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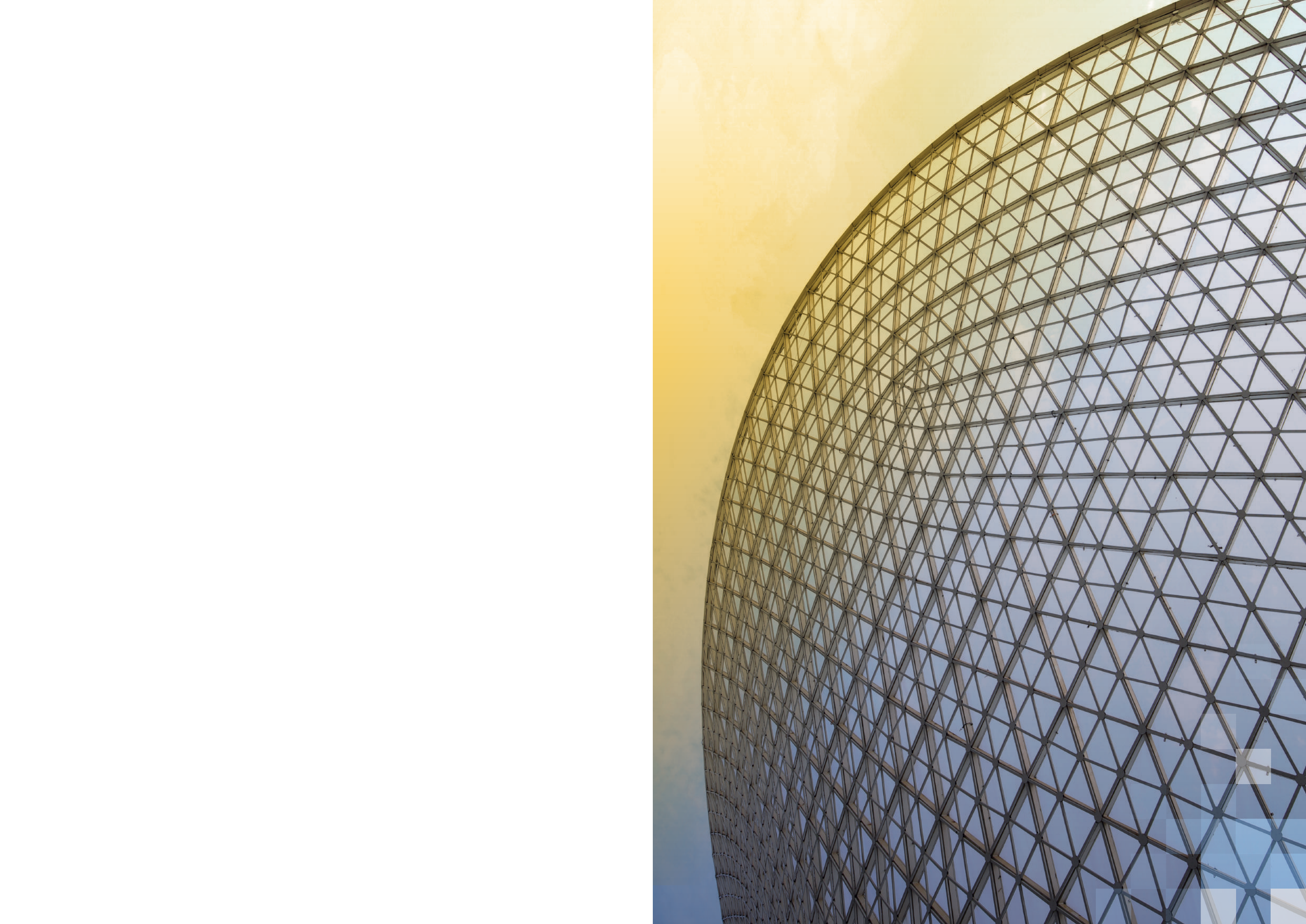
# EnergyTrends

INVESTMENT STRATEGY AND EVOLUTION  
OF CORPORATE VENTURE CAPITAL RISK  
IN THE ENERGY SECTOR

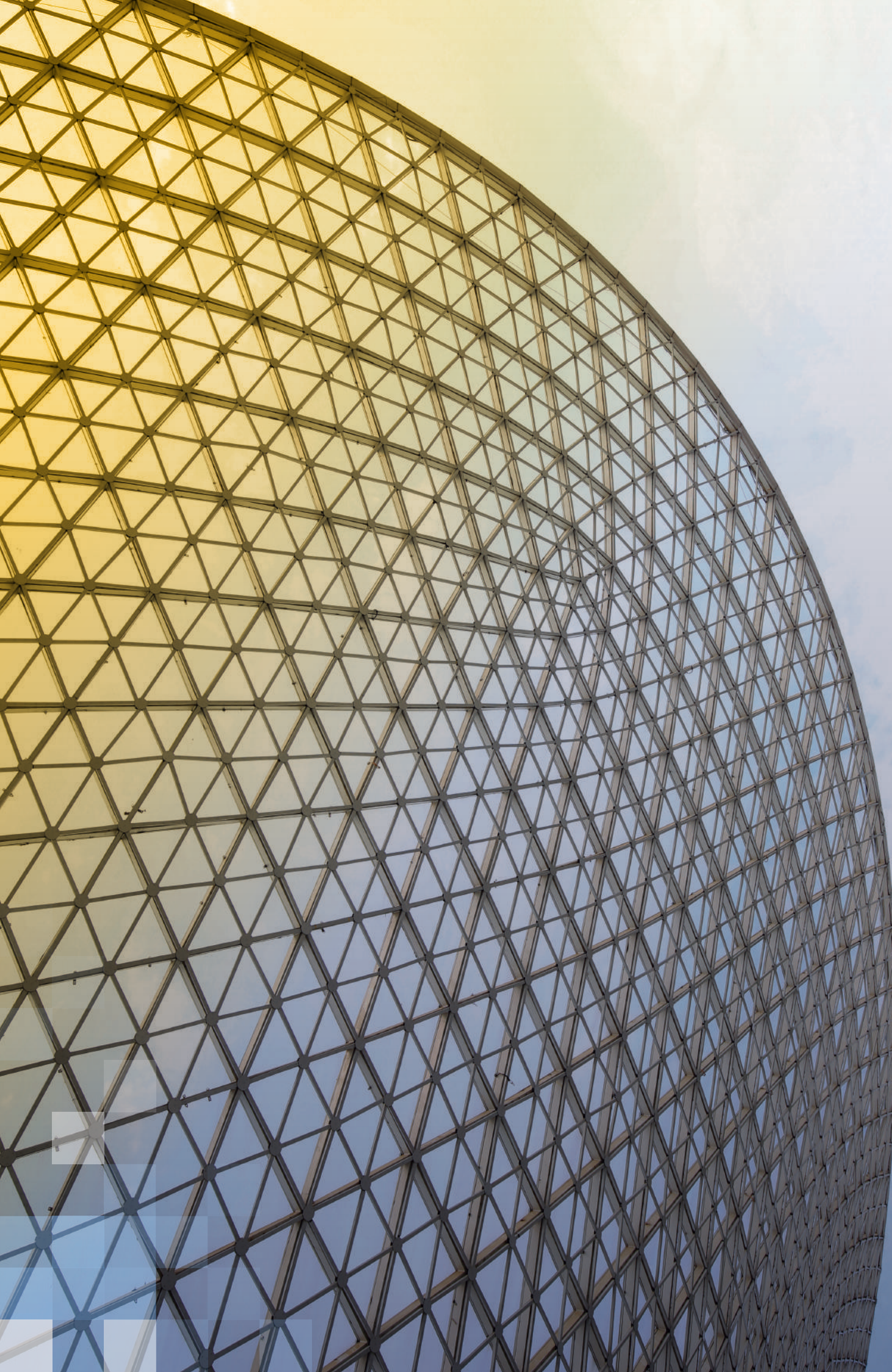
NTT DATA Utilities  
\_April 2018

**FUTURE  
AT HEART**









Since the beginning of the Energy Sector, **innovation has been one of the main pillars of the industry**, facilitating the reinvention of the production model and having an impact on the way of life of the people in different countries of the world.

The transport revolution, supported by internal combustion engines and electrification all around the world, has enabled the Energy Sector share technical knowledge and talent to rapidly develop infrastructures, operations, and markets. All this has strengthened the innovative nature of the companies, who, together with their technological partners, were the real drivers of the change.

The recent arrival of the Digital Era opens up, once again, the opportunity to redefine the energy model of the future. The exponential advances in technologies together with low-cost electronics and computing capacity strengthen the innovative nature of the Sector offering all types of solutions with respect to efficient storage, distributed energy, biofuels, and transport.

A new energy model with fewer barriers to entry. **The wave of innovation facilitates the emergence of new companies capable of taking on the traditional energy companies**, giving rise to an ecosystem where talent can be in any place and making collaboration between companies for driving the model change absolutely essential to what is currently being conceived.

This collaborative model can be based on different strategic approaches. Over the last few years **one of the most-frequently used tools by companies to position themselves as entrepreneur in this ecosystem are venture capital funds**. Possessing in many cases the skills, knowledge, technology, and/or scalable business of great interest to the Energy Sector, their approach as strategic investor has a competitive edge, since they offer companies investing in them access to infrastructures, client portfolios and knowledge that otherwise would be difficult to access.

Aware of this trend, everis is publishing this report in which they have **analysed the investment strategy of 111 companies in the Energy Sector (oil, gas, and electricity) over the last 10 years**. With this vision of the state-of-the-art open innovation available to corporate venture capital, this report provides real information about the innovation ecosystem currently under debate and helps redefine the investment strategy or open innovation of the different stakeholders in the ecosystem.

*Héctor Pinar Fernández*  
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# 01

## Introduction

The objective of this report is to give an overview of the current trends of the macro-energy sector, with respect to venture capital investments made in technological start-ups and new business models, and thereby be able to anticipate possible changes in the sector in light of the investments made.

An upward trend in the energy sector, are investments in **Venture Capital (VC)**, or risk capital involving the temporary provision of financial resources to early-stage, emerging companies that are deemed to have high-growth potential and the capacity to create technology and disruptive business models for the sector in exchange for a stake in the same.

Increasingly, large companies have their own capital risk funds, known as **Corporate Venture Capital (CVC)**, that enable them to invest and at the same time align their interests with the development of these early-stage, emerging companies, that are usually start-ups.

The phenomenon of Corporate Venture Capital investment, from the point of view of the activity performed by **Energy CVC**, shall be analysed in detail in this report, including the interaction with **VC** and **CVC** not specific to the sector.

For the preparation of this report those investments in venture capital performed by energy companies over the last ten years have been analysed, limiting the same to disclosed investments.

“An upward trend in the energy sector, are investments in Venture Capital (VC), or risk capital.”

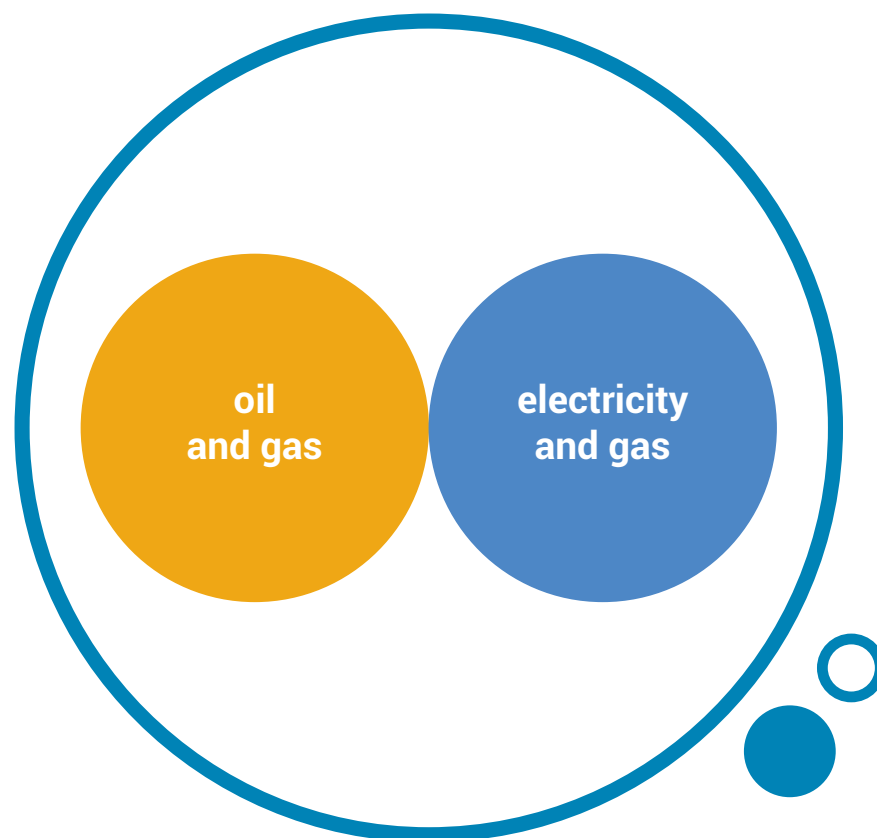


## Scope of the report

This report includes those investments performed by companies belonging to the Energy Sector. They have been analysed according to sectoral criteria based on their core activity.

Within the scope of this report there is a section on **oil and gas companies** dedicated to the extraction, refining, distribution and transportation of petroleum products, and in another section all the other **electricity and gas companies** dedicated to generation (whether conventional or renewable) of electricity, in addition to those dedicated to the transportation and distribution of electricity and/or gas.

Outside the scope of this report are those companies in environments such as suppliers of equipment for generating electricity and performing oil activities, petrochemical companies with no activity relevant to extraction or refining, Government Agencies, etc.



“The objective of this report is to analyse those start-ups funded with financial contributions from companies in the Energy Sector”

## Methodology

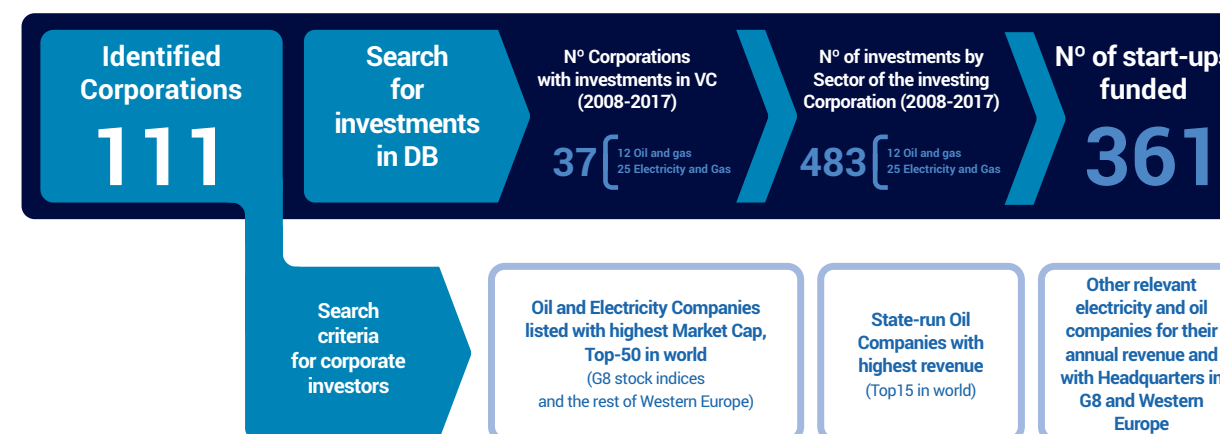
The initial search for companies for preparing this report has been performed using **the most important international stock indices as a reference**, as well as specialised lists from the highly respected Global Fortune 500.

The search has extended to the Media and specialised webs in this subject matter, collecting all information relevant to the 2008-2016 period under the understanding that the same is sufficient for detecting and analysing the evolution of the sector as whole.

The objective of this report is to analyse those start-ups funded with financial contributions from companies in the Energy Sector within the scope of the same. It must be noted that there are different ways of collaborating with start-ups that does not necessarily involve financing: **collaborative models not involving direct financing have not been included in this report.**

## Corporations analysed

After analysing a sub-set of energy companies, limited to the sectoral scope of this report, out of a total of the 111 companies identified during the search, said sub-set has been reduced to 37, having analysed a total of **483 investments** in 361 start-ups since 2008.



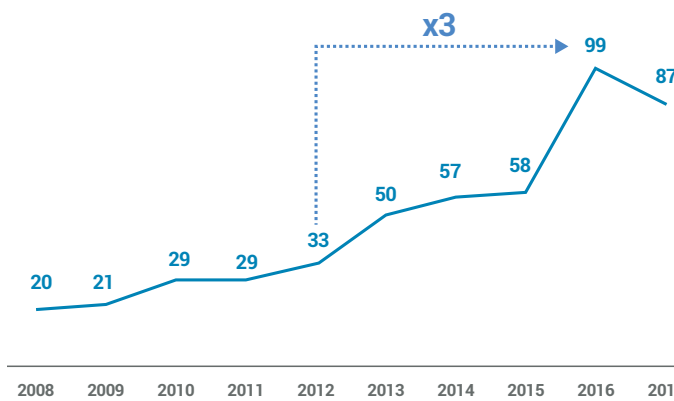


# 02

## Investment Activity

The participation of energy companies in the investment activity, is on the increase. Over a decade ago, the intense financing movement was limited almost in exclusivity to venture capital investments in a reduced group of Global Fortune 500 American and European companies. **The number of these types of investments has experienced a notable increase, rising by a factor of three over the last six years.**

*Number of VC investments by energy corporations*



“Over the last six years, the investment activity of energy companies has increased three-fold”

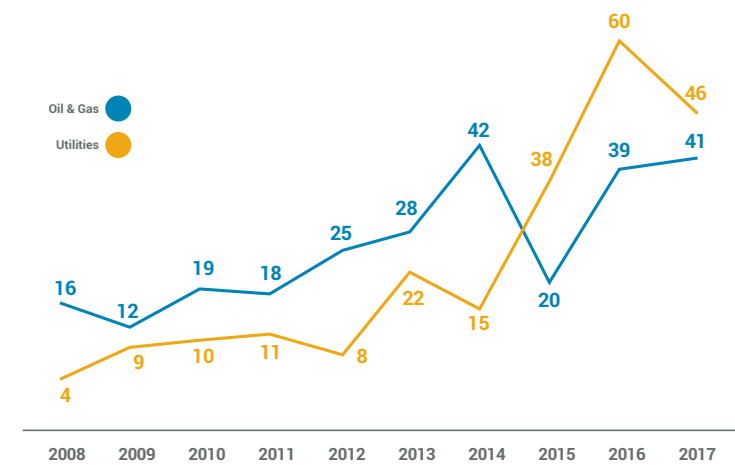


This notable increase in investment in Corporate Venture Capital funds over the last few years has been exponential in the case of electricity and gas companies, whose on-year activity (number of investments per year), has multiplied by six between 2012 and 2016.

In the case of oil companies, investment activity in venture capital in 2012 was already at a high and since then the Brent barrel price has been recorded dropping more than 50%. This placed notable financial pressure on the Oil and Gas corporations, reflected in an increase in the number of investments, a mere 58% in said period.

The main reason for the increase in investments by corporate venture capital funds is due to the increasing number of energy corporations that have begun to make this type of investment.

Number of yearly VC investments by energy corporations



Year of the first investment in start-ups by the main energy corporations<sup>1</sup>



<sup>1</sup> List (including but not limited to).

“The main reason for the increase in investments by corporate venture capital funds is due to the increasing number of energy corporations that have begun to make this type of investment.”





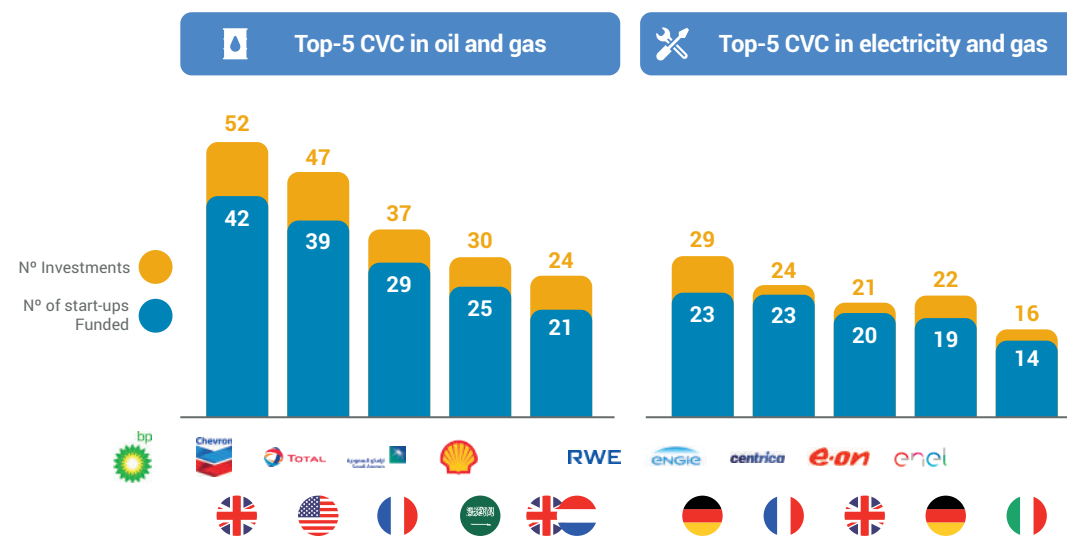
## Which energy companies lead CVC investment?

Taking into account the number of years of investment activity of each aforementioned CVC, amongst the companies with the higher number of VC investments since 2008 can be found **BP, Chevron, Total, Statoil, Centrica and RWE**.

However, other corporations that registered zero or residual activity before 2011 have positioned themselves on the list as the biggest investors, namely, **Saudi Aramco, Engie, E.ON and Enel**.

Prominent companies that are not on this list or who made residual investments are the big Russian oil companies such as Gazprom, Lukoil, Rosfnet, and other large State-run oil companies such as Petrobras, Petronas, and PEMEX.

Energy corporations with more investments in VC (2008-2017)



“The Top-5 electricity and gas companies leading CVC investment are European”

Lastly, it is worth mentioning that five of the companies with the most investment activity in the area of electricity and gas are European electricity companies.

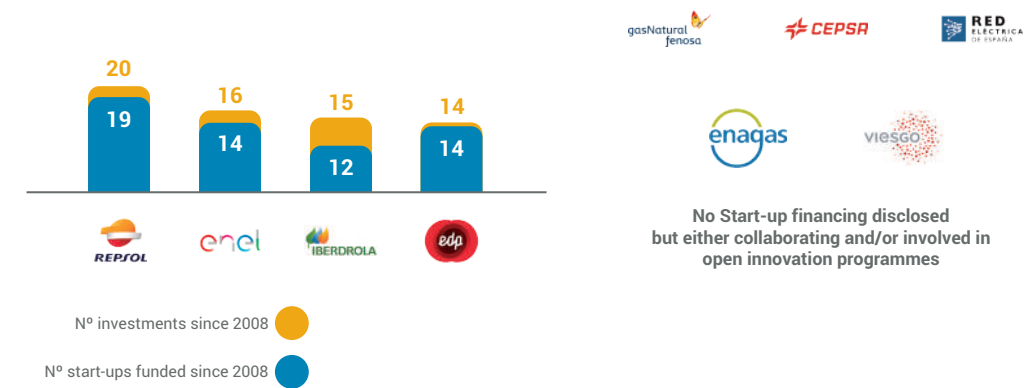
## CVC investment activity in Spain

The large Spanish energy companies, with the exception of Repsol, that have twenty investments in nineteen start-ups, followed by Enel, Iberdrola and EDP, do not have any significant venture capital investment activity sourced from corporate funds.

“RWE leads the Top 5 of CVC investment in electricity and gas”

Corporations with investment activity

Corporations with no investment activity



However, some relevant facts indicate a firm intention of some of them to take advantage of the opportunity emerging from the start-ups:

- Open innovation spaces like **Innovahub**, created by Naturgy.
- **Corporate entrepreneurship** programmes by Enagas
- Collaboration agreements with leading-edge technological centres and universities for **developing initiatives in the R&D+I arena** by Viesgo.

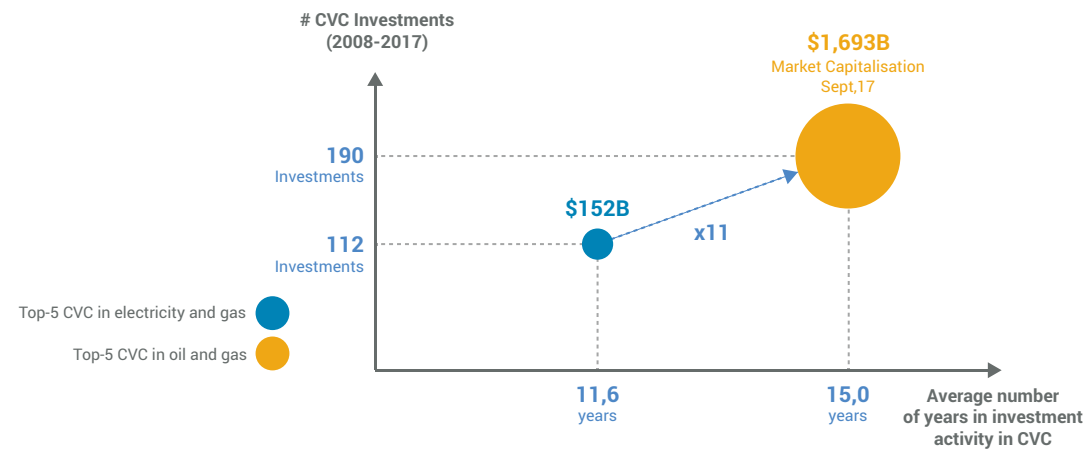


# Sectoral comparison of the investment activity

The average investment since 2008 of the Top-5 oil companies is greater than the electricity and gas companies of the same category. To be precise, **the oil companies in question performed**

**190 venture capital investment operations since 2008 as opposed to 112 made by their electricity counterparts.**

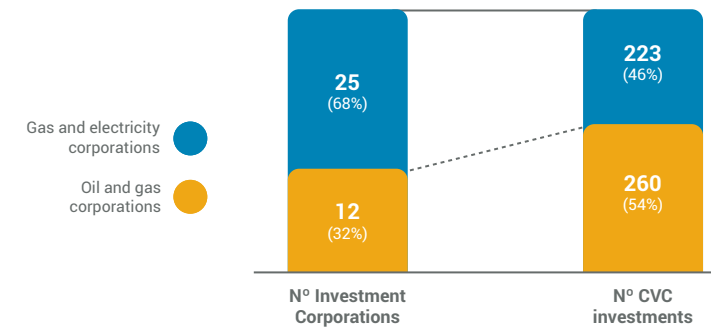
*Biggest energy CVC: N° investments, market capitalisation, number of years of investment activity*



There are various explanations on why the Top-5 oil companies have invested more in venture capital. One of them being, and worthy of note, is that their average market capitalisation is ten times larger than that of electricity companies in their category, totalling 1,693 billion dollars compared to 152 billion dollars. This provides them with greater investment capacity, plus the fact that **these oil companies started to invest, on average, four years before the analysed electricity companies.**

It is important to have a complete picture of the investment activity in the last decade and not just one of the 5 biggest investors of each sector. If we analyse the 37 corporations with investment activity, there are more electricity companies with activity than oil companies.

*2008-2017 Investments by sector of the CVC*



Due to the reasons described in this section, such as the average size of the company and the number of years of investment activity, **these 12 oil companies, although only making up 32% of the corporations with investment activity, total 54% of the corporate venture capital investments, compared to 46% of those made by 25 electricity companies.**



“The Top-5 oil companies performed 190 venture capital investment operations since 2008 as opposed to 112 made by their electricity counterparts.”



# Investment Methodology

Following the analysis methodology of this report, **only those venture capital investments made directly by companies have been taken into consideration**. This refers to the financing of start-ups by the companies analysed, either by the same or by an entity belonging to the parent company.

In light of the foregoing, it is considered relevant to mention another investment methodology used by energy companies, as described below.

## Co-investment with other venture capital risk funds

Corporate funds do not tend to invest on their own. In almost all of the funded start-ups they do it alongside one or more venture capital investment funds, sharing the same investment round, or in different rounds.

This can be seen in the fact that co-invested energy funds has amounted to a total of 644 different investors since 2008. **The corporation more conducive to co-investing was the oil company Chevron that led 201 co-investment rounds, followed by Total, BP and Shell.**

### Co-investors that invest alongside the energy CVCs

Energy CVCs									...	Total co-inversion
#co-investors (VCs and CVCs)	201	169	160	119	64	78	92	70	...	=644

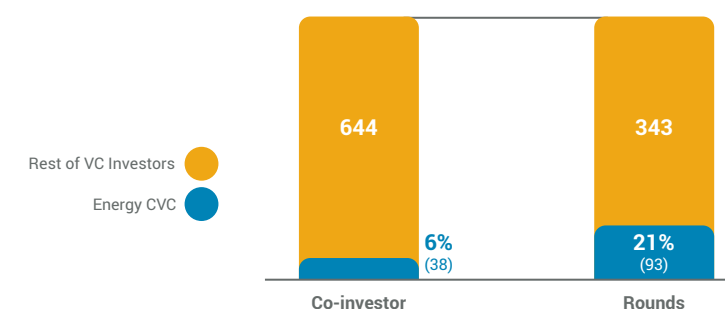
These 644 co-investors can be classified into the following categories, out of which of note are non-corporate venture capital funds with 385 co-investors, representing more than half of the total, followed by venture capital corporate funds outside the energy company sector, increasing the number by 189 co-investors.

### Co-investors by type

Non-corporate VC	385
Corporate VC (CVCs)	189
"Angel" Investors	51
Public and academic Foundations and Institutions	19
<b>Total</b>	<b>644</b>

Out of a considerable number of investments, corporate funds were the ones that led their round. To be precise, energy corporate venture capital funds, even though they represented 6% of the co-investors as a whole, they led at least 21% of the rounds in which they invested.

### Investment rounds in which Energy CVC have participated (by VC type that led them)



Companies from the energy sector co-investing alongside other energy corporations, where at least 13 of the top-20 energy companies co-invested with other energy companies in the same start-ups and, in many cases, in the same rounds.

### Nº of co-invested start-ups by two or more Energy CVC (2008-2007)

		Oil							Electricity					
Oil		1	-	1	-	-	-	-	1	1	1	1	1	1
		-	2	-	1	-	-	1	-	-	1	-	-	-
		-	-	2	3	3	-	-	-	-	-	-	-	-
Electricity		-	-	-	-	-	1	-	-	1	1	-	1	-
		-	-	-	-	-	1	1	-	-	1	-	-	-



It should also be noted that corporate funds co-invest in other corporate funds belonging to some of their suppliers and related industries.

	bp	Chevron	Shell	Engie	STATOIL	TOTAL	CEZ GROUP	e-on	ENGIE	nrg
GE	✓	-	-	✓	-	-	✓	✓	✓	✓
Schlumberger	✓	-	✓	✓	-	-	-	-	-	-
SIEMENS ALSTOM	✓	✓	✓	-	✓	✓	✓	-	-	-

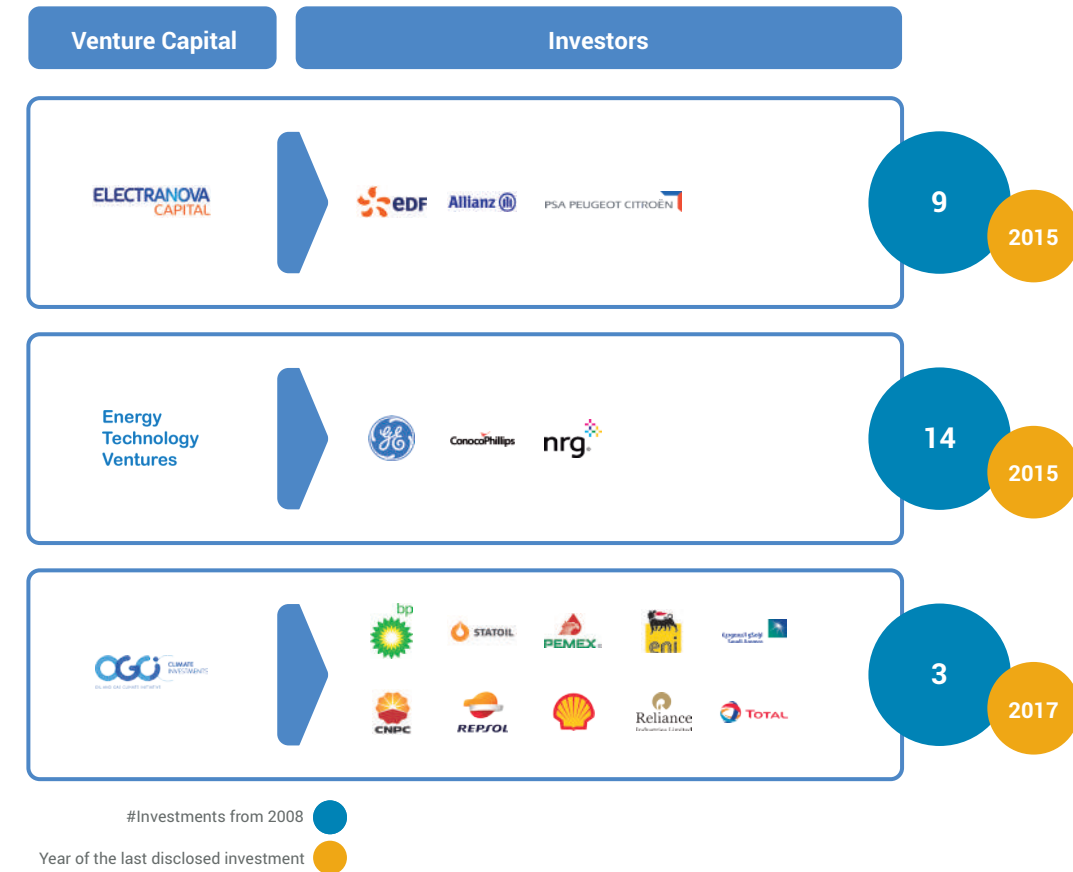
In particular, **General Electric, Schlumberger and Siemens-Alstom** were the suppliers who most co-invested alongside their clients from the Energy Sector, although rounds have also been identified in which they co-invested in corporate funds of other industries.

Energy CVCs	Technology Giants				Car manufacturers			Food manufacturers	
	Google	DELL	QUALCOMM	MOTOROLA	BMW	DAIMLER	TESLA	Unilever	Cargill
bp	✓	-	✓	-	-	-	-	✓	✓
Chevron	✓	✓	-	✓	-	-	-	-	-
Shell	-	✓	✓	✓	-	✓	✓	-	✓
Engie	-	✓	-	-	✓	-	-	-	-
STATOIL	✓	-	-	-	✓	✓	-	-	-

On occasions, some energy corporations co-invest together through specialised VC. In particular, **EDF made the majority of their investments through Electranova Capital**, a venture capital investment fund led by a financial institution, but whose funds come mainly from three corporative investment

funds from different industries: energy (EDF), car (Grupo PSA), and insurance (Allianza). These corporations, in addition to contributing capital, also assess the investment activity.

*Specialised VC with participation in Energy corporations*



Likewise, **ConocoPhillips and NRG** made the majority of their investments through **Energy Technology Ventures**, a corporate investment fund led by General Electric, where apart from contributing funding they also assessed the investment.

In 2016, ten of the biggest Oil and Gas companies launched **OGC (Oil & Gas Climate Investments)**, a CVC focussing on CleanTech that has made at least 3 investments and that has many more under analysis or for which the investment process is under way.

“On occasions, some energy corporations co-invest together through specialised VC”



# 03

## Why invest in Energy companies?

The logic applied by a corporate venture capital fund for energy when investing in start-ups is unlike the investment logic applied to portfolio management. Neither is it reasoned on obtaining a return on the invested capital based on an attractive profit from the start-up.

Usually it arises from the intention of taking advantage of the competitiveness of the start-up, its technology, business model, the talent or knowledge gained and/or integrating its solutions into their core business. It is for this reason that many investments are often accompanied by joint collaboration in the form of roll outs through pilot schemes.

“The investment strategy of the energy CVC is not reasoned on financial logic alone”

### Open innovation

The term **open innovation** was first used in the 60s by the University of California and refers to an **innovation model based on collaboration outside the company**, with stakeholders such as: public institutions, universities, investigation centres, suppliers, competitors, clients, development communities, freelance experts and, of course, start-ups.

Many large corporations are gradually opening their work teams and internal processes to third-parties. Increasingly the supplier profile of highly-innovative digital services does not always correspond to conventional suppliers.



# Open vs. internal innovation mix: Chevron and ExxonMobil case study

Each energy corporation decides their own innovation mix; internal vs. open innovation. To demonstrate the diversity of these innovation options, two American oil companies with very different mixes are compared.

Both ExxonMobil as well as Chevron spent approximately 0.5% of their revenue on R+D in 2016, however their innovation strategies were different.

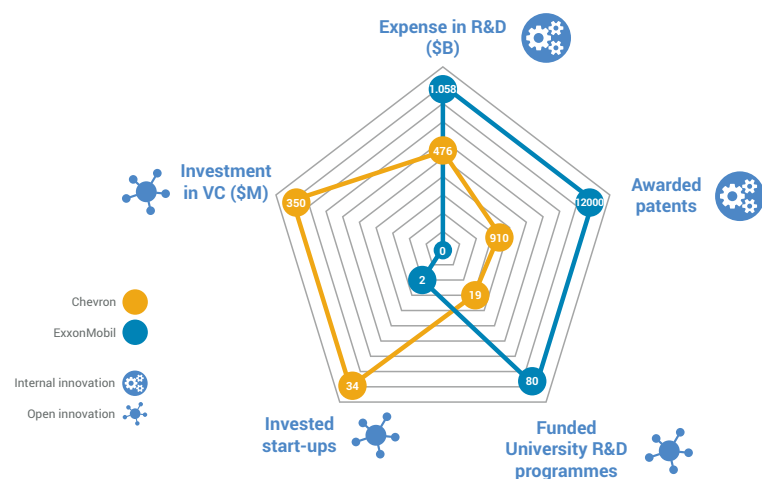
## a) ExxonMobil as an example of internal innovation.

- **Internal innovation:** spent \$1 billion on R&D in 2016, the biggest budget in the sector (together with Total) and leader in the Oil and Gas sector for obtaining patents in US in 2016 (400 patents).
- **External innovation:** no investment in VC. Instead, they have R&D programmes in 80 universities.

## b) Chevron as an example of open innovation.

- **Internal innovation:** spent \$476 million on R&D in 2016.
- **External innovation:** invested \$350 million in VC in 2016 and has an active portfolio of 28 start-ups.

Metrics comparison of accumulated innovation as of 2016 between the oil companies Chevron and ExxonMobil





# 04

## Start-ups as stakeholders

Diverse investment trends in corporate funds as well as in areas and technologies have been identified that have experienced significant growth based on investment activity. These trends are going to be studied in this section.

### The rise of CleanTech

The start-up phenomenon can be classified into different areas depending on its type, however if one area had to be chosen as representative of the scope of this report, it can be concluded that it falls within the **CleanTech**.

### What is CleanTech?

CleanTech investments are defined as all **those related to electricity, biotechnology, new materials, biofuels, water and sustainable mobility**. This definition excludes investments in oil companies except in the case of start-ups orientated towards clean energy applied to oil and gas activities.

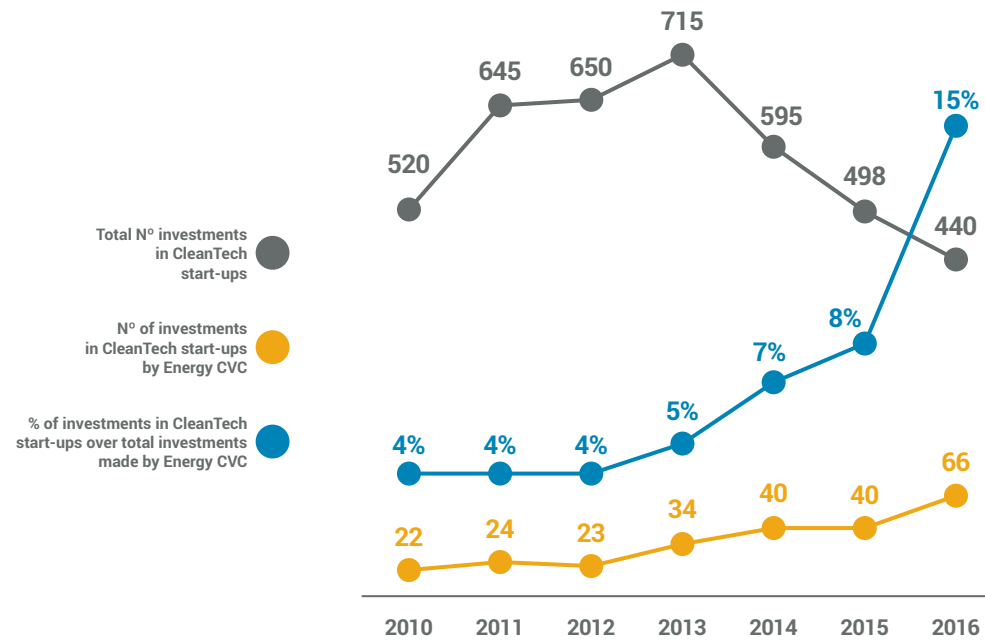
A distinction has been made between CleanTech and Sustainable Mobility due to the enormous importance placed on it in terms of funding from venture capital, being deemed to warrant a specific analysis.

“If one had to choose an area out of the diverse investment trends it would have to be CleanTech”



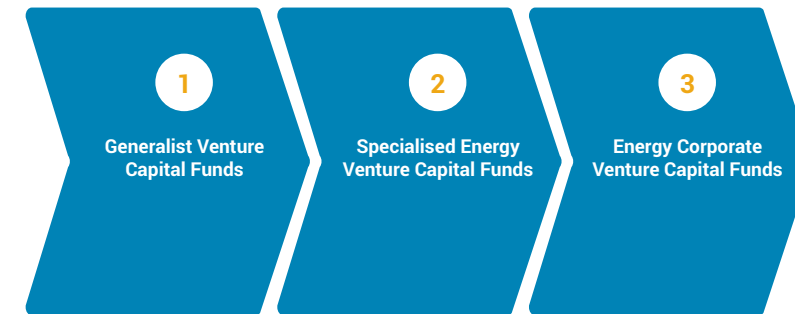
# Investment in CleanTech and its evolution

The participation of energy companies has been growing from a near-to residual position with respect to the total investment in CleanTech, going from 4% in 2012 reaching up to a significant present share of 15% in 2016.



It should be noted that the total number of energy venture capital investments have dropped significantly, and in contrast the increase in investments in these technologies by corporate funds.

In order to understand the full picture of venture capital investment in CleanTech and how new investors have arrived on the scene, it is worth remembering that, the type of investor has also evolved.



At first they started to invest in generalist venture capital funds, in a second phase they evolved to vertical venture capital with a specific focus on CleanTech such as financial investment and a reduced number of corporate funds for large, listed Western oil companies, as well as technology giants and some industrial giants.

Over the last few years numerous participants have become involved, such as corporate investment funds for electricity and gas companies and oil companies, as well as other corporate investments funds for sector-related industries.

Likewise, it is important to mention the inclusion of other relevant stakeholders in CleanTech, such as for example Governmental Agencies.

“CleanTech investments by energy companies have grown from 4% (2012) to 15% (2016)”



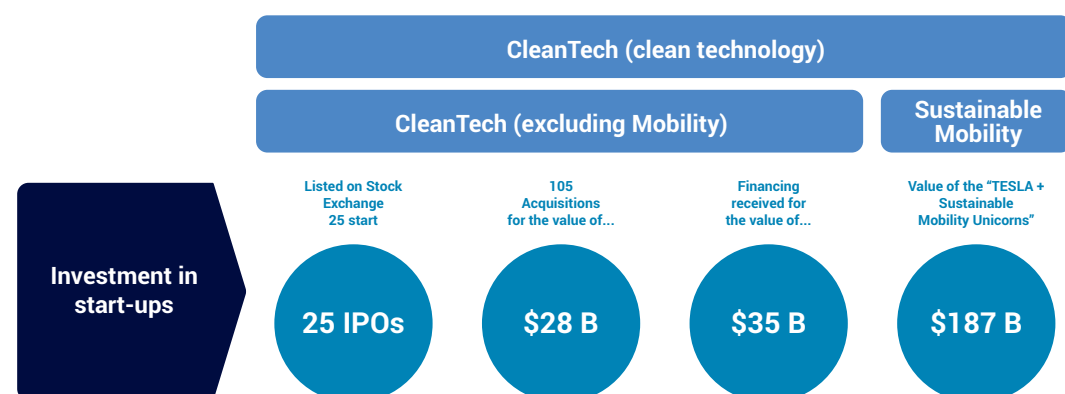


# Representation of the CleanTech

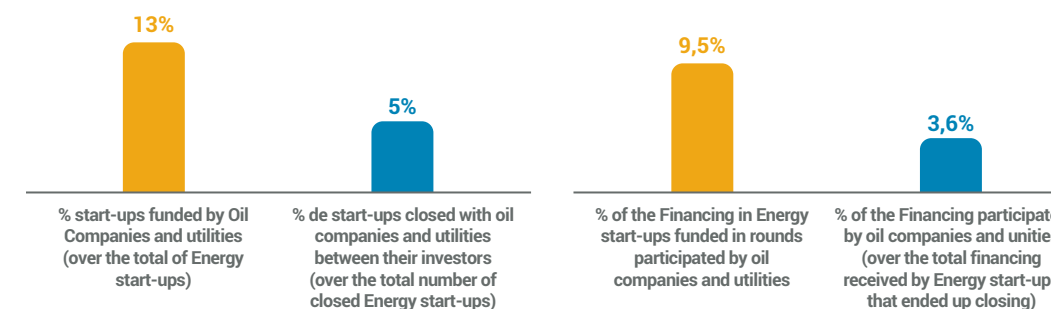
Whilst over the last five years the shareholders of the **twenty energy companies most in demand experienced a loss in value of some 40 billion dollars**, in the same period the **CleanTech attained the highest growth**, from which relevant data about the investments made in these technologies has been obtained that has put the magnitude of this phenomena into perspective.

To give you an idea of the extent of the opportunity created around the CleanTech, and performing a quick comparison with Sustainable Mobility, **the value of the largest mobility start-ups in the last decade has been analysed**, listed and unlisted on the Stock Exchange, in a list called **"Mobility Unicorns + Tesla"**.

Over the last 5 years (2012-2017)



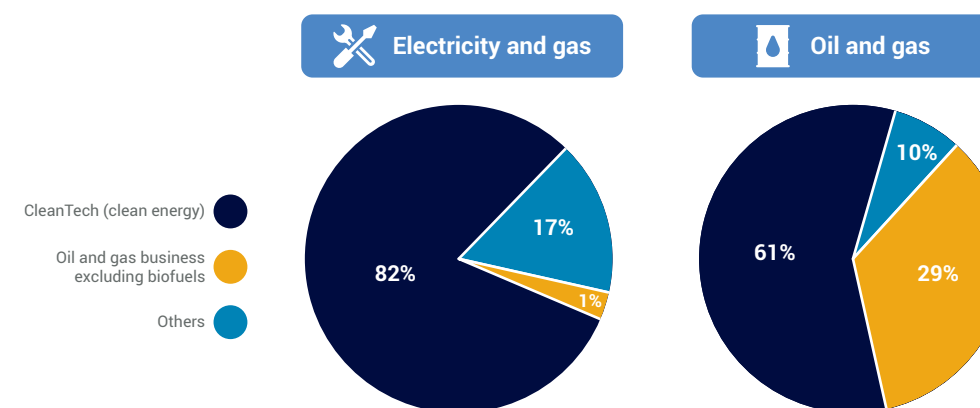
Out of the loss in value<sup>1</sup> from the bankruptcy of CleanTech start-ups between 2012 and 2016, calculated at some 6.45 billion dollars, the corporate investment funds were only involved in rounds for a total value of 232 million dollars, representing only 3.6% of the same.



This proportion is a great deal lower than the total participation of energy corporate investment funds financing CleanTech Startups that in the same period was 9.5%.

CleanTech, including Sustainable Mobility, represent more than **82%** of the corporate venture capital investments made by electricity and gas companies. In the same way, out of the 262 investments made by oil companies, **61%** were destined to CleanTech, without including some non-specific energy IT start-ups that some analysts consider to be within the scope of the CleanTech arena.

Nº investments of Energy CVC (2008-2017)



Some practices in the behaviour of the investor have been identified and that, in principle, may serve to minimise the risks and maximise the return on investment made by energy companies.

<sup>1</sup> For purposes of this report, "value loss" is the total financing received in VC rounds by start-ups that have ended up closing. Possible distributed dividends by the start-ups have not been taken into account (for being highly improbable), nor any capital gains generated from capital transactions. Neither has the fact that, on many occasions, the start-ups slow down their activity without registering an official close in a public way been taken into account.

"Over the last five years the biggest growth has been in CleanTech"



# Investment trends

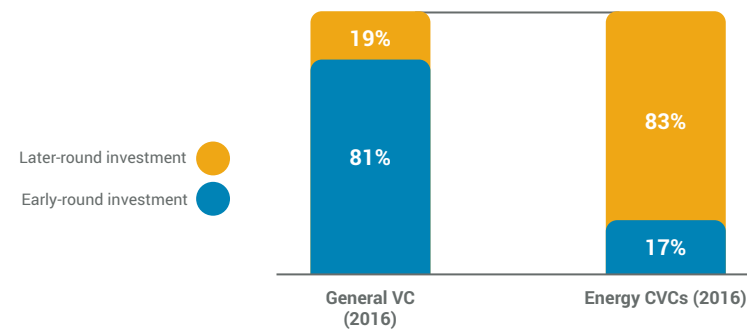
Energy corporate venture capital funds are using some investment strategies in order to limit the risk and improve return.

## Investment in later phases

It has been verified that energy corporate venture capital funds invest in later phases than the average venture capital investment. In 2016, **energy corporate venture capital funds** for which there is public information only **carried out 17% of their investments in the Seed or Series A round, hereinafter "early rounds"**.

In comparison, the investment funds in **non-corporate venture capital funds**, including all sectors, **also made 81% of their investments in the early rounds during 2016.**

% of investments depending on the round



## Collaboration with the start-ups in which they invest

It is quite common that energy corporations **collaborate in projects with start-ups in which they invest** both before and after investing in them, including, occasionally, after they no longer participate in funding the same.

There are numerous examples of this type of collaboration, such as the case of E.ON North America: in March 2017 they announced that they would be introducing a fast-response lithium-ion energy storage system in two of their wind-power generation plants in Texas. To manage this system it used the battery management software from the start-up Greensmith that had been funded by E.ON in 2015.

## Increasing investment in Software technologies

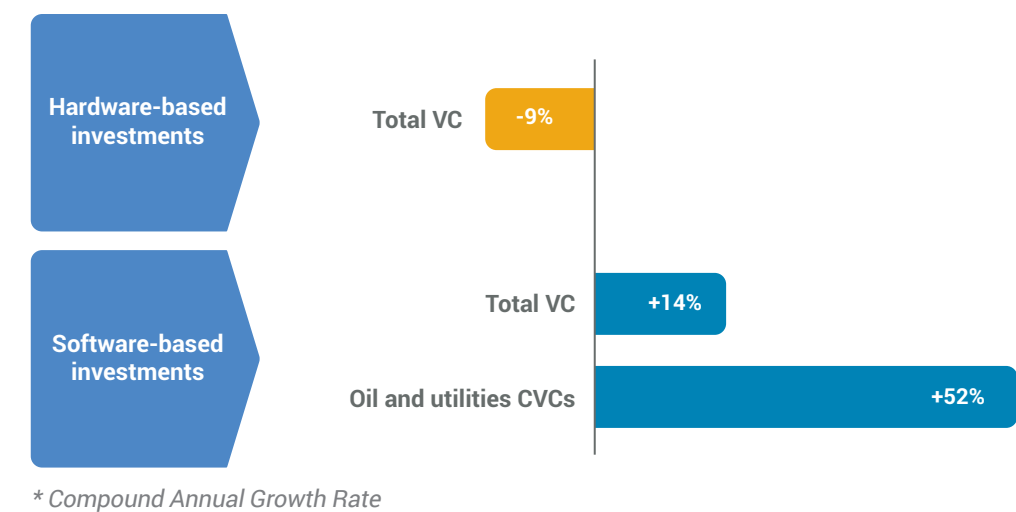
In the main, **internal innovation of Hardware technologies runs the risk of becoming obsolete**, since the rhythm of technological development may leave it less competitive in terms of cost during the R&D phase or not reach sufficient economies of scale for the required level of competitiveness.

Within the scope of open innovation, **companies began to invest in those start-ups that had managed to get around these risks at the outset.** However, due to the nature of the Hardware technologies that are usually capital-intensive (normally requiring development of production processes and manufacturing installations, as well as R&D laboratories with high fixed costs), there is always the added risk of backing the wrong technology due to the feasibility of the technology, with few possibilities of obtaining synergies with the core business of the energy companies.

In contrast, over the last few years, **the Software technologies have benefited from, amongst other factors, a drastic reduction in data processing costs** that since 2007 have dropped by 99.8%, as well as for data storage in the Cloud, that between 2006 and 2014 went down by 84%.

We can confirm that venture capital investment in Software-based start-ups grew between 2010 and 2015, at a Compound Annual Growth Rate (CAGR) of +14%, opposed to a negative CAGR of -9% in investment destined to Hardware-technology based start-ups.

CAGR\* in #annual investments in start-ups based on Hardware and Software (2010-2015)



Furthermore, for corporate venture capital funds investing in energy, the increase in the investment in Software have experienced an even sharper increase than venture capital investments, growing with a CAGR at +52% in the same period<sup>3</sup>.

It can concluded therefore that if the Venture Capital sector have realised that the **best return on their investment is in Software**, the Energy Corporate Venture Capital funds have been all too aware and perhaps more so of this opportunity.

<sup>3</sup> Even though it should be underscored that this very high growth rate is due, in part, to the fact that Energy CVC investment activity was very low in 2011 and it is this very low baseline that makes the CAGR figures so extenuated.



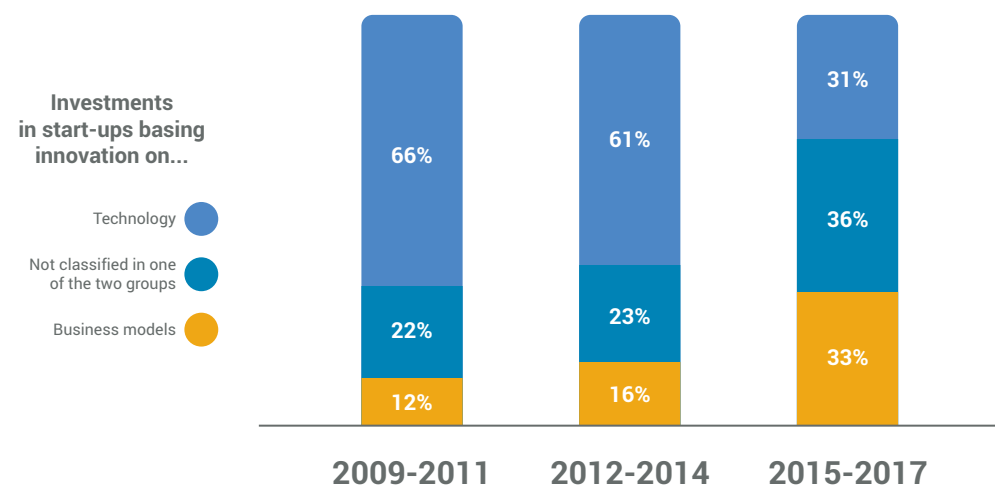
## Increasing investment in business-model based innovation

After classifying the start-ups within the scope of this report, results were obtained that demonstrate the growth in the **trend of energy companies investing in start-ups to leverage innovative business models, instead of to leverage pure technological innovations**, such as, for example, the development of new methods and processes, new materials, etc.

The investment in business-model based innovation start-ups represented a mere 12% in the period 2009-2011, a proportion that has rocketed reaching 33% in 2015-2017.

In the same period, technology-based innovation start-ups dropped from 66% in the period 2009-2011 to 31% in 2015-2017.

% Energy CVC investments by innovation leverage



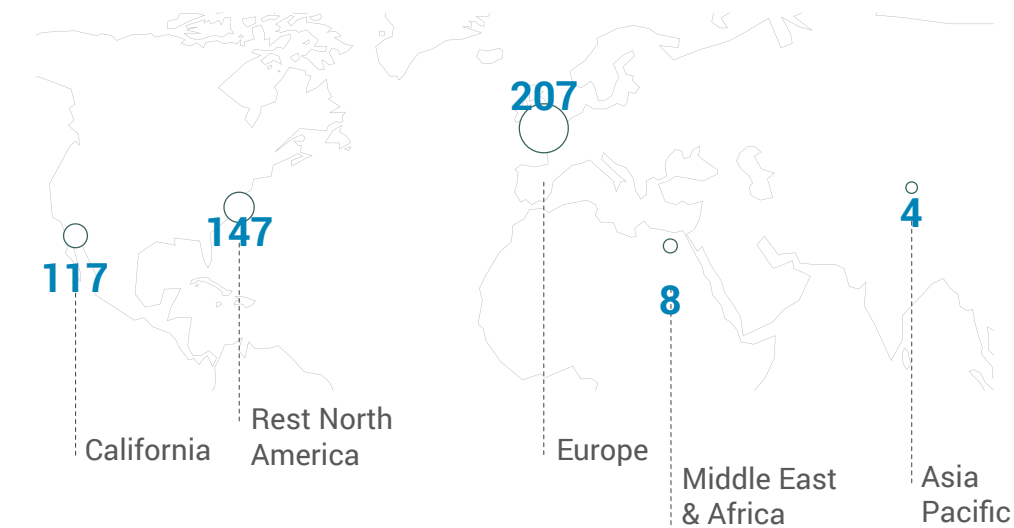
To clarify what is meant by business-model innovation, some examples of the new models and trends that are driving some start-ups are described below: **offering a product as a service** (part of the

macro-trend known as "Everything-as-a-Service"), **collaboration between Users and Prosumers** in the distributed generation arena.

## Venture capital investment hubs represent a significant part of the investments

A significant part of investment by energy corporate venture capital funds is focussed on **start-ups with Headquarters located close to the venture capital hubs in the world**, something that follows the global trend.

Number of investments

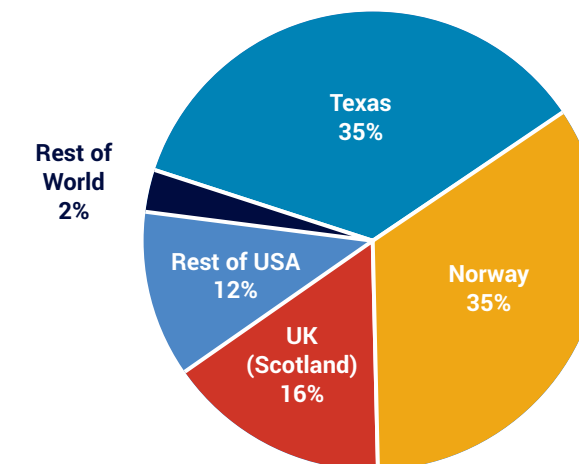


A quarter (25%) of total investment in energy corporate venture capital funds since 2008 was destined to start-ups with headquarters in **California**, when California only represents 3% of the global GDP. **Tel Aviv** is another hub that is thoroughly over-represented.

## In some disciplines the investment is geographically-centric

Over three-quarters (86%) of start-ups dedicated to Research and Development and funded by energy corporate venture funds, follow a standard that is not a coincidence: they have their Headquarters in economically-advanced regions rich in oil such as **Texas, Norway and the UK (in particular in Scotland)**.

Base location of the start-ups dedicated to Research and Development funded by oil companies since 2008



NOTE: Analysed population 49 E&P start-ups funded by oil companies since 2008.



# Investment areas

This section not only makes reference to general investment trends but also identifies specific trends towards investing in technology and business models by energy companies.

The funded start-ups for the period under analysis between 2008 and 2017 shall now be considered depending on their different opportunity areas, classified into the following 3 umbrella groups:

- 

Investment in **start-ups belonging to the Electricity sector**, representing 46% of the investments.
- 

Investments in **start-ups orientated at activities in the Oil, Gas, and Biofuel sector**. Representing 28% of the investments.
- 

Investments in **start-ups that offer complimentary Business Models and Technology for the Energy Sector**, representing 26% of the investments.

## Investment in Electricity start-ups

Even though the volume of venture capital investments by electricity companies has been 71% over the total number of investments, oil companies have also been very active investors in start-ups in the electricity sector, performing up to 28% of the investments. **One of the reasons for this interest for electricity may be because of the uncertainty of the future demand for oil.**

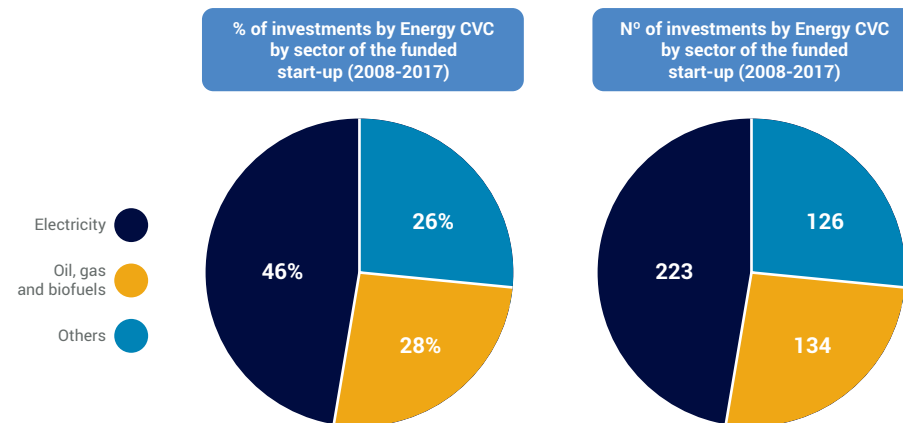
Within these hypothetical diversification strategies, investment in electricity start-ups is one way of entering the electricity market in a disruptive manner, by backing the new technologies and business models of start-ups who are clear leaders in this arena.

## Investment in oil, gas and biofuel start-ups

Even though electricity is the most representative sector for start-ups in the energy sector, **investment activity by oil companies in start-ups dedicated to the core oil and gas business is also intensifying**, both in refining-petrochemicals as well as, and in particular, Research and Development, with the oil companies performing 88% of the investments.

This trend reflects the great efficiency and value creation potential that can be generated thanks to technology.

Percentage and N° of investments in start-ups by energy corporations in 2008-2017 by sector

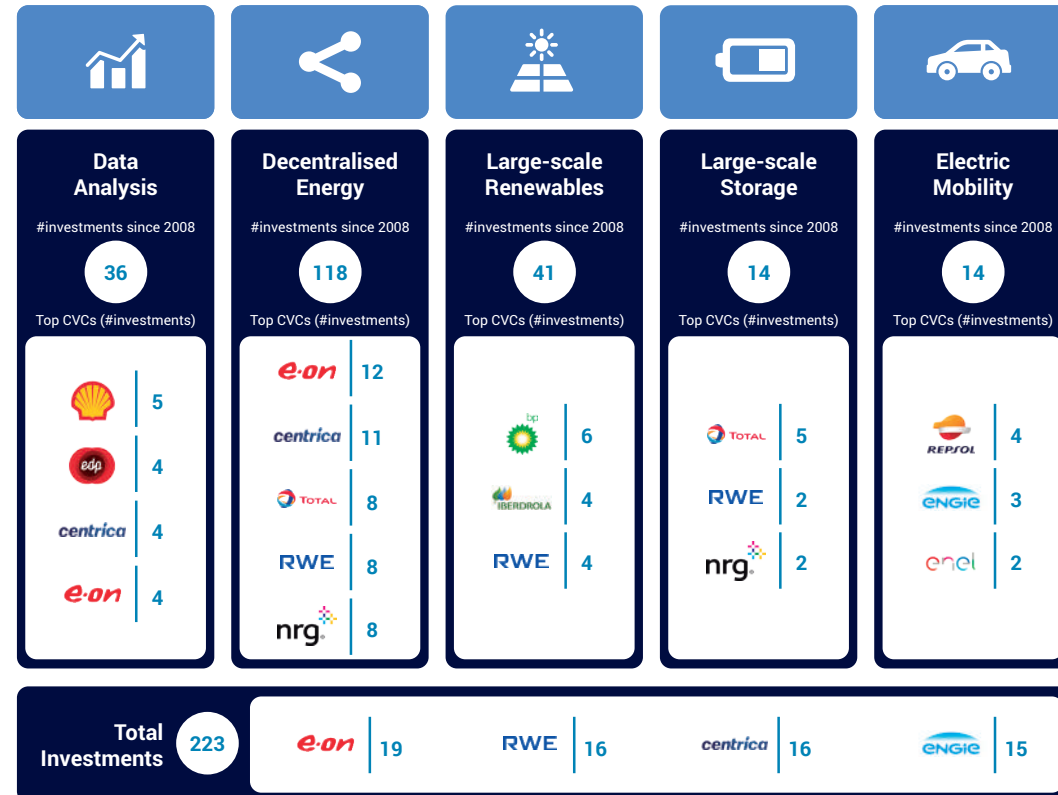


“The investment in Electricity start-ups is one way of entering the electricity market”



## Investment in electricity

To analyse investments in the electricity sector, investments in start-ups have been classified into five-top areas, identifying in the same the most active investors.



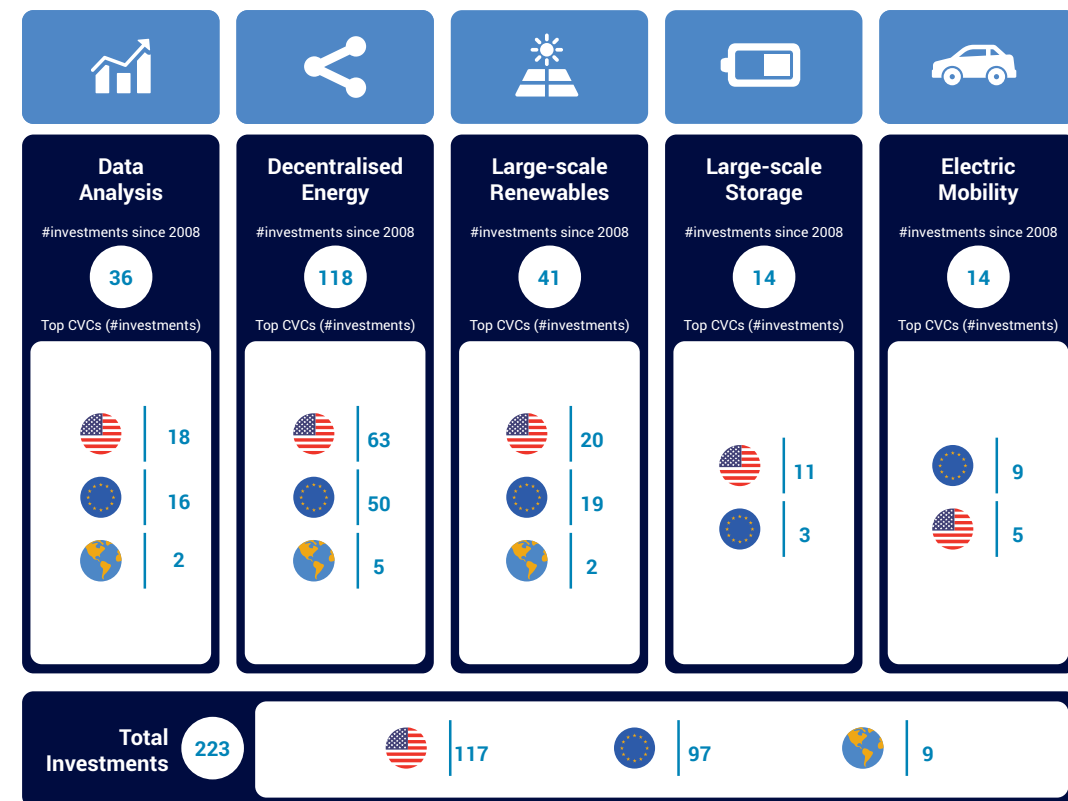
Globally it is the electricity companies that have performed the most investments in electricity start-ups, with a total of 159. In the period 2008-2017 E.ON led the ranking, with 12% of the investments.

Moreover, oil companies were identified amongst the biggest corporate energy investors, representing 28% of the same and a total of 64 investments out of the total opportunity areas in the sector.

- Repsol led the electric mobility category, with 4 investments during 2008-2017.
- Total and Shell were the biggest investors in large-scale storage and data analysis, with 5 investments each.

When analysing the investments by base region of funded start-ups, the United States (USA) leads the number of investments, largely due to the venture capital investor ecosystem in Silicon Valley in all categories, except in electric mobility, where Europe leads the category with 9 investments, nearly double that of the USA in the analysed period.

With respect to non-European and American investments in start-ups, they total 4% of the investments in the analysed period, focusing mainly on large-scale renewables and decentralized energy.



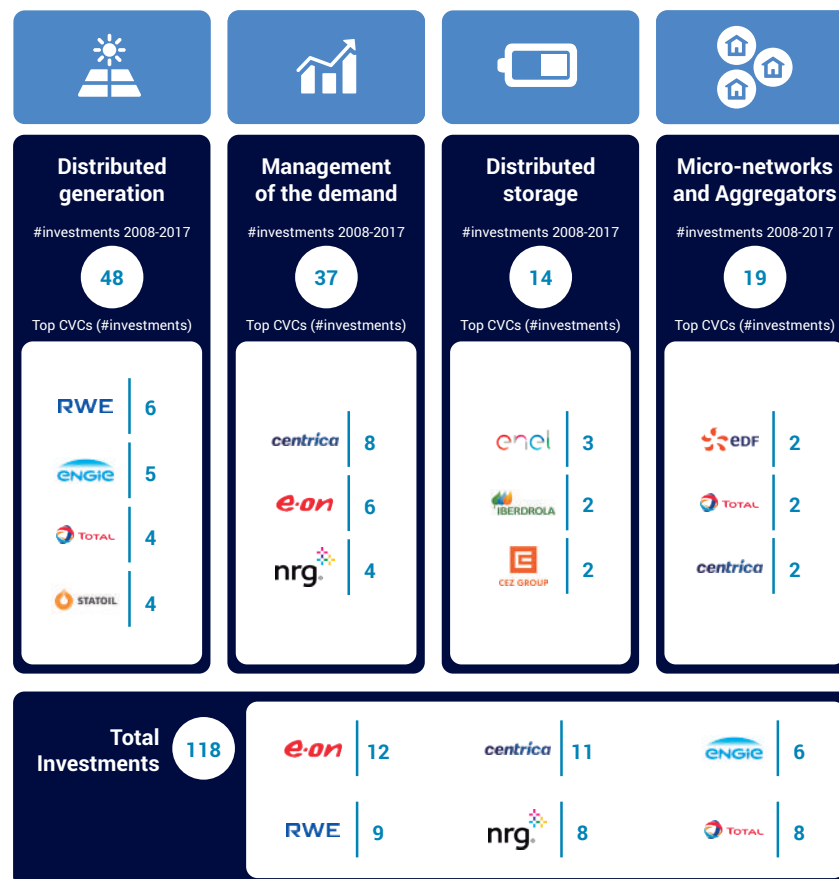
“Europe leads investments in electric mobility”



## Energy decentralisation

Investments in decentralized technology has gained significant weight over the total, representing 53% of the 223 investments made, followed by large-scale renewables that only represent 18%.

Because of this the decentralized energy area requires in depth analysis to identify the investment trends, as well as the technologies, main business models and companies that are behind them.

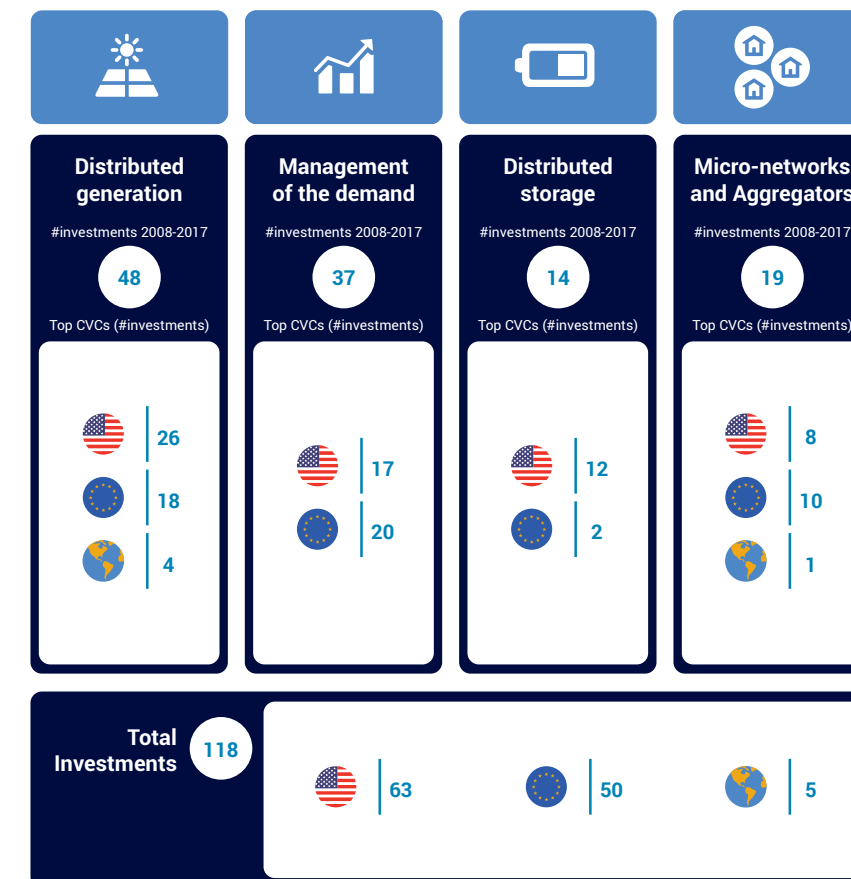


The 118 investments in decentralised energy are subdivided into 4 main areas. **Distributed generation** (also known as decentralised generation), involves the generation of electricity by many small energy sources in locations near to the points where it is consumed, it represents 40% of the investments,

thereby leading this area. The main investors are the electricity companies RWE and Engie, followed by the oil companies Total and Statoil.

The introduction of new technologies, such as for example, Artificial Intelligence and the Internet-Of-Things, are facilitating the development of utilities with respect to the management of the demand in energy, making a more accurate adjustment to production. This area represents 31% of the investments in decentralised energy and is led by the electricity companies Centrica, E.ON and the American company NRG.

The distributed storage and the micro-networks area amount to 12% and 16% respectively, being noteworthy the fact that the leading companies in investments are the French Companies EDF, world leader in distributed energy, and the oil company Total, followed by the electric company Centrica.



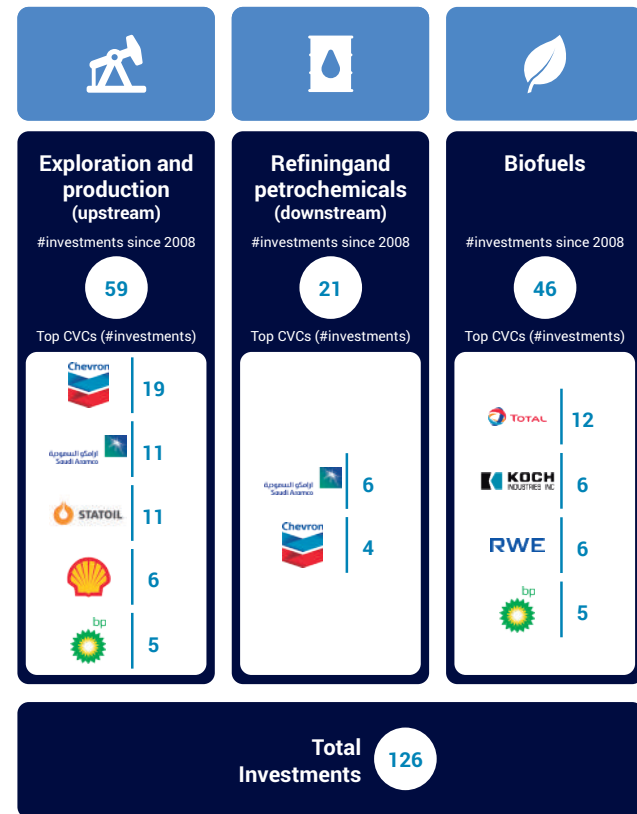
When analysing the profile of the investments<sup>4</sup> from a geographic perspective, out of the 118 investments made in decentralised energy, **more than 59% of them correspond to corporate venture capital funds**

**based in the United States**, with nearly the total of the remaining investment being made in Europe.

<sup>4</sup> This figure has been ascertained from more than 200 electricity investments that are included in the scope of this report (2008-2017). Out of all the investments in the period, only the ones invested or acquired by an energy corporation between 2014 and 2017 are included. In addition, those funded by a corporate energy company in 2013 and that, in the same year or afterwards, have been acquired by energy corporations or by corporations of other sectors are highlighted, since this type of transaction is considered to be an indicator of the importance of start-up.

# Investment in oil, gas and biofuel

This figure has been ascertained from the 126 investments in oil, gas and biofuels that have been made over the last 10 years.

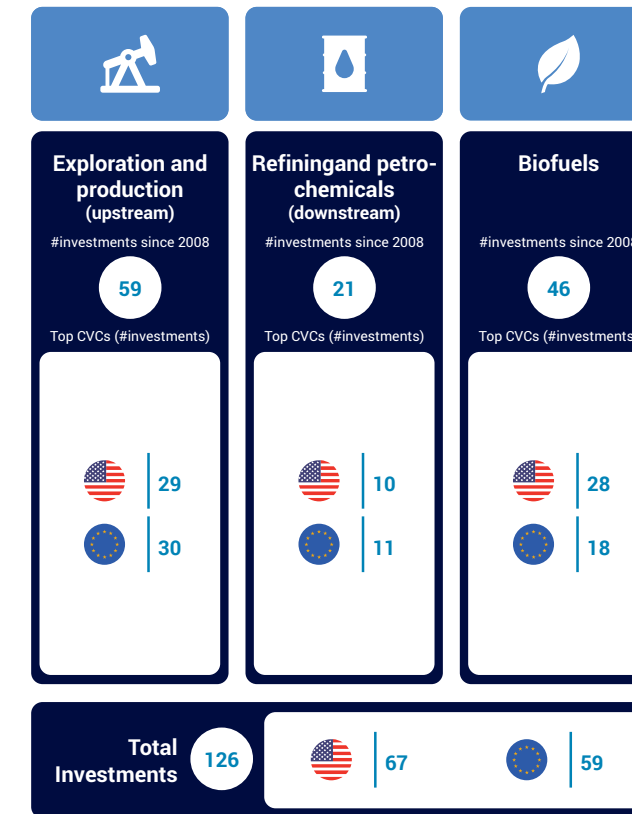


Out of all the investments analysed, the oil companies are the ones who have made almost all the investments in start-ups, due to the obvious link that these technologies have to their core business. Exploration and production, mainly involving hardware and equipment investments, leads the

category in number of investments with 47% of the same, Chevron being the most active oil company with 19 investments.

“The geographic distribution of the investments is balanced between the United States and Europe”

Although the predominance of the oil companies is clear, in the biofuels area RWE has made 12% of the investments.



The geographic distribution of the investments is balanced between the United States and Europe, being in the upstream and downstream areas where Europe leads the category by number of investments with the United States clearly leading investment in biofuels.

## Other investments

Out of the 483 investments analysed, a total of 134 correspond to non-classifiable investments in the two main areas in which this report has been developed.

Out of these 134 non-classifiable investments, more than 60% of them were made by corporate venture capital funds of oil companies, being also significant the participation of electricity companies in this type of investment.

Some of the investments were made in start-ups dedicated to mobility, both in the area of shared mobility and in the new forms of mobility, being the oil companies especially representative in this area.

Other relevant investments were made in **nano-material technology and new data management and transactions systems, such as blockchain technology.**



# Acquisition of start-ups

The best way of **increasing the probability of success** in the attainment of expected synergies **lies in the corporate investment fund taking control, and, in turn, the company that backs it, of the funded start-up.** Said control in the majority of the acquisitions included within the scope of this report has been attained by purchasing 100% of the capital of the start-up.

Although some of these acquisitions look for full-integration of the start-up with the corporate investment fund that acquires them, in other cases the only objective is to maintain them in parallel, **respecting their independence so that the start-up does not lose its culture or agility**, two key elements in the success of start-ups.

Other motives that lead to the acquisition of a start-up instead of just investing in them are now itemised:

## 1

**Facilitates entry into a business more quickly** thanks to the acquisition of the necessary assets to penetrate the market (acquiring the client base, the technology or the distribution network).

## 2

**Acquires the exclusivity of an asset** (patents, processes, etc.) to compete better or to avoid a competitor acquiring it.

## 3

**Acquires a potential replacement product** and avoids cannibalising profits of the acquiring company.

## 4

**Uses the start-up as a transformation instrument of the organisation and culture of the acquiring company.** Ultimately, using it as means to introduce dynamism, entrepreneurship and agility in the parent organisation.

## 5

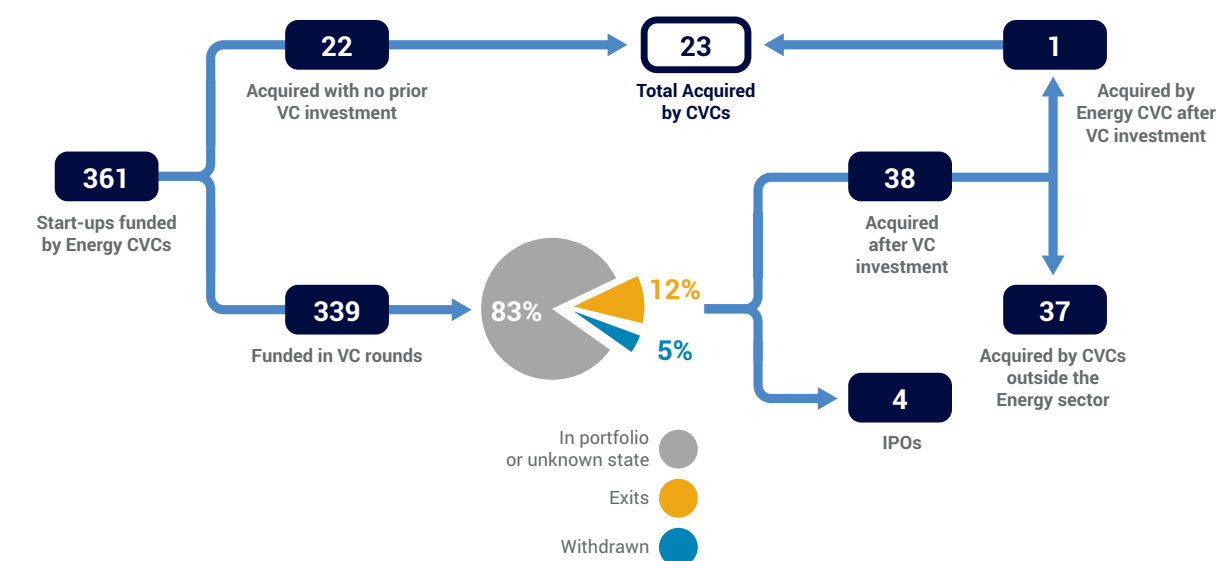
**Takes control to attain other possible synergies with the core business of the acquiring company,** such as for example being complementary to the offer, geographic complementarity, operational synergies, economies of scale in purchases, acquisition of scarce human capital, acquisition of management talent, amongst others.

## The start-up life-cycle

After the analysis of the life cycle of the start-ups, the following facts can be highlighted:

- Out of 361 funded start-ups, 22 were acquisitions and the rest were funded in venture capital rounds.
- Out of the 42 start-ups that ended up in an exit strategy:
  - Only 4 went public (IPOs).
  - The remaining 38 were acquired: mainly by corporations outside the scope of this report, that is, not oil or electricity companies, and only one was acquired by an energy corporate venture capital fund that had been investor in venture capital rounds.
- Out of the start-ups funded by venture capital rounds, 12% end up in an exit strategy and only 5% of those exit strategies end up being acquired by the same corporate investment fund.

Life cycle of the start-ups funded by Energy CVC since 2008



The last section affirms that only 3% of the start-ups acquired by energy corporate venture capital funds had received financing previously from the corporate funds that acquired them.

In this case, the said start-up was AlertMe, funded by Centrica in 2010 in Series B and thereafter acquired by Centrica in 2015.

This fact is rather surprising, given that intuition leads you to thinking the complete opposite: investing in venture capital rounds helps the corporate investment fund to get to know and assess the start-ups better and, therefore, it would be expected that the buyers had been investors in previous rounds.

## Biggest buyers of start-ups and largest acquisitions















The biggest corporate investment fund buyer of start-ups was, by far, the British company **Centrica**, with 10 start-ups acquired since 2008, 6 of which correspond to start-ups dedicated to managing demand and client data analysis.

Other important buyers were the American electricity company **NRG Energy** with 5 purchases, 3 of which were Distributed Generation start-ups.

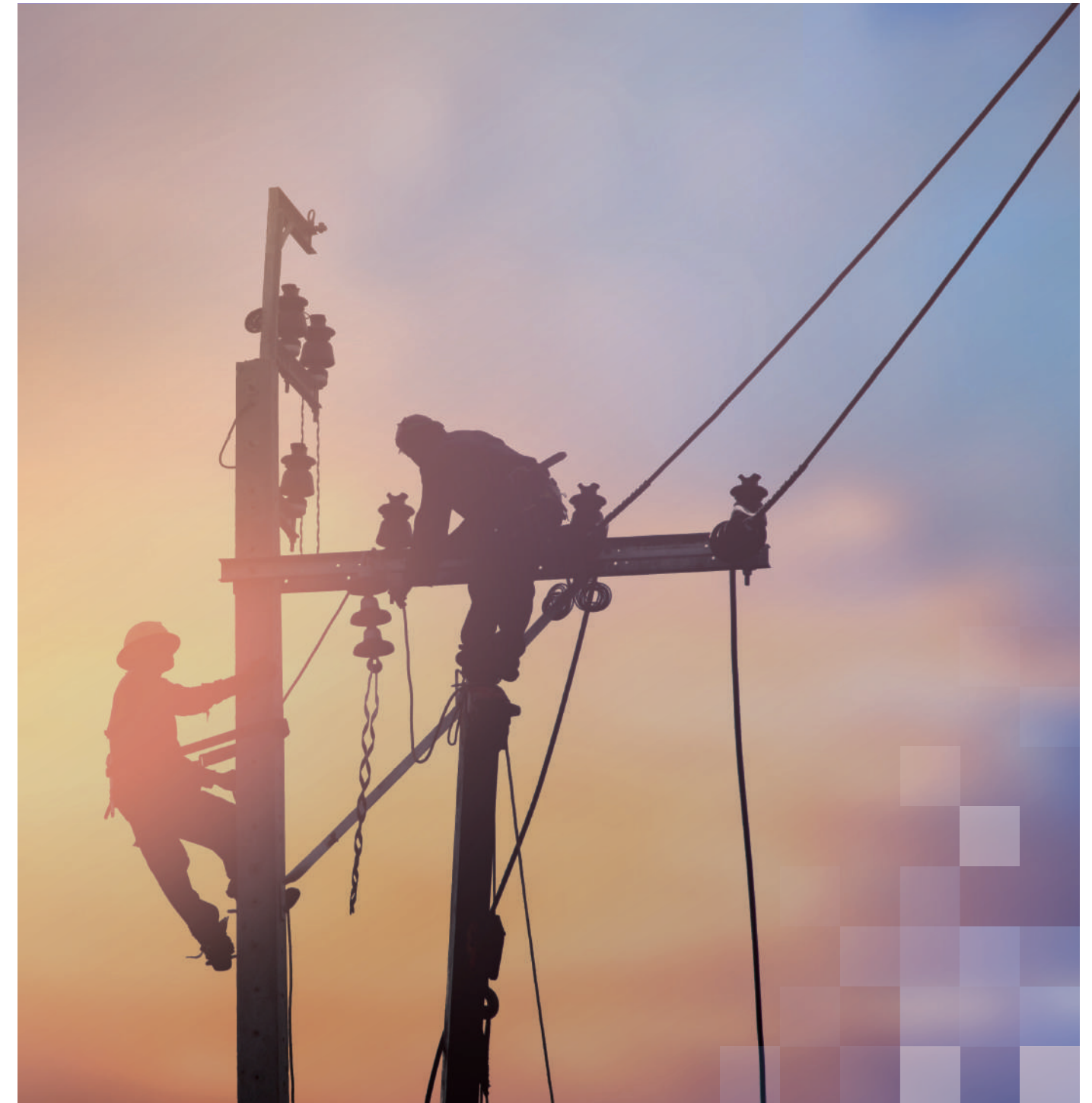
On analysis of the acquisitions by total amount, the largest acquisitions were those of **Power Secure** in 2016 (dedicated to Microgrid/Energy Management Systems) by the South American electricity company; **Green Mountain Energy**, dedicated to Distributed Generation, acquired by NRG in 2010; and the start-up **Enernoc**, acquired by Enel in 2017. These three acquisitions amounted to a total outlay of more than 1 billion US dollars.

Centrica was also amongst the top of the list of largest acquisitions, since 3 of the 7 largest acquisitions were made by this British electricity company, the first electricity company (alongside its American counterpart PG&E) in starting to invest, way back in 2000.

### Largest start-up acquisitions made by Energy CVCs (disclosed)

Acquired start-up	Purchaser	Transaction Price	Year Purchased	Opportunity Area
		431 \$M	2016	Micro-networks & Aggregators
		350 \$M	2010	Distributed Generation
		300 \$M	2017	Demand Management
		100 \$M	2015	Demand Management
		98 \$M	2010	Biofuel
		60 \$M	2015	Client data analysis
		46 \$M	2013	Demand Management

“The biggest corporate investment fund acquiring start-ups was the British company, Centrica”





# 05

## Recommendations

This section covers a series of recommendations based on the results obtained in this report, depending on the investment maturity of the corporations in the venture capital investment arena.

### Companies starting their activity

In the past the purpose of venture capital investment was for obtaining high return on the investment. However, it is worth recalling that **corporate venture capital investments do not follow investor rationale from this point of view.**

The recommendations that are presented herein below for those companies that are intending to enter in corporate investment are aimed at defining another, equally attainable, type of objective through this activity, as well as the resources and capacity needed to achieve them.

### Structure and organisation

Of course, return-on-investment is the most direct and measurable objective, though there are also other objectives that offer the opportunity to create value that must be considered when structuring and organising the corporate fund, and that are not always measured in terms of cash flow.

**Investment in corporate venture capital must always be aligned with the corporate strategy,** being the creation of value for the corporation as the ultimate objective.

The acquisition of technological know-how, the entry into new markets and/or businesses, and the acquisition of talent are some of the value contributions that are not directly reflected on the Income Statement and therefore the Organisation must be able to detect the same by implementing base performance indicators.

There are two possible ways of structuring the investment activity of a corporation:

- Through a **fund specific and proprietary to the corporation.**
- Through the participation in a **fund involving other stakeholders with whom they share a common interest.**



## Team profile

When organising the fund, first-level talent needs to be selected, with profiles that are both financial and strategic, as well as technological. They must have the necessary capacity to be able to assess in a flexible way potential investment in, or acquisition of, start-ups with the support from the different technological and business areas of the company.

It is essential **to form a team with an influential network of contacts, not only inside the Organisation, but also outside the same**, in order to have the capacity and tools necessary to source start-ups of potential interest to the corporation.

## Corporate Strategy

It is important to define within the directives of the Strategic Plan of the corporation the existence and priority of the different strategies. This has an influence on the type of start-ups that are being searched for.

- **Diversification strategies** focussing on those start-ups belonging to markets or sectors in which the company has an interest in entering.
- **Strategies based on the core business**, as for example those based on efficiency and/or technology, focusing their search on start-ups that are more closely related to the core business of the corporation.

## Innovation focal points

Having a network of contacts is essential, both inside the world of finance as well as the world of technology, that gives the fund the capacity and tools necessary to find, analyse, and subsequently invest in those start-ups that are of interest to the corporation.

In this way, the search for start-ups should not be limited to country or base region of the corporation, rather promoting presence in the hubs of the venture capital investment activity, such as for example innovation hubs, incubators, and accelerators.

Furthermore, **special attention needs to be placed on the geographic hubs where innovation ecosystems have evolved** around specific technological areas and emerging business models, such as for example in Texas and Norway, where a significant part of the oil-sector innovation has converged.

Other sources of open innovation to consider are the suppliers of the companies, both of services and equipment, as well as academic institutions and governmental bodies.

“Having a network of contacts is essential, both inside the world of finance as well as the world of technology.”

## Value proposal

Try and position the corporate fund so that it is perceived as being important, so that it attracts the best start-ups, by defining a clear value proposal, based not only on the perception of a capital partner, rather of a partner with the potential of being able to

offer specialist knowledge and experience, as well as having access to means, infrastructures and support that facilitate the optimal development of the start-ups and at the same time align the corporate interests with said development.





## Companies with investment activity

In light of the results obtained in this report, there are certain recommendations to consider for those corporations that report investment activity with respect to investment strategies, risk reduction and metrics to take into account when assessing return.

### Investment strategies

Depending on the type of the start-up, different investment strategies may be used to increase return, whether due to the incorporation of the start-up in the core business or through disinvestment of the same.

- The investment strategies **must be based on creating specific value** that the company can offer, leveraging its experience and any internal capacity that can create value for the start-up.
- Certain strategic investments require **resources and capacities that a priori are not achievable** by investment companies in their entirety.
- The strategic character of investments by corporate venture capital funds involve value creation per se, but as mentioned previously in the report, **the co-investment strategies enable them to maximise the value added to the start-up by combining the key competence of each investment partner**. By means of an example are the investments made by energy companies together with their equipment manufacturers and their service providers.

### Reduction of risks and maximising investment return

Corporate investments, as opposed to venture capital investments, pursue different objectives, the main difference being the search for synergy with the core business of the investing company.

**It is recommended collaborating with a start-up before making the investment**, whether through acceleration programmes or roll outs through pilot schemes. Potential synergies will be detected that can be assessed from a privileged position, being able to test in a flexible way the solutions proposed by the start-up in real-use cases. All this, without putting the core business of the company at risk, nor compromising the brand or relationship with clients, plus being able to acquire knowledge and even talent for the company.

The cost of not experimenting with new business models and new technologies needs to be considered, given that if the paradigm changes in an accelerated way, an extremely valuable opportunity may be lost to perform the transformation to the new business idea or technology, taking into account as well the new market that could be captured.

“Faced with a paradigm shift, the high costs of not experimenting with innovation needs to be considered”

Lastly, a balance needs to be made between investment in early rounds and investing in later rounds considering that the probability of success and survival of the start-up is greater in the later rounds, but in contrast its potential return is usually less.

### Measurement of investment return

Return-on-investment is typically calculated on the generated cash flow. However, the cash flows are not the only source of profit from investments in corporate venture capital. In general they are difficult to measure in accounting and cannot be turned into cash flows.

#### Training and attracting talent

The transfer of knowledge may happen either through collaboration in joint projects with the start-up, training events or direct transfer, such as for example through acquisition of the developed technology.

Start-ups are sources of talent, both in management and technological environments. Accordingly, there are numerous corporations who have integrated the human capital from the funded start-ups into the ranks of their management and researchers.

#### Innovative nature

Communicating investments in start-ups to capital markets may influence the analyst and investor perception of the innovation capacity of the corporation, or even on the competitive positioning of the corporation with respect to certain assets obtained from the start-up that may give them a competitive advantage. This appraisal may give rise to an increase in the share price in the long-term.

#### Impact on the Media

Some corporate venture capital investments have an impact on the Media that could be measured and construed as reducing the budget spent on corporate communication campaigns, in the same way that the impact of sponsored sports and cultural events are measured.







# EnergyTrends

INVESTMENT STRATEGY AND EVOLUTION  
OF CORPORATE VENTURE CAPITAL RISK  
IN THE ENERGY SECTOR

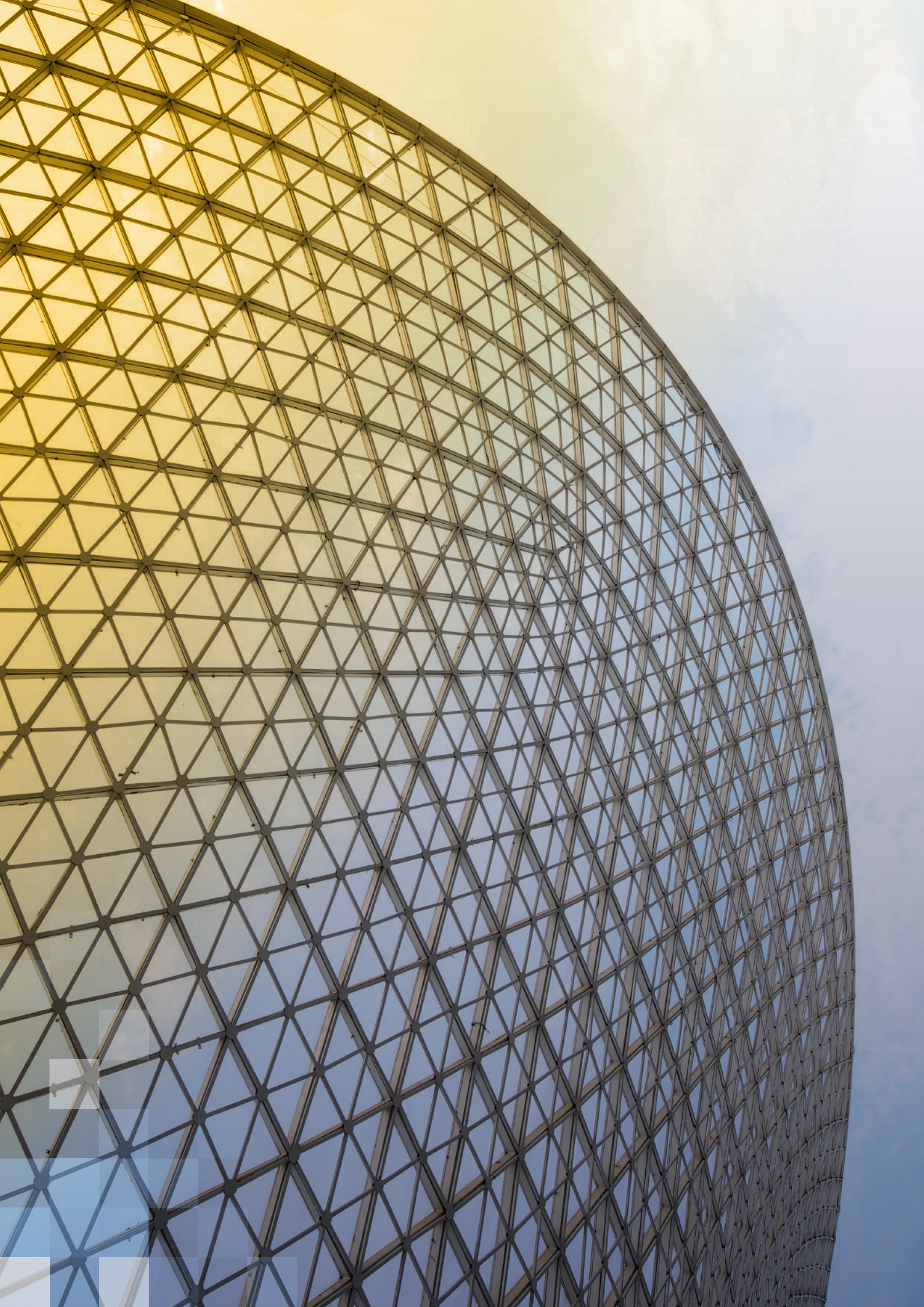
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