experience across the project lifecycle from planning/development to construction and operations;
- Dedicated in-house offshore wind team of c.3,000 staff globally across key offshore wind markets including Europe, North America and Asia;
- Experience in constructing over 25 offshore wind farms and strong experience in the German market.

## Quality components

- Tier 1 components: Siemens Gamesa 11MW WTGs ;
- Due Diligence process confirmed a life expectancy in excess of 30 years.

## Revenues

- 20-year PPA with revenue protection for c.75% of offtake through fixed price tranche and collared tranche support by a floor;
- Remaining offtake through merchant revenue sales, covered by PPA for route to market, with strong fundamentals leading to medium term price growth.

## O&M and asset management

- 5-year WTG maintenance agreement from OEM after which maintenance is in-sourced under wider O&M agreement for additional 15 years;
- Above market 97.5% WTG availability warranty;
- 20-year wider O&M agreement structured as a full-service concept, largely on an annual fixed fee basis – comprising c.80% of total opex on a PV basis over first 20 years of operations;
- Wider services agreement covering all other ancillary services.

## Project location



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# Near- and long-term real assets investment trends vary, but sustainability is key to both

## NEAR TERM: Continued volatility with some challenges

- Heightened competition for assets
- Emergence of inflation, particularly energy, combined with tight labor markets
- Ongoing regulatory uncertainty

## LONG TERM: Structural themes continue to be robust – if not increasing

- Demographic shifts driving demand and necessity
- Disruptive technologies shaping tomorrow's world
- Net Zero targets take precedence

**Responsible investment is the present *and* future**

**ESG  
integration**

**ESG  
measurement**

**Impact**

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*Today's Global Megatrends and the Real Assets of the Future* **14**