INSTITUTIONAL EQUITY INVESTMENT IN EU RENEWABLE ENERGY PROJECTS
Market Data and Investment Trends

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Infrastructure or “real assets” or “essential services” are increasingly attractive to global institutional investors, especially pension funds and insurance companies seeking to match long term liabilities with long-duration and often inflation-linked assets like transmission grids, airports, gas pipelines and water networks. Renewable energy projects, a subset of infrastructure which often benefit from long term contracts or tariffs, are also attracting significant institutional investor interest. Renewable energy projects offer many of the attributes of "core" infrastructure assets are increasingly competitive with conventional forms of power generation. Globally, renewables are the fastest growing source of new power generation capacity.

Renewable energy projects are emerging as their own investable asset class for institutional investors. This is not just speculation, but is a fact as evidenced by the strong growth in institutional investor investment in European renewables over the last 12 years.

This paper is based on both proprietary research by Two Lights Energy Advisors, Asper Investment Management and HgCapital tracking institutional equity investment in EU renewable energy projects from 2004 through 30 September 2016 and Bloomberg New Energy Finance data on overall EU renewable energy investment. The research shows that institutional investors are taking a larger share of a maturing to slowing market, and offers insight into how differing investors approach the sector – technology, geography, project stage. The analysis should provide guidance to investors and policy makers.

The highlights of our research are:

- Institutional equity investment in EU renewable projects has increased from less than €300 million per year in 2004 to over €8 billion per year in 2015, a compound annual growth rate exceeding 40%.
- Since 2010 the growth in institutional equity investment in European renewables comes despite falling overall growth in the market. According to Bloomberg New Energy Finance (BNEF), annual investment in EU renewables since 2012 has averaged 18% below the 2011 levels. 2015 saw an uptick in investment, driven by a very high level of M&A activity in existing assets, while construction of new assets continues to lag. The first three quarters of 2016 suggest that investment will fall. This is due primarily to regulatory, political and macro-economic risks in Europe.
- Since 2012, the UK and Germany have accounted for over half of EU renewable energy investment overall, and 60% of institutional equity. The UK alone has averaged over 50% of institutional equity investment in the last three years. This is not surprising given the strong legal and regulatory frameworks and macroeconomic conditions in Europe’s two leading economies.
- To a surprising extent, through 2015 investment remained robust despite ongoing regulatory changes. However, when the changes are substantial and retroactive, or where support for new projects is abruptly removed, new investment comes to a virtual halt, as has been the case in Spain, Italy, Czech Republic, Bulgaria, Romania and Greece. With Brexit and the EU shifting toward auction based systems for renewables, 2016 investment is
- Nearly €30 billion in equity has been invested in EU renewable projects that have a combined debt and equity value in excess of €80 billion.
- Onshore wind, offshore wind and Solar PV account for over 90% of institutional investment, 43%, 27% and 20%, respectively. Offshore wind investment has accelerated dramatically in since 2014.
- The number of active renewable energy investors has increased from less than 10 in 2004 to over 100 today, with direct investment (as opposed to investment through funds) by pension funds, insurance companies and listed “Yieldco” funds the fastest growing sources of new capital.
The overall and institutional equity investment pace in the EU has fallen in 2016, and is likely to continue to fall. In our opinion this is due the EU’s regulatory and macroeconomic uncertainty, which is resulting in fewer new projects being built; a trend that we expect to continue into 2017 and possibly beyond.
The data sample:

The database was started by the author in 2008 when he was leading the renewable energy team at HgCapital, and where he now serves as a senior advisor. Today the database is jointly maintained by Two Lights Energy Advisors, Asper Investment Management and HgCapital. The database covers institutional equity investments in EU renewable power projects from 2004 through 30 September 2016, and covers over 750 separate transactions by more than 150 financial investors accounting for over €33 billion of equity invested and over €81 billion of Enterprise Value. We have not sought to track every investment by every small family office or insurance company, but we have focussed on the major investors. The investors, listed in the following table, include infrastructure funds, renewable energy funds, private equity funds, hedge funds, the UK Green Investment Bank and direct investors such as pension funds, insurance companies and family offices.

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### YieldCos
- Abengoa Yield
- Bluefield Solar
- Capital Stage
- Foresight Solar
- Greencoat Wind
- John Laing Environmental Infrastructure
- Next Energy Solar
- The Renewable Infrastructure Group
- Saeta Yield

### Other
- UK Green Investment Bank
- B Capital
- Capital Dynamics
- Chorus
- CIP
- Eliot Capital
- Eternity Capital
- GCC Private Wealth
- Chistofferson Robb
- EcoFin
- Gravis Capital
- Marguerite Advisers
- Partners Group
- Skandia

### Private Equity Funds
- Blackstone
- Bridgepoint
- Bregal
- Englefield Capital
- Good Energy/Magnetar Capital
- Oaktree
- Magnum Capital
- Mercapital
- Warwick Capital

The investments tracked are in the EU 15 plus Norway, Switzerland, Poland and Bulgaria. There are additional investments in Czech Republic, Romania and the Baltic States that are not tracked.

The data is sourced from press releases, investor websites, investor conference presentations and data sources such as Bloomberg New Energy Finance, NewNet and Cleantech Pipeline. Deal values are based on disclosed data, or estimates made by Two Lights Energy Advisors, Asper Investment Management and HgCapital based on their own experience and market comparables.

### BLOOMBERG NEW ENERGY FINANCE DATA

For overall investment in EU renewable energy infrastructure, we use deal and investment data compiled by Bloomberg New Energy Finance (BNEF) for the EU28, Norway and Switzerland. The dataset selected is categorized by BNEF as “Asset Finance”, which covers renewable energy and related infrastructure projects such as offshore wind grids. It excludes IPOs, Venture Capital and government grants. Within the Asset Finance category, there are three sub-categories: (i) “New Build”, which refers to capital committed to build new renewable energy projects, including both debt and equity, (ii) “Refinancing”, which refers primarily to the refinancing of bank or other debt used to build renewable energy projects and generally is used by existing and not new projects, and (iii) “M&A”, which refers to the purchase and sale of existing renewable energy projects, which would include among other things the purchase of operating projects by Yieldcos and the sale of majority or minority interests in offshore wind projects by utilities. The investments come from all sources, debt, equity, utility and strategic investors, financial investors, banks, pension funds, private equity and infrastructure funds and the like.

The BNEF data is reported in US Dollars and is reported on a quarterly basis. For this report, the US Dollar investment is converted into Euros at the average exchange rate for the quarter in which the investment is reported.
THE RESULTS

Overall Institutional Equity Investment

From 2004 through 30 September 2016 institutional equity investment in EU renewable projects increased from less than €300 million per year to over €8.0 billion per year in 2015, for a total of over €33 billion of investment and a greater than 40% compound annual growth rate. The data reflects equity investment only. A majority of assets are also financed with project finance debt. The combined debt and equity value of the assets is estimated to be at least €80 billion. The slowing investment pace in 2016 is correlated to and consistent with the falling overall pace of investment in the EU renewable infrastructure market, which is due to continuing macroeconomic (low growth), regulatory (retroactive policy changes) and political (Brexit) issues facing Europe.

Total Capital Invested in EU Renewable Energy Projects by Financial Investors
1 January 2004 – 30 September 2016 (€m by year)

The 2011 spike was due to three principal factors:

2. Two large offshore wind projects which were financed on an ungeared all-equity basis.
3. Increased renewable energy activity by large EU infrastructure funds nearing the end of their investment period at a time when there were few core infrastructure opportunities.

2012 saw a return to a more normal growth pace. The growth since 2013 has been largely driven by offshore wind investments by financial investors. Though offshore wind is small by the number of deals, each deal tends to be large and, following the wider infrastructure trend to less-geared structures, they involve less debt and more equity. They appeal to very large pension funds and insurance companies who are seeking to invest large infrastructure allocations.
Overall Investment in EU Renewable Energy Assets

Investment in EU renewable energy projects peaked in 2011, showing strong resilience in the immediate aftermath of the 2008 financial crisis. Investment fell in 2012 and again in 2013, staging a slight recovery in 2014. 2016 investment reached a record high, driven mainly by offshore wind deals. 2016 investment is slowing due to political, regulatory and macroeconomic concerns.

Total Investment in EU Renewable Energy Projects by Style
1 January 2007 – 30 September 2016 (€m by year)

From 2006 through 2011 Spain was the second largest renewable energy market in Europe, behind Germany. Following a series of retroactive changes starting in 2010, investors have shunned Spain and new project investment is virtually nil.

Since 2012, the UK has been the single largest market, accounting for nearly 50% of investment activity. This has been due to its attractive and historically stable regulatory framework and its world leading status in offshore wind projects, which typically cost €800-1,000 million. The economic issues facing Southern Europe, especially Greece and Italy have led to a slowdown in investments. Similarly, Nordic investment has slowed due to low power prices occasioned by lower electricity demand due to low industrial activity.
Institutional Equity Share of Total Investment

Merging the HgCapital data with the BNEF data, we can clearly see that institutional investor equity is increasing as percentage of total investment, growing from a little over 1% in 2007 to 13.5% in 2014 and 17.5% in 2015 to date.

Financial Investor Share of Total Investment in EU Renewable Energy Projects
1 January 2007 – 30 September 2015 (% by year)

Onshore wind has attracted the most capital, accounting for nearly 45% of total institutional equity capital invested, followed by offshore wind and solar PV. However, in recent years offshore wind has attracted more investment, and could be poised to overtake onshore wind if the trend continues. Other renewable technologies, such as hydro, geothermal, solar thermal and biomass, are small. The allocation to onshore wind, offshore wind and solar PV reflects the mature and proven nature of those technologies.

Equity invested by Financial Investors in EU Renewable Energy Projects by Technology
1 January 2004 – 30 September 2016 (€m by year)
**Countries**

The UK has emerged as the leading destination for investment followed by the Germany, Spain, France and Italy. Since 2012 the UK, driven by offshore wind investment, has accounted for 51% of all EU institutional equity investment. With the recent regulatory uncertainty in Southern Europe, Spain, Italy and other countries will see very little new investment. The investment allocation of countries reflects a combination of stable regulatory regimes (e.g. Germany and France, Italy, Germany, France and the UK) and strong growth markets for new projects (e.g. Spain, UK, Italian solar). As we will see later, investment is also skewed to those countries that offer feed-in tariffs in contrast to market-based green certificate regimes.

*Equity invested by Financial Investors in EU Renewable Energy Projects by Country*
*1 January 2004 – 30 September 2016 (€m by year)*
Relative activity by investor type

Since 2011 direct investors such as pension funds and insurance companies have grown dramatically, and now account for 31% of all institutional equity committed since 2004 and 34% since 2011. Direct investors are followed by general infrastructure funds and listed “Yieldcos”. Before 2011 dedicated unlisted renewable energy funds like HgCapital were the dominant investors. Listed Yieldcos have come on quickly, accounting for 13% of investment since 2004 and 15% of investment since 2011, but it is unclear if they will continue to grow as the several new listings have failed and in the USA Yieldcos have fallen out of favour with investors.

Equity invested by Financial Investors in EU Renewable Energy Projects by Investor Type
1 January 2004 – 30 September 2016 (€m by year)

Investment by risk appetite

Renewable energy projects have four phases:

- Development - evaluating the sites and getting the necessary permits.
- Pre-construction - arranging the detailed layout of the site and securing all necessary contracts and agreeing the construction schedule.
- Construction - actually building the project.
- Operations.

Each phase has its own risks, with development being the most risky and operations the least risky. The development phase is the least capital intensive, with the construction phase the most capital intensive. An analysis of the database shows how the €33+ billion has been invested against these categories.

Sources: Two Lights Energy Advisors, Asper Investment Management, HgCapital
Equity invested by Financial Investors in EU Renewable Energy Projects by Project Phase
1 January 2004 – 30 September 2015 (€m by year)

- **Construction Risk** refers to where the investor commits capital and takes risk of construction delays and cost overruns.
- **Operating** refers to projects that have been operating for at least 12 months after completion of construction.
- **No Construction Risk** refers to situations where the investor commits capital subject to completion, with another party taking cost overrun, delay and performance risk.
- **Operating and Development and Construction and Development** refer to a limited number of transactions in which investors acquire businesses with both operating assets and a pipeline of projects under development or assets under construction and pipeline of assets under development.
- **Development** refers to investing before construction permits are granted.

Operating projects or projects that have completed construction are overwhelmingly favoured by investors, accounting for 72% of all institutional equity capital since 2011. Development investment, on the other hand, is the least favoured. Construction capital has remained relatively steady, but it suggests that lack of construction risk appetite may be stalling projects. The number of investors that will invest in completed projects is substantially greater, with over 100 active investors. About 40 investors consider construction risk and fewer than 15 financial investors currently support project development.

In 2016 development investment dropped to virtually zero. This is due to the changing nature of renewable support in the EU, which is moving from unlimited feed in tariffs and green certificates available to all projects, to auction based systems in which limited capacity is offered and prices are bid. This increases development risk for failed bids.

Sources: Two Lights Energy Advisors, Asper Investment Management, HgCapital
**Investment by style**

Institutional investors prefer investing directly in projects as opposed to investing in companies, listed or unlisted, that may hold projects in addition to development activities. Direct project equity accounts for 91% of institutional capita since 2004, and 94% since 2011.

**Equity invested by Financial Investors in EU Renewable Energy Projects by Style**

1 January 2004 – 30 September 2016 (€m by year)

![Investment by风格](image)

Sources: Two Lights Energy Advisors, Asper Investment Management, HgCapital

**Investment by Revenue Risk**

Finally, revenue source is a risk. In Europe, renewable projects have been supported through two mechanisms:

1. **Feed-in tariffs** where a fixed payment is made for a fixed duration for every unit of electricity produced, and
2. **Green Certificate** systems where the projects receive the market price of electricity plus a premium in the form of a saleable Green Certificate. The Green Certificate systems come in two varieties, one where the price is fixed like the UK and Italy, and the other where the price floats like Poland and Scandinavia.

In the following chart:

- **Feed in Tariff** refers to projects with fixed tariffs (e.g., Germany, Italian Solar, Spain, UK small solar)
- **Semi-Merchant** refers to projects that have a fixed green certificate price but are exposed to power price risk (e.g., UK onshore and offshore wind, large scale UK solar, Italian Wind)
- **Merchant** refers to projects where both power and green certificate prices are exposed to market risk (e.g., Sweden and Norway).
Through 2012, investors clearly favoured feed in tariffs. The explosion of investment in “Semi Merchant” starting in 2013 is attributable to strong investment interest in UK onshore and offshore wind, supported mostly by ROC projects. This is reflected in several large investments by UK listed Yieldcos in existing onshore wind projects, and pension funds and the UK Green Investment bank in offshore wind projects. This coincided with financial difficulties, retroactive changes and withdrawal of tariffs in Southern Europe – Spain, Italy, Greece, Bulgaria and Romania. It also reflects investor confidence in the UK market, especially for the regulatory and legal stability that it has offered.

In 2015 and 2016 there has been substantial growth in Merchant investments in Sweden and Norway. This is driven by several factors:

- Large-scale projects (150-500MW+) using the latest, lowest cost technologies at scale driving the “levelized cost of energy” of Nordic wind to below €50MWH, making Nordic wind the least cost in Europe;
- Increase in the number of investors seeking to invest large tickets;
- Nordic utilities and corporates offering long-term power purchase agreements to mitigate price risk;
- An increasing belief among investors that Nordic power prices are at the bottom of a cycle and there is upside from rising costs.
Risk appetite by type of investor

Returning to our four stages of a project, we can look at where individual classes of investors invest.

Direct investors (pension funds, insurance companies, listed Yieldcos) generally take no construction risk, either buying operating projects or agreeing to acquire projects once they have been constructed and are operational.

Equity invested by Direct Investors in EU Renewable Energy Projects by Risk Profile
1 January 2004 – 30 September 2016 (€m by year)

Sources: Two Lights Energy Advisors, Asper Investment Management, HgCapital

General infrastructure funds favour operating assets, but they will take construction risk from time to time.

Equity invested by Generalist Infrastructure Funds in EU Renewable Energy Projects by Risk Profile
1 January 2004 – 30 September 2016 (€m by year)

Sources: Two Lights Energy Advisors, Asper Investment Management, HgCapital

Historically, unlisted renewable energy and private equity funds provided the most construction capital. In recent years, however, they too have focused increasingly on operating assets.
Equity invested by Unlisted Renewable and PE Funds in EU Renewable Energy Projects by Revenue Source
1 January 2004 – 30 September 2016 (€m by year)

The investor ecosystem

The data shows that there is an emerging an ecosystem of investment in EU renewables. It is one in which private equity funds, dedicated renewable energy fund specialists, and large strategic developers such as Nordic utilities take the early stage risks of developing, building and de-risking projects. Once de-risked, they become attractive investments for pension funds, insurance companies, listed Yieldcos and generalist infrastructure funds who are seeking stable but lower yields. This is not very different from how the commercial real estate business works where private equity type funds develop, build and lease out new properties which are then sold on as cash flowing investments to pension funds, real estate investment trusts and other long term investors.
The long-term data shows strong growth in institutional equity investment in EU renewable energy projects, both in the number of investors and in the amount of capital committed. We do not track data for other markets, but anecdotal data and perusing of news sources, such as Bloomberg New Energy Finance, New World Energy Network and Clean Tech Connect, indicates that institutional capital well aware of global investment opportunities in renewable energy infrastructure.

But this strong growth in institutional equity investment in Europe must be weighed against a falling market. Overall, investment in new renewable energy projects is down, due primarily to investor concerns over EU political, regulatory and macroeconomic risks. For example:

- Countries like Spain, Italy, Greece, Czech Republic and Bulgaria which have made retroactive cuts to tariffs for existing projects have seen investment in new projects drop to nil. There is some appetite among distress investors to acquire operating assets in those markets, but it is limited.

- Countries that have abruptly removed renewable support programs, or made drastic cuts in tariffs for new projects have seen substantial falls in investment. This would include Spain, Belgium and Finland. There is often a lag in the fall in investment, as project sponsors rush to complete projects before tariff deadlines. It will be interesting to see what happens to investment levels in the UK given the announced reductions in tariffs and early closure of the renewable obligation.

- Sluggish economic growth and flat to falling electricity demand in most of Europe create concerns for some investors who worry about long-term competitiveness

- The UK “Brexit” vote increases political and economic risks, and some investors are sitting on the sidelines until the picture becomes clearer.

- The EU’s move from feed in tariff schemes open to all projects regardless of economy or need is being replaced by auction systems with capacity caps. This is limiting the number of new projects and increases risks on developers that they may not be able to secure acceptable tariffs, or any tariff at all, to support their projects, reducing the supply of investible projects.

- There will likely be a pause in Yieldco investment, as the market has turned against them, at least for the moment. This means that most institutional investment is likely to come from pension funds and insurance companies investing directly.

- Given the strong institutional preference for operating assets and a limited tolerance for construction risk, there is a risk that there is insufficient development and construction equity. To date construction has been financed by specialized funds and utilities, which have been able to recycle capital. Development capital has always been hard to procure. With falling tariffs and support, it could be that development is viewed as too risky, which could lead to a shortage of future projects.
About the author

Tom Murley has been a leading investor in renewable energy projects for over 25 years. He has been involved in the debt and equity financing of over 100 renewable and conventional energy projects in the United States, Europe and Central America with a combined capital value in excess of $10 billion. From 2004 to 2016 he founded and led the renewable energy investment team at HgCapital, heads the renewable energy team at HgCapital, one of Europe’s leading private equity houses. During his tenure at he guided HgCapital through two fundraisings which secured over $1 billion in capital from over 30 leading global investors, and investing over $700 million in equity in over 50 EU wind, solar and hydro projects. In 2016 Tom became Senior Advisor and Chair to the HgCapital renewables business, simultaneous with the announcement the staged-spinout of the HgCapital renewables business to the team that Tom created, which will be branded Asper Investment Management, which Tom also chairs. The spinout is expected to be complete at the end of 2017.

Tom is the principal consultant of Two Lights Energy Advisors, which offers bespoke investment and strategic advice to institutional investors in the global energy infrastructure markets, with a special focus on offering “investment committee” level advice on investment strategies and individual investment opportunities. In 2012He was named to the inaugural board of directors of the UK Green Investment Bank, where he sits on the investment committee. In 2016 he was elected to the Board of Ameresco, Inc (NYSE: AMRC), a leading energy services and energy solutions company. Tom also serves as a Director of the Institutional Investors Group on Climate Change and has previously served as a Director of the Norwegian Wind Energy Association. He Chaired the Clean Tech Committee of the British Venture Capital and Private Equity Association and was the co-founder and co-Chairman of the Low Carbon Finance Group, a UK-based consortium of experienced energy financiers who advise policymakers on structuring energy policy and regulation to attract institutional investment. He is a qualified lawyer and holds degrees from Northwestern University and Fordham University School of Law.