

From on-shore wind to e-fuels Investing in Energy Transition Opportunities and challenges



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Source: Mirova, as of end December 2023.

Investment opportunity: Net Zero by 2050

\$ 4.5 trillion <u>annua</u> investment needed

in clean energy by the early 2030s to reach net zero by 2050¹

\$ 1.8 trillion invested in 2023

so ca. 3 trillion annual investment is missing

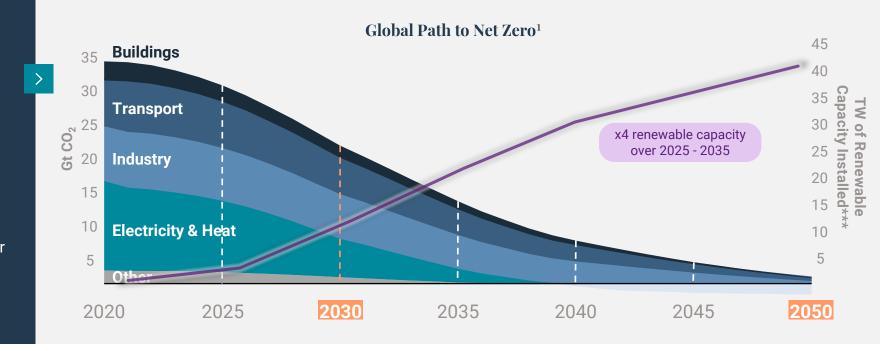
Climate infrastructure will play a key role

to keep global warming below 1.5°C as called for in the Paris Agreement²

The Net Zero challenge is an immense investment opportunity, and infrastructure investment will be instrumental

- → Emissions must be reduced by 45% by 2030 and reach net zero by 2050.
- → Electricity production can achieve close to 50% of energy needs.

 Electrification of transportation and heating are the next growth path.
- → Industry decarbonization requires considerable clean H2 production.







Why invest in the energy transition?

A transition in motion

From 9.6% to 22.5%¹

Increase in the renewable energy share of energy consumption in the EU between 2004 and 2022

42.5% by 2023²

EU binding target for renewable energy' consumption share

EU-led Global Pledge on Renewables & Energy Efficiency

Announced at **COP28**³ to x3 the renewable installed capacity and x2 the energy efficiency improvements

An evolving industry

Competitiveness

A decreasing clean energy production cost puts renewables at parity with conventional generation sources

Innovation

Growing number of solutions to the energy transmission, distribution & storage challenges enable integration of renewable technologies in energy systems

Financing

Sound cash flow predictability allowed by mature renewable energy technologies

A diversifying asset class

Some decorrelation

Low correlation to the business & capital market cycles and providing attractive yield potential

Low volatility

Long-term investments in tangible assets with relatively steady, low volatile, inflation-linked cash flows

Regulatory treatment

Favorable treatment under Solvency II

























CORPORATE INVESTMENTS

Creating value from Corporate Investments

From local developers to international IPP⁽¹⁾, corporate investments unlock a new range of investments with the following benefits:

REINFORCE PORTFOLIO'S DIVERSIFICATION

Corporate Investments allow funds:

- To invest in multi-technology multi-geography companies, hence enhancing technological and geographical diversification;
- To mitigate exposure when investing in a new technology.

EXAMPLE OF INVESTMENTS

tagenergy



DRIVECO

MAXIMISE THE IMPACTS OF INVESTMENTS

Corporate Investments allow funds:

- To finance the **development of pipelines of projects**, putting the additionality criteria at the core of investments;
- To finance the **development of the team**, increasing the number of projects the company will be able to pursue.

EXAMPLE OF INVESTMENTS







FOSTER THE TRANSITION FROM LOCAL DEVELOPER TO IPP

Corporate Investments allow funds:

- To finance the company **operations' scale up** from a local company to a national IPP;
- To support the development of a company in a new geography or a new technology.

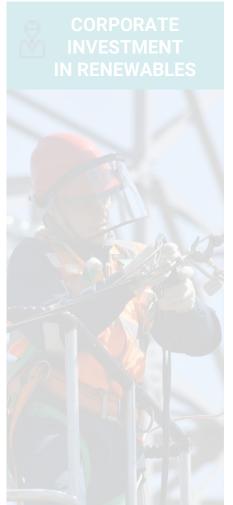
EXAMPLE OF INVESTMENTS

















Electric Vehicles and charging infrastructure

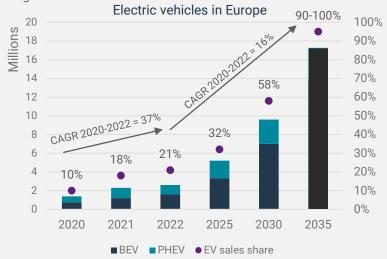
EUROPEAN REGULATORY CONTEXT

- In the beginning of 2023, a new law to ban the sale of petrol and diesel cars from 2035 was voted by the European Parliament
- In 2023, the European Commission approved the Alternative Fuels Infrastructure Regulation ("AFIR"), in order to spur the development of charging stations and to guarantee capillary infrastructural coverage.
- For each battery-electric car in a given Member State, a power output of 1-3 kW must be provided by publicly accessible recharging infrastructure
- Every 60 km along the transEuropean transport (TEN-T)
 network, fast recharging stations of at least 150 kW need
 to be installed from 2025 onwards
- Each year, the total power output provided through charging stations should grow with the number of registered cars

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ELECTRIC VEHICLE IN EUROPE

- In the beginning of 2023, a new law to ban the sale of petrol and diesel cars from 2035 was voted by the European Parliament. Thus, in 2035, all new cars registered will be zero-emissions. By 2050, the whole car stock should be EVs.
- > The growth in EV demand in the EU hides important discrepancies across countries: 79% of new cars sold in Norway were BEV while they represented only 3% in Poland for a 12% European average (2022). However in the long-term, all countries should reach the targets.



CHARGING POINTS IN EUROPE

- > In number, the residential slow chargers represent the majority of charging points.
- However, in energy supplied, the fast and ultra fast chargers will represent a higher share due to their efficiency.
- Based on market forecasts provided by IEA, the European EV/charging point ratio is set to be equal to 24x in 2030 vs 15x in 2022.



Source: European Commission, "European Statistics" 2023; IEA, "Global EV Outlook, 2023; Mirova analysis.

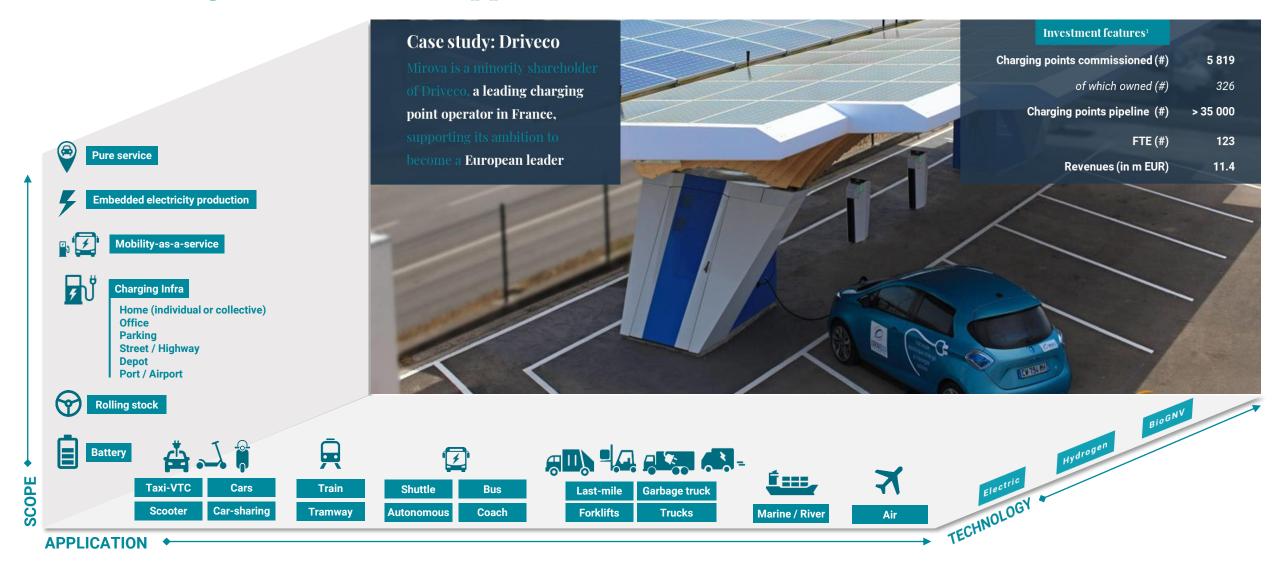
Note: BEV = Battery Electric Vehicle; PHEV = Plug-in Hybrid Electric Vehicle, 2035 data for the sale and share in Electric vehicles is an estimation based on new regulation and estimated car sales in 2035.

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NVESTMENT MANAGERS

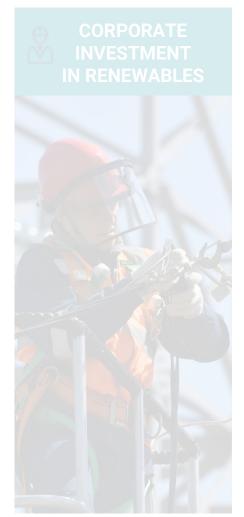
E-MOBILITY

A wide-range of investment opportunities

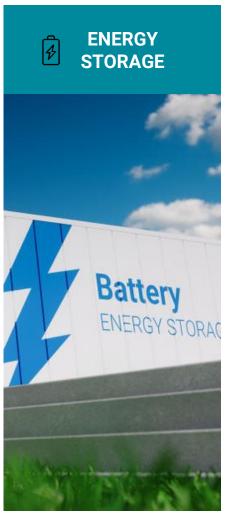








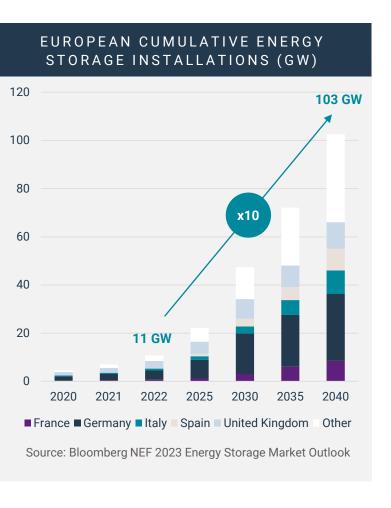






ENERGY STORAGE

Energy storage will be instrumental to the energy transition and a prerequisite to a high penetration of renewables



European stationary storage capacity by 2040

Capacity increase by 2040 (vs. 2022)

\$ 662 Bn Capex required over the next 2 decades

-79% Li-ion battery cost decrease over 2013-2022

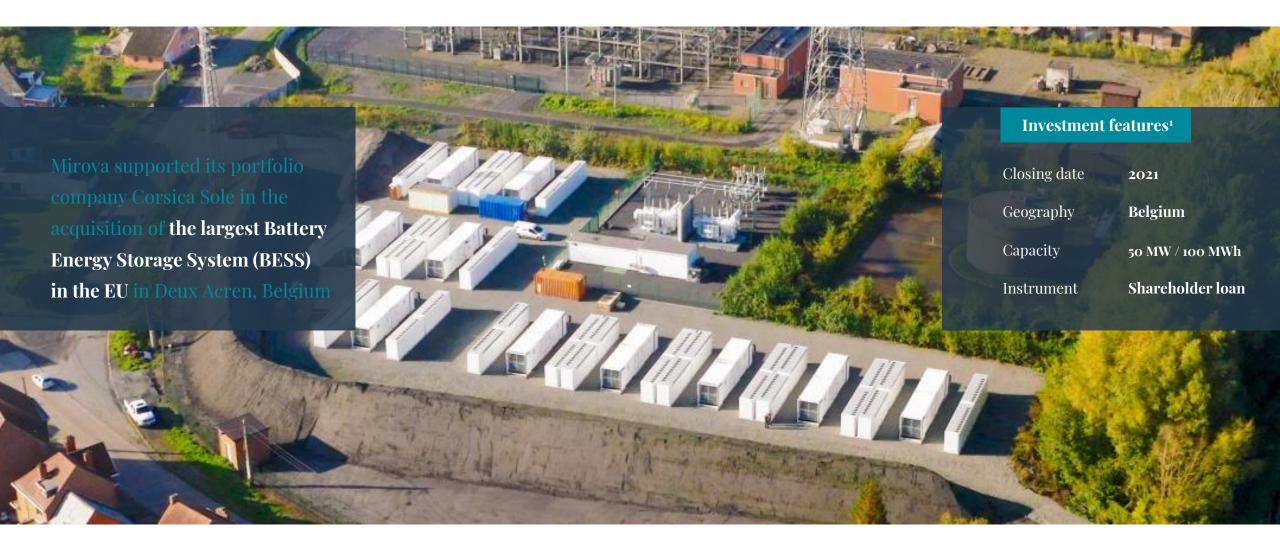
"In the near term, renewables-plus-storage, especially solar-plus-storage, has become a major driver for battery build. This is a new era of dispatchable renewables, based on new contract structures between developer and grid"

Bloomberg New Energy Finance



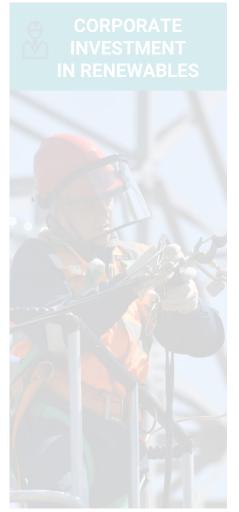
ENERGY STORAGE

Case study: Deux Acren











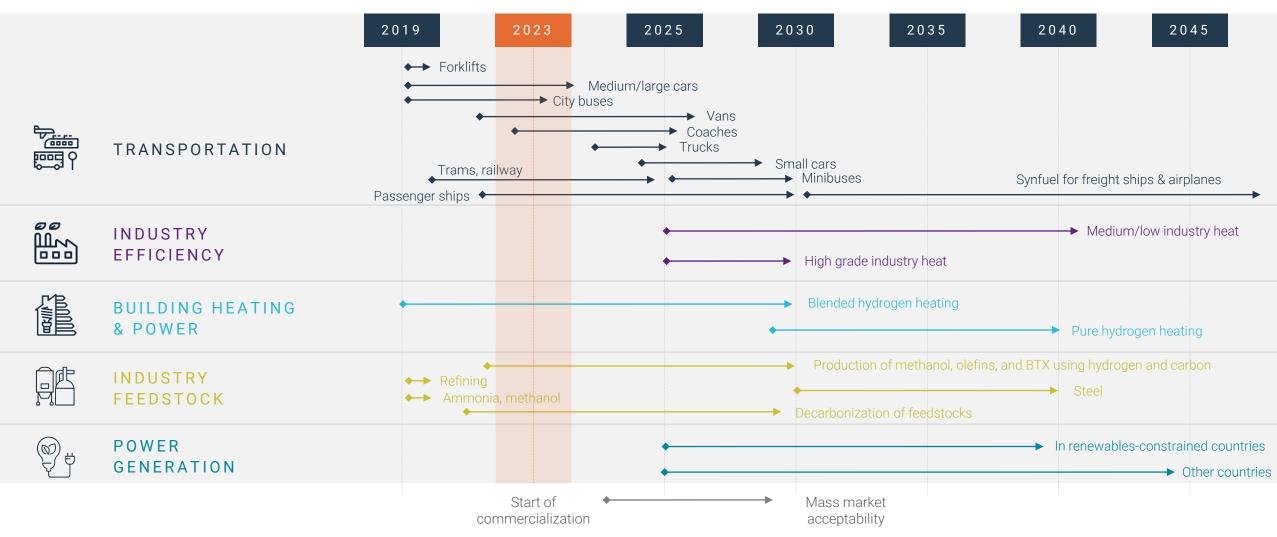




HYDROGEN

Hydrogen and commercial readiness

Hydrogen is quickly reaching commercial readiness in various segments







HYDROGEN

Hydrogen in key figures

Hydrogen demand could increase 10-fold by 2050¹, fuelled by buoyant technology progress and supportive political agenda

VARIOUS APPLICATIONS FOR HYDROGEN

- > Methanization: recreating methane from H2 and CO2 to inject into natural gas networks
- Power-to-gas: injection of H2 into natural gas networks
- Renewable energy storage: using exceeding production to produce H2 via electrolysis
- Electricity production: H2 fueling a fuel cell adaptable to various electrical devices (cars, bikes, scooters)
- Stationary storage



A major role in decarbonization¹

6%

Of the cumulative emissions reductions in the IEA Net Zero scenario is from hydrogen

167Mt Of H_2 annual production by 2030 in the NZE scenario from the IEA



Falling cost of renewables and H2 technologies1

Decrease in Solar PV LCOE since 2009 and 63% for onshore wind

Decrease in green hydrogen production costs through 2030 and may continue to fall steadily at a slightly slower rate until 2050

Strategic push in national roadmaps1

Governments had an hydrogen strategy in place at the end of 2022

2030 target of renewable hydrogen, 50% produced domestically in the REPowerEU programme backed by the European Hydrogen Bank

H2



Industry alliances and momentum growing¹

150

Multinational companies members of the Hydrogen Council today, up from 13 members in 2017

Major investments announced globally since 2017, in new segments, e.g. heavy duty and rail

(1) Source: McKinsey, Hydrogen Council, Net Zero Tracker, Climate Change Tracker, Lazard, PWC, IEA



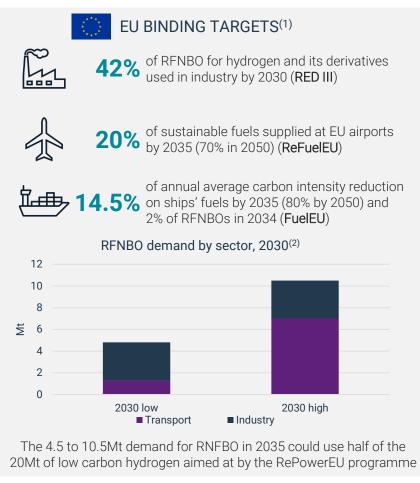


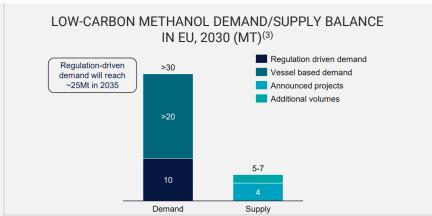
LOW CARBON FUELS

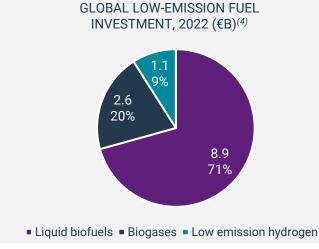
E-Fuel: overview

DEFINITIONS AND INVESTMENTS

- > Low-carbon fuels can be E-Fuels or biofuels
- > E-fuels are fuels that are produced from water electrolysis using low carbon electricity. The EU precised the definition of E-Fuels as Renewable Fuels of Non-Biological Origin (RFNBO) that must deliver GHG emissions savings of 70% compared to fossil fuels.
- > **Biofuels** are any fuels that are made from biomass known as the feedstock.
- > Today, globally, **89% of investments** in low carbon fuels are for **biofuels and biogases**.
- However, demand for e-fuels based on hydrogen will increase sharply by 2030, supported by EU regulation and voluntary demand.
- According to the current pipeline, e-fuel such as Emethanol will be under supply in 2030.
- Thus, there is an **investment gap for E-Fuels**: at least **€400 billion** will be required to cover the cost gap between existing hydrogen production and the new production required to meet the 10Mt of H₂ targets in 2030.







Notes: RFNBO = Renewable Fuels of Non-Biological Origin, GHG = Greenhouse gases

(1) Council of the European Union, 2023. (2) S&P Global Global Commodities Insight, 2023. (3) Innovation Outlook, IRENA, 2023. (4) Tracking Clean Energy Progress 2023, IEA.





OUR ENERGY TRANSITION INFRASTRUCTURE EXPERTISE

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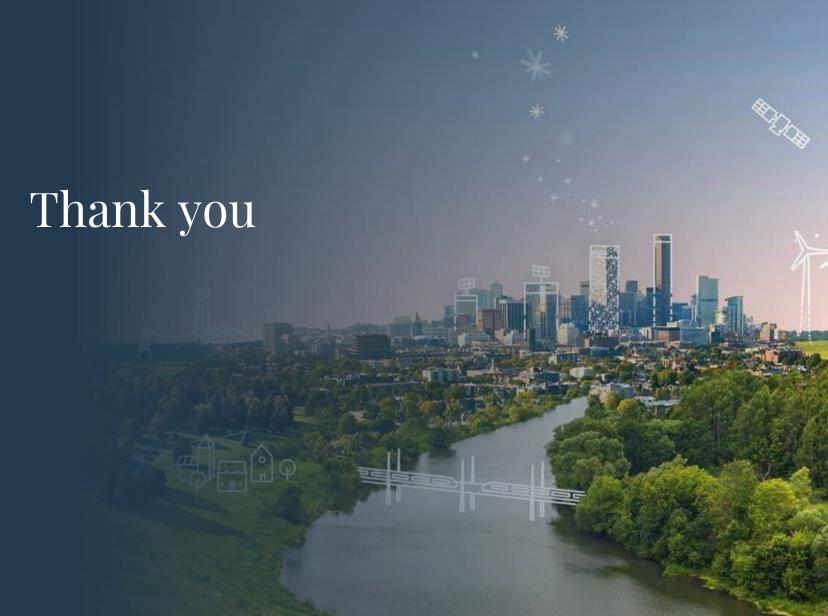
Our investment platform dedicated to the energy transition in OECD

Figures mentioned are based on past years, which is no indicator of future performance.



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Main risk factors

Capital loss risk

Value and profitability may change over time (particularly due to currency risk), as well as shares may be more or less valued than their initial price at the repurchase date. There is no guarantee that the capital invested into the funds will be send back to the investor.

Financial / Economic Risk

Funds invest in Project Companies on the basis of estimates and projections of income and cash flows to be generated by the assets held by the Project Company. Although the Management Company pays particular attention to the conception of financial models (a domain in which it has accumulated years of expertise) and subjects these to validation with counterparties as well as submitting them to the risk department and in some cases having them audited by external firms to validate their structure and assumptions (including accounting and tax provisions), there is a risk of error in these estimates, projections, calculations and other forward methods when making an investment

Market risk

In some cases, the underlying projects in Funds will sell their electricity at market prices rather than at a predetermined price. The electricity selling prices of these projects are subject to changes in the supply/demand balance of these markets. The same holds true for the price of green certificates generated by such projects. The sale/purchase price of green certificates can therefore decrease substantially. However, it is possible to use conventional hedging instruments such as forward sales when the market offers a certain level of liquidity.

Liquidity risk

Project Companies in which Funds invests are generally not admitted for trading on a financial market and therefore the securities of such Project Companies have low liquidity. Therefore, the funds may not be able to sell the securities of Project Companies held in the portfolio on time and/or at the expected price. Moreover, the agreements concluded in the framework of the investment, including shareholder agreements, may include provisions affecting the liquidity of the Funds' holding because of rights granted to other partners if the funds elects to sell all or part of its participation (preferential rights, right of first refusal, right of joint exit, etc.).

ESG Investing Methodological Limits

By using ESG criteria in the investment policy, the relevant Fund's objective would in particular be to better manage sustainability risk. ESG criteria may be generated using the Investment Manager's proprietary models, third party models and data or a combination of both. The assessment criteria may change over time or vary depending on the sector or industry in which the relevant issuer operates. Applying ESG criteria to the investment process may lead the Investment Manager to invest in or exclude securities for non-financial reasons, irrespective of market opportunities available. ESG data received from third parties may be incomplete, inaccurate or unavailable from time to time. As a result, there is a risk that the Investment Manager may incorrectly assess a security or issuer, resulting in the incorrect direct or indirect inclusion or exclusion of a security in the portfolio of a Fund.

Sustainability risk

The Funds are subject to sustainability risks as defined in the Regulation 2019/2088 (article 2(22)) by environmental, social or governance event or condition that, if it occurs, could cause an actual or a potential material negative impact on the value of the investment. More information on the framework related to the incorporation of sustainability risks can be found on the website of the Management Company and the Investment Manager.

Project risk

Risk related to the occurrence of an incident on a industrial site that may jeopardize the future of the project (delay, financial losses, environmental consequences...), to an investment in a inefficient technology or less attractive than other competitive technologies, or to the impossibility for the SPV to conclude its technical coordination's task.

Electricity network risk

Renewables assets, storage assets or ,more generally, assets related to the energy transition, depend on the correct functioning of the national or local electricity network, and the electricity distribution through the network. Any degradation of the network or its electrical distribution tools, related to external causes (environmental disaster) or internal sources (inefficient management of the network operators) generates a risk to the operation and the profitability of the underlying asset under management.

Credit risk

It deals with the lender's default risk and the depreciation risk that may affect the portfolio due to a consequent change of lenders margin. Because of its investment strategy, the funds are therefore subject to a credit risk.

Operational risk

Risk related to the wrong technical and administrative achievement of an operation (delay in securities and/or cash delivery).

Regulatory risk

This risk corresponds to any unfavourable change in the legislation or regulations, or non-compliance therewith. Regulatory risk exists in all countries and may involve general corporate law, banking law, accounting and tax legislation, sector-specific regulation, planning law and environmental law, etc.

Counterparty risk

The Funds' investments are made in Project Companies which themselves conclude contracts with various counterparties: manufacturers, operators, etc. The Project Companies also enter into contracts with counterparties buying power generated by the projects (public entities in the context of feed-in tariffs, or private entities under an over-the-counter contract). Although the Management Company carefully selects the counterparties of both the Funds and the Project Companies, all these counterparties may potentially default, leading to a risk of loss resulting from a counterparty defaulting on a contract or on its obligations before the operation is definitively settled in the form of a cash flow.

Compliance risk

Non-compliance with laws and regulations, professional and ethical standards and practices, specific to banking activities may generate a risk of judicial, administrative or disciplinary sanction, financial loss, damage to reputation. These risks include the provisions on the prevention of money laundering and the financing of terrorism. The main compliance risks result from the non-observance of rules that are mostly governed by public order.



Indicative risks description. Prospective investors should have the ability to understand the risks involved as well as sufficient financial means to bear the loss of their investment.



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