of energy from renewable sources in energy supplies also assist with creating confidence in the likely continuity of support for renewable energy although, as examined in Chapter 4, their ability to have this effect depends on the strength of the supporting legal regimes for securing compliance with them.[51]

In addition, states enter investment treaties to give confidence to nationals from participating states that the terms on which investments are made in host states will not be changed arbitrarily.[52] A main purpose for developing and developed states to conclude investment treaties is to leverage investment which would not otherwise be made due to a lack of confidence in the host state's investment environment. The Energy Charter Treaty's provisions on investment were also intended to perform that function by giving nationals of developed west European states the confidence to conduct and finance development in energy rich states previously forming part of the Soviet Union.[53] Many of the cases heard under the Energy Charter Treaty's dispute resolution mechanism have involved claims that states have failed to provide fair and equitable treatment to investors by other parties due to ex-post alteration of support offered for renewable energy.[54]

Second, problems experienced with feed-in tariffs necessitating change have often been due to subsidies being made available in law to any actor falling under the relevant law's definition of persons entitled to support. The need for *ex post* intervention can be reduced by better defining and placing limits on the available support in law. See Boute's discussion of reducing regulatory risks associated with subsidies by limiting quantities of supported output, providing finite budgets or setting maximum electricity volumes for competitive allocations and restricting scheme access to generators in defined locations where connecting new power plants does not necessitate major network upgrade works.[55] Including provisions that allow change in the terms on which subsidies are provided when this is justified by a change in circumstances since the scheme was introduced can also be used to avoid the rigidity that makes disruptive change unavoidable. In this regard the EU's 2018 RES Directive allows Member States to 'adjust the level of support in accordance with objective criteria, provided that such criteria are established in the original design of the support scheme'.[56]

IV. Case Studies: Providing Operating Support for Renewable Energy

The following case studies of the three operating support scheme types discussed above and used by Germany (Feed-in tariff) and the United Kingdom (Certificate/

[51] Chapter 4, Section IV.
[52] Anatole Boute, 'Combating Climate Change through Investment Arbitration' (2012) 35 *Fordham International Law Journal* 613.
[53] Energy Charter Treaty (adopted on 17 December 1994, entered into force on 16 April 1998) 2080 UNTS 95.
[54] Boute (n 42) 2–4.
[55] ibid, 3–4.
[56] 2018 RES Directive (n 41) art 6(2).

Obligation, Premium and Competitive Allocation) illustrate how risks associated with them have arisen in practice.

A. Feed-in Tariff, Premium Schemes and Competitive Allocation (Germany)[57]

Germany's experience with supporting renewable electricity under the EEG 2000 provides a good case study of the feed-in tariff and premium scheme types and of competitive allocation of subsidies. It shows that feed-in tariffs can be very effective for attracting investment in renewables, but that their use and success can give rise to concerns, particularly over the costs that financing feed-in tariffs can give rise to pressure for subsidy reform. It also illustrates the discomfort that policymakers who subscribe to the economic theory that undistorted market competition offers the best route to cheaper and more secure energy may feel with using subsidies and other market-interfering methods to promote renewable energy growth. Their antipathy to market intrusion manifests in policy goals, whilst accepting subsidies as a necessary evil for establishing renewable energy capacities in the near term, to lessen and eventually eliminate that intrusion over time.

Germany made available a classic feed-in tariff scheme between 2000 and 2014 under the often-reformed EEG 2000.[58] The scheme guaranteed the purchase of electricity produced by renewable energy technologies specified in law at governmentally set fixed prices for a duration of 20 years. Germany's transmission system operators were obligated to pay the subsidies. They recouped monies paid through a combination of selling the electricity purchased from renewable generators in markets and including unrecouped costs in a surcharge borne by consumers.[59] The system operators were also obligated to guarantee access to networks for renewable generators and to give priority access to renewable electricity over power from other sources.[60]

The investor confidence produced by mandatory purchase and guaranteed returns for a guaranteed period drove significant growth in renewable electricity in Germany. This increased from 6.2 per cent of electricity supplies in 2000 to 25.8 per cent in 2014.[61] However, the scheme's popularity led to significant growth in the cost of financing its operation for system operators and therefore for the public and for its industries.[62] Resulting concerns over support for renewable energy and its economic effects led to

[57] The case study draws from academic comment on electricity subsidy schemes used in Germany since 2000 including Klessmann et al (n 17), Lauber (n 14), Hart and Marcellino (n 3), Gawel and Purkus (n 25), Thomas (n 20), Matthias Lang and Annette Lang, 'The 2014 German Renewable Energy Sources Act Revision – From Feed-in Tariffs to Direct Marketing to Competitive Bidding' (2015) 33 *Journal of Energy and Natural Resources Law* 131; Penttinen (n 12); Merethe Leiren and Inken Reimer, 'Historical Institutionalist Perspective on the shift from Feed-In Tariffs towards Auctioning in German Renewable Energy Policy', (2018) 43 *Energy Research and Social Science* 33; and Johannes Saurer and Jonas Monast, 'Renewable Energy Federalism in Germany and the US' (2021) 10 *Transnational Environmental Law* 293.

[58] Gesetz für den Vorrang Erneuerbarer Energien, Federal Law Gazette 2000, part I, 305.

[59] Klessmann et al (n 17) 3650; Saurer and Monast (n 57) 300; Leiren and Reimer (n 57) 35.

[60] ibid. See also Chapter 6, section IVA.

[61] Lang and Lang (n 57).

[62] Thomas (n 20) 76–78; Lang and Lang (n 57) 131–33; Saurer and Monast (n 57) 300; Leiren and Reimer (n 57) 35–37.

calls for the EEG's reform. Exemptions were granted from the surcharge for Germany's energy-intensive industries because of fears that their economic competitiveness with equivalent industries in states not subject to a similar surcharge would suffer.[63] This domestic political pressure coincided with increasing opposition from the European Commission to the use of subsidy schemes that removed renewable energy generators from market exposure on grounds including distortion of electricity market competition, obstruction from national policy and legal interventions of Europe-wide energy markets' emergence, concerns that technologies removed from market exposure would not undergo competition-driven production efficiencies in order to maximise profit and, in connection with this, that feed-in tariffs were causing higher electricity prices than would be the case under subsidies paid in addition to revenue from electricity sold in markets as a premium.[64] In addition, competition-related questions arose over whether the exemption for energy-intensive businesses was unlawful under EU law on state aid.[65] Its guidelines on state aid in the fields of energy and the environment for 2014–2020 advised that, save for small-scale developments, FIT schemes should be replaced as they came up for renewal of state aid approval, by schemes under which support was provided on top of electricity sold in markets (whether through premiums or certificates).[66]

These influences have driven three stages of evolution in German support for renewable electricity.[67] First, the addition of a voluntary option for subsidy recipients to choose premium payments on top of directly marketed electricity rather than a feed-in tariff. Second, the direct marketing premium scheme replaced the feed-in tariff as the sole source of support in 2014 except for small renewable projects which remain eligible for the feed-in tariff.[68] Under this scheme, project operators are paid a sum by the relevant transmission system operator on top of each unit of electricity sold in markets. This is the difference between a specified level and an average monthly market price, the idea being that overall revenues will be consistently close to those required for the project concerned to cover costs and make a profit.[69] Third, premiums are now made available through auctions under which developers submit bids stating the specific revenue level by reference to which premiums will be calculated, with lowest bidders succeeding in obtaining support which is now limited by the German government to maximum amounts for particular technologies.[70]

(i) Case Study Summary

The switch from a subsidy type with very low risks of non-recovery for investors to one in which price risk is low, but other types of risk of non-cost recovery

[63] Saurer and Monast (n 57) 301; Leiren and Reimer (n 57) 36.
[64] See section IIIB above. See also Saurer and Monast (n 57) 301–02, Leiren and Reimer (n 57) 37–38.
[65] Saurer and Monast (n 57) 301; and Leiren and Reimer (n 57) 37–38.
[66] Commission, State Aid Guidelines (n 26).
[67] Thomas (n 20); Lang and Lang (n 57); Penttinen (n 12) 81; Saurer and Monast (n 57) 301–03; Leiren and Reimer (n 57) 36–38.
[68] See Lang and Lang (n 57) 137 for details of projects still eligible for the feed-in tariff.
[69] Gawel and Purkus (n 25) 600–02.
[70] Lang and Lang (n 57) 137–39.

(eg, route-to-market risk) are present will inevitably affect investor confidence in the renewables sector. The introduction of further investment risks associated with the auction of subsidies from deliberately limited budgets such as non-availability of support and incurring advance development costs without certainty of support will have a further impact. Indeed, the auction process seems designed to dampen growth in renewable electricity partly to address difficulties posed by this for the functioning of the wider electricity system and partly to address the cost concerns mentioned above.[71] Germany's experience therefore illustrates problems that very effective support for renewable energy may engender in terms of system functionality and public acceptability. However, questions arise over whether the responses adopted will maintain the growth in renewable energy required to achieve a rapid decarbonisation of Germany's electricity sector. The increase in renewable energy production continued to grow, reaching nearly 40 per cent by 2018,[72] but more of this growth is likely to have come from investment by utilities which are better able to bear the transaction costs and risks of auction processes than from smaller businesses and community-level investment. A consequence of this is that the acceptance of renewable energy development that investment by non-traditional actors associated with localities engendered may diminish as major commercial developers without a community connection take their place.[73]

One lesson from this account must be that strategies for renewable energy support which aspire to the full decarbonisation needed for combatting climate change must consider challenges associated with systemic ability and public willingness to accept the switch to a different and potentially higher cost system in policy and legal design from the outset. The problem here may lie as much with political failures to explain both the short-term and long-term costs and benefits of shifting away from fossil fuel energy to renewable energy and the relative merits of removing and exposing renewables from market competition as with the legal design of Germany's FIT schemes.

B. Renewables Obligation Order (ROO) (Certificate/Obligation Scheme, UK)[74]

The ROO was introduced in 2002 and frequently amended subsequently.[75] It was withdrawn in 2017 on its complete replacement by the Contracts for Difference scheme examined in Section IVC. It required licensed UK electricity suppliers to source a specified proportion of electricity they provided to customers from eligible renewable sources. Suppliers discharged the obligation by obtaining certificates of

[71] ibid, 133; Penttinen (n 12) 81.
[72] Saurer and Monast (n 57) 302.
[73] Leiren and Reimer (n 57) 37–38.
[74] The case study draws from critical analysis of the Renewables Obligation presented in Geoffrey Wood and Stephen Dow, 'What Lessons Have Been Learned in Reforming the Renewables Obligation? An Analysis of Internal and External Failures in UK Renewable Energy Policy' (2011) 39 *Energy Policy* 2228 and in Bridget Woodman and Catherine Mitchell, 'Learning from Experience? The Development of the Renewables Obligation in England and Wales 2002–2010' (2011) 39 *Energy Policy* 3914.
[75] The Renewables Obligation Order 2002 (SI 2002/914).

renewable electricity production directly from producers or indirectly through a certificate market. Producers received monies from certificate sales in addition to the price obtained for electricity supplied. Suppliers who failed to supply enough certificates to cover their obligation were required to pay a 'buy-out' price to Ofgem at the year end. The resulting buy-out fund was then redistributed amongst electricity suppliers each year with the size of shares being determined by their relative success in meeting the obligation.[76]

Two problems were experienced with the scheme during its early years, both of which this scheme type is prone to in general. The first was that the level of the obligation was set too low with the result that it was met before the year end and that the price of certificates was lowered because of a lack of scarcity. This problem was addressed by amending the mechanism by which the level of obligation was recalculated each year to ensure that it exceeded anticipated renewable electricity production (also known as creating 'headroom'), thereby preventing certificate prices from crashing.[77]

Second, the scheme was effective for attracting investment in the lowest-cost technologies for producing electricity such as onshore wind because they offered greatest potential of making a significant profit from the scheme but was ineffective for attracting investment in less developed technologies producing electricity at higher costs due to less experience with their use. This has been addressed by 'banding', a practice under which less developed technologies are given more certificates for each unit of electricity produced in recognition of the higher level of financial support they need to attract investment.[78] Under agreed banding levels for the period 2013 to 2017, 0.9 of a certificate was awarded for each MWh of onshore wind increasing to 2 ROCs (declining to 1.8 in 2016–17) for each MWh of offshore wind and 3 ROCs for each MWh generated from tidal stream and wave power.[79]

The RO was closed to new generating plant from 2017 on its replacement by the Contracts for Difference scheme. Rights to receive ROCs accrued to the date of closure have been grandfathered (ie, developments already accredited under the RO will continue to receive support under the scheme for however many years remain of the 20-year term for which this is provided). Generators were able to choose between ROs and CFDs from 2014 to 2017. The Government seeks to maintain confidence in the scheme by confirming that the current arrangements, driven by 'headroom', will continue until 2027 and that it will buy certificates itself at a fixed price from 2027 to 2037 when the scheme ends.[80]

[76] Woodman and Mitchell (n 74) 3915.
[77] ibid, 3916–19.
[78] ibid, 3919.
[79] Department for Business, Energy and Industrial Strategy and Ofgem, Renewables Obligation banding levels 2013–17', Calculating Renewable Obligation Certificates (ROCs) – GOV.UK (www.gov.uk) (accessed 4 October 2022).
[80] Ofgem, *Renewables Obligation: Guidance for Generators that receive support or would like to receive support under the Renewables Obligation (RO) scheme* (Guidance document, April 2019) www.ofgem.gov.uk/system/files/docs/2018/09/renewables_obligation_guidance_for_generators_september_2018_0.pdf (accessed 4 October 2022).

Notwithstanding the improvements mentioned above, the Renewables Obligation was criticised by academic commentators on grounds that it had not reduced risks for investors sufficiently to secure growth rates in renewable energy enabling the Government to meet its commitments on renewable energy consumption.[81] The introduction of 'headroom' stabilised certificate prices whilst banding strengthened the position of newer technologies. However, two fundamental risks remained throughout: the lack of a guaranteed route to market for energy sales and the lack of certainty both over market prices and prices for certificates. As a result, the scheme continued to benefit energy from cheaper established renewables (particularly onshore wind) even after banding and from large-scale developments that benefit from economies of scale. It also favoured established large power companies able to take risks that expenditure would not be recovered, proving weak in contrast for attracting market entry by new developers. The articles referred to above compare the scheme unfavourably with the Feed-in Tariff scheme type for promoting increases in renewable energy production, particularly from new technology developments conducted by non-incumbent electricity producers.

(i) Case Study Summary

The UK's experience with the Renewables Obligation highlights difficulties which can arise for attracting investment in renewable energy when support schemes still leave developers significantly exposed to the risk that revenues from generation and from the subsidy may not be sufficient to cover development costs. This is particularly the case for new market entrants, for smaller generation projects and for those using less-well-established technologies, all of which are less well able than incumbent generating companies with substantial existing asset bases and revenue streams to take on risks of loss-making development on the off-chance of making large profits if market and certificate prices are both high.

The experience also illustrates both the need for careful legal design of support schemes to ensure that they are capable of attracting support for the renewables sector in circumstances when this may not otherwise be forthcoming; and how legal reform can be used to address weaknesses in a scheme. We have seen that the initial Renewables Obligation contained features, insufficient scarcity of certificates to generate investment-supporting prices throughout the year and insistence by the UK government on strict technology neutrality when the scheme was introduced, which undermined its effectiveness for attracting financial support. Legal reforms in the shape of headroom and banding improved the scheme's appeal for investment, particularly in new technologies and projects by new market entrants. It is to be regretted that valuable experience with supporting renewable energy in the UK gained from years of trial and error with the RO were completely abandoned in favour of the Contracts for Difference scheme, a new and much more complex set of arrangements for allocating support.

[81] Wood and Dow (n 74); Woodman and Mitchell (n 74).

C. Contracts for Difference (CFD) Scheme (Premium Scheme by Auction, UK)[82]

The CFD scheme ran in parallel with the Renewables Obligation until 2017. It has been the sole support scheme available for new renewable energy generators in the UK (above 5MW) since April 2017. The legal foundation for the scheme is contained in the Energy Act 2013, but with much of the detail having been provided in following regulations. To date, four funding rounds have taken place under the scheme: in 2015, 2017, 2019 and 2022. The fifth round is due to be held in 2023.

(i) Competitive Allocation

Under the initial scheme design, it was envisaged that renewable energy developers would apply for support from three funding pots:

- *Established technologies* such as onshore wind, solar (funding for this pot was only made available in CFD allocation round one and in round four, but with eligibility limited to projects of 5MW maximum capacity and below);
- *'Less established' technologies* such as offshore wind, wave and tidal. A minimum amount of the budget was ring-fenced for wave and tidal energy only in CFD allocation round one. The UK Government announced in June 2018 that remote island onshore wind would be differentiated from other onshore wind projects to allow *onshore* wind farms in the Scottish islands to seek funding from this pot because of the particular difficulties with producing and transmitting electricity from these locations.[83] Offshore wind was removed from this pot in round four, having become much better established since 2014 and was given its own funding pot in view of the UK's policy ambitions for massive offshore wind energy generation.
- *Conversions of fossil fuel generating plant to run on biomass*. No funding was provided for this pot in the early allocation rounds and it has since been abandoned.

The UK Government advised before funding round one that the budget for established technologies would be limited to ensure competition between applicants. Applicants

[82] The case study draws from information made available by the UK Government at 'Electricity Market Reform: Contracts for Difference' (UK Government website, last updated February 2017) www.gov.uk/government/collections/electricity-market-reform-contracts-for-difference (accessed 4 October 2022). It also draws from critical analyses of the Contracts for Difference scheme presented in Kozlov (n 39), Penttinen (n 12), Brodies, Electricity Market Reform: Comparing Contracts for Difference to the Renewables Obligation, (September 2013, briefing document produced by law firm) Microsoft Word – 18397399_5.DOC (rackcdn.com) (accessed 4 October 2022); Ross Fairley, 'All Change in Green Energy: Results of the first Contracts for Difference auction', *In-House Lawyer* (May 2015) All change in green energy: results of the first Contracts for Difference auction – The In-House Lawyer (inhouselawyer.co.uk) (accessed 4 October 2022); and Marijke Welisch and Rahmatallah Poudineh, 'Auctions for Allocation of Offshore Wind Contracts for Difference in the UK' (2020) 147 *Renewable Energy* 1266.

[83] Department of Business, Energy and Industrial Strategy, 'Contracts for Difference: Stakeholder Bulletin' (UK Government website, June 2018) CfD_stakeholder_bulletin – June_2018.pdf (publishing.service.gov.uk) (accessed 4 October 2022).

were to submit sealed bids stating the strike price that they would be willing to accept and the contracts were to be awarded by auction to the lowest bidders. All applicants for funding from the budget for 'less established' technologies would receive funding based on administrative strike prices published in December 2013 or would also be asked to submit sealed bids stating the strike price acceptable to them if applications exceeded available funding. Contracts awarded have been based solely on sealed bids because of applications exceeding the budget under all the auctions to date.

(ii) Premium Payment

Generators who are awarded a CFD enter a contract with a counterparty established by statute which is responsible for paying the premium. The scheme provides recipients of support with a premium for each unit of electricity sold by them in electricity markets. The premium amounts to the difference between a reference wholesale price (reflective of average market price levels during periods for which payments are claimed under a contract) and a 'strike price' (a figure specified in the contract for difference which is intended to reflect the cost of investing in a particular low carbon technology). The generator pays monies back to the counterparty if the reference wholesale price exceeds the strike price. The hope is that the guaranteed receipt of a long-term relatively stable price will encourage investment in renewable energy projects (contrast this stability with the full exposure to market volatility under the Renewables Obligation scheme). Licensed electricity suppliers have obligations to fund the scheme by making payments to the counterparty but, in contrast to the Renewables Obligation, they do not have obligations to include a specified proportion of renewable energy in their supply portfolios.

(iii) Sources of Investment Risk

As with other premium schemes, risk that revenue received from electricity sold in markets will not cover development costs is lower than under schemes such as the Renewables Obligation which give generators greater exposure to market volatility. However, several areas of risk remain which may combine to discourage potential investors from financing renewable energy projects where support from a Contract for Difference would be required to make the development attractive to them. Some of the possible sources of risk are listed below to add detail to the main categories of premium scheme characteristics identified in Section IIIB which may impair their effectiveness for attracting investment in the renewables sector.

- *Price risk* – This is much reduced compared to the Renewables Obligation, but some risk remains that developers will not be able to recover their costs because the market price they receive together with payments under the CFD do not cover them, particularly for generators who sell electricity to wholesalers at below the market reference price rather than selling energy themselves into markets (receiving lower prices because the wholesaler bears the market risk).
- *Route to market risk (1)* – In contrast to the Renewables Obligation, there is no legal obligation on suppliers to supply a proportion of renewable energy. Much will

therefore depend, for actual volumes of renewable energy generation supported by CFDs, on whether strike prices set under the CFDs enable renewable generators both to sell energy into the market at competitive prices and to cover their costs, thereby encouraging investment in renewable generation.

- *Route to market risk (2)* – The ability of generators to benefit from CFD support depends on their ability to find a sale for their electricity. However, concerns arose when the scheme was being designed that generators (particularly those with small-scale plant using new technology) with CFDs would not be able to benefit from them because they were unable to conclude power purchase agreements with suppliers. To address this concern, the UK Government proposed that 'offtakers of last resort' should be appointed who would be obliged to take uncontracted power produced by a CFD holder, albeit at a discount to the market reference price to ensure that this would be seen as a 'last resort'.[84]
- *Allocation risk (1)* – As noted at IVC(i) above, there is no guarantee that renewable generators will receive support under the scheme. Willingness to invest may be impaired by the lack of firm knowledge about strike prices (and therefore about prospects of recovering development costs) until auctions have been held. Evidence from the first CFD auction suggests that the auction process, coupled with limited budgets, can result in a major risk of exclusion from support under the scheme, particularly for smaller generators that are less able to submit low bids because they lack the revenues/asset base to absorb a loss.[85] The fourth allocation round responded to this by limiting support in the established technologies pot to projects with capacities of 5MW and below. Investor confidence has also been affected by the infrequency of allocation rounds, the lack of a set timetable for years ahead with each round to date being arranged on a one-off basis and variation in the monies provided for funding rounds as budgets are agreed separately for each round. The unpredictability in timing and funding makes it harder for developers to plan ahead and hampers the emergence of supply chain businesses for renewable energy development and operation.[86] The UK Government plans to address these concerns in part by holding annual auctions with the fifth allocation round taking place in 2023.[87]
- *Allocation risk (2)* – Developers can only apply for a CFD when development proposals are well-advanced (ie, planning permission has been obtained and grid connection agreements made with the network operator). This may put off developers and investors as substantial costs are incurred for environmental assessment and securing grid access without a guarantee that the project will obtain a CFD. As Fairley notes, the scheme favours 'bigger developers who are generally more able to carry the cost of developing a project up to the point of planning and grid

[84] Ofgem, 'Offtaker of last resort' (Ofgem Website) Offtaker of Last Resort (OLR) | Ofgem (accessed 4 October 2022).
[85] Fairley (n 82).
[86] Welisch and Poudinet (n 82), 1267, 1268, 1273.
[87] UK Parliament, Statement made by Kwasi Kwarteng, Secretary of State for Business, Energy and Industrial Strategy', Statement UIN HCWS600, 9 February 2022.

[connection] in order to qualify to bid in a CFD action and live with the risk of being unsuccessful'.[88]

- *Complexity risks* – The transaction costs of such a complex arrangement are high. The CFD proposals can be compared unfavourably in this respect with the simplicity both of FIT and premium schemes and of the Renewables Obligation that was available to all renewable energy units meeting statutory definitions.
- *Repayment risk* – The fact that generators must repay monies to the counterparty when the reference price is above the strike price could affect the solvency of small producers, particularly those which are selling energy under PPAs at a sizeable markdown from market prices. The fact that renewable generators will be unable to benefit from higher yields in certain market conditions may also put off more entrepreneurial investors.
- *Cost recovery risk* – The CFDs run for 15 years rather than the 20-year support for RO projects, with the potential consequence that it will be harder for developers to recover project development costs over the shorter timescale.[89]
- *Funding availability risk* – The CFD scheme competes with other subsidies within an overall cap on the budget for funding for energy development (the levy control framework).[90] The government also negotiates individual CFDs with larger developments (eg, new nuclear, large offshore wind). CFDs such as the contract agreed in 2013 for the new nuclear power station Hinkley Point C (£92.50, double the current wholesale price of electricity) will eat into funds that could have gone to multiple smaller renewable energy projects at lower cost.

(iv) CFD Auctions

The first CFD auction was held in February 2015. 2GW of renewable electricity was supported including 750MW of onshore wind, 72MW of solar PV and 1.1GW of offshore wind. The auction used a 'pay as clear' system. This means that the strike price awarded for successful generators under the auction are raised to the highest strike price for a successful participant in the auction round for a project type for the year that the project type requests support to commence (eg, all onshore wind expected to receive support from 2018–2019 receives a strike price of £82.50). The low budget of the auction (compared to the Renewables Obligation), led to fierce competition and strike prices at lower levels than administrative strike prices. Some technology types lost out as a result with solar receiving a strike price for 2015–2016 of £50, too little in practice for the projects concerned to be constructed. Experience with the auction evidences some of the concerns mentioned above, particularly allocation risk.[91]

[88] Fairley (n 82).
[89] Welisch and Poudinet (n 82), 1268.
[90] Department for Business, Energy, and Industrial Strategy, 'Levy Control Framework' Levy Control Framework (LCF) – GOV.UK (www.gov.uk) (accessed 4 October 2022).
[91] For information about the first allocation round see UK Government, 'Contracts for Difference (CfD): first allocation round' (UK Government website) Contracts for Difference (CfD): first allocation round – GOV.UK (www.gov.uk) (accessed 4 October 2022).

The second auction was due to be held in October 2015 but was postponed. Amber Rudd, then the Secretary of State for Energy and Climate Change, announced in November 2015 that there would be a further auction in 2016 and one more before the end of the parliament (May 2020). No auction took place in 2016. Instead, the UK Government announced in November 2016 that a second allocation round would commence in April 2017. This round did not offer funding for technologies in the 'established' band such as onshore wind and solar PV. A total of £290 million was made available for specified technologies in the 'less established' band only. The auction was held in August 2017 and the results announced on 11 September. The auction resulted in support for three very large offshore wind farms (including the 1.4GW Hornsea 2 scheme) with offshore wind accounting for 97 per cent of supported technology. A noteworthy feature of the auction was that the strike price for offshore wind projects for 2022–2023 (57.50) was less than half the strike price for projects due to commence operation in 2017/2018 under the first auction.[92]

The third allocation round was significantly less generous than its predecessor with total funding of £65 million. Funding was limited again to less-established technologies, with the great majority of support going again to offshore wind projects.[93] In contrast, £280 million was made available for the fourth round auction in 2022 with support being provided for multiple small solar farms and onshore wind farms in Scotland as well as a number of Scottish remote island wind and tidal energy projects under the less-established funding pot. The largest share of funds again went to offshore wind with five projects totalling nearly 7GW maximum capacity receiving support. A floating offshore wind project received support for the first time under this round.[94]

(v) Case Study Summary

Analysis of the UK's CFD scheme highlights strengths and weaknesses of the premium scheme type. Such schemes tend to expose developments to lower price risk than the certificate/obligation scheme type and therefore to reduce this major source of concern for investors to an acceptable level. However, the analysis shows that the premium scheme type is not a panacea. The requirement, as with the certificate/obligation scheme, for developers to find a buyer for their electricity in order to receive the premium creates a risk that the development will not find a route to market. Again, this is particularly the case for projects using newer technologies, small-scale commercial developments and new market entrants who, in contrast to incumbent producers, may not have corporate links to supply companies.

[92] For information about the second allocation round see UK Government, 'Contracts for Difference (CfD): second allocation round' (UK Government website) Contracts for Difference (CfD): second allocation round – GOV.UK (www.gov.uk) (accessed 4 October 2022).

[93] For information about the third allocation round see UK Government, 'Contracts for Difference (CfD): third allocation round' (UK Government website) Contracts for Difference (CfD): Allocation Round 3 – GOV.UK (www.gov.uk) (accessed 4 October 2022).

[94] For information about the fourth allocation round see UK Government, 'Contracts for Difference (CfD): fourth allocation round' (UK Government website) Contracts for Difference (CfD) Allocation Round 4: results – GOV.UK (www.gov.uk) (accessed 4 October 2022). For further information on floating offshore wind energy see Chapter 8, section IB.

The case study also shows the importance of careful legal design for support schemes and of how law can be used to address design problems. Legal provision for a buyer of last resort addressed the route to market risk mentioned above to an extent. In contrast, a substantial residual price risk remains for smaller-scale electricity generators who sell electricity to wholesalers at a below market price rather than attempt to participate directly in markets themselves. Such developers may be left out of pocket even after receiving a premium because this is calculated as the difference between the strike price and the average market price for electricity.

With regard to subsidies allocated competitively rather than as of legal right, the case study displays some of the claimed strengths and weaknesses of such an approach for supporting renewable energy. The allocation risk of not obtaining a contract and therefore of not recouping costs incurred to be able to participate in an auction is likely to act as a deterrent for initiating projects, especially those using newer technologies which may struggle to compete in auctions with better-established bidders. The dramatic drop in strike price sought by offshore wind projects in auction round two compared to round one is due to rapidly declining production costs as the technology's efficiency and scale of deployment increase but may also be attributable to the need for bidders to be competitive in auctions by submitting bids at the lower end of the remuneration likely to be needed by them to cover development costs.

In connection with the impact of the auction design, the case study also shows that schemes may be intentionally poor for supporting certain types of renewable energy development. For example, a government's policy on support may prefer large-scale developments using better-established technologies because they are perceived to offer greater potential for economies of scale and production efficiency and therefore to be lower cost. This chapter does not look critically at such policy choices, its focus being on assisting readers with identifying where, as with the Contracts for Difference scheme, a subsidy may not be well-designed for attracting investment in projects likely to be perceived by developers as risky. Even so, it is legitimate to question whether an approach of boosting renewable energy in the short term by concentrating only on certain technologies will be effective for realising the wholesale decarbonisation of energy that will be needed during the twenty-first century if the international community's commitment to net zero greenhouse gases by 2050 is to be achieved.

Classroom Questions

1. Why can it be challenging to attract investment in renewable energy development? How can subsidies assist with attracting investment?
2. What type of subsidies are used to provide: (a) investment support; (b) operating support? When are they usually provided and for what purposes?
3. Identify the main characteristics and the strengths and weaknesses for promoting the growth of renewable energy production of the following types of operating support schemes:
   (i) Feed-in tariffs
   (ii) Obligation/certificate schemes
   (iii) Premium schemes

4. Why are subsidies sometimes made available through competitive processes (e.g. tenders/auctions)? Are there any potential downsides of competitive allocation for attracting investment in renewable energy?
5. Identify and compare the strengths and weaknesses of the three schemes reviewed in the case studies for attracting investment in renewable energy.

Scenario

Tidaltech has developed a new technology for producing electricity from tidal streams. The technology has been trialled successfully and is now ready for its first deployment in small-scale commercial projects. Tidaltech predicts that it would struggle to cover its development costs, including the costs of repaying monies borrowed from investors, through electricity sales alone. Tidaltech is therefore looking at public support made available by a number of states with significant potential for electricity production from tidal streams. Inventato, an island state, offers a guaranteed feed-in tariff payment over a 20-year term for tidal stream electricity at a level that should enable Tidaltech to cover its development costs with a small profit margin as long as it can secure investment at a low enough rate of interest to make payments affordable. Fabricado, an archipelago, offers guaranteed feed-in premium payments over a 20-year term for tidal stream technology to be paid on top of monies received for electricity sold in markets under power purchase agreements. The premium is available to all projects using tidal stream power technology as of right (ie, applicants do not have to participate in a competitive bidding process to secure support). The premium to be paid is the difference between the average weekly electricity market price and an administratively set strike price. Fabricado's administrative strike price for tidal stream is set at the same level as the price to be paid for each unit of electricity under Inventato's feed-in tariff. However, recipients of premiums under this scheme are not required to pay monies to the subsidy provider if the market price exceeds the strike price, meaning that Tidaltech could make a substantial profit when electricity market prices are high.

Tidaltech is drawn towards Fabricado's scheme because of the potential for making higher profits from developments using its new technology but is cautious about making a choice between development in Inventato and in Fabricado as it only has the resources to undertake commercial developments in one of the two jurisdictions. Advise Tidaltech on the potential benefits and disadvantages of Inventato's feed-in tariff scheme and Fabricado's feed-in premium scheme for reducing risks that it will not be able to recoup its development costs from investment in the two jurisdictions.

Suggested Reading

Articles

Zeineb Abdmouleh, Rashid Alammari and Adel Gastli, 'Review of Policies Encouraging Renewable Energy Integration and Best Practices' (2015) 45 *Renewable and Sustainable Energy Reviews* 249.

Craig Hart and Dominic Marcellino, 'Subsidies or Free Markets to Promote Renewables?' (2012) 3 *Renewable Energy Law and Policy* 196.

Volkmar Lauber, 'The European Experience with Renewable Energy Support Schemes and Their Adoption: Potential Lessons for Other Countries' (2011) 2 *Renewable Energy Law and Policy* 120.

Temitope Onifade, 'Hybrid Renewable Energy Support Policy in the Power Sector: The Contracts for Difference and Capacity Market Case Study' (2016) 95 *Energy Policy* 390.

Policy

European Commission, 'European Commission guidance for the design of renewable support schemes – Accompanying the document Communication from the Commission: Delivering the internal market in electricity and making the most of public intervention' SWD (2013) 439 final.

Michael Taylor, *Energy Subsidies: Evolution in the global energy transformation to 2050* (IRENA, Technical Paper 1/2020) Energy subsidies: Evolution in the global energy transformation to 2050 (irena.org) (accessed 9 October 2022).