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# In Sight of the Clean Trillion

UPDATE ON AN EXPANDING LANDSCAPE  
OF INVESTOR OPPORTUNITIES

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# IN SIGHT OF THE CLEAN TRILLION: UPDATE ON AN EXPANDING LANDSCAPE OF INVESTOR OPPORTUNITIES

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## About Ceres

Ceres is a sustainability nonprofit organization working with the most influential investors and companies to build leadership and drive solutions throughout the economy. Through powerful networks and advocacy, Ceres tackles the world's biggest sustainability challenges, including climate change, water scarcity and pollution, and human rights abuses. For more information, visit [ceres.org](http://ceres.org).

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# EXECUTIVE SUMMARY



In January 2014, Ceres released *Investing in the Clean Trillion: Closing the Clean Energy Investment Gap*. That report drew awareness to the need for an additional \$1 trillion per year, on average, investment in clean energy through 2050 in order to limit global temperature rise to no more than 2 degrees Celsius. Less than two years later, 195 countries came together in late 2015 to adopt the Paris Agreement, an historic global accord which for the first time set a goal of “holding the increase in the global average temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 °C above pre-industrial levels.” Ceres’ subsequent analysis together with Bloomberg New Energy Finance, *Mapping the Gap: The Road from Paris* (2016), looked at business-as-usual global investment in clean energy in the electric power sector through 2040 as compared to the levels of investment required even to reach a 2°C scenario. That analysis identified a projected multi-trillion dollar gap — and corresponding investment opportunity — in the electric power sector alone, that would need to be met via policy and other interventions to catalyze scaled-up deployment of diverse sources of clean energy investment, from public finance to corporate balance sheets as well as institutional investors.

This new report, *In Sight of the Clean Trillion*, takes stock of the updated context and landscape in which clean energy has gone mainstream, and includes the following key findings.

## Setting the Context: In Sight of the Clean Trillion

- ▶ **The scale of global clean energy investment opportunity is significant.** In order to stave off the worst impacts of climate change and meet the Paris Agreement’s objectives, the global clean energy transition will generate tens of trillions of dollars of clean energy investment opportunities through 2050. As clean energy markets have shifted, driven increasingly in recent years by underlying market fundamentals and elevated attention to risks inherent in conventional energy sources, the transition to a clean energy future already cuts across many sectors and is engaging diverse sources of capital.
- ▶ **Achieving the “Clean Trillion” is eminently feasible.** In the context of global investment flows and the evolving energy market, scaling low-carbon investment at the pace and scale required is achievable via a broad and expanding range of investment opportunities that can match investors’ risk-return requirements across an array of asset classes.
- ▶ **A significant proportion of global clean energy investment is anticipated to be deployed in the transportation sector, in particular for Low Emissions Vehicles (LEVs).** As the area of low-carbon investment anticipated to have the highest level of aggregate global capital requirements, LEVs such as Electric Vehicles (EVs) are dominant and are anticipated to tap into well-known financing models.

## The Clean Energy Landscape Today — Investing in a Trillion Dollar Market

- ▶ **Energy market dynamics have shifted in favor of clean energy such as wind and solar, which increasingly out-compete new fossil fuel and nuclear power sources, and the advanced and clean energy market has surpassed US\$ 1.4 trillion globally.** In recent years, dramatic reductions in cost, increases in scale, and technology improvements have rapidly changed the clean energy market.
- ▶ **As clean energy matures and expands to a mainstream, large-scale market, it is important for investors to understand increasingly diversified investment opportunities.** Such opportunities include investment in clean energy infrastructure (such as wind and solar projects) which can deliver stable, long-term, bond-like cash returns and a predictable stream of cash flows; storage infrastructure and technology, one of the highest growth areas; and early stage digital energy technology with risk-return profiles that can mirror those of venture capital investment.

## Investor Opportunities

- ▶ **Clean energy investment increasingly is driven by underlying investment fundamentals and quality of opportunity.** Environmental and climate goals, previously seen as the primary drivers for low carbon investment, have been eclipsed by the growing diversity of investment opportunities that match investors' risk-return requirements as the clean energy market has become increasingly competitive, matures and grows.
- ▶ **Investors are most likely to become involved in primary market clean energy investment in the following ways:**
  - Investing in infrastructure or private equity funds;
  - Direct project-level investment — e.g., infrastructure equity, project loans, bonds — principally by large investors;
  - Buying securitized bonds or equity;
  - Investing in green buildings — e.g., energy efficiency bonds;
  - Funding the balance sheets of corporate developers — debt and equity.
- ▶ **Institutional investors' fiduciary obligations demand consideration of climate-related risks and climate solution opportunities across investment portfolios.** Responsible investment, ESG and climate related governance are increasingly important areas of assessment for institutional investors. In order to meet

this challenge and tap related opportunities, investors should reassess their *strategic asset allocation*, *acquire the right skills and capacity* to evaluate low-carbon investment opportunities; and *engage with relevant service providers, including investment consultants and credit ratings agencies*.

- ▶ **Institutional investors should require their consultants to improve and accelerate the integration of climate factors — both risks and opportunities — into their strategic asset allocation and investment strategy reviews and recommendations.**
- ▶ **Investors should carefully assess their long-term views on the wider energy and infrastructure market, taking into account climate-related risks and opportunities, and should increase allocation to low carbon assets consistent with the well-established principle of long-term risk diversification.** This will help avoid the kinds of losses experienced in the recent past via exposure to high carbon assets, such as in the coal sector. On the opportunity side, we recommend consideration of opportunities in new asset creation in clean energy infrastructure where investors commit long-term capital into the development and construction stages of the asset life cycle, providing distinct collateral benefits in carbon reduction as well as jobs and economic growth.
- ▶ **Investors should consider setting a target and/or investing at least 1% of their total assets under management into lower carbon and renewable energy infrastructure** consistent with the call to action issued in 2017 by the former head of the UN Framework Convention on Climate Change and architect of the Paris Climate Agreement, Christiana Figueres, through her organization Mission2020. Consideration of investments counted toward such a 1% target should encompass newly developed and constructed infrastructure investments that produce *additional* carbon mitigation.
- ▶ **19 of the world's largest asset owners have invested more than 5 percent of their total assets in low-carbon investments, adopting a broad, long-term time horizon rather than focusing on short-term return requirements and incentives.** Still, most investment consultants have been slow to incorporate climate-related considerations as standard across their client base, and many among this influential cohort still need to update their risk profiles related to low-carbon opportunities, such as, for instance, the risks and returns associated with renewable energy, in light of the increasingly fast path to revenue for many renewable projects.

## Investment Approaches for Institutional Investment in Clean Energy

► **A broad range of clean energy investment vehicles is available to meet investors' risk-return requirements.**

To help navigate the diversity of opportunities, this report provides an overview of prominent investment vehicles for clean energy by asset type, investment strategy objective, indicative investment scale, target returns (including returns by clean energy sub-sector), standard investment period, type of investors and key risk mitigation mechanisms, as well as an overview of general transparency, liquidity, control, diversification and other attributes. Section IV also highlights comparisons of key financing structures, including fund and co-investment, direct project investment, yieldcos, green bonds and securitized project debt.

► **Investors should take into account key differences between clean and conventional energy infrastructure, which increasingly favor clean energy as the sector matures.** These factors include pre-construction timelines and investment opportunities, construction staging, technology maturity, and coal or nuclear power risk mitigation.

► **Investors should consider opportunities to “avoid the crowd” by exploring rising opportunities in “Greenfield” (i.e., pre-construction, development-stage project) investment; dispatchable clean energy; and direct loans to project finance.**

- *Greenfield investments* have become more attractive as earlier-stage risks have become better understood and mitigated;
- *Blending greenfield-stage exposure with operating assets in a diversified portfolio* may assist investors in making their first move into the sector;
- *Dispatchable clean energy is a key market gap*, with technologies such as battery storage seeing significant cost reductions and increasing market competitiveness.

## The Potential for Green Banks to Drive Investment Opportunities: A Focus on Energy Efficiency

► **Green Banks hold tremendous promise for catalyzing investment in energy efficiency, one of the cleanest and lowest cost clean energy resources.** The world's largest green bank — the Australian based Clean Energy Finance Corporation (CEFC) — has demonstrated this potential by directing approximately half of its AU \$5.8 billion in investment commitments toward

energy efficiency, leveraging more than double its investment via co-financiers and investors.

► **As demonstrated by the CEFC, green banks can deploy multiple levers to drive energy efficiency and other clean energy investments, including via pulling the market along with the demonstration effect of market-leading projects and crowding-in of private equity.** They also can create **aggregation programs** to tap smaller-scale clean energy investment opportunities (including energy efficiency and EVs) while minimizing transaction costs.

## Policy Design — Toward a Post-Subsidy World

► **Despite the fact that global subsidies for clean energy are a small fraction of those provided for fossil fuels, falling costs increasingly have enabled clean energy to be competitive on an unsubsidized basis.** Even as subsidies are phased out in some areas, however, underlying policy design is still critical to support a strategic, sustainable, and smooth transition to an economically inclusive clean energy future.

► **Dispatchable clean generation and energy efficiency are expected to feature centrally in the next critical stage of growth and policy design.** This includes battery energy storage and “smart grid” technology as key elements for creating reliable, stable energy supply.

► **Setting specific carbon reduction and clean energy generation targets, combined with placing a price on carbon, is one of the cheapest, most effective means of driving clean energy deployment.** To level a playing field that has been distorted by extensively subsidized fossil fuel resources, to send a strong market signal, and to provide greater certainty for investors, effective prices on carbon are required.

Today, as market realities demand investors focus attention on climate-related financial risks and investment opportunities, this report provides insight into market trends and key considerations, particularly for institutional investors. As the world grapples with reaching the pace and scale of clean energy transition required to meet the objectives of the Paris Agreement, the expanding landscape of clean energy investment opportunities places us now, more than ever before, in sight of the Clean Trillion.