

The Financialisation, Marketisation & Privatisation of Renewable Energy

626 transactions in global
renewable energy secondary
market in 20 months cost
US\$289bn

Strategies for public ownership

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This report is based on the [ESSU Global Renewable Energy Secondary Market Transactions Database, 2020.](#)

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Abbreviations

AB	Akietiebolag (limited company or corporation in Sweden)
AES	US electricity company
AG	Aktiengesellschaft (Public Company in Germany)
A/S	Aktieselskab (Public Company in Denmark, Sweden & Norway)
BP	British Petroleum
B.V.	Besloten Vennootschap (private limited company in Netherlands)
DIF	Investment company based in Netherlands
EDF	Electricite de France
EDP	Energias de Portugal
ENEL	Italian multinational energy company
ESG	Environment, Social and Governance
ESSU	European Services Strategy Unit
EU	European Union
GmbH	Gesellschaft mit beschränkter Haftung (Private limited company in Germany)
GW	Gigawatt
IFC	International Finance Corporation
Inc.	Incorporated
JVC	Joint Venture Company
KKR	Kravis, Kohlberg & Roberts (Private equity company)
LLC	Limited Liability Company
LLP	Limited Liability Partnership
LP	Limited Partnership
LTD	Limited
MW.	Megawatt
NV	Naamloze Vennootschap (Limited liability public company in Netherlands & Belgium)
PLC	Public Listed Company
PPA	Power Purchase Agreements
PPP	Public Private Partnership
PV	Photovoltaic
RWE	German electricity company
S.A.	Soci.t. Anonyme (public company in France, Spain, Latin America)
SGR	societa di gestione del risparmio (asset management company in Italy)
SpA	Societa per azioni (Company with shares in Italy)
SSE	Scottish and Southern Energy
TUED	Trade Unions for Energy Democracy
UAE	United Arab Emirates
UK	United Kingdom
US	United States

Currency exchange rates to US\$ used in Part 3

Aust \$	x 0.735497
Euro	x 1.19066
Brazilian Real	x 0.185337
Canadian \$	x 0.765295
Indian Rupee	x 0.0136922
UK £	x 1.33679

Rates on 1 September 2020

Introduction

This research report and database builds on *Equitable Recovery Strategies: Why public ownership and democratic control must be at the heart of Green and Integrated Public Healthcare Deals*, European Services Strategy Unit Research Report No. 11 (Whitfield, 2020b).

Political economy perspective

But the secondary market is more than the sale of wind farms, solar, hydro or battery projects. In reality it is an integral part of the structure of a market system and serves a particular set of functions to serve the interests of banks, other financial institutions and renewable energy companies. Neoliberalism advanced financialisation, marketisation, individualisation and privatization of the state sector as a driving force for the economy rooted in markets and capitalist accumulation (Whitfield, 2020a).

The market provides a mechanism for investors to extract profit at the development or operational stages of renewable energy projects. The private sector developer role, comparable to the property market, enables investors to maximise profits once land acquisition, regulatory approval and a Power Purchase Agreement are secured. This process enables utility and petroleum companies to ‘shop’ around to buy ‘ready to build’ renewable energy projects without committing to creating permanent in-house development capabilities.

Renewable energy electricity generation is largely in the control of finance capital and market forces so, that by 2050, generation, distribution and supply could be substantially owned and controlled by the private sector. The multinational fossil fuel companies will either be ‘transformed’ into ‘new’ monopolies or replaced by a new set of multinational companies that operate in the same way. Most will claim ESG (Environment, Social and Governance) good practice but meaningful equality, employment, participation and transparency criteria are missing or marginalised.

For example, the role of the US bank J.P. Morgan Chase & Co, in particular its subsidiary, J.P. Morgan Asset Management, illustrates how finance capital has been able to create powerful influence, if not control, of key renewable energy companies accompanied by the use of tax havens.

Challenges and opportunities

Economic Recovery Strategies detailed the policies and strategies needed for economic recovery, particularly the role of public ownership and operation in the economy and renewable energy. Unfortunately, Green New Deals, as presently constructed, will not be a solution to the key issues regarding the secondary market. They generally lack specific proposals that will challenge the current ownership and control by finance capital and private renewable energy companies.

The proposed European Union Green Deal and European Investment Bank multi-billion funding and loan facility to the public sector in the 27 member states must provide access to finance public ownership and operation of renewable energy projects and to increase regulation of the largely private sector dominated current projects.

Structure of the report

Part 1 sets out the research objectives, describes the political economy of the renewable energy secondary market and its participants. This section makes the case against a secondary market and outlines the methodology adopted in compiling the database.

Part 2 tracks the global dimension of transactions and details the flows between countries and regions from Germany, India, Brazil, Canada, Australia and the UK. It examines the dominant role of private equity firms and transactions by major utility and petroleum companies. The wide use of tax havens is revealed, together with an example of how a US bank is embedded in the

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renewable energy sector. This part concludes with a cost estimate of the 626 transactions together with an analysis of the limited role of the public sector in renewable energy as reflected by the secondary market.

Part 3 makes the case for the public policy agenda to change from general demands for climate action and targets to those that focus on *how* the targets are going to be met and to rapidly increase public provision of power generation. It sets out proposals to significantly increase public ownership and operation of renewable energy projects and to increase the scope and powers of regulatory frameworks.

This report draws heavily on the companion [ESSU Global Renewable Energy Secondary Market Transactions Database, 2020](#).

Summary of findings

The research identified 626 renewable energy secondary market transactions in the global economy in a 20-month period between January 2019 and 31st August 2020 (326 transactions in 2019 and 300 in the first 8 months of 2020). They primarily reflect the sale of wind parks, solar farms, hydro, biomass, energy-from-waste and battery storage projects that are at the development, construction or operational stage.

Table 1: **Global overview of renewable energy transactions in 20 months**

Key Findings	
Total transactions	626
Cost	US\$289bn
Total megawatts	300,000
% private equity	34%
% public sector	4% of MW or 4.4% of transactions

Source: ESSU Global Renewable Energy Secondary Market Transactions Database, 2020.

If the current rate of transactions increases 10% annually in the next ten years and assuming an average 1% increase in inflation, there could be nearly 10,000 transactions at a cost of US\$4,825bn.

The scale of transactions is a direct reflection of the extent of private sector ownership and operational control of renewable energy projects. Governments and public sector companies accounted for only 4.4% of these transactions which reinforces the evidence that the ownership and operation of the renewable energy sector is dominated by the private sector.

Governments and public authorities are involved in renewable energy policy making, auctions of project sites, approving planning permission, subsidies and guarantees intended to attract private investment. The World Bank, the International Finance Corporation, regional development banks and overseas aid agencies provide direct finance or loans to similarly attract private investment in the global south. It is a repeat of the corporate welfare role which became common in other sectors over the last 40 years.

Other key findings include:

- Transactions were concentrated in Europe and North America which account for 315 and 179 transactions respectively and virtually the same level of 98,000MW but includes transactions in Asia, Latin America, Africa and Oceania.
- Private equity funds were involved in 159 transactions acquiring renewable energy assets and 53 transactions in selling assets.
- Utility companies were involved in 44 transactions where they purchased renewable energy assets and 18 where they sold assets.
- Petroleum companies were involved in 16 acquisitions and 7 transactions where they sold assets.
- 140 transactions involved a parent company or subsidiaries registered in tax havens.
- 38 assets were acquired into public ownership (15,270MW), 14 assets were privatised (14,504MW) and 14 assets were transferred between public authorities (5,175MW) – there was a net gain in the number assets transferred to the public sector there was only a small gain in the level of MW.
- There was a wide variation in type of projects (wind, solar, hydro, biomass, energy from waste, battery storage) size (1MW - 10,000MW) and cost (€1.1m – US\$4,668m) of transactions.

Increase publicly owned and operated renewable energy generation

1. Prioritise publicly financed renewable energy generation in industrialised countries and with a wider generation, grid and supply in developing countries.
2. Increase direct public investment in new renewable energy projects and retain them in public ownership and operation.
3. Agree selective public acquisition of renewable energy assets by negotiation or via nationalisation. All future public financial support must be conditional on binding agreements that give the public sector the first option to acquire the project in any future sale of the project.
4. Increase public sector in-house capabilities to plan, develop and operate renewable energy projects. A decommodification process (redesign of services, jobs, regulations, democratic accountability, participation and disclosure) in government and public authorities should be combined with the adoption of radical public management committed to public ownership and provision. This would terminate the financialisation, marketisation, individualisation and privatisation processes and significantly improve the quality of public services and terms and conditions and training of public employees (Whitfield, 2020a).
5. Ensure regeneration and development plans, strategies and retrofitting housing programmes include new publicly owned and operated renewable energy projects.
6. Classify renewable energy assets as public goods and align with public service principles and values.
7. Maximise local and regional economic development and employment opportunities created by the construction, production and operation of renewable energy projects and make quantified proposals a condition of regulatory approval and any direct or indirect public financial support.
8. Ensure that innovative and technological developments are harnessed to meet collective social, economic, environmental and power generation needs instead of driving market forces and profit maximisation.
9. Demand more stringent policies that ban the use of tax havens for the finance and ownership of renewable energy projects.
10. It is imperative that Green Deals contain detailed proposals to address the operation and impact of the secondary market in renewable energy projects within nation states and internationally.

These proposals are set out in Part 3 with strategies to widen the scope and powers in regulatory frameworks to increase democratic accountability, obtain greater local/regional economic and employment benefits from renewable energy investments.

It proposes the establishment of a National Renewable Energy Agency to strengthen economic linkages between projects and local/regional economies, coordinate research and innovation and to address training and skills development.

Part 1

Renewable energy secondary market

Research objectives

The research into the scale and impact of the renewable energy secondary market has five key objectives:

Firstly, to investigate the global scale of the sale of renewable energy assets such as wind, solar, hydro, biomass, energy-from-waste and battery storage projects, plus joint ventures, mergers and takeovers of renewable energy companies and support services in the secondary market. The scale and extent of this market has been significantly under-reported. At a time of widening commitment to renewable energy it is essential to assess the long-term impact of current trends. The scale of the renewable energy secondary market was reported briefly in *Equitable Recovery Strategies* published in June 2020 making exposing the extent and scale of the secondary market a priority.

Secondly, to expose the increasing and extensive role of the private sector, particularly private equity funds, in the renewable energy sector. This has far-reaching implications that could lead to the replacement of the current corporate ownership and control of the fossil fuel industry in the renewable energy sector by 2050 or earlier.

Thirdly, to reveal evidence of the limited role of the public sector in the finance, ownership and operation of renewable energy projects. There is a dearth of evidence about the secondary market in renewable energy and a degree of confusion in the public sector and trade union movement over the actual role of the public sector in the renewable energy industry. Public ownership to date is largely limited to a few publicly-owned utility companies and a small number of public authorities.

Fourthly, the existence of a secondary market reinforces market relations in renewable energy which pre-determine the future structure of electricity generation, ownership and democratic accountability.

Finally, to compile a public database based on corporate data including renewable energy company regulatory news announcements, corporate press releases, company annual reports, supported by industry news bulletins and annual global reviews by international agencies.

Political economy of the secondary market

The secondary market is a direct consequence of the reliance on private finance and market forces with capital accumulation an inevitable driving force. The ideology of free trade, competition, markets, deregulation and a focus on outcomes (whilst marginalising the quality of inputs, processes and outputs) is aligned with attempts to reconfigure the role of the state, cut taxes, reduce the cost and power of labour, marginalise equalities and social justice. The secondary market is largely unregulated, although many transactions require regulatory approval. This varies between countries.

A political economy of privatisation framework (Whitfield, 2020) is built on the concepts of accumulation by dispossession (Harvey, 2003) and the primary and secondary circuits of capital (Lefevvre, 2003). It draws on the evidence of the processes of financialisation, marketisation and individualisation which have a critical role in facilitating different forms of privatisation. Equally important is the existence of national and global companies and investment funds (such as sovereign wealth, pension, insurance, private equity and infrastructure funds) willing to participate in the privatisation process. Their participation is contingent on the availability of public subsidies, guarantees, grants, tax concessions and favourable regulatory frameworks.

A secondary market in renewable energy operates for the benefit of financial and business interests. The market provides capital with an opportunity to exit the market by selling part or all

of an asset to maximise accumulation, reduce risks and to redirect investment to other more advantageous forms or locations for investment. It also facilitates mergers and acquisitions to execute corporate strategies for increasing market share, target companies that have adopted innovative practices and/or have high levels of business performance. The secondary market facilitates companies to create joint venture projects that operate via special purpose companies.

The market enables developers of renewable energy projects to plan, design, secure planning and regulatory approvals and negotiate Power Purchase Agreements to secure a long-term purchaser of the electricity to be generated and then to sell the project prior to construction. This avoids responsibility for construction risks and management of the procurement process. The developer role enables utility and petroleum companies and private equity funds to buy 'ready to build' renewable energy projects.

In addition, the market provides a marketplace for outsourcing companies, renewable energy companies seeking to broaden their range of support services and the promotion of innovative methods to improve the monitoring and performance management of projects. It also attracts institutional investors such as private equity funds, pension funds and sovereign wealth funds in anticipation that projects deliver good quality and secure long-term returns. This is particularly the case where investors can avoid development and construction risks and buy operational wind, solar and hydro projects.

Finally, a secondary market is a vehicle for developers and renewable energy companies to extract increased value of a project as a consequence of increased generation capacity and/or demand for a certain type or location of operational renewable energy projects.

Key participants

There are four direct participants - renewable energy developers and operators, financial organisations, manufacturers and governments and public authorities. The workforce, electricity users and local economies and communities are impacted but rarely, if ever, have an opportunity to participate in secondary market decision making.

Developers and operators: Renewable energy companies build, operate and maintain onshore/offshore wind, solar, hydro, biomass, battery storage, energy from waste and hydrogen projects. They include subsidiaries of utility and fossil fuel companies, subsidiaries of private equity funds, some are listed on stock exchanges whilst others are private companies that frequently focus on one type of renewable energy, for example, wind, solar or hydro and joint venture companies or partnerships. However, they outsource many developer, construction and operational functions.

Financial organisations: Private finance can be raised from renewable energy investment funds, private equity funds, infrastructure funds, insurance and pension funds, sovereign wealth funds and international organisations such as the World Bank, International Finance Corporation, regional development banks and oversea aid agencies. This includes secondary funds operated by private equity and infrastructure funds that raise capital from investors to specifically engage in buying and selling secondary market renewable assets. Private equity funds can be recognised by the use of Capital and/or Partners, LLP and LP in the company name. Other companies range from public limited companies with shares listed on stock exchanges, privately owned and state or municipal owned companies. Pension funds are increasingly active participants in funding primary and secondary market renewable energy projects, thus reinforcing private sector ownership and operation of renewable energy projects. An uncritical OECD analysis stated that government should support primary and secondary markets:

“...much of this secondary market activity is fuelled by increased investor appetite for operational projects. For example, in the renewable energy sector, the increase of equity provision by institutional investors can be traced mainly to the acquisition of operational assets or portfolios for onshore wind deals (OECD, 2016a). Pension funds and insurers are less involved in greenfield onshore windpower transactions,

suggesting that institutional investors look to the onshore wind sector mainly for the acquisition of existing projects in the operational phase.” (OECD, 2019).

Manufacturers: Include the production of turbines, blades, solar panels, energy from waste plants, biomass and hydro project technology. There are numerous companies engaged in the manufacturing supply chain and in the support services required, particularly for offshore wind projects.

Governments and public authorities must have a key role in developing climate action policies and setting renewable energy targets, regulatory frameworks, sanctioning auctions, planning permissions, Power Purchase Agreements and approving financial subsidies or other forms of corporate welfare intended to attract investors. However, they rarely impose: labour standards or monitor them; impose conditions or limitations on outsourcing; prohibit the use of tax havens or require projects to include economic development opportunities in the development, construction and production of renewable energy projects. The state is in effect a facilitator or agent for the private ownership and operation of renewable energy.

The secondary market is facilitated by a network of *consultants and lawyers* only too willing to increase their share of transaction fees.

Private equity funds have a significant role in the renewable energy secondary market. For example, Brookfield Renewable Partners, is active in the renewable energy secondary market having acquired five new assets and sold two others in the twenty-month period of this research. Brookfield had adopted an “...*asset recycling strategy, selling a partial interest in mature assets and exiting non-core markets*” (Brookfield Renewable Partners, 2019). The report also cited:

“...capital recycling on an opportunistic basis, and diverse sources of capital. Principal sources of liquidity are cash flows from operation, our credit facilities, up-financings on non-recourse borrowings and proceeds from the issuance of various securities through public markets” (ibid).

“In 2019, we also continued to execute our capital recycling strategy of selling mature, de-risked or non-core assets to lower cost of capital buyers and redeploying the proceeds into higher yielding opportunities. During the year, we raised almost \$600 million (\$365 million net to BEP) through this funding strategy, allowing us to crystallize an approximate 18% return on our Portuguese and Northern Ireland wind assets and to return more than two times our capital invested in South Africa” (Brookfield Renewable Partners, 2020).

Comparison with the PPP secondary market

The PPP secondary market grew rapidly both in the UK and internationally since 2003 and consists of the sale of equity in PPP projects and the sale of infrastructure investment funds. The average rate of return from PPP projects was 28.7% i.e. infrastructure funds have acquired PPP equity at a price that reflects this rate of return. These funds in turn aim to provide their shareholders with a 7%-8% rate of return (Whitfield 2016, 2018 and Smyth and Whitfield, 2017).

The ESSU PPP Equity Database 1998-2016 identified 462 transactions involving 1,003 projects in the UK with an estimated total value of £10.3bn (Whitfield, 2017). Transactions globally were identified but these were based on limited samples (Whitfield, 2010, 2016 and 2020). The PPP secondary market was very significant for public infrastructure, particularly for the use of offshore tax havens, but was certainly not on the same scale as the renewable energy secondary market.

The renewable energy database has followed the same principles as the ESSU PPP/PFI Secondary Market database that exposed the rampant profiteering and offshoring (Whitfield, 2018). Equity transactions in PFI/PPP projects varied widely in the percentage equity sold from very small percentages to full ownership whereas renewable energy transactions are usually

between 50-100% with the latter being most common. Furthermore, renewable energy transactions are not limited by the legal and financial constraints of PPPs which have a limited contract period (see Whitfield 2017 and 2018).

Existence of secondary market marginalised

Despite the significant presence of the renewable energy secondary market it is revealing that the following major reports were examined for commentary and analysis of the implications of and secondary market. Each report was searched for words 'secondary market', 'acquisitions', 'disposals', 'takeovers and mergers'. However, it is revealing that none of the following reports referred to the secondary market and only two briefly mentioned merger and/or acquisition.

- International Renewable Energy Agency (2020) *Global Renewables Outlook, Energy Transformation 2050*.
- International Energy Agency (2020) *Global Energy Review 2020*.
- World Economic Forum (2020) *The Global Risks Report 2020*.
- McKinsey Global Institute (2020) *Climate risk and response: Physical hazards and socioeconomic impacts*.
- Bloomberg NEF (2020) *Clean Energy Investment Trends 2019*.
- Clean Energy Council (2020) *Clean Energy Australia: Report 2020*.
- International Renewable Energy Agency and the G20 Climate Sustainability Working Group (2019), *Climate Change and Renewable Energy: National Policies and the Role of Communities, Cities and Regions*.
- REN21 (2019) *Renewables 2019: Global Status Report*.
- Climate Policy Initiative (2019) *Global Landscape of Climate Finance 2019*.
- International Renewable Energy Agency (2018), *Global Energy Transformation: A roadmap to 2050*.
- OECD (2017) *The empirics of enabling investment and innovation in renewable energy, Environment Working Papers No.123*.
- OECD and International Energy Agency (2014) *Capturing the Multiple Benefits of Energy Efficiency*.

Only one study, the annual *Global Trends in Renewable Energy Investment*, addressed the overall level of acquisition activity and identified the ten largest transactions (Frankfurt School-United Nations Environment Programme Collaborating Centre and Bloomberg New Energy Finance, 2020).

A recent OECD working paper undertook an econometric analysis to assess the impacts of climate mitigation policies and the quality of the investment environment on investment and innovation in renewable power in OECD and G20 countries. The study also avoided the secondary market despite it having grown from US\$8.5bn in 2004 to US\$146.2bn in 2017 (Frankfurt School-UNEP Bloomberg New Energy Finance, 2020) on the grounds that:

“The investment flows considered by the project include both domestic and international flows of new investment in greenfield (i.e. newly built) infrastructure assets. They include: asset finance; corporate debt; venture capital (VC) and private equity (PE). Asset finance represents the majority of flows considered by the study.

Since the analysis here focusses on the impact of policy on new investments rather than buying and selling existing projects and companies, the analysis disregards deals for mergers and acquisitions as well as for public markets. The exclusions of flows from mergers and acquisitions and public markets also safeguard against the possible risk of double-counting” (OECD, 2017).

The Climate Assembly UK 2020 recommended “*Changes to energy market rules to allow more companies to compete*” (with 86% approval). However, the 556 pages of the Climate Assembly’s final report made no reference to a secondary market or the sale of wind and solar assets. Similarly, ‘public ownership’, ‘state ownership’, ‘municipal ownership’, ‘local authority ownership’ do not appear either. But the 108 Assembly members strongly supported roles for

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government investment (80%), local solutions (80%), individual responsibility (80%) and market innovation (80%) (Climate Assembly UK, 2020).

There is even a renewable energy 'Matchmaking Service' provided by Green Dealflow (Denmark) - "...we are matchmakers for professional investors and asset owners in solar and wind industry" and provide details of projects for sale and "...connect verified investors with verified developers". It publishes an annual transaction review that reports the number of deals by country, type of renewable energy and companies involved but does not publicly disclose details of transactions (Green Dealflow, 2020).

The case against a secondary market in renewable energy

- Increases the role of market forces in renewable energy and consolidates market interests.
- Creates new opportunities for profiteering from renewable energy generation. Revenue from the sale of assets accrues to the parent company that owns the equity and does not directly benefit the project, local economy or community.
- Increases the use of tax havens, as companies and investment funds seek to minimise or avoid tax liabilities in order to maximise profits.
- Ultimately increases the cost of electricity than it would otherwise be without the secondary market and those extracting transaction fees.
- There is a fundamental lack of democratic accountability because the secondary market operates independently of governments and international agencies (except when regulatory approval is required). The fact that some state-owned companies and public authorities participate in the secondary market does not justify its existence.
- Private equity and investment and funds, consultants and lawyers have a financial interest in sustaining the secondary market.
- The fact that the secondary market generates additional profits and fees is likely to invalidate the original impact assessments undertaken at the start of the project.
- The secondary market changes the ownership of assets and may change the priority of certain projects, but it does not increase investment in existing assets except when older assets are acquired for upgrading.
- Changing corporate ownership via private negotiation may lead to the weakening of the original environmental and community commitments by the new owners.
- The secondary market will mushroom as the rate of renewable energy projects increases to meet the demands set by climate targets. This will accelerate financialisation, marketisation and privatisation as more and more projects are commodified and traded, thus public ownership and democratic accountability of power generation will be more difficult to achieve.

Renewable energy secondary market transactions 2004-2020

Secondary market transactions increased rapidly from US\$8.5bn in 2004 to a peak of US\$151.5bn in 2018 (Frankfurt School and United Nations Environment Programme, 2020). The data indicates a significant decline in 2019 to US\$100.7bn although the ESSU database indicates a smaller decline to an estimated US\$137bn. The high number of transactions in the first eight months of 2020 at an estimated cost of US\$130bn could, if they continue at the same rate, rise to an estimated US\$195bn for the full year which would be a new annual peak.

The 626 transactions in the ESSU Global Renewable Energy Secondary Market Transactions Database are unlikely to be the total number of transactions in the 20 month research period.

The ESSU Global Renewable Energy Secondary Market Database

The database covers a 20-month period from 1 January 2019 to 31 August 2020. Transactions

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identified the vendor, purchaser, a brief note describing scope of the transaction; the type of renewable energy asset (onshore or offshore wind, solar, hydro, energy from waste, biomass, battery/storage or grid), the total MW of the project, the percentage of equity ownership, country location, price and the prime data source. Using the MW relevant to the percentage of equity owned was not possible because of the rate of non-disclosure which means there is a small degree of double counting in the MW data.

Transactions result from the typology of market-based renewable energy ownership and operational demands which include:

- Sale and acquisition of individual (or portfolios) of renewable energy projects to enter new markets, extract profit, or to recycle assets to finance new projects or to exit particular markets;
- Renewable energy developers often sell projects once planning permission has been obtained and a Power Purchase Agreement agreed, similar to the way that property developers operate;
- Takeovers or mergers of companies happen to increase market share and enter new markets;
- To establish Joint Ventures Companies or partnerships that usually include equity sharing to enable companies to take a joint approach to new projects and/or the operation of existing assets;
- To expand to include a wider range of renewable energy projects such as wind, solar, hydro, battery, storage or hydrogen and/or to widen the provision of support services such as exploration, drilling, shipping and ICT services;
- To acquire access to innovative developments that increase the efficiency of renewable energy assets and new methods of monitoring their performance;
- To upgrade older assets with new solar panels or more powerful and efficient turbines.

The database excludes Power Purchase Agreements (PPA) for the sale of electricity; the financial close of new projects; refinancing of operational projects; contract awards following a tendering process or auction; planning and regulatory approvals of new projects and orders for turbines, blades or solar panels. These events are important and interesting stages in the development of renewable energy projects but are not secondary market transactions which entail the sale of assets and a change in their ownership.

The database identifies the location of assets whilst the vendor/purchaser data identifies the location of the parent company that ultimately owns the equity in renewable energy assets. Notifications of asset sales are either reported at the date of sale or in the case of larger sales an announcement of a binding agreement is made but the actual conclusion of the sale usually occurs several weeks or months later.

The extent to which the secondary market fully reflects the overall composition and pattern of ownership of the renewable energy sector is relevant. It may be argued that the scale of sales and acquisitions by public sector organisations is overstated or under-reported in the 20-month period of the research. However, the scope and global scale of transactions revealed by the ESSU Global Renewable Energy Secondary Market Transactions Database 2020, together with the general data available on transactions before and after the research period, indicate that it largely reflects the current renewable energy sector.

Timescale

The database covers the whole of 2019 and the first eight months of 2020 ie a 20-month period between 1st January 2019 to the 31 August 2020. The limited time period was justified because of the urgency in fulfilling the research objectives and to highlight the existence of significant secondary market trading in the period prior to 2019/2020.

Sources of data

The spreadsheet was built primarily on regulatory news statements, the investor relations sections of company websites, company annual reports, renewable energy industry daily news

reports and annual global reviews of renewable energy markets and developments. The MW data was obtained from the same sources. Combined wind and solar projects usually provided a joint MW total.

Timelines vary between the date of a binding agreement or an agreed transaction and its ultimate conclusion which depends heavily on the scope of the assets and complexity of the transaction and whether regulatory approval is required. The database is based on the first formal announcement of a transaction and has been updated if there are any amendments when the deal is closed.

Transactions continue

Secondary market transactions have continued in September and October 2020 following the research period and include, for example:

- Equinor (Norway) has agreed to sell BP a 50% stake in two US offshore wind projects with 4.4GW capacity for US\$1.1bn. The Empire Wind lease is off the New York State coast and Beacon Wind is off the Massachusetts coast.
- BlackRock Real Assets is to acquire New Green Power, a solar developer in Taiwan for US\$237.6m.
- Eolus Vind AB (Sweden) has sold a 46.5 MW wind park in California to Cubico Sustainable Investments.
- MET Group (Switzerland) has acquired a 42MW wind farm in Bulgaria from Enel Green Power (Italy).
- SSE plc has agreed to sell its 50% stake in two energy-from-waste plants at Ferrybridge to European Diversified Infrastructure Fund 3, managed by First Sentier Investors (previously First State Investments) for US\$1,330m. The two 75MW plants are jointly owned with Wheelabrator Technologies.
- EDP (Portugal) has signed a binding agreement to sell an 80% shareholding in a US wind and solar portfolio to Connor, Clark & Lunn Infrastructure for US\$676m. The projects are located in four states with a total 563 MW.
- Vortex Energy (EFG Hermes) has sold controlling stake in Vortex Solar to TNB International Sdn Bhd (Tenaga Nasional Berhad) utility in Malaysia. The 365MW portfolio was originally acquired from TerraForm Power in 2017.
- Global Infrastructure Partners has acquired the entire solar 306 MW portfolio belonging to the RattanIndia Group, which operates coal-fired power plants in several states.
- MPC Capital (Germany) have commenced the development process for a 5 MW solar project in Barbados and is looking for further sites in Jamaica, Costa Rica, Panama, Trinidad & Tobago, Columbia and Barbados.
- John Laing plc sells stakes in six wind farms in South Australia, Victoria and Tasmania to First Sentier Investors for US\$202.2m “...to realise assets to maximise value for shareholders” stated CEO Ben Loomes.
- Scatec Solar (Norway) is acquire SN Power hydropower with 1.4GW capacity from Norfund for US\$1.17bn. The portfolio includes hydro plants in the Philippines, Laos, Uganda and a development pipeline in Asia and sub-Saharan Africa.

Part 2

Tracking the transactions

This part examines the concentration of transactions in countries, a summary of global flows and ownership changes in selected countries, the dominant role of private equity funds and the use of tax havens. In addition, an analysis estimates the cost of the 626 transactions, identifies the limited role the public sector in the secondary market and the role of government and international agencies in developing economies.

Concentration of transactions

Table 2 identifies the number and MW of renewable energy projects located in each country that were involved in transactions between the 1st January 2019 and 31st August 2020. Where projects are based on two or more countries the MW has been divided equally between them.

Table 2: Concentration of transactions in key countries

Country	No. of Transactions	Total MW identified
Australia (2)	18	3,968
Brazil (2)	22	12,530
Chile & other Latin American countries (2)	20	5,392
China (2)	7	1,246
India (2)	20	15,145
Japan (1)	9	779
Taiwan (2)	8	2,451
Africa (2)	6	1,060
Middle East (2)	7	2,307
Key European countries		
Denmark (3)	17	4,343
England, Wales, Northern Ireland (7)	39	5,559
France (2)	36	11,075
Finland (1)	11	1,126
Germany (13)	33	19,652
Italy (4)	34	3,434
Netherlands (0)	8	1,437
Norway (2)	12	3,333
Poland (0)	8	4,411
Portugal (2)	7	2,998
Republic of Ireland (2)	19	2,650
Scotland (0)	16	1,525
Spain (2)	34	11,510
Sweden (1)	19	13,030
Other European countries (3)	14	998
European wide (3)	9	11,089
Europe	316	98,170
USA (16)	157	87,706
Canada (5)	21	10,828
North America	179	98,534
Total	610	241,582

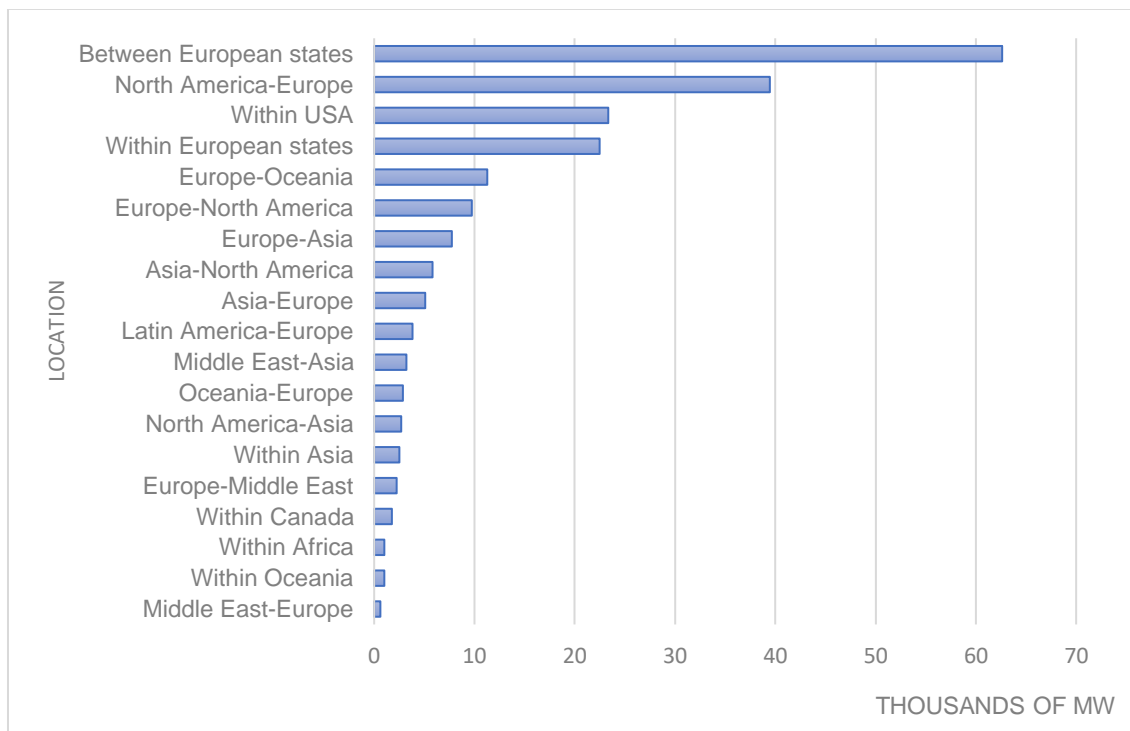
Source: ESSU Global Renewable Energy Secondary Market Transactions Database, 2020. (Number of transactions where MW data is not available)

The global dimension of renewable energy transactions

The global scope and flow of transactions is summarised in Figure 1. It highlights the dominant role of within and between European states and North America reflected by the level of MW in transactions and their global scale in and between regions.

Global Trade in Renewable Energy Assets

Figure 1: Global market in the sale and purchase of renewable energy assets



Source: ESSU Global Renewable Energy Secondary Market Transactions Database, 20. Note non-disclosure of vendor or purchaser in 42 transactions and the non-disclosure of MW in 94 transactions are not included in Figure 3.

A more detailed examination of the changes in ownership as a result of secondary market transactions was undertaken for six countries - Germany, India, Brazil, Canada, Australia and the UK.

Germany – 33 transactions

7 resulted in a change of ownership between German companies.

14 German owned projects were sold to companies in France (3), Switzerland (2), Luxembourg (2), and one each to Austria, Italy, Denmark, Sweden, UK, Canada and Australia.

2 German projects owned by US companies were sold to the UK and Thailand.

5 projects transferred to German ownership from Denmark (2), Sweden (2) and Italy (1).

3 projects transferred from Norway to Switzerland, Belgium to UK/Netherlands and UK to another UK company.

2 were acquired by German companies but the vendor was not disclosed.

India – 20 transactions

5 projects changed ownership between companies in India.

3 projects transferred to Indian ownership from Norway, Germany and a UK/India joint venture.

11 projects were acquired by companies in Japan (2), Malaysia (2), Canada (2), UK (2), USA (1), South Korea (1) and France (1).

1 project changed ownership from Germany to the UK.

Brazil – 22 transactions

10 projects changed ownership between companies in Brazil.

2 projects transferred ownership from France and the Netherlands to Brazil.

4 projects were acquired by companies in Japan, UK and USA including one by Canada but the vendor was not disclosed.

3 projects were transferred from one German company to a European/international utility company.

3 projects were sold between foreign companies – Italy to China, UK to China and Portugal to UK.

Global Trade in Renewable Energy Assets

Canada – 21 transactions

10 projects changed ownership between Canadian companies.

5 projects transferred to Canadian ownership from USA (3), Japan (1) and China (1).

4 projects changed ownership between US companies including one was sold by a US company to a joint venture in France/Spain.

2 projects were sold by Canadian companies to the USA and the Netherlands.

Australia – 18 transactions

2 projects changed ownership between Australian companies including one that was purchased by an Australian company but the vendor was not disclosed.

5 projects transferred to Australian ownership from France, Germany, Italy, New Zealand and the Republic of Ireland.

6 Australian projects were acquired by companies in Italy, Denmark, Switzerland, Spain, Philippines and UK.

5 projects changed ownership Germany to Spain, UK to Canada, UK to Switzerland, UK to South Korea and another between UAE companies.

UK – 55 transactions

27 projects changed ownership between UK companies.

11 projects transferred from Spain, Denmark, Germany, Norway, USA and Republic of Ireland (2) ownership to the UK including 4 that were purchased by UK companies but the vendor was not disclosed.

9 UK projects were acquired by companies in France (3), Republic of Ireland (2), Norway (1), Spain (1), Denmark (1) and Guernsey (1).

8 UK projects changed ownership between Canada and USA, Germany and Australia, Republic of Ireland to USA and France, Germany to USA, USA to Germany.

Scotland's 15 transactions are included in the UK data and revealed 5 transactions between UK companies; 4 transferred from Norway, Germany and Republic of Ireland (2) to the UK; 1 transferred from Scotland to the rest of the UK; 2 transferred from USA to Germany and France to the Republic of Ireland; 1 transferred from the UK to France and in 2 cases the vendor was not disclosed in transactions acquired by companies in Guernsey and the UK. None of the UK companies were identified as based in Scotland.

The degree to which renewable energy projects traded in the secondary market remain owned by companies in the same country varies from a low of 5% in Australia to Germany (21%) and India (25%) rising to Brazil (45%), Canada (47%) and UK (49%).

The six countries had limited impact in the transfer of assets from foreign ownership. Australia was most successful with 28% of transactions and Canada with 24%. In the other four countries the rate was 9% for Brazil and between 13%-15% for Germany, India and the UK. The transfer of assets to foreign ownership was the reverse of this process. Sixty percent of India's transactions resulted increase ownership which included four transactions with global private equity funds – Brookfield, KKR and two with Actis (Table 3).

Dominant role of private equity funds

Private equity funds raise capital from wealthy individual investors and institutional organisations such as pension funds, mutual, insurance and sovereign wealth funds who are seeking a high rate of return. They are normally identified by LLP, LP, Partners, Capital Partners or inclusion of a 'private equity fund' in the company name or description.

The activity of the top twenty private equity funds active in the renewable energy secondary market are summarised in Table 3. They were involved in 159 purchases of assets and in 50 cases sold assets, 34% of total transactions. It was not possible to investigate all the companies cited in the database so they could have been involved in a larger percentage of transactions.

Table 3: Transactions by private equity funds

Private Equity Funds	Vendor	Purchaser
Actis Capital	2	4
Ardian Infrastructure Partners	0	6
Aquila Capital	2	11
Berkshire Hathaway	0	1
BlackRock Inc.	5	3
Blackstone	0	1
Brookfield	2	5
Capital Dynamics	0	7
Carlyle Group	0	2
Copenhagen Infrastructure Partners	6	6
DIF Capital Partners	1	5
Foresight Group LLP	0	9
Glennmont Partners	4	8
Goldman Sachs Asset Management	0	6
Greenbacker Renewables LLC	2	14
Gresham House Investment	1	5
KKR & Co. Inc.	1	4
Longroad Energy Partners LLC	1	4
Mirova SA	3	0
Partners Group	0	3
SUSI Partners	0	6
The Renewables Infrastructure Group (TRIG)	0	8
Other private equity companies	23	41
Total	53	159

Source: ESSU Global Renewable Energy Secondary Market Transaction Database, 2020.

Several large utility and petroleum companies were engaged in the renewable energy secondary market between 1 January 2019 and 31 August 2020 in which they purchased 44 and 16 assets respectively. They sold 18 and 7 assets respectively in the same period (Table 4). EDF (France) was the most active ending with a net gain of eleven assets in this period.

Table 4: Transactions by major utility and petroleum companies

Major Companies	Vendor	Purchaser
Major Utility Companies		
American Electric Power	0	3
Dominion Energy (USA)	3	2
Duke Energy (USA)	1	2
EDF (France)	5	16
ESB (Republic of Ireland)	1	5
Iberdrola (Spain)	1	5
RWE (Germany)	1	3
EDP (Portugal)	2	5
SSE (UK & Republic of Ireland)	4	3
Sub total	18	44
Petroleum Companies		
BP (UK)	2	4
Equinor (Norway)	2	2
Petronas (Malaysia)	0	1
Repsol (Spain)	0	1
Total (France)	3	8
Sub total	7	16

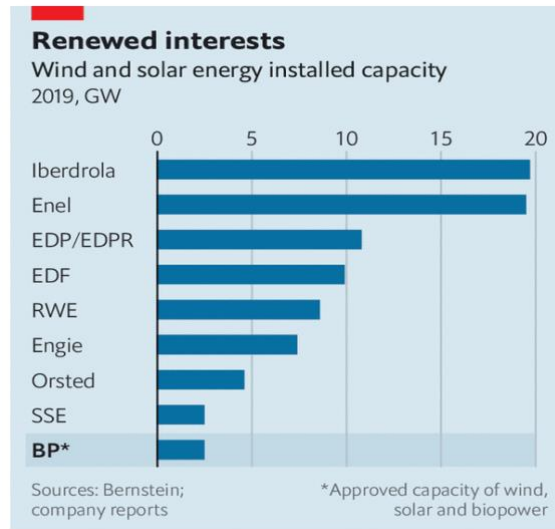
Source: ESSU Global Renewable Energy Secondary Market Transaction Database, 2020.

Only EDF (France) and Ørsted (Denmark) are government-owned companies with 100% and 50.12% shareholdings respectively (Figure 2). The remaining companies were originally publicly-owned but have been systematically privatised in recent decades. Currently the French

Global Trade in Renewable Energy Assets

and Italian governments have minority stakes of 23.64% and 23.58% in Engie and ENEL respectively. Institutional shareholders own 86% of RWE (26% based in Germany). China Three Gorges owns 21.55% of EDP (Portugal) with BlackRock private equity holding 5% with the latter holding similar stakes of 7.13%, 7%, 5.16% and 3.51% of SSE, RWE, EDP and Engie respectively (2019/2020 data). The Qatar Investment Authority own 8.69% and 2.27% of Iberdrola and EDP respectively.

Figure 2: Few major companies are publicly owned



The Economist

Private equity and infrastructure funds raise capital on a regular basis from institutional investors such as pension funds, insurance companies, sovereign wealth funds and wealthy individual investors. These funds are closed when the target amount has been reached. Recent examples of fund raising are cited in Table 5. The resources are then used to finance new acquisitions or investment in new projects according to the company's strategy.

Table 5: Infrastructure and private equity fundraising in 2019 and 2020

Examples of fund raising	Amount Raised (US\$bn)
2019	
Global Infrastructure Partners IV	22.0
EQT Infrastructure IV	10.1
Ardian Infrastructure Fund V	6.9
Macquarie European Infrastructure Fund VI	6.7
New Haven Infrastructure Partners III (Morgan Stanley)	5.5
2020	
Brookfield Infrastructure Fund IV	20.0
Antin Infrastructure Partners	7.7
Actis Energy 5	4.0
DIF Capital Partners	3.0
BlackRock Global Renewable Power Fund III	2.5
Total	88.4

Source: Prequin, 2020.

Wide use of tax havens

At least 28 companies trading in the renewable energy secondary market have direct links with tax havens which enables them to avoid or to minimise taxation on their assets (Table 6). This leads to a significant loss of taxation revenue by respective governments. For example, five infrastructure funds in tax havens made a total profit of £2,894.6m between 2011-2017 and paid zero corporate taxation in the tax havens which represented a potential loss of over £600m in UK tax revenue (Whitfield, 2017).

Global Trade in Renewable Energy Assets

Twenty-eight secondary market renewable energy companies, or their parent company, are registered in tax havens and were directly or indirectly involved in 140 transactions, 22% of the total number of transactions (eliminating double counting) in the research period. Assuming they accounted for the same proportion of costs, this would mean that US\$54bn of the total transaction costs avoided, or were liable only for minimal taxation, in the twenty-month period. This is equivalent to US\$324bn over ten years. The lack of disclosure in general and the secrecy of tax havens means that it is not possible to determine which sales or acquisitions were processed through tax havens.

FP Lux Investments S.A. is a Luxembourg registered investment company with Wind Infrastructure 1, an investment fund for institution investors. In February 2020 the fund adviser, the Swiss based asset management company re:cap global investors ag, acquired three wind farms, two in France and one in Germany (total 19.2MW), from Energiequelle GmbH, a German renewable energy developer. See transaction No 396 in the database – note no disclosure of cost.

The €600m fund is now fully invested with 26 wind farms with 121 turbines in Germany, France, Sweden and Finland with a total capacity of 343MW. FP Lux and re:cap recently opened a second fund, RE Infrastructure Opportunities, which has an expected internal rate of return of 6% per annum after costs over a fund term of 15 years. “*The subscription is possible from five million euros*” (re:cap press release, 2020). “*Investments in renewable energy.....offer investors long-term stable cash flows and uncorrelated earnings. It’s a classical win-win situation*” stated re:cap chief executive Thomas Seibel (ibid). This example illustrates the scale and global spread of intermediaries that operate the space between owners and on-site operation and management of secondary market renewable energy projects.

Table 6: Use of tax havens in renewable energy transactions

Company	Tax haven.	No of transactions
Actis LLP	Immediate parent Luxembourg; ultimate parent in Guernsey	6
Altor Fund V	Jersey	1
Aquila Capital	Luxembourg	13
Antin Infrastructure Partners	Reg in England & Wales but has 2 in Luxembourg	2
BlackRock LLP	Cayman Islands	8
Bluefield Solar Income Fund	Guernsey	1
Brookfield Renewable Partners LP	Bermuda	7
Capital Dynamics Clean Energy & Infra LP	Cayman Islands	7
Chorus Infrastructure Fund SA	Luxembourg	1
DIF Management Luxembourg S.a.r.l.	Luxembourg	1
Ellomay Luxembourg Holdings	Luxembourg	3
Envavis AG (Encavis Infrastructure S.a.r.l)	Luxembourg	14
Equitix (Tetragon Financial Group)	Guernsey	3
FP Lux Investments S.A. SICAV-SIF	Luxembourg	1
Foresight Energy Infrastructure Partners SCSp	2 in Luxembourg and 1 in Guernsey	9
InControl SA	Luxembourg	1
J.P. Morgan Asset Management	Cayman Islands	19
The Renewables Infrastructure Group	Guernsey	8
Xinyi Energy (BVI) Limited (Xinyi Solar)	British Virgin Islands	1
3i infrastructure fund	Jersey	1
Marguerite Pantheon SCSp	Luxembourg	1
Meridiam Infrastructure	Luxembourg	3
Mirova SA	Luxembourg	3
NovEnergia Holding Co.	Luxembourg	1
Prime Capital AG	Luxembourg	1
Sonnex Power Holdings	41 in British Virgin Islands, 7 in Luxembourg, 1 in Bermuda	16
SUSI Partners (adviser Sustainable S.a.r.l)	Luxembourg	6
Ventient Energy Ltd.	Luxembourg and ultimate parent company is IIF Holding LP, Cayman Islands	2
Total		140

Source: ESSU Global Renewable Energy Secondary Market Transactions Database, 2020 and The International Consortium of Investigative Journalists Offshore Leaks Database

A US Bank, private equity and infrastructure funds, tax havens and renewable energy companies

This section details the practices used by a major US Bank to accumulate renewable energy assets via the secondary market. It raises fundamental issues about democratic accountability and transparency of renewable energy projects.

Terra Firma Capital Partners private equity fund sold Infinis Group's 20 operational UK onshore wind farms (409MW) to institutional investors advised by J.P. Morgan Asset Management (J.P. Morgan Chase & Co) in February 2017.

The following month Infracapital Partners LP sold its 33.3% stake in Zephyr Investment's 17 wind farms to institutional investors advised by J.P. Morgan Asset Management. Ten years earlier Infracapital and 'an investment entity' advised by J.P. Morgan Asset Management had jointly bought the 50% share stake in Zephyr from Arcapital Bank, a Bahrain based investment bank. "*Sale of stake in Zephyr turns wind into money*" was a headline in The Daily Telegraph.

Ventient Energy was launched in November 2017 by merging the Zephyr and Infinis assets to create the UK's third largest wind renewable energy company, advised by J.P. Morgan Asset Management.

Vortex Energy (EFG Hermes, Egypt) launched the sale of its 49% stake in a 998MW portfolio of 56 wind farms in Spain, France, Portugal and Belgium to institutional investors advised by J.P. Morgan Asset Management in late 2018. The sale to Ventient Energy was completed in late March 2019 for €800m.

The next month EDP Renewables (Portugal) decided to sell its 51% stake in the same 56 assets to institutional investors advised by J.P. Morgan Asset Management for a similar sum. This transpired to be Ventient Energy and the deal was confirmed in July 2019.

Ventient completed the acquisition of Iberwind (Portugal) from CK Infrastructure Holdings Limited (Hong Kong) disclosed in August and completed in October 2020 adding 31 wind farms and 730MW.

Ventient Energy Limited has its headquarters in Edinburgh but it is a subsidiary of Ventient Energy Sarl, Luxembourg. "*The ultimate parent company is IIF International Holding LP, an entity 100% owned by institutional investors and so there is no ultimate controlling party. IIF Holding LP is a Cayman Islands exempted limited partnership advised by JP Morgan Investment Management*" (Ventient Energy Limited, Annual Report 2019).

Sonnedix Power Holdings or its subsidiaries were involved in 16 transactions in the research period. The Company's shareholders are IIF Solar Investment Ltd and Solar Global Holdings Ltd. The ultimate parent company is IFF Holding LP, a fund for institutional investors advised by J.P. Morgan Asset Management. Sonnedix operates through over 500 subsidiaries (with 100% ownership in the vast majority) in 16 countries including mainly France Italy, Spain and USA and 41 in British Virgin Islands, 7 in Luxembourg and 1 in Bermuda.

The Sonnedix Board of Directors includes Andrew Gilbert, a Managing Director and an Investment Principal for the Infrastructure Investment Group at J.P. Morgan Asset Management. It is also interesting to note that Sonnedix arranged a €202,545,000 shareholder loan from IIF in 2019 as an advance on equity which was converted to contributed share capital and share premium on 1st January 2020 (Sonnedix Power Holdings Limited Annual Report, 2019).

Public Citizen (USA) challenges J.P. Morgan's activities

It is clear that Ventient is J.P. Morgan's European wind energy platform. This is supported by Public Citizen, the US progressive advocacy group and think tank, which recently provided evidence to the Federal Energy Regulatory Commission (FERC) of how J.P. Morgan Chase & Co. "*...created a lightly-regulated, off-the-books series of private equity shell companies known as Infrastructure Investments Fund (IIF).*" Public Citizen's evidence submitted a complaint about the appointment of IIF 'owners' to serve on boards of directors when they could not be deemed to be owners. They claimed that *J.P. Morgan "...designed the 'owners' to serve as a figurehead*

board of directors in an effort to evade Bank Holding Company Act restrictions on J.P. Morgan's control of energy assets." The owners' were 'assigned' a nominal value of US\$10,000 which is 'transferred' to new owners after the terms are completed – so the 'owners' do not contribute any money or capital.

"J.P. Morgan had financial incentive to self-brand its new private equity arm, as selling securities to institutional investors is easier when the name on those securities is "J.P. Morgan". J.P. Morgan retained its name on IIF's securities sales through the first ten years of its existence. J.P. Morgan's decision to remove its name from IIF by 2016 did not reflect any diminished management role for the bank, but rather acknowledged that J.P. Morgan had established IIF as an investment vehicle.

Seventy-nine percent of the equity invested by IIF's limited partners is raised from foreign sources: 27% from the United Kingdom, 18% Europe (excluding the U.K.), 13% Canada, 8% Japan, 6% the Middle East, 4% Australia, 2% Asia (excluding Japan) and 1% "other". Only 21% of IIF's equity is from the United States.

J.P. Morgan's control over IIF is deeper than just the legacy of naming rights—J.P. Morgan designed IIF's weak corporate controls to maximize the bank's ability to direct IIF's operations and investments" (Public Citizen, 2020).

The FERC (2020) responded to Public Citizen's submission by demanding that J.P. Morgan respond within 30 days to provide information about the nature of the relationship between J.P. Morgan and its affiliates. The company is required to describe in detail:

- how each of the entities is staffed and how management and operational decision-making is carried out; the rights and responsibilities that are delegated to *J.P. Morgan Investment* or an affiliates;
- how ownership interests, including any outstanding voting securities of companies, are managed;
- what rights and responsibilities are delegated to J.P. Morgan Investment and affiliates;
- which entities have a board of directors and describe their decision-making process with respect to that entity;
- explain in detail, whether and if so, how IIF GP owners acquired their respective ownership interests in IIF GP;
- explain whether current IFF GP Owners have an existing or past relationship, (including but not limited to) as employees, with J.P. Morgan Investment or any of its affiliates including J.P. Morgan Chase & Co.

J.P. Morgan Investment must provide any relevant agreements detailing the rights and responsibilities delegated to J.P. Morgan Investment or that pertain to the management and operational decision-making, including management services agreements or LLC agreements.

Estimated cost of the 626 transactions to date

The widespread lack of disclosure of the prices paid to acquire renewable energy assets, and to a lesser extent their total MW, meant that the total value of the transactions relied on an assumption that the cost data for transactions were representative of the transactions that did not disclose financial information. It also assumed that the samples were reasonably comparable for different types of renewable energy projects (wind, solar, hydro, biomass, energy from waste, battery storage), the size and location of projects (industrialised economies, global south, urban or rural, onshore or offshore) and their age or economic efficiency (reflecting innovation and advances in turbines, blades and PV panels) and the length of power purchase agreements and operational contracts will influence the value/price of assets. The failure to disclose financial details was common across different types of transactions.

The database has financial information for 197 (31.5%) of the 626 transactions. To estimate the total cost the UK, European and USA and other countries were treated separately. For example, 21 of the 54 UK transactions had a cost of £6,267m and assuming the same costs were reflected

Global Trade in Renewable Energy Assets

in the remaining UK transactions the total cost is £16,115.1m. Converted to US\$ the total is \$21,542.5m (see currency exchange rates on page 4).

The same process was applied to the 252 European transactions which reported financial data for €24,720m in 62 transactions in Euros. Using the same assumption as above, the total cost was €100,474.8m or US\$119,631.3m.

The remaining 320 transactions were predominately USA transactions but included those in Brazil, India, Australia and other countries with 107 providing financial information. Financial data was either reported in US\$ or was converted when costs were reported from these three countries. The cost of the 320 transactions was US\$139,137.7m. The total cost of the 626 transactions is US\$280,311m. The additional cost of processing the transactions is examined below.

Transaction fees

Despite the scale of transactions there is virtually no direct disclosure of their cost. A search of the annual global reports by the International Energy Agency, REN21, International Renewable Energy Agency, Frankfurt School-UNEP Centre/BNEF and other organisations revealed no discussion of transaction costs.

Renewable energy and all similar transactions normally involve the vendor and the purchaser signing a binding confidentiality agreement to permit an exchange of information. They will need to undertake:

- due diligence
- review of the whole life financial model of the project
- asset value assessment
- current and previous operational performance
- review of current contracts
- risk analysis
- employment and equality objectives and performance.

This involves legal, financial and technical adviser's fees and expenses by both vendor and purchaser. The UK sold the Green Investment Bank to Macquarie Bank in 2015. The Green Bank incurred costs of £10.4m and the UK government £4.8m, a total of £15.2 m or 0.66% of the £2.3bn sale price (National Audit Office, 2017). In another example, Thrive Renewables sold two wind farms to Equitix Limited in 2019 for £23.73m and incurred sale costs of £365,130 or 1.54% (Thrive Renewables plc, 2020). This sum excluded Equitix's transaction costs which are likely to have been higher than Thrive's because, as purchaser, it would have had higher due diligence costs.

Given the particular nature of renewable energy assets it is reasonable to assume an average transaction cost of 3%. Thus based on the total cost 626 transactions of US\$280.3bn, the transaction fees charged by consultants, lawyers and asset management advisors would have been US\$8.4bn.

The total combined cost of the 626 transactions and the fees incurred by vendors and purchasers in processing transactions is estimated to be US\$289bn in the 20 month research period.

Limited role of the public sector in renewable energy

The publicly owned companies in Table 7 A, B and C (see Appendix) were involved in 65 or 10.5% of the 626 transactions in the 20-month period. These transactions are divided into three groups: public sector acquisitions from private companies; the transfer of renewable energy assets between public authorities; and the sale of public assets to the private sector. Of the 65 transactions involving publicly-owned renewable energy companies, 38 acquired assets, 14 transactions were between public authorities and 14 privatised renewable energy assets. Table 7 (Appendix) is divided into three parts to identify the three types of transactions. They reveal that:

- 38 assets were acquired into public ownership - 15,270.8 MW;
- 14 assets were transferred between public authorities - 5,175.4 MW;
- 14 public assets were privatised - 14,504.8 MW.

In conclusion, although the number of assets acquired for public ownership was more than twice the number privatised, the MW is virtually identical with only a 766MW difference. (Coincidentally, the percentage of data not available in acquisitions and privatisation is virtually the same at 21.6% and 21.4% respectively). In effect, the assets transferred between public authorities are neutral with no net gain. **Hence the benefits of public ownership are largely eliminated by the privatisation of renewable energy assets.**

An alternative method is to compare the level of MW in the same public owned companies as a percentage of the total MW for all 626 transactions. 533 of the 626 transactions identified the MW of projects which totalled 260,677MW. Assuming the remaining 94 projects that did not disclose the MW had on average the same level of those that did, then the total for 626 projects is estimated to be 299,778MW. The combined MW for assets coming into public ownership and the transactions between public authorities comprising 52 transactions and 20,446MW (Table 7) represents 6.8% of the total MW in all the transactions or 8.3% of total transactions. In conclusion, publicly owned renewable energy companies accounted for between 6.7% and 8.3% of the 626 transactions studied. However, the privatised renewable energy projects (Table 7C) accounted for 2.2% of transactions and 4.8% of MW thus reducing the overall impact of the public sector to (6.8% - 2.2%) to 4.6% of transactions and (8.3% - 4.3%) to 4% of MW.

An earlier random sample of 37 major renewable energy companies in the global economy that owned and operated projects revealed that only 11.6% were publicly owned (Whitfield, 2020b). Another study revealed that private investment from various sources accounted for 58.5% of finance in contrast to the 27.1% from public sources (State banks, State utilities, other state corporations and Government agencies) that facilitated the development of projects (Semieniuk and Mazzucatto, 2019).

Role of governments and international agencies in developing economies

The World Bank Group including the International Finance Corporation (IFC) and the International Bank for Reconstruction and Development (IBRD), have been instrumental in supporting a 'sustainable energy market' in developing economies. The objective has been to "...to create a market for solar power generation, mitigate investment risks, or achieve specific national energy policy objectives" (IBRD and The World Bank, 2019). They concentrated on providing legal, policy, and regulatory framework; planning, technical and operational capacity; government-sponsored guarantees; and investment in enabling infrastructure with direct and indirect financing having a marginal role. A survey of private investors conducted for the above report led to 51 participants and 61 country-specific responses.

"Only 8 percent of the survey responses indicated that direct financing by the public sector in solar generation assets (for example, equipment and civil works) was an important investment consideration, compared to 66 percent which characterized this form of public intervention as nonessential. However, blending public concessional sources of funds with commercial finance has helped develop projects that were not viable on fully commercial terms." (ibid) [bold in original].

Renewable energy projects in Morocco, Senegal, South Africa, India, Chile, Philippines and Maldives provide examples of how this strategy has been implemented. This included government or public agency acquisition of land for solar development; provision of infrastructure such as roads and water supply; securing permits; improved distribution grids; grants used for upfront subsidies to private developers; guarantees (multinational development banks are preferred); all of which reduce the risks for private investors and attract finance from national or local banks and bilateral donor agencies (ibid). Little surprise that corporate welfare is established in renewable energy.

Part 3

The case for public investment, ownership and operation

Although the focus is on meeting climate targets of decarbonisation by 2050 or earlier, the renewable energy power generation and distribution strategy must extend well beyond this date. Digitisation and automation in the economy means that power security, equitable access, affordability and sustainability will be even more critical in economic activity, public services and people's lives. There is compelling evidence that this cannot be left to market forces and private companies. Equally, they cannot guarantee to achieve full decarbonisation by 2050 nor to ensure that stranded fossil fuel assets remain stranded.

Decarbonisation of energy must run parallel with the *decommodification* of public services and the *de-commercialisation* of nature and biodiversity. They must be aligned with *democratisation* and participation and *political, economic, social and environmental equality and justice* (Whitfield, 2020a).

The public case must be made for an integrated renewable energy sector and public provision. The consequences of the secondary market, its financial costs and the impact of a fragmented system must be understood. The advantages of public ownership and provision are set out in Whitfield (2020). Radical change from 'mobilising the market', a flawed and failed strategy for public services, to one of 'intervention in the market' and ultimately to public ownership and operation of power generation is essential.

The public policy agenda must change from general demands for climate action and targets to those that focus on *how* the targets are going to be met and to rapidly increase public provision of power generation. It has implications for public sector management in the digitisation and automation of public services because the continuity and sustainability of power generation in an age of differential climate conditions and weather impacts is increasingly critical. There is an inherent danger of relying on market forces and conveniently forgetting the failures of privately financed public infrastructure via PPPs, broadband provision and the outsourcing of the Covid-19 test and trace system in meetings social and economic objectives.

The need for publicly owned and operated renewable energy generation

This section is a summary of proposals to increase public ownership and operation of renewable energy projects and increase the scope and powers of regulatory frameworks.

1. Prioritise publicly financed renewable energy generation in industrialised countries but a wider generation, grid and supply in developing countries.
2. Increase direct public investment in new renewable energy projects and retain them in public ownership and operation.
3. Agree selective public acquisition of renewable energy assets by negotiation or via nationalisation. All future public financial support must be conditional on binding agreements that give the public sector the first option to acquire the project in any future sale of the project.
4. Increase public sector in-house capabilities to plan, develop and operate renewable energy projects. A decommodification process (redesign of services, jobs, regulations, democratic accountability, participation and disclosure) in government and public authorities should be combined with the adoption of radical public management committed to public ownership and provision. This would terminate the financialisation, marketisation, individualisation and privatisation processes and significantly improve the quality of public services and terms and conditions and training of public employees (Whitfield, 2020a).

5. Ensure regeneration and development plans, strategies and retrofitting housing programmes include new publicly owned and operated renewable energy projects.
6. Classify renewable energy assets as public goods and align with public service principles and values.
7. Maximise local and regional economic development and employment opportunities created by the construction, production and operation of renewable energy projects and make quantified proposals a condition of regulatory approval and any direct or indirect public financial support.
8. Ensure that innovative and technological developments are harnessed to meet collective social, economic, environmental and power generation needs instead of driving market forces and profit maximisation.
9. Demand more stringent policies that ban the use of tax havens for the finance and ownership of renewable energy projects.
10. It is imperative that Green Deals contain detailed proposals to address the operation and impact of the secondary market in renewable energy projects within nation states and internationally.

Widening the scope and powers in regulatory frameworks

- The prime objective must be to de-commodify and reverse of the monetisation of the renewable energy sector and to rapidly increase public sector capabilities to plan, develop, own, operate and manage renewable energy projects.
- Eliminate outsourcing and exploitation of low wage and poor working conditions for all employees. Take the initiative for radical improvement in employment terms and conditions in all stages of renewable energy projects – see just transition Code of Practice in Whitfield (2020b).
- Redirect public expenditure from corporate welfare assistance to private companies, to direct investment in public ownership and operation of renewable energy assets.
- Revise the renewable energy planning and development process to maximise opportunities for public intervention and to stop or significantly reduce the uses of auctions.
- Introduce improved regulations on quality of jobs, employment standards, training and sourcing of supply chains.
- Impose more comprehensive economic conditions such as regional/local manufacturing, local construction and training with regular monitoring and performance reports that assess impacts.
- Impose regulations and standards that both promote public sector principles and values and are used in impact assessments and evaluation of projects.

Need for national coordination

There is an urgent need for a democratically accountable National Renewable Energy Agency to develop a longer-term renewable energy strategy that includes public ownership, democratic control and public management of assets. The Agency should work closely with the proposed National Conversion Agency which will acquire, convert and adapt factories and plants, and to demolish and reclaim land and property for new economic and social use such as the manufacture of electric cars, vans, buses, heat pumps or components for renewable energy systems (Whitfield, 2020b).

National Renewable Energy Agency should have three key responsibilities:

Firstly, to strengthen the economic linkages between renewable energy projects and local/regional and national economies to maximise the development, production, construction and employment benefits. It should be required to liaise with regional and local public authorities to ensure the widest possible application of renewable energy provision in cities, new communities and redevelopment projects.

Secondly, to coordinate research and innovation and application of new renewable energy products and technologies to ensure projects have access to the latest developments.

Thirdly, to be responsible for planning training and skills development to meet the needs of the renewable energy sector.

Re-examine state-owned corporation model

The State-owned Enterprise (SoE) model, particularly the 50.1% majority control public ownership model, needs to be re-examined but this is not within the scope of this study. The presence of other shareholders, such as private equity funds and other companies with renewable energy interests, reinforces SoE involvement in the commercialisation, marketisation and privatisation policies of other governments (see pages 19-20). This issue is equally applicable to some SoE's that are 100% government owned.

Pension fund investment increased in renewable energy projects

Whilst pension fund investment in renewable energy projects is important and can meet the need for long-term returns, there are concerns over their funding of secondary market activities that are intended to benefit company shareholders rather than pension fund members. This is outside the remit of this report but it is vital that the issue be examined in detail.

A 2020 survey found that 68% of pension fund investors expect increased investment in renewable energy projects over the next five years with 74% of those surveyed already were already investors in renewable energy (Alpha Real Capita, 2020).

Organising and action

Part 8 of the *Equitable Recovery Strategy* report contains a discussion of strategic issues and organising, building alliances and alternative plans for trade unions, community organisations and public policy organisations (Whitfield, 2020b). Appendix 1 of the report has a summary economic strategies, Green Deal and Integrated Public Healthcare System Deal proposals.

Appendix

Table 7: Transactions involving government, state and municipal owned renewable energy companies between 1 January 2019 and 31 August 2020

A. Assets acquired for public ownership

Country	Organisation	Acquire from	Asset	Public ownership	MW
Canada	Ontario Power Corp.	I Squared Capital, USA	Cube Hydro – 19 facilities	Provincial Govt 100.0	385
Canada	Columbia Power Corp & Columbia Basin Trust	Fortis Inc. USA	Waneta Hydroelectric	British Columbia Provincial govt	335
Czech Republic	CEZ	ABO Wind, Germany	8 wind farms	Government 70.00	116.5
China	Zheneng Group	China Jinjiang Environment Holding Co.	Waste to energy	Provincial Govt 100.0	632
China	CGN Energy International	Enel Green Power S.p.A. (Italy)	2 solar & 1 wind projects 100.0%	Government 100.0	540
China	CGN Energy International	Actis LLP (UK)	Atlantic Energias Renovaveis wind	Government 100.0	642
China	CGN Energy International & Hermes Infrastructure	Aquila Capital (Germany)	5 wind projects 100.0%	Government 100.0	813
Denmark	Orsted A/S	Pattern Energy Group (USA)	South Dakota wind farm 100.0	Government 50.12 SEAS-NVE 5.01	103
Denmark	Orsted A/S	Longroad Energy Holdings LLC (USA)	Muscle Shoals, Alabama, solar 100.0	Government 50.12 SEAS-NVE 5.01	294
France	EDF Renewables	York Nebraska Wind Partners LLC	Milligan 1 Wind Project	Government 100.0	300
France	EDF Renewables	Asia Clean Capital	17 rooftop solar facilities	Government 100.0	77
France	EDF Renewables	LUXEL Group	portfolio over 40 projects	Government 100.0	1,000
France	EDF Renewables	Alpiq Group 25% stake		Government 100.0	n/a
France	EDF Renewables	PEC Energia (Brazil)	5 wind farms Pernambuco	Government 100.0	600
France	EDF Renewables	PowerFlex Systems	electric vehicle charging	Government 100.0	n/a
France	EDF Renewables	Hazel Shore Ltd (Republic of Ireland)	Codling offshore wind	Government 100.0	1,000
France	EDF Group	energy2market (e2m)	manages/operates 3GW plants	Government 100.0	n/a
France	EDF (with Meridiam & SIFCA)	BIOVEA Energie (France)	JVC - 40%, 36% & 24% stakes	Government 40.0	46
Germany	EnBW Energie Baden-Wurttemberg AG	Power Wind Ptners AB & Gnosjo Energi	7 wind farms in Sweden 105 MW 100%	State of Baden 46.75 Association of regional & local govt 46.75	n/a
Germany	EnBW Energie Baden-Wurttemberg AG	Groupe Valeco (France)	Developer of wind and solar projects 100%	State of Baden 46.75 Association of regional & local govt 46.75	2032
Lithuania	Ignitis Group	Earth Capital Partners LLP UK	Wind farm	Government 100.0	94
Netherlands	Stadtwerke Tubingen	Energiekontor AG	3 solar parks	Municipal works 100.0	13.3
Norway	Statkraft A/S	Airvolution Clean Energy Ltd (UK)	onshore wind developer	Government 100.0	n/a
Norway	Statkraft A/S	Torsa Renovables SL (Chile)	3 wind farms 100.0%	Government 100.0	109

Global Trade in Renewable Energy Assets

Norway	Statkraft A/S	JBM Solar (Republic of Ireland)	9 solar projects 100.0%	Government 100.0	320
Norway	Equinor ASA	Polenergia Co. (Poland)	Baltyk 1 offshore wind 50.0%	Government 67.0 Others 33.0	1,560
Norway	Equinor ASA	Not disclosed	Scatec Solar 5.2%	Government 67.0 Others 33.0	1,505
Republic of Ireland	Electricity Supply Board	Parkwind NV (Belgium)	Oriel offshore Wind Farm, Republic of Ireland 35.0%	Government 96.0	330
Republic of Ireland	Electricity Supply Board	Terra Solar Ltd (Republic of Ireland)	portfolio of solar assets 100.0%	Government 96.0	118
Republic of Ireland	Electricity Supply Board	Harmony Solar Ireland Ltd	Solar partnership €30m capital	Government 96.0	n/a
Romania	Electrica Furnizare	Long Bridge Milenium SRL (Romania)	Stanesti solar farm	Government 48.8	8
Sweden	Vattenfall AB	Solytic GmbH (Germany)	PV optimisation	Government 100.0	n/a
Switzerland	EZW Municipal Electric	Norsk Vind Energi AS (Norway)	Makaknuten wind	City of Zurich 100.0	95
United Arab Emirates	Masdar Clean Energy	John Laing plc (UK)	Rocksprings & Sterling wind 100.0%	Government 100.0	179
United Arab Emirates	Masdar Clean Energy	Hero Future Energies of India	Strategic alliance solar, minority stake	Government 100.0	1,440
United Arab Emirates	Masdar Clean Energy	Tribe Infra Group JVC with Masdar Tribe Energy	Waste to energy East Rockingham, Perth 40%	Government 100.0	29
United Arab Emirates	Masdar Clean Energy	Infinity Energy (Egypt)	JVC develop wind & solar projects in Egypt	Government 100.0	235
United Arab Emirates	Masdar Clean Energy	Compania Espanola de Petroleos Cespa Spain.	joint 50/50 development venture	Government 100.0	n/a
Total 38					15,270.8

Source: ESSU Global Renewable Energy Secondary Market Transactions Database, 2020.

Global Trade in Renewable Energy Assets

B. Transfer of renewal energy assets between public authorities between 1 January 2019 and 31 August 2020

Country	Purchaser	Vendor	Asset	% sold	MW
Austria	Wiener Stadtwerke (City of Vienna 100.0%)	EnBW Energie Baden-Wurttemberg	Stake in energy & environ services EVN AG (51% owned by State of Lower Austria)	28.35	367
China	Unnamed state-owned companies	ReneSola Power (China)	11 solar parks in Zhejiang, 3 in Shanghai	100.0	22.3
France	EDF Renewables Joint venture	China Energy Investment Corporation (China)	Dongtai IV and Dongtai V offshore wind	37.5	502
Denmark	SEAS-NVE customer-owned	Orsted A/S	Radius Elnet electricity grid 19,000km & City Light	100.0	n/a
Germany	City of Hamburg	Vattenfall AB Sweden	District Heating system	74.9%	n/a
Germany	MVV Energie AG	Juwi Group	Renewable energy developer	majority	361.1
Germany	City of Hamburg Stadtreinigung Hamburg	Vattenfall AB Sweden	Rugenberger Damm energy from waste	55.0	n/a
Germany	Wiener Stadtwerke GmbH (Austria)	EnBW Energie Baden-Wurttemberg AG	EVN Group – electricity Generation & natural gas	28.3	367
Germany	Oldenburg & other municipal auth (Germany)	EnBW Energie Baden-Wurttemberg AG	EWE	n/a	6
India	National Thermal Power Corp	Government of India	NEEPCO hydro project	74.5	1,500
Italy	Edison EDF Group (Italy)	EDF EN Services Italia (Italy)	services 47 wind farms	70.0	n/a
Republic of Ireland	Electricity Supply Board	Equinor ASA (Norway)	partnership identify offshore sites		n/a
Republic of Ireland	Electricity Supply Board	EDF Renewables	Neart na Gaoithe offshore wind	50.0%	450
United Arab Emirates	Masdar Clean Energy	EDF Renewables (France)	3 wind, 5 solar (2 with battery)	50/50	1,600
Total 14					5,175.4

Source: ESSU Global Renewable Energy Secondary Market Transactions Database, 2020.

Global Trade in Renewable Energy Assets

C. Privatisation of public assets as a result of transactions between 1 January 2019 and 31 August 2020

Country	Public sector vendor	Purchaser	Asset	% sold	MW
Brazil	Eletrobras Government 51.0	Omega Geracao S.A.	28 wind projects in 5 SPV	100.0	528.8
Brazil	Eletrobras Government 51.0	Pirineus Multistrategy Fund	Wind farm	49.0	26.0
Brazil	EDF Renewables (France) 100.0	Omega Geracao S.A. (Brazil)	Ventos da Bahia 1 & 2	50.0	182.6
Denmark	Orsted A/S 50.1	Bigadan A/S (Denmark)	Kalundborg Bioenergi plant	40.0	n/a
Germany	EnBW 100.0% and Rhein Energie 100% owned by Stadtwerke Koln which is 100% public ownership	First State Investments, Australia	MVV Energie (City of Mannheim 50.1%)	45.1	10,000
Germany	EnBW 100.0% and Rhein Energie 100% owned by Stadtwerke Koln which is 100% public ownership	Green Investment Group (UK) & JERA Co Inc (Japan)	Formosa 3 offshore	100.0	2,000
Germany	EWE Group AG 74.0	Ardian Infrastructure Partners (France)	EWE Group 74% owned by Oldenburg & other municipal authorities	26.0	n/a
Norway	Statkraft 100.0	Greencoat UK Wind (UK)	Windy Rig & Twentysilling wind farms	100.0	81
Norway	Equinor ASA 67.0	Credit Suisse Infra Partners (Switzerland)	Arkona offshore wind farm Germany	25.0	385
Republic of Ireland	Electricity Supply Board 96.0	Parkwind NV (Belgium)	Clogherhead wind farm	35.00	500
United Arab Emirates	Masdar JVC (UAE) 100.0	Taaleri Energia (Finland)	Wind & solar projects Central/Eastern Europe	n/a	n/a
USA	Eugene Water & Electric Board 96.0	PacifiCorp (Berkshire Hathaway)	Foote Creek 1 Wind Wyoming	50.0	41.4
USA	City of Danville, North Carolina 100.0	Northbrook Energy LLC (USA)	Hydro plant	100.0	10.0
Vietnam	Electricity of Vietnam 100.0	Super Energy Corp (Thailand)	4 solar parks in Binh Phuoc Province	100	750
Total 14					14,504.8

Source: ESSU Global Renewable Energy Secondary Market Transactions Database, 2020.

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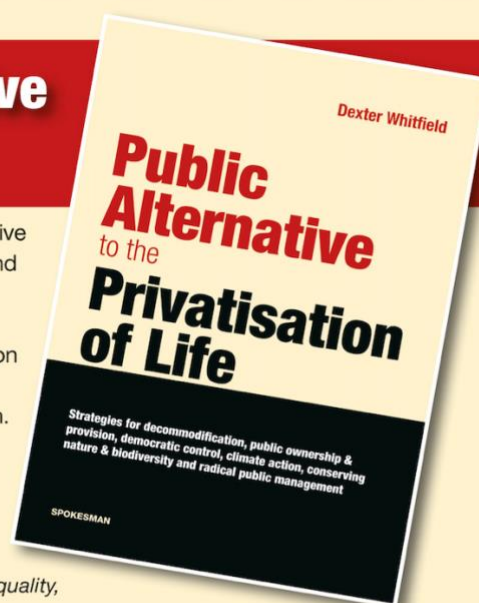
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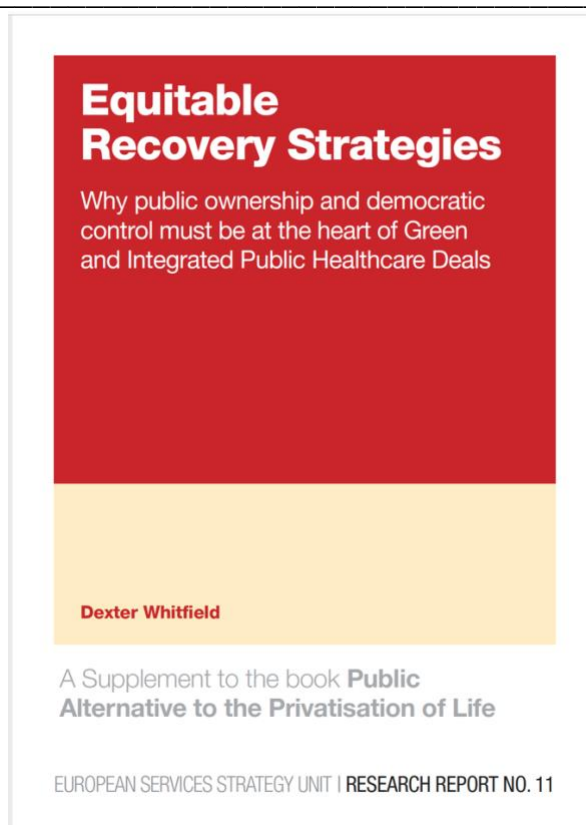
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