accenture

New Energy Consumer

Embracing connected energy business models for future growth

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Management summary

For energy companies today, the traditional commodity business focused on pure electricity and gas sales is stagnating. In its place comes an energy transition with a focus on sustainability.

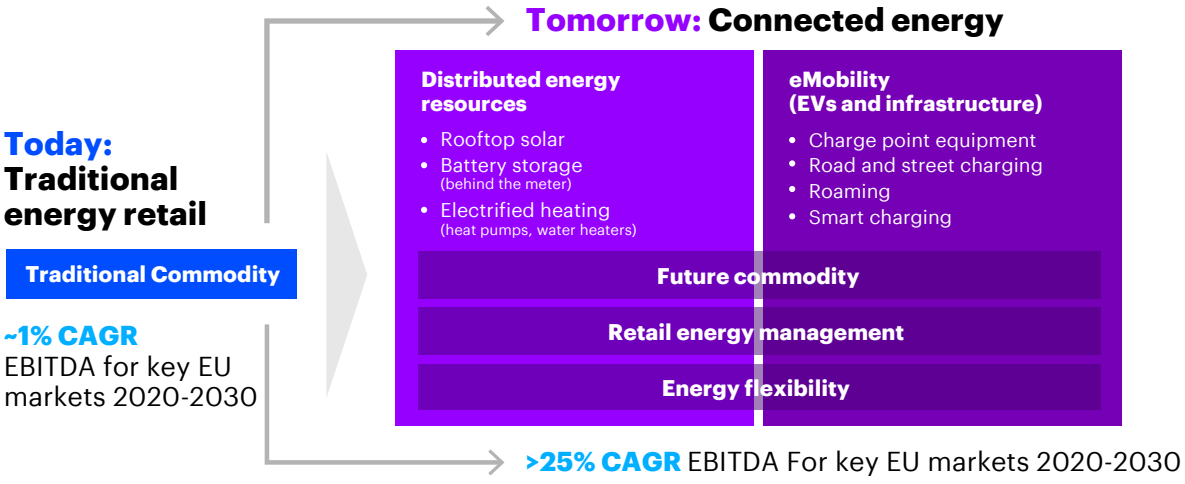
The transition is characterized by rapidly proliferating renewables, distributed energy resources (DERs), electric vehicles (EVs), increasing customer demand for new energy services, ambitious climate targets and cross-industry convergence—all further accelerated by the impacts of the COVID-19 pandemic.

New business models hold great potential for energy companies to find growth in this environment. However, it is still unclear which will be profitable. Many opportunities are hyped as keys to future growth, but not all will be able to deliver on these promises. Thus far, most players in the space—oil and gas majors, utilities and automotive companies alike—are struggling to make money with these new business models.

To find value and sustain growth, participants must separate hype from reality.

In this report, we dive into the most promising of these connected energy business models—centered on DERs and eMobility for residential and commercial customers across Spain, Italy, France, Germany, the Netherlands and the United Kingdom—to identify where value will exist in 2030. Our findings suggest that these business models will yield significant profits—between €7.2 billion and €8.8 billion (US$8.5 billion and US$10.3 billion) of total EBITDA across the industry within the coming decade—through the application of sustainable offerings such as rooftop solar, battery storage, electrified heating and EV charging services (see Figure 1).

Figure 1 **Connected energy business models offer the potential for significant growth over the next 10 years.**



Scope: Six key European countries (UK, NL, FR, IT, DE, ES)

EBITDA = Earnings Before Interest, Taxes, Depreciation, & Amortization
Source: Accenture modeling and analysis.

The value yielded by these opportunities will vary—and it is important for energy companies to proceed with a holistic view. Some business models, such as those focusing on rooftop solar, are projected to exhibit higher EBITDA profit potential. Others, such as those focusing on long-journey road charging stations for EVs, are projected to exhibit lower EBITDA profit potential—but may still offer value as part of bundled offerings (for example, by contributing to increased customer retention via more comprehensive offering sets).

Critically, to help make offerings more viable and accessible, emerging lease and rent ownership approaches (where customers pay on a monthly basis as opposed to a large up-front sum) can unlock additional value, for both customers and the energy companies that provide the offerings. Alongside the application of retail energy flexibility, these approaches represent important enablers for customer affordability and participation, helping connected energy products and services reach the broader customer base—adopted not only by the privileged few, but also by the mass market.

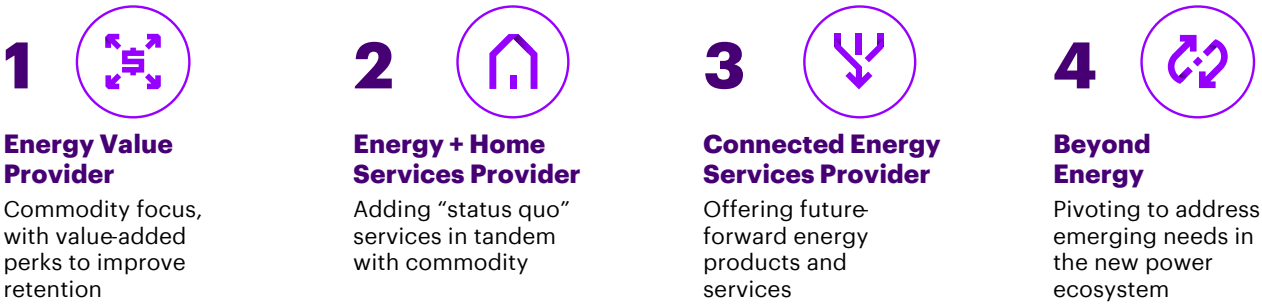
Across these opportunities, timing is crucial and distinct value pathways are taking shape. There is opportunity to execute and realize value today as well as on the horizon to be well-positioned as market models evolve. But this window of opportunity will not remain open indefinitely. For most energy companies, the shift from a business focused primarily on commodity sales and traditional home services to one substantially incorporating connected energy opportunities will not be easy. But as our findings emphasize, those that execute with a strategic, coordinated and pragmatic approach have the potential to uncover significant value during the energy transition. It is time for decisive action.

Defining connected energy business models

Strategic plays for a new energy ecosystem

For the core of our analysis, we examined four strategic plays energy companies can consider as they look to the future.

Figure 2 **Four strategic plays for energy companies.**



The "Energy Value Provider" play focuses on offering commodity electricity with the addition of value-added perks to improve retention and extend customer lifetime value, without the intent to generate profits directly. These services create opportunities for personalized, relevant customer engagement, for example, providing connections with a local handyperson, or a notification of an upcoming storm. The "Energy + Home Services Provider" play focuses on offering conventional home energy services like boiler maintenance and smart home installations, in addition to commodity sales. The "Beyond Energy" play refers to energy companies extending their retail offerings to include security, telecom or financial services.

Finally, the "Connected Energy Services Provider" play focuses on emerging energy business models nearing their tipping point—the focus of this report. With this play, energy companies can offer future-forward products and services in areas like eMobility, DERs, energy management and flexibility. Our analysis is not intended to provide an exhaustive catalogue of opportunities an energy company might pursue, but rather to quantify the value of several of the most promising and concrete emerging opportunities in the connected energy space.

A diverse menu of connected energy services

Within the "Connected Energy Services Provider" play, we can consider a "menu" of distinct pure-play products and services that can be offered to customers (see Figure 3). Before considering how these can be bundled together in practice, it is helpful to examine both the individual models and the financing approaches that can be applied to bring them to market.

Figure 3 **A diverse menu of pure-play connected energy products and services can be offered to customers.**

Electricity supply

- For the Home
- For EVs

eMobility

- Charge Point Equipment Referral & Installation
- Charge Point Equipment Operation & Maintenance
- Flexibility (i.e., Smart Charging–Behind the Meter or Aggregated)
- Charging on the Go (Utilization of Road/ Street Charging)
- Charging Anywhere (Access Fee for Roaming)

Rooftop solar

- Equipment Referral & Installation
- Equipment Operations & Maintenance

Battery storage

- Equipment Referral & Installation
- Equipment Operations & Maintenance
- Flexibility (Behind the Meter or Aggregated)

Smart heating

- Equipment Referral & Installation
- Equipment Operations & Maintenance
- Flexibilty (Behind the Meter or Aggregated)

Our analysis focuses on the residential (B2C) and small/medium business (B2B) consumer markets, examining new business models centered on eMobility and DERs, as well as impacts on commodity electricity supply.

For eMobility, the focus is on business models related to charging infrastructure and services. At the most basic end of the spectrum, energy companies can offer the electricity to serve the rapidly growing number of EV charge points used by customers. They can also offer home and fleet charging solutions, by providing sales, leases/rentals and/or upkeep of charging hardware. To serve customers while out and about, they can offer "charging on the go," which includes charging on urban streets and on roads between cities (similar to gas stations today). And they can help customers to "charge anywhere" by providing "roaming" services facilitating charging across multiple providers, for example, while traveling.

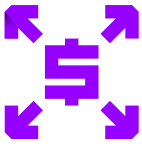
DER business models focus on rooftop solar, battery storage and smart heating applications such as smart heat pumps and smart water heaters. For these technologies, energy companies can offer customers referrals for equipment purchase and installation as well as providing operations and maintenance (O&M) for the hardware. For batteries and smart heating, energy companies can also offer flexibility services that allow customers to tap into the storage capabilities of the devices, both to help improve their efficiency behind the meter and to aggregate and sell the flexibility externally in the markets (though the maturity of most markets to enable the latter remains nascent).

Retail energy management services, while not identified explicitly in our analysis as independent customer offerings, are included as components of several models (like rooftop solar + storage, standalone storage and smart water heating), which implicitly rely on these services to operate and create value.

Alternative financing: buying, leasing/renting and using

Several of these connected energy business models can be offered via two distinct, but not mutually exclusive, approaches to asset ownership—Buy and Lease/Rent. Both approaches can play a part in an energy company's portfolio of services offered to the end customer to suit varying customer needs:

Buy refers to the more traditional case in which the customer buys and owns the assets in question. For example, a customer's upfront purchase of a rooftop solar array from the energy company—or from another vendor to which the energy company refers—falls into this category.



Lease/Rent refers to those cases in which the energy company owns the assets and the customer pays for the equipment "as a service." In this case, the energy company keeps full or partial ownership of the installed equipment, providing the upfront capital expenditure while amortizing the investment from the consumer through monthly or annual fees. One example would be a subscription model allowing customers to lease EV charge points for their business.

It's important to note that these approaches do not apply for all business models. For public EV charging in particular, the infrastructure is instead simply "Used" by the end customer rather than being bought or leased/rented.

For additional details regarding the research methodology, please refer to the Appendix.

Growth from new business models

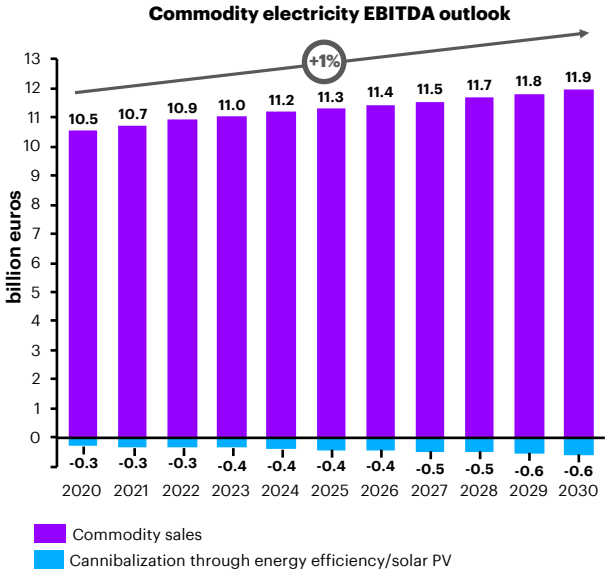
Opportunity: A decade to deliver

The status-quo commodity business is projected to offer limited growth potential for energy companies in key European markets over the coming decade. However, it is likely that this stagnation can be offset to a significant degree by new growth models centered on eMobility and DERs. Figure 4 details this striking comparison in terms of market-wide EBITDA profit potential.

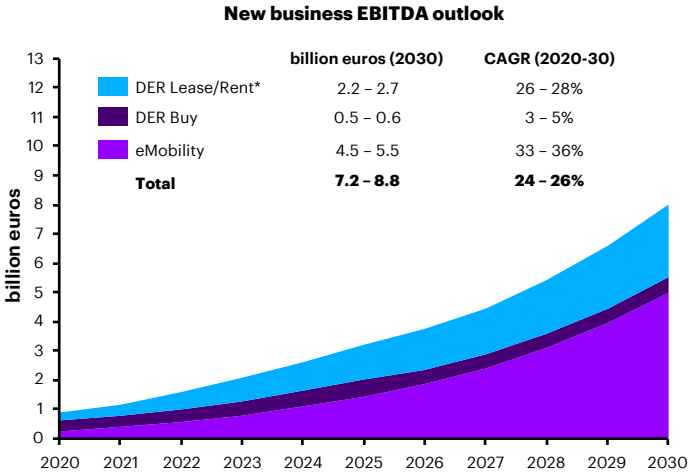
Figure 4 **While commodity EBITDA stagnates, 40% of the total 2030 market EBITDA is projected to come from new connected energy business models for eMobility and DERs.**

EBITDA 2030 outlook (billion euros) – commodity vs new business in utilities retail in six key European markets

Scope: Six key European countries (UK, NL, FR, IT, DE, ES)



Source: Accenture modeling.



*Including utility capital costs
Excluded from the scope: traditional heating/boiler systems and services; building insulation; building energy management systems/HEM not related to solar PV/storage/EVs
Assumptions: utility keeps 35% of the flexibility gains, sharing the rest with the consumer.

Source: Accenture modeling.

We project the value from eMobility business models to be between €4.5 billion and €5.5 billion ($5.3 billion and $6.5 billion) in 2030. Our analysis shows value from DER business models to be projected to reach €2.7 billion to €3.3 billion ($3.2 billion to $3.9 billion), including the Buy business models which are more prevalent today (€500 million to €600 million, or $587 million to $704 million), as well as the additional value from Lease/Rent models (€2.2 billion to €2.7 billion, or $2.6 billion to $3.2 billion).

In contrast, traditional commodity electricity EBITDA[1] for these six countries is projected to grow a mere 1% in the next 10 years (1% EBITDA CAGR), suggesting a grim future for pure commodity-centric businesses.

Not just profit potential: planet potential

In addition to economic value, these new business models hold substantial environmental potential. By 2030, they could drive an annual reduction of up to 76 million metric tons of CO_2[2] (see Figure 5)—similar to the current sum of intra-EU aviation emissions.[3] While the switch from internal combustion engines (ICE) to private and business-owned light EVs will dominate the overall emissions reduction, rooftop solar will also play a visible role, especially in the B2B sector, driven by self-consumption reducing the need for electricity supplied by conventional sources.

Figure 5 **Total net avoided emissions from eMobility and DER (million metric tons CO_2/year in 2030).**

(ICEs replaced by EVs, traditional electricity consumption replaced by standalone rooftop solar or rooftop solar with storage)

Source: Accenture modeling.

Value differences: location is key

Our analysis also reveals significant differences between countries in terms of where growth of emerging business models will be found. While DER models are projected to dominate the new business in Germany and Italy, the markets in Spain and the Netherlands are projected to be dominated by eMobility opportunities (see Figure 6).

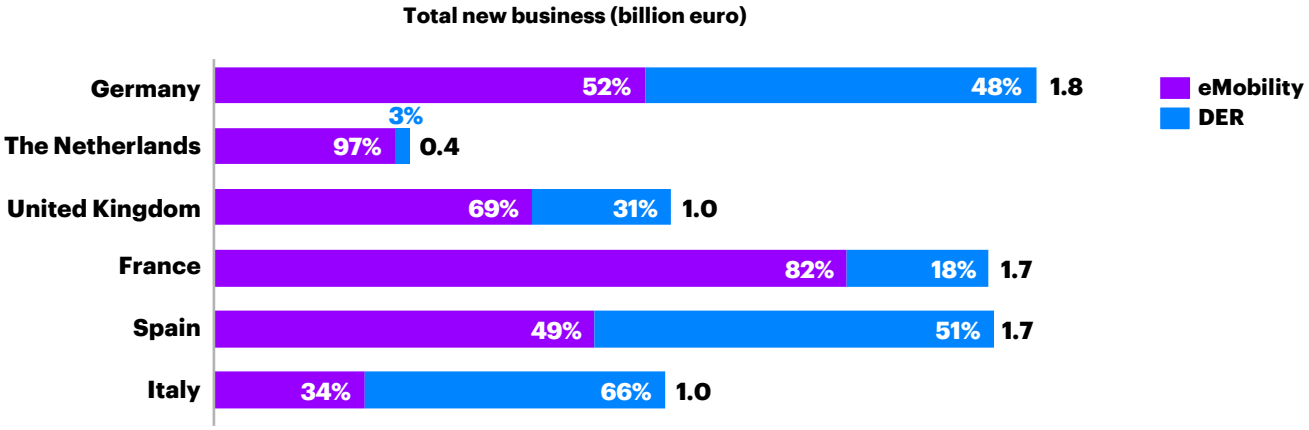
Beyond differences in population and economy size, some of this is explained by the existing large basis of small-scale solar installations in Germany and Italy, while Spain has prioritized the development of utility-scale solar over the past decade. Also, the existing technology penetration in the market influences new growth potential. For example, high rooftop solar penetration in countries such as the Netherlands is likely to limit additional profit growth from services such as referral and installation of rooftop solar equipment over the next decade.

The existing regulatory incentives also play a key role: while Germany and Italy have a legacy of feed-in tariffs for small-scale solar and have recently introduced major incentives for rooftop solar + storage, the Netherlands has followed a net metering scheme. As net metering remunerates grid feed-in by practically the full electricity price throughout the day, this effectively removes the incentive to invest in storage.

Regulatory incentives can play a key role for eMobility as well, for example, where they have contributed meaningfully to EV adoption in countries such as Norway and the Netherlands. The intent of these incentives is typically to subsidize the technology until it reaches a tipping point for the end customer business case, at which point the subsidies are removed. The potential impact of these subsidies to make markets is significant, as is their relatively "fickle" nature, in that they are subject to change by the regulator at any time.

Figure 6 EBITDA outlook for connected energy business models varies by country.

2030 EBITDA outlook (billion euro) by new business models and country
Buy + Lease/Rent business overall



Utility keeps 35% of the flexibility gains, sharing the rest with the consumer.
Source: Accenture modeling.

Choosing the optimal business models to pursue

Decisions, decisions: Charting a path with eMobility and DER

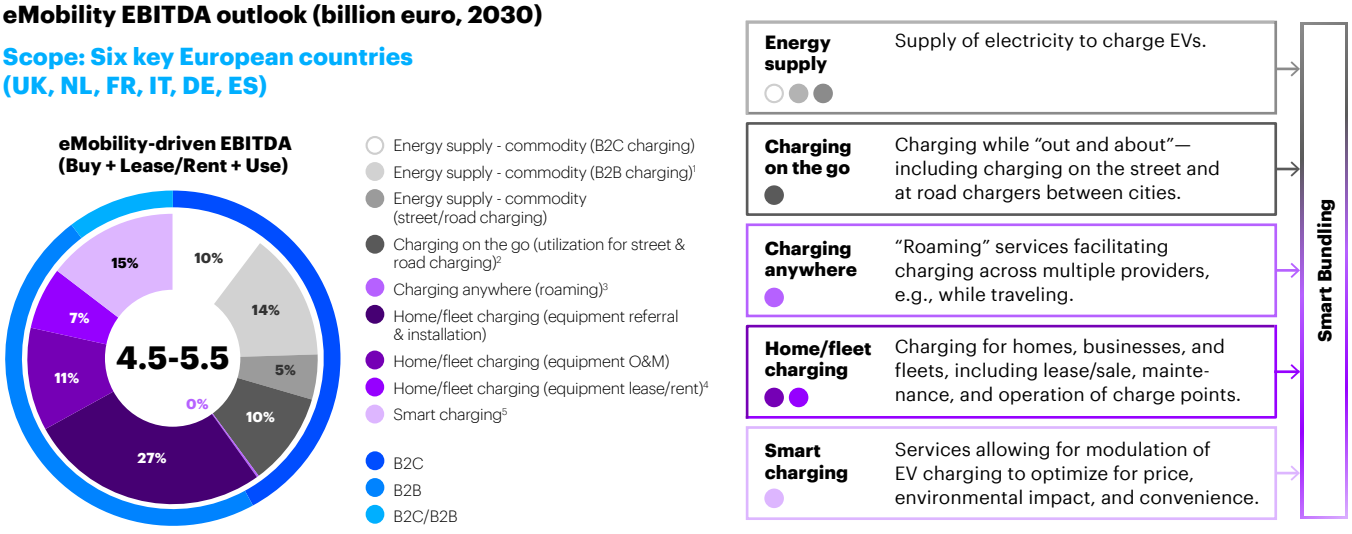
The key questions for energy companies quickly become: Which are the optimal growth models to pursue? What are the appropriate products and/or services to offer alongside existing ones, and how should they be bundled? The ideal path forward for energy companies will naturally depend on individual market and business context as well as target customer segment characteristics but will likely reflect a mixture of eMobility and DER business models (with opportunity for both Lease/Rent and Buy approaches). To help provide more detailed insight, we can examine the value projected for the menu of pure-play services spanning eMobility and DER opportunities.

eMobility pure-play services

Home and fleet charging

The opportunity for eMobility is a sizable one, projected at approximately €5 billion ($5.9 billion) value in 2030 for the key European countries (see Figure 7). We estimate that more than 40% of this value will be in home and fleet charging for B2B and B2C applications. More than a half of this value will come from the B2B charging opportunity driven by companies purchasing light commercial vehicles (with chargers for their charging depots), as well as passenger cars used for commercial purposes, company-owned cars provided to employees as benefits (common in markets including the United Kingdom and Germany) and destination charging stations provided by business customers (e.g., hotels and supermarkets). The B2C charging opportunity is driven by the purchase of passenger cars for private use, with a charger installed at home.

Figure 7 **In 2030, value opportunities for eMobility business models are projected to be approximately €5 billion ($5.9 billion).**



[1] B2B includes a) "Fleet" = commercial e-vans + company-owned passenger EVs offered to employees and b) "Destination": hotels, supermarkets.
[2] "Charging on the go (road/street)" excluding commodity while including utilization fees, capital costs and O&M costs.
[3] eMSP access fee.
[4] Including capital cost impact.
[5] 35% of flexibility gains shared with the utility.
Source: Accenture modeling.

Energy supply

Nearly 30% of the total eMobility value is projected to come from increased energy supply sales, i.e., the additional electricity which will need to be sold to meet the demands of the rapidly growing number of EVs on the roads. Energy companies are well positioned to capitalize on this opportunity, but increasingly aggressive moves by cross-industry entrants mean they need to act decisively. The bulk of EV commodity growth is projected to come from B2B charging, driven by both company-owned employee fleet electric cars, light commercial e-vans as well as passenger EVs using destination charging locations.

Charging on the go (road and street charging)

Street and road charging, which allow EV drivers to charge at public stations by paying per-use utilization fees based on time and/or amount charged, account for around 10% of eMobility value. This value is relatively limited since most charging is projected to continue to take place while EVs are parked at private locations, such as homes or fleet depots.

Shared, public street charging stations are projected to contribute most of this limited EBITDA, primarily driven by EV customers in metropolitan areas. These customers often lack a suitable location for their own private home or workplace charging location and must charge their vehicles via shared, typically medium- speed public charge points located on the street.

EBITDA value from road charging is projected to be minimal by comparison, as it is projected to account for a relatively low percentage of charging volume.[4] Road charging refers to high-power charge points located outside of cities and used for short “refuels” while on longer trips, via approximately 20-minute charging sessions (analogous to conventional gas/petrol stations for ICE vehicles). A remarkably high utilization rate is needed for road charging stations to break even, given the relatively high investment of approximately €50,000 ($59,000) per 100 kW station (our assumption of seven to eight full 50 kWh EV charges per day per charge point on average is already optimistic).

However, road charging business models are already being applied to create value beyond EDITDA, for example, with the deployment of proprietary EV charging networks, which can offer convenience and brand loyalty incentive for vehicle owners.

Charging anywhere (roaming)

Roaming subscription services to "charge anywhere" are projected to drive negligible EBITDA value by themselves. These services provide additional charging options and functionality to EV drivers, in exchange for payment of a recurring access fee. For example, roaming services often allow EV drivers to not only locate available charging stations, but also more easily and cheaply use charge points offered by a wide range of operators—only paying a single monthly bill and receiving consolidated insights on their charging habits. Fulfillment of these roaming services is made possible not only by vehicle charging interoperability— such as compatible charging plug types—but also by information infrastructure which operates behind the scenes to reconcile charging sessions and payments across networks. These models are loosely analogous to a service provider like Booking.com in the hospitality space, which provides a single portal for customers to book stays at a wide variety of hotel providers.[5]

Despite the limited EBITDA potential, these models can offer value when bundled with other offerings, for example, to help improve customer experience and thus improve retention. This approach is already being demonstrated by some leading energy companies that create packaged offerings including charger installation, commodity sales and roaming access to public charging.

Demand-side flexibility

Finally, we project that a significant segment of eMobility EBITDA value—about 15%—can be found in demand-side flexibility; i.e., EV smart charging. This refers to unidirectional load shifting based on financial incentive (V1G), rather than bidirectional vehicle to grid (V2G), which remains in the relatively early stages and will need to overcome significant technical barriers to become viable at scale. Rather than being a service offered on its own, smart charging is primarily a mechanism to make eMobility solutions like home charging, fleet charging and energy supply more affordable for the end customer and, from a business standpoint, more competitive in the marketplace. Here, energy companies can offer value to customers for "free," deriving revenue by taking a cut of the end flexibility value that is created. Our analysis indicates that even with the consumer retaining more than 60% of total flexibility value, the remaining cut will be more than enough to allow energy companies to market, sell, run and maintain a flexibility service and platform (including overhead costs needed to operate)—resulting in EBITDA potential of more than €700 million ($822 million) in 2030.

It's also important to note that the projected demand-side flexibility value refers to valorization on the wholesale and retail markets. Deriving value from demand-side flexibility in other ways, such as bidding it into markets for grid services, has the potential to create additional value—but, as mentioned, will require additional market evolution to do so at scale. Early examples like Equigy (a pan-European, blockchain-enabled network targeting the aggregation of EVs to play into balancing markets)[6] already show promise in the space.

Distributed energy resources pure-play services

Dimensions of DER: technology and service

DER opportunities are projected to yield significant value over the next decade. These business models can be considered "by technology," focusing on the actual equipment/hardware deployed at customers, or alternatively "by service," giving insight on the underlying profit models.

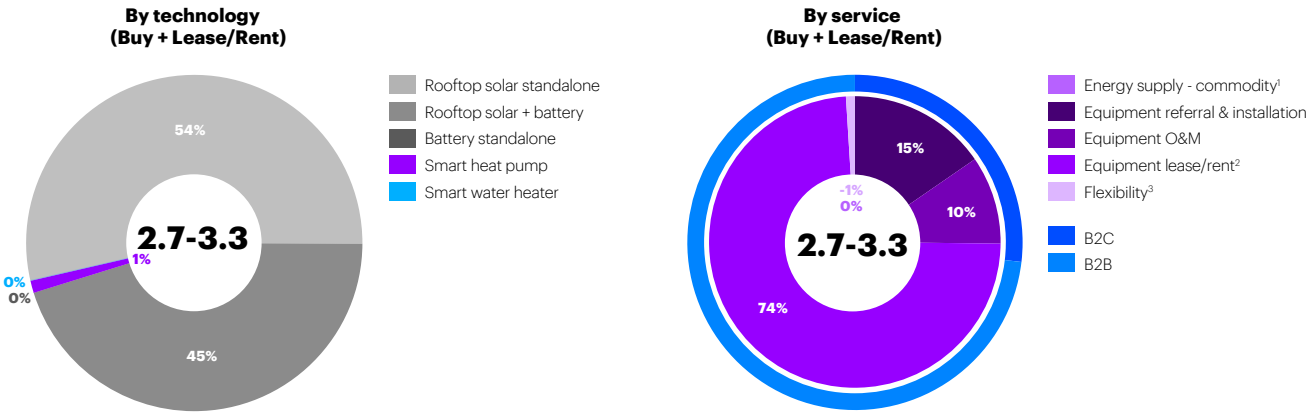
By technology, the DER opportunity can be viewed in two key categories: rooftop solar and battery storage (standalone or in combination), and electrified heating (including smart heat pumps and smart water heaters). Standalone rooftop solar contributes 54% of the total EBITDA market for DERs in 2030, and rooftop solar + storage represents most of the remaining potential (45%), with only limited EBITDA opportunity contributed by electrified heating (See Figure 8).

By service, about three-quarters of projected value is associated with the Lease/Rent asset ownership approach—subscription services primarily for standalone rooftop solar and rooftop solar + storage models. This value is largely driven by the commercial segment as investment payback time falls to, at best, less than one year (and indeed, the commercial sector dominates the new DER business opportunity overall, representing 73% of the total in 2030). In this case, customer self-consumption gains exceed customer costs from subscription fees and O&M for the rooftop solar system, creating a theoretical market of more than one million commercial solar subscription customers by 2030.

Figure 8 **In 2030, value opportunities for DER business models are projected to represent approximately €3 billion ($3.5 billion).**

DER EBITDA outlook (billion euro, 2030)

Scope: Six key European countries (UK, NL, FR, IT, DE, ES)



[1] No additional growth on EBITDA through commodity electricity installation due to minimal market for smart heat pumps and smart water heaters; not addressing traditional market for boilers or water heaters.
[2] Including capital cost impact.
[3] 35% of flexibility gains shared with the utility.

Source: Accenture modeling.

Referral and installation for new solar and storage equipment is projected to account for 15% of DER EBITDA value, driven by an expected surge in the new base of customers acquiring equipment themselves and requiring one-off services to procure and set up their equipment. Profit potential from O&M contributes 10% of DER value, applicable to all customers via ongoing services to keep their equipment in working condition over time. EBITDA value from additional commodity sales are negligible, as reduced net consumption driven by distributed generation from rooftop solar negates the increases driven by electrified smart heat pumps and boilers.

Interestingly, DER value potential from flexibility is projected to be "negative" overall. This is because the business case for consumers is made not based on flexibility sales back to the utility or grid (customers might gain some price arbitrage, but not enough to offset the investment cost), but rather from self-consumption (avoidance of energy purchase by consuming one's own generated energy, boosted potentially by battery storage); i.e., to avoid commodity fees, grid fees and taxes. Since this value from self-consumption is realized by the customer directly, it is not reflected as EBITDA value from flexibility, but rather in terms of greater customer adoption of DER installations driven by an improved customer business case.

In general, for standalone storage and solar + storage models, we observe that the existence of dynamic pricing tariffs, such as those in Spain, are beneficial for the business case. On the other hand, existence of net metering, where electricity is billed based on the simple "net" amount used, regardless of time of use such as in the Netherlands, is comparatively detrimental for the solar + storage business case. It's again important to note that should new markets open, allowing aggregation of flexibility for ancillary services, balancing markets, etc., they may add additional value stacking opportunities to improve the business case for storage and solar + storage aggregation.

Rooftop solar and battery storage

Customers tend to find rooftop solar valuable for two main reasons: reduced price and increased quality of their electricity supply. Not only are they able to reduce their energy bill (for example, via reduced grid fees and taxes driven by solar self-consumption), but they are also simultaneously shifting to a larger share of locally produced, renewable energy—a shift that is increasingly resonant with both residential and commercial segments, who value making informed decisions regarding their energy source, e.g., going "green" and local.

Why are rooftop solar and battery energy storage so frequently coupled together? While the relatively nascent nature of battery storage technologies means that the business case for storage-only home and small business applications is often limited due to high technology costs, coupling storage with solar allows for more opportunity for self-consumption in terms of separating the timing of generation from timing of consumption.

For Lease/Rent rooftop solar + storage models in particular, capital investment requirements are remarkably limited compared with projected returns, especially over the medium and long term, making them especially enticing for energy companies to pursue. This is driven by growth of both the B2B and B2C-focused versions of this business model, with the latter including community energy applications, where customers pay for a share of utility-owned and sited solar or solar + storage.

Residential-focused Lease/Rent models for solar + storage sited at customers' homes are also gaining traction. In Germany, for example, companies like sonnen are already bringing them to fruition.[7] Their sonnenNow program offers straightforward, cost-effective rental of a solar + storage system—as well as the option to seamlessly add the lease and operation of an EV via sonnenDrive—all for a consolidated monthly fee.

Even given the remarkably rapid technological advancements and cost reduction exhibited by battery storage systems, the business case for standalone storage for residential and commercial customers in our focus countries is still projected to be greatly dependent on subsidy to break even through 2030. Here, we refer to battery electricity storage both located behind the meter or in the near vicinity of the customer in the case of collective self-consumption installations. Battery storage allows energy usage to be decoupled from energy acquisition, i.e., energy can be purchased (charging the battery) when it is inexpensive, or sold from the battery when it is expensive to purchase from the grid (in geographies with tariffs that value electricity differently over time).

Without significant subsidization, European customers will likely have a difficult time justifying the cost of these standalone systems and adoption will likely be limited, for example, to customers with heightened concern for energy resiliency during power outages.

As mentioned, the primary business case for energy storage is driven largely by self-consumption when coupled with rooftop solar, with limited value for price arbitrage. Industrial customers may be able to derive additional value from battery storage, such as by valorizing flexibility for ancillary grid services like frequency modulation—as demonstrated by players like German storage provider Be.storaged,[8] but these opportunities lie outside the scope of this analysis, which is limited to residential and small/medium business customer segments.

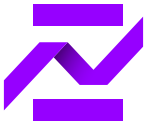
Electrified heating

Although not projected to yield much EBITDA value over the next decade, smart water heaters retain a potentially advantageous quality—they represent the potential to tap into energy storage already in place. Unlike battery storage, which entails relatively high costs to purchase and install, smart water heaters take advantage of the currently installed supply of devices. Doing so implies a comparatively low cost required to add on smart operation, via a small digital device to control the existing water heater, and also circumvents the relatively limited market for net-new water heater installations projected over the coming decade. This approach can unlock energy-efficiency opportunities to reduce overall electricity demand and offer the opportunity to use the hot water in the heater as an energy storage medium, for flexibility such as load shifting.

For the six European countries we assessed, the limiting factor is the potential to create value from the flexibility generated. Based on the projected development of energy and flexibility market models to 2030, value from these devices is limited. However, in the case that markets evolve significantly faster than projected, and/or subsidies favoring this flexibility bolster value beyond what is projected, smart water heaters may see increased traction for aggregation and commercial demand-side asset optimization.

On the other hand, smart heat pumps[9] require a relatively large capital investment to purchase and install, either via conversion from an existing gas heat pump (the market for which is, in contrast with water heaters, quite limited) or via net new construction which includes electric heat pumps. In either case, we project their investment costs will continue to exceed the efficiency gains for in-scope European countries.

Smart heat pump business models could become more viable if technology costs decrease more quickly than projected, if wholesale prices increase dramatically, and/or if regulatory parameters shift toward aggressive subsidization and incentivization of smart electric heat pumps in particular. Announcements such as the United Kingdom's recently revealed target to install 600,000 heat pumps every year by 2028[10] suggest that the latter could indeed prove to be the case. The inverse of this mechanism can also be a factor—avoidance of steep taxes on gas, for example, can also play a role in making electric heat pumps more economically viable for customers (as can already be observed influencing the market in the Netherlands).



The value of demand-side flexibility

Demand-side flexibility can yield significant value for EVs and DERs—but the value potential can vary by technology. According to our estimates, a U.K. EV driver could save up to £100 per year by smart charging their vehicle at home–shifting their demand outside of peak periods by modulating charging based on grid, market and/or user needs. This is without including still-nascent vehicle to grid, or V2G, opportunities in which electricity flows from the EV back to the grid when needed. On the DER side, shifting a smart heat pump outside peak periods could save another £80/year. However, not all impacts are as sizable—shifting a smart washing machine's demand outside peak periods, for example, yields only about £7/year. As these projections illustrate, energy companies are wise to focus on the flexibility applications with the greatest customer impact and business case for their specific market, while considering the costs and regulatory tailwinds needed to create value at scale.

The EU's transition to dynamic pricing[11] will leave many residential and business customers looking for opportunities for self- consumption and arbitrage from energy flexibility—prime value propositions for emerging connected energy business models. One example of a player operating in this space is Dutch supplier Nieuwestroom,[12] which brings to market a strong focus on dynamic pricing specifically for commercial customers, as well as additional services like price alerts, the ability to choose origin-guaranteed green energy and buy-back of solar production from prosumers.

In general, it's interesting to note that demand-side flexibility can be unlocked via two distinct models: one that puts the consumers fully in control by exposing them to dynamic pricing tariffs, and a second one that offers a flat rate in exchange for utilization of their demand-side flexibility (aggregator model). With the dynamic pricing approach, the end consumers are exposed to varying prices, and can modulate their own energy use accordingly (preferably in a fully automated way). With the aggregator approach, no dynamic tariff is applied for end consumers. Instead, the BRP (balance responsible party—most often the retailer) establishes an arrangement with the end customer to offer a flat (or at least less variable) tariff in exchange for ability to leverage demand-side flexibility. For example, the BRP may be allowed to leverage the flexibility of an EV via smart charging overnight, as long as the vehicle is left fully charged in the morning. The BRP can then create value from this flexibility on the spot and ancillary services markets, while the end customer mitigates risk and/or obtains a discount for the privilege.

Alternative Financing

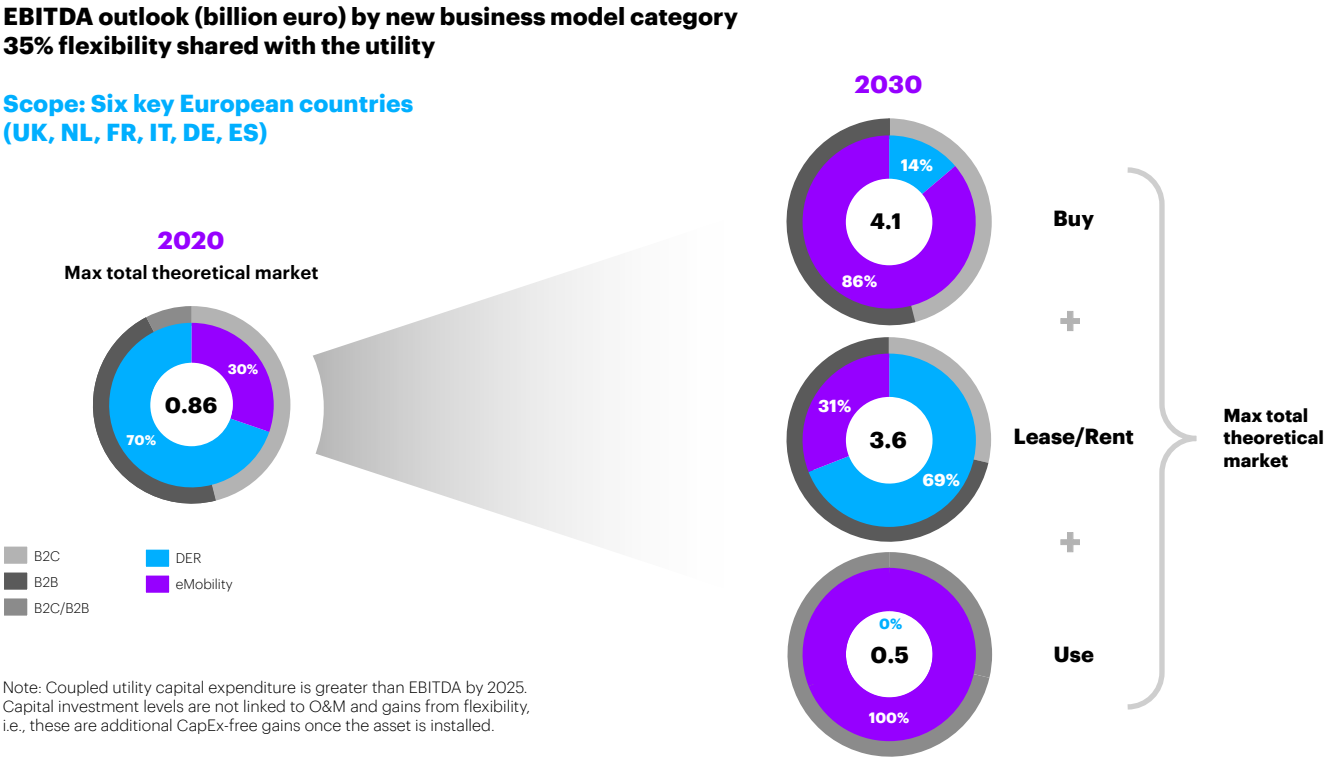
A tale of three ownership approaches

Across a portfolio of services, the realistic path forward for most energy companies will likely entail a mix of Buy, Lease/Rent and Use models, with offerings varying based on the market relevant technology and—most importantly—the specific customer segments targeted.

Currently in 2020, according to our modeling, the total estimated value from connected energy business models (although limited compared to the current traditional commodity business) is distributed more or less evenly between residential and commercial customer segments (see Figure 9). We estimate that 70% of the current value lies with DER models, and 30% with eMobility models. In most cases across the board, Buy ownership models are more common. The Use business models are reserved for shared public charging, where end customers use the street- or road-charging stations within or outside the cities.

In 2030, we project the maximum theoretical EBITDA potential to be distributed relatively evenly between Buy and Lease/Rent business models, supported by Use models specific to eMobility. Buy models are projected to be split similarly between B2C (46%) and B2B customers (54%), with an overall emphasis on eMobility applications (86% of the opportunity, vs. 14% from DER). On the other hand, Lease/Rent models are projected to find greater traction with commercial segments, and with a proportionally greater potential for DER-focused applications (69% of the opportunity, vs. 31% from eMobility).

Figure 9 **EBITDA outlook for new business models from today to 2030 across Lease/Rent, Buy and Use ownership schemes, for DER and eMobility.**



Note: Coupled utility capital expenditure is greater than EBITDA by 2025. Capital investment levels are not linked to O&M and gains from flexibility, i.e., these are additional CapEx-free gains once the asset is installed.

Source: Accenture modeling.

Customers with sufficient capital to afford the Buy approach may opt to do so to reduce total cost of ownership, for example, via avoided interest payments for financing. This approach may also be pursued by customers who choose to arrange their own financing separately.

The appeal of Lease/Rent models

Lease/Rent models, on the other hand, may appeal to customers unwilling or unable to make the large capital investment needed for upfront purchase, or for businesses that otherwise prefer to incur operational expenditure but are keen to derive the benefits offered. Post-pandemic volatility and global market tumult are projected to further support the case for Lease/Rent models accordingly.[13] These models also tend to be more likely to appeal to younger customers, including millennials and Gen Zs, who tend to be more comfortable with as-a-service models. Lease/Rent models have proven highly popular in other industry segments such as automotive sales—where customers often lease more expensive cars than they could or would otherwise purchase, and telecommunications—where many customers opt to rent their relatively expensive smartphone on a monthly basis vs. paying for it upfront. Accordingly, Lease/Rent models could potentially play a key role in helping bridge the gap between connected energy offerings and the mass market.

From the perspective of energy companies offering Lease/Rent models, a few factors can be considered. These models offer new revenue streams from DER assets in the form of monthly charges, in exchange for the trade-off of carrying additional capital on their balance sheets (the latter being a factor by definition not reflected in EBITDA projections). Access to institutional capital, such as from the EU's post-COVID recovery package,[14] could also help accommodate upfront cost.

In eMobility, EV adoption has historically been contingent on regulatory incentives like EV purchase subsidization or perks such as discounted parking offered to EV drivers. However, we project that the increasingly attractive total cost of ownership of EVs compared with ICE vehicles will drive increased penetration and value opportunities in the space, even in the absence of incentives. Especially based on recovery from the COVID-19 pandemic, Lease/Rent models can offer an opportunity for customers to embrace EVs as they rebuild—as we are already seeing take shape as countries like Germany launch generous EV subsidies.[15] Offerings such as Edison Energia's Plug & Go in Italy, which offers an EV lease bundled with a home charger, installation and access to charge point location—are already bringing these models to market.[16]

These Lease/Rent models also reflect a different type of relationship with the end customer, i.e., that of a digital service provider vs. a product seller. Service provider relationships come with their own host of opportunities and challenges: services tend to offer increased customer retention/reduced churn, and greater potential for cross and upsell. The shift to service models can also help make customers' engagement with relatively complex energy offerings simpler, as the energy company takes care of the details and charges only a single monthly fee. However, these models also can reflect greater emphasis on support and customer operations, since the relationship spans a longer duration with more touchpoints and accountability to ensure positive quality of the service over time.

“Solar plus” as-a-service for commercial customers

The EBITDA opportunity for Lease/Rent models is dominated by standalone rooftop solar and rooftop solar + battery storage, with a specific emphasis on value for commercial customers. The avoidance of high upfront cost and associated risk through application of these ownership approaches are likely to be differentiating factors for small and medium-size businesses (SMBs). One example would be a case in which an investor hosts multiple business clients in a single establishment, such as a shopping center. In such a case, the building owner could run into challenges arranging the capital to invest in DERs, as there may also be capital implications for their tenants. “Solar plus” Lease/Rent business models could help to lower that decision barrier, for example, paying only a manageable recurring equipment access fee, while gaining the benefits of an integrated solution and the advantages that DERs can afford.

One example of such a Lease/Rent ownership approach in action for DERs is Portuguese electric utility EDP’s Save to Compete program.[17] The offering is targeted at SMB customers, allowing them to acquire energy-efficiency solutions without upfront investment. Businesses can join the program free of charge and access personalized energy-efficiency recommendations tailored to their specific industry segment, operating and building characteristics. EDP invests in energy-efficiency solutions which are paid by the business customer through the savings generated as part of a long-term partnership.

Residential value from Lease/Rent

However, value from the Lease/Rent approach is not limited to commercial customers. In one example underscoring the value of such a model across customer groups, one Australian energy company installed solar PV for roughly 40,000 customers in 2016. The business plateaued the following year with zero operating profits. After switching to a solar-as-service model that included free installation with monthly payments, the company was able to grow its customer base 1,000% by 2019 to 440,000 customers and a 12% jump in profit margin.[18]

In Spain, Repsol’s new SolMatch[19] community solar offering is another great example of a Lease/Rent model with a residential focus. The online platform is the first large solar community in Spain that matches owners of urban buildings with empty rooftops (“the roofers”) with those interested in participating in community energy (the “matchers”)—financed, built and managed by Repsol. The straightforward proposition and user experience allow customers easy participation in the energy transition.

The value of business model bundling: “Leticia’s” story

In practice, business models are often brought to market as bundles, combining several offerings into a single value proposition for the end customer. This approach can be valuable for the customer, as it allows provision of a better integrated offering that more completely addresses their needs. It can also be valuable for the energy company, as it allows for lower churn and opportunities to cross-sell and upsell.

Meet Leticia

36

Years old

Manager at a local retail store

Lives in an apartment in the city center

Environmentally conscious consumer

Wants to participate in solar energy even though she doesn’t own a rooftop

Extra money each month goes toward donations to support social causes

This illustrative example of Leticia's story represents an environmentally conscious consumer who wants to participate in solar energy, even though she doesn't own a rooftop. Via smart direct marketing she receives a message from a fictional energy brand about how frictionless, personalized and social their solar energy experience is.

In a simple way, Leticia is able to explore and enroll with a community solar program, enabling her to enjoy solar energy from a local panel she invests in. The offer is subscription-based, and she is able to see how much energy she produces to power her home. She is able to track her cost savings, and she can see her impact on the environment. The abundant energy Leticia produces can be sold or donated to local nonprofits in need.

Further along her journey, Leticia receives a personalized offer from the same energy brand to further expand her subscription service with an additional offer. She's able to simulate what an EV could mean for her, as the company has noticed that she has had a growing interest in EVs—and she's able to swiftly book a test drive with the EV of her choice. Depending on her needs, she can choose to bundle public or private charging, or a combination of both. When she needs to charge her car via public stations, she's able to quickly see via her in-car navigation system which stations are nearby and available on her route.

Leticia's experience brings out the best in her, as this fictional energy brand helps her to contribute toward a carbon-neutral world. The energy brand becomes part of her life alongside her other favorite subscription services, such as Netflix and Spotify.

The value of bundling business models

As Leticia's story illustrates, bundling across multiple business models can offer value greater than the sum of its parts. This approach has been applied successfully for years in industries like banking, where customers are often incentivized to enroll in multiple financial products and services via a single institution.

These types of bundled offerings are already seeing traction in the market. For example, charge point operation + roaming bundles refer to bundling EV roaming services with charge point products, allowing customers to enroll with a single service to cover all charging needs. These models can target residential and/or fleet applications. In the Netherlands, one example is Total's Vroaming offering, which can cover charging both at home and away with one consolidated contract. They offer a variety of bundles, including a pure roaming model and a roaming model coupled with a home charging station, to best fit customers' needs across both residential and small business segments.[20]

We see significant untapped potential for energy companies to provide bundled offerings over the coming decade to help meet customers on their own terms. This approach can help by improving customer satisfaction driven by convenience (the lack of which remains a key barrier to customer adoption), and by increasing loyalty and retention as customers are less prone to leave bundled services. The opportunity for energy companies to offer true end-to-end bundles (i.e., including commodity sales) could represent a strong differentiating factor against other entrants competing in the energy services space.

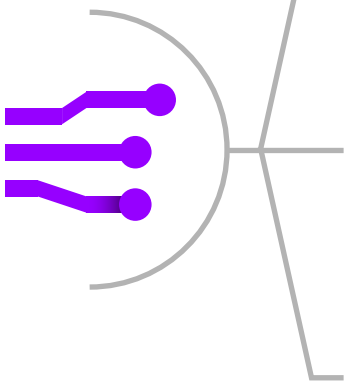
Pathways for making new business models a reality

When considering the pursuit of future energy business models, timing is a key factor. We observe three value pathways that can help structure planning and execution: one that is currently viable, and two likely to become more broadly viable at scale in the future.

Current value pathway: Direct solutions

As this report analyzes and quantifies, immediate value opportunity exists now (and over the coming decade) in the form of direct individual and bundled offerings of connected energy solutions in the eMobility and DER spaces. The timing of these solutions will necessarily differ by region (as explored in Figure 6), and will be influenced based on prevailing market, consumer and regulatory forces.

The maturity of the solutions in question is a major determining factor influencing the degree to which regulatory support is necessary for success. Offerings closer to their tipping points (such as rooftop solar) will naturally require less subsidization to succeed, while offerings at earlier levels of maturity (such as energy storage) may require more regulatory support in order to gain traction. For both groups, efforts such as the EU's post-COVID recovery initiative (€1.8 trillion in total[21]) and Germany's stimulus specifically targeting EVs[22] have the potential to accelerate the advancement of connected energy business models even more rapidly.



Now

Current value pathway: direct solutions, focusing on individual and bundled offerings of connected energy solutions in the eMobility and DER space.

Future

Future value pathway #1: aggregation and commercial asset optimization depending on market structures and rules, volatility from renewables, and natural gas prices—enabling value stacking of aggregated DER assets.

Future

Future value pathway #2: pivots beyond the core business with energy companies extending their retail offerings beyond energy, such as offering security, telecom or financial services.

Future value pathway #1: aggregation and commercial asset optimization

Aggregation and commercial asset optimization have the potential to yield significant future value; indeed, many customers are already and increasingly open to engage with these models.[23] The timing of this value pathway coming to fruition will depend on natural gas prices and volatility from renewables, while the ability to realize the end value will depend on the maturity of market structures in place to do so. Each of these three contributing factors can be considered individually:

1. **Natural gas price** (and by extension the state of the oil and gas sector more broadly) is a key influencing factor, given that natural gas peaking resources are currently the main sources of flexibility on the grid. Gas prices accordingly have a significant bearing on the viability and profitability of other business models seeking to derive value from flexibility, including flexibility from DERs.

2. **Volatility from renewables** is another important factor impacting the pace of viability for aggregation and commercial asset optimization. Increasing wholesale price volatility, especially at lower price levels, will exacerbate the critical need for flexibility. This will help unlock the business case for distributed flexibility sources like demand response, battery storage and smart heating.

3. Finally, **market structures and rules** are the limiting factors currently holding back the actual realization of value from aggregation and optimization business models in Europe. The maturity of these markets varies by type: spot and balancing markets are more mature (though the latter differs by country), congestion markets at the transmission level are established but are less mature, and congestion markets at the distribution level either do not yet exist or remain in the early stages. At the distribution level, the markets are not yet equipped to effectively incentivize aggregation and optimization. It is for this reason that the value from these models remains so difficult to quantify at this early stage (and thus omitted from the value quantification of this report). But what specifically must change from a market standpoint in order to realize this value? Two main outcomes must be achieved:

    1. DERs must obtain greater access to participate in existing flexibility markets.

    2. New flexibility markets must be created at the distribution (local) level, allowing for effective valuation and valorization of flexibility from DERs.

With sufficient progress, these three contributing factors will pave the way for new opportunities in the space, and open up new potential for "value stacking," combining multiple value streams to improve the business case for a given DER. Accordingly, virtual power plants (VPPs), i.e., aggregated groups of DERs that bid their flexibility into the market in place of generation resources, could eventually offer greater value in the European market, for example, by aggregating flexibility from smart heating devices.

Future value pathway #2: pivots beyond the core business

These pivots refer to energy companies extending their retail offerings for their existing customer base beyond the core energy business—such as offering security, telecom or financial services. Though these opportunities can potentially be pursued today, they are perhaps more realistically likely to be viable for most energy companies beyond 2030 as part of an ongoing transition and diversification from the traditional pure commodity business.

Conclusion

The energy ecosystem stands at an inflection point. Evolving regulation, maturing technology, stiffening cross-industry competition and the shifting demands of the energy consumer are rapidly driving change—the pace of which is only continuing to accelerate. Decarbonization is no longer an option but a reality and an inevitability, and digital technologies are paving the way for a host of new opportunities in the space. For energy companies it is undoubtedly a time of great challenge. The commodity-centric business of the past century is still delivering value, but growth is stagnant.

However, along with these challenges is a once-in-a-lifetime opportunity to forge a new path forward. Sustainability is coming into its own as being not only beneficial for the planet, but for the bottom line as well, and energy companies are well positioned to capitalize on this current "perfect storm." Indeed, we project the connected energy business will represent a remarkable 40% of the total market EBITDA for key European countries in 2030. Executing decisively to implement and scale these models represents the most viable path to sustained growth.

Across rooftop solar, battery storage, electrified heating and EV charging, energy companies have the opportunity to craft a set of pure-play offerings that best fit their business strategy and the needs of their customer base. Emerging asset ownership approaches allowing customers to lease or rent these products and services can help to better address their needs in the post-pandemic world, unlocking additional value alongside more traditional ownership models.

As energy companies assemble their portfolio of pure plays, they also have the opportunity to optimize how they combine offerings together to achieve results that are greater than the sum of their parts. Bundles targeting distinct customer segments and key personas can not only increase retention but also attract new customers who feel their changing energy needs are better served in a simple, affordable, transparent and trusted manner.

For energy companies, the window of opportunity to act is now, and that window will soon close. To execute effectively, the shift from a traditional commodity-centric business to a digital energy services company will be part “evolution” (leveraging and building on existing capabilities to play to competitive advantages), and part “revolution” (rapidly developing the new capabilities necessary for successful execution).

Navigating these challenges will not be easy, but it will be the energy companies who do so successfully that will position themselves to execute and capture value as the energy transition continues to accelerate.

Appendix - research methodology details

Quantitative modeling methodology

The quantitative value model on which the EBITDA profit projections in this report are derived first examines the consumer business case, including energy-efficiency gains (e.g., self-consumption); regulatory incentives (e.g., capital grants, feed-in tariffs and net metering); and flexibility gains (e.g., from shifting demand throughout the day for savings via TOU tariffs or arbitrage remuneration via flexibility aggregators). The gains are compared with consumer costs related to commodity electricity, equipment, services, financing and/or access fees. Finally, the resulting consumer net cash flows are measured with net present value, boiling down to payback times, and are combined with selected Bass diffusion coefficients (differential equations modeling how new products are adopted by a population) into a forecast of the annual number of adopting consumers. The utility EBITDA combines per-customer profitability with the annual number of addressable customers by country, segment and scenario.

The underlying country-level modeling provides localized insights on selected key markets in Europe, focusing on France, Spain, Germany, Italy, the Netherlands and the United Kingdom. The modeling considers local market characteristics including average/off peak/peak wholesale electricity price forecasts, number of households and companies, electricity load profiles, levels of solar radiation and local regulation and incentives.

Additional notes on the research methodology

- **Commodity sales** are projected to be relatively stagnant, driven by assumed limited increase in retail prices and consumption volumes (modeled as number of consumers times average retail price).
- **Commodity cannibalization** is limited by proportionally small absolute number of solar PV adopters vs. overall consumer basis in most countries.
- A **leasing period** of 10 years for rented equipment is assumed.
- Current DER **feed-in tariffs** are assumed to be phased out within five years.
- **Installation size** for rooftop solar and battery storage varies by B2C/B2B sector and country based on local estimates with home rooftop solar installation typically around 5 kW; for eMobility assuming 10 kW charging for home, workplace and destination charging, 22 kW for street charging and 100 kW for road charging points. For smart heating, we separately analyzed smart heat pumps (assumed average installation sizes of 5-10 kW for small residential and 30-50 kW for commercial or larger residential buildings) and smart water heaters (average installations of 5-10 kWh for smaller customers vs 30-50 kWh for larger customers).
- The analysis excludes business models for **traditional heating equipment business** (such as boiler maintenance) as well as business models for **traditional building retail energy management solutions and systems, home energy management (HEM),** as well as **energy-efficiency retrofits** (if not related to retail energy management through rooftop solar, storage and/or EV smart charging).
- **Referral of equipment** (rooftop solar, battery storage, EV charging point) always assumes an opportunity for referral/intermediation while recognizing that in reality B2B customers may acquire equipment in bulk without intermediation.

- The analysis also excludes **industrial consumers** as a segment with considerably different priorities and economic implications.
- The **allocation of flexibility** can have a significant bearing on economics for these models, e.g., for opportunities like battery storage for which sluggish adoption is dependent on economics. Note that flexibility allocation is not applicable for standalone rooftop solar, since no battery or retail energy management system is included in this business model with which flexibility would be harnessed.
- Value from participating in **ancillary markets** for primary and secondary system balancing is also excluded, given the nascent nature of these markets.
- In both Lease/Rent and Buy scenarios, **flexibility gains are split** between the utilities (35%, to cover the costs of providing flexibility services, at a margin representing the EBITDA for utilities) and consumers keeping the remaining flexibility gains (65%).
- **Financing costs** for energy companies in the Lease/Rent businesses are assumed to be 1% per year. Impact to overall EBITDA is a minor (less than €0.5 billion) decrease.
- For **O&M,** we assume that there is a yearly EBITDA market for all customers (new and existing users of equipment). This is in contrast to value for referral/installation, which is for new customers only. O&M is instead a recurring market opportunity for all customers, and we assume one can switch within one year (i.e. it's an "open" and not a "protected opportunity").
- The modeling also addresses the **per-customer overhead costs** included marketing/cost to acquire as well as **cost to serve** including customer service, IT and administration per customer.

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