

Business Models for Unlocking the Consumer Renewables Market



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Introduction

We are in the 'make or break' decade for decarbonisation. If we want to get real about addressing climate change, we cannot delay scaling renewable energy systems (RES) any longer.

Integrated decarbonization confronts challenges such as market fragmentation, mistrust, and financial barriers which often cast renewables as costly upfront investments. However, this very disarticulation lays the groundwork for innovative, integrated solutions. By reframing renewables from costs to profitable investments, we can transform reluctance into proactive positive action. This blog is a compilation of examples showcasing diverse business models that can support technology deployments across various geographies. No single business model fits all, but the diversity of the consumer renewable energy landscape enables numerous routes-to-market, disrupting traditional energy provision and fostering profitable opportunities in the renewable energy transition.

The opportunities are clear. The cost of solar, batteries, and EVs is going down and on-grid solar is '[in the money](#)' (at least for real estate investment trusts in the US). Studies ^{1,2,3} and companies' experience show how big the economic opportunity existing renewable technology offers. Shorter paybacks, up to 100% saving on energy, and unlocking new revenue streams. Consumers can save on their energy bills, and enjoy short payback periods. To achieve coordinated, compact, and connected energy systems, integrated approaches are essential. These approaches have the potential to yield economic savings of up to US\$17 trillion by 2050⁴.

Energy service companies (ESCOs) can play a key role in helping businesses to transform procurement and operations management for integrated decarbonization. These companies have played a crucial role in implementing clean technology and solutions within developed economies. They have optimised their services, fostering innovation to enhance the accessibility and affordability of clean energy solutions across diverse market segments. In 2020, the size of the global ESCO market increased by 6% to USD 33 billion⁵.

The landscape is full of opportunities. We aim to shed light on the vast market potential and the efficacy of various business models in rolling out integrated solutions. Our focus is on opportunities over obstacles, and this is why we've collated exemplary practices observed in the market.

We have identified 4 key business models – Shared-Savings contracts, Servitisation Pay-as-you-Go and lease-to-own, which are beneficial for businesses and households seeking financial flexibility. These innovative business models are emerging as key solutions to the longstanding challenge of capital expenditure (CAPEX).

Such models are particularly transformative in addressing the initial costs associated with sustainable energy technologies like solar PV and onsite storage.

¹ [EVs Grid-Services-Can-Drive-Residential-Solar-and-Battery-Growth May-2019.pdf \(ieefa.org\)](#)

² [Commercial consumer savings with distributed energy systems | Frontier Economics \(frontier-economics.com\)](#)

³ [nrel.gov/docs/fy21osti/79790.pdf](#)

⁴ [https://newclimateeconomy.report/2018/wp-content/uploads/sites/6/2018/09/NCE_2018_ExecutiveSummary_FINAL.pdf](#)

⁵ [https://c2e2.unepccc.org/wp-content/uploads/sites/3/2021/10/chinas-remarkable-success-in-esco-development-current-status-driving-policies-and-prospects.pdf](#)

The table below briefly presents various business models, each suited to address the capital expenditure (CAPEX) hurdles prevalent in the sector:

Business Model	Client type	Technology owner	Contractual terms
Shared-savings contracts	Public entities and large companies	Client at the end of Term	<ul style="list-style-type: none"> • ESCO invests 100% • Contract period between 7-15 years • Client and ESCO share savings, so ESCO recovers investments from Savings. • Client pays ESCO through ongoing energy savings
Servitisation	Individuals, SME, Large companies and public entities	Assets typically remain with the ESCO	<ul style="list-style-type: none"> • ESCO invests 100% • Term and service coverage to be defined based on technology/service • Client pays ESCO for the service itself
Pay-as-you-Go	Individuals, SMEs	ESCO	<ul style="list-style-type: none"> • Term to be defined • Modest payments based on consumption
Lease-to-own	Individuals, SMEs	Client at the end of Term	<ul style="list-style-type: none"> • Term to be defined such as consequences for missed payments • Repayments over fixed period

Shared-savings contracts

In the shared savings model, the payment structure is dynamic, adjusting based on demonstrated performance. This setup ensures that any costs or savings stemming from performance deviations—whether underperformance or overperformance—are equitably distributed between both parties involved. Importantly, the service provider shoulders the client's credit risk and any financing obligations.

Pros	Cons
No Upfront Costs for Client: The client does not have to provide initial capital for energy efficiency improvements.	Shared Savings: The client must share the savings with the ESCO, potentially leading to higher long-term costs compared to self-financing.

Reduced Financial Risk: The ESCO takes on the risk of the project not delivering expected energy savings.	Contract Duration: These contracts can be long-term, locking clients into relationships that might become less favourable over time.
Expertise: ESCOs bring their technical expertise, ensuring that the best energy-saving measures are implemented.	Complexity: Contracts can be complex, potentially leading to misunderstandings or disputes.
Performance Guarantee: ESCOs guarantee a certain level of energy savings, ensuring the client benefits financially.	Potential Overestimation
Maintenance and Monitoring: ESCOs often provide maintenance and continuous monitoring of the installed systems, ensuring they function correctly.	Limited Flexibility: The consumer might have limited flexibility to make changes to the energy systems once under contract.

Example: Rwanda Supermarket's

Solektra is one of Rwanda's solar solutions providers headquartered in Kigali since 2018. The first-of-a-kind integrated system composed of solar PV, battery storage, EV 2-wheelers, and charging infrastructure was installed on the site of Rwanda's largest supermarket Sawa Citi. To make this happen, Solektra opted for an ESCO agreement with Sawa Citi. Sawa Citi pays a monthly fee to Solektra, using the energy savings, and by the termination of the contract the equipment will be owned by Sawa Citi.

With the system generating between 50kWh to 90kWh of electricity daily, the supermarket is able to save over 600 USD annually in electricity costs. Moreover, the produced electricity is 20% cheaper than grid electricity, providing substantial long-term savings.

Servitisation

Ideal for technologies that require consistent maintenance or updates such as e-cookers or e-bikes.

'Servitisation' of the energy sector applies to many power assets including batteries, lighting, or transport. It is often referred to as the 'X-as-a-service' model or more specifically Energy-as-a-Service is designed to help businesses and end-users bundle energy services to ease the procurement and use of different distributed sources⁶. Energy-as-a-Service is a delivery model for diverse solutions that combine hardware, software, and services. It can typically involve a subscription-based service: the customer can enjoy the benefits of a product without purchasing it outright or directly managing its use. Service-based business models can provide producers with steady revenue streams while benefiting customers through increased product value and accessibility through financing. The customer benefits from avoiding direct

⁶ [deloitte-uk-energy-as-a-service-report-2019.pdf](#)

electricity payments, expensive upgrades for electrical equipment or software, or device management while still benefiting from the use of the device.

Pros	Cons
Recurring Revenue: Provides companies with a steady and predictable stream of income.	Complex Transition: Traditional product-based companies may face challenges in adapting to a service-oriented model.
Strengthened Customer Relationships: Regular interactions can lead to better customer loyalty and understanding.	Demand for Continuous Support: Requires companies to offer ongoing customer support
Opportunity for Upgrades: Allows companies to upsell or cross-sell additional services over time.	Revenue Delays: Immediate revenues may decrease as upfront product sales shift to longer-term service contracts.
Enhanced Competitive Differentiation: Can offer a unique selling proposition, setting a company apart from product-only competitors.	Contractual Complexities: Negotiating and managing service contracts can be more intricate than traditional sales.
Stable Demand: Reduced sensitivity to economic downturns as customers commit to services instead of making large capital expenditures.	

Example: 'battery-as-as-a-service' in Kenya

Integrate to Zero is supporting BASE and Ampersand to explore and scale the 'battery-as-as-a-service' business using renewable energy in Kenya. Ampersand offers charging services for e-wheelers in the city. When a motorcycle needs a battery, they reach an Ampersand charging station to swap the discharged battery with a fully charged one.

As part of the collaboration between Integrate to Zero, BASE, and Ampersand, the project aims to solarise charging stations of E-wheeler batteries and franchise this model in commercial venues. The aim is to have solar-powered charging stations distributed throughout the city in commercial buildings such as supermarkets, parking lots or other small businesses. Ampersand will also explore options to grow the network to peri-urban and rural areas.

These businesses will benefit from renting space to accommodate the solar system and the charging stations. The charging stations and batteries will be monitored by an IoT platform accessible to registered users. The project aims to create a financial special purpose vehicle (SPV), which would be used to manage the financing required for the charging stations. It includes solar photovoltaic systems, charging dispenser racks, and swappable batteries (as well as the software licence). This model is designed to recover the investment and generate a revolving effect for scaling solar charging stations to other regions. The charging stations will be set up in commercial buildings while the financial vehicle will own the assets (under Ampersand Kenya).

Pay-as-you-go (PAYG)⁷

Pay-as-you-go (PAYG) models are primarily aimed at customers who require flexible payment options for their energy needs. This target group often includes individuals and small businesses in emerging markets or under-served communities who may not have access to traditional credit facilities or the upfront capital to pay for energy services in full.

Notoriously used in the Software-as-a-Service (SaaS) and mobile phone industry, the pay-as-you-go-model is when a user pays based on how much they consume. For example, phone carriers bill based on minutes used.

Traditionally it is used as a financing technology that allows end-users to pay for solar energy in weekly instalments or whenever they are financially liquid. This way consumers can make a series of modest payments to purchase time units for using solar electricity instead of paying upfront for the entire solar system. The PAYG business model emerged to address energy access needs and to provide electricity from renewable energy sources at affordable prices, with payments facilitated by technologies available in these areas. Widespread use of mobile payment technologies, abundant solar resources, and declining solar PV and battery costs, coupled with increased awareness of these technologies, have been key drivers in the success of this business model.

The most common companies that offer PAYG offers include:

1. Distributed Energy Services Companies (DESCO): who provide a given energy service in exchange for ongoing payments.
2. Asset finance or micro-loan providers that offer rent-to-own models.
3. Business-to-business intermediaries who supply hardware and software support for global operations to last-mile energy service and payment logistics.

The most common core components of a solar home system based on the PAYG business model include:

- solar PV power
- battery storage system
- Mobile payment system
- information and communications technology with control units providing information on the charge left in the batteries, weather forecasts and payment reminders
- Power-consuming appliances, like LED bulbs, e-cookers or e-bikes

Pros	Cons
Financial Flexibility: Allows consumers to manage their cash flow better by spreading payments over time.	Total Cost: Long-term costs can be higher than paying upfront due to added interest or service fees.

⁷ [Pay-as-you-go models: Innovation Landscape Brief \(irena.org\)](https://www.irena.org/publications/2018/04/Pay-as-you-go-models)

No Debt or Credit Required: Offers an alternative for those without access to credit or who want to avoid debt.	Service Interruption Risk: If payments are not made on time, services or products can be shut off or repossessed.
Usage-Based Payments: Consumers pay for what they use, which can encourage more conscious consumption.	Long-Term Commitment: Typically requires a long-term payment commitment, which can be a burden if financial situations change.
Low Entry Barrier: Low initial costs make it easier for consumers to acquire goods or services that they need.	Late Fees and Penalties: Late payments can result in additional fees, increasing the overall cost.
Built-in Support and Maintenance: Often includes support, maintenance, and updates as part of the service.	

Street Lighting and PAYGO EV charging

Xtreme Energy, one of the largest providers of solar lighting in Nigeria, recognized the opportunity for electric vehicles and buses to reduce cost, and pollution and enable greater power reliability for intra-city transportation in cities like Maiduguri, Borno State. As a result, Xtreme is expanding its business to cover energy production, on and off-grid, vehicle production, and the integration of these sources.

Their first integrated system site is a solar PV and battery system on one of Nigeria's supermarkets on top of solar-powered street lighting and EV charging infrastructure, interconnected with a smart inverter. The model they are trialling is to offer 'pay-as-you-go' EV charging services to clients and mobilise the income from this service to further install other systems and EV charging stations across other street lighting sites they operate.

Unlocking on-bill financing for e-cooking and e-wheelers with PAYGO

Kenya's Utility company Kenya Power together with Power Pay, a digital solutions provider, combined efforts to roll out e-cooking and e-wheelers solutions using a PAYGO and blended utility-finance.

Power Pay digitises conventional appliances by installing interoperable widgets that measure energy consumption, allowing Kenya Power to track the contribution of each appliance and to lock out the device remotely, enabling third-party appliance distributors and financiers to work in partnership to offer PAYGO appliances to Kenya Power's customers.

Lease-to-Own⁸

The lease-to-own model is primarily targeted towards individuals and businesses seeking sustainable energy solutions but lacking the upfront capital to invest. It appeals to those who prefer gradual payment plans, allowing them to eventually own the energy assets after a predefined period, making it particularly attractive in markets with limited access to traditional financing.

The lease-to-own model is a structured payment approach enabling customers to purchase energy systems, like solar home setups, through manageable instalments. Typically, this model applies to smaller solar PV systems designed to power essential items like light bulbs, small appliances, and mobile phone charging.

Customers can repay these costs over a span of time (e.g. 6 months to three years typically) depending on their financial capacity. This model is widely used, with over 90% of solar PV systems operating on a lease-to-own basis⁹. However, it's important to note that consistent payment is crucial; failure to meet the agreed instalments can lead to the ESCO reclaiming the system from the customer's property. This is the case because in a lease-to-own arrangement, the ownership of the asset initially remains with the lessor or the energy service provider (ESP). The customer, or lessee, uses the asset while making regular payments. Once all the payments are completed, typically over a predetermined period, ownership of the asset is transferred from the ESCO to the customer. Until the final payment is made, the ESCO retains ownership.

This model can be contrasted with on-bill financing. On-bill financing is a financial mechanism used in the renewable energy and energy efficiency sectors to help customers fund the installation of energy upgrades without the need for a large upfront investment. In this model, the cost of energy improvements, such as solar panel installations or energy efficiency retrofits, is financed by the utility company or a third-party financier and then added to the customer's regular utility bill¹⁰.

On-bill financing, on the other hand, involves the energy provider or a third party financing the upfront cost of an energy efficiency upgrade or renewable energy installation for a customer. The customer then repays this cost over time through an additional charge on their regular utility bill. The key difference here is that the repayment for the asset is integrated into the customer's existing utility bill, making it a convenient option for many users.

Both lease-to-own and on-bill financing aim to overcome the barrier of high upfront costs for energy improvements, but while lease-to-own directly transfers asset ownership after full payment, on-bill financing is more about repaying a loan or financing agreement through the utility bill, without necessarily implying a transfer of ownership until the loan is fully repaid.

Pros	Cons
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⁸https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2020/Jul/IRENA_Pay-as-you-go_models_2020.pdf

⁹ Sotiriou, A.G. et al. (2018), Strange Beasts: Making Sense of PAYGo Solar Business Models, Forum 14, Consultative Group to Assist the Poor, Washington, DC, www.cgap.org/sites/default/files/Forum-Strange-Beasts-Jan-2018.pdf

¹⁰ <https://energy-base.org/app/uploads/2020/03/Knowledge-Brief-Green-On-Bill.pdf>

Large Upfront Cost: Lease-to-own allows customers to access energy assets without the burden of a significant initial investment, making renewable energy solutions more accessible.	Overall Cost: Over the duration of the lease, the total amount paid can be higher than the upfront cost due to interest or financing fees.
Ownership Transfer with lease-to-own: After completing the payments, the customer gains full ownership of the asset, making it a long-term investment rather than a recurring expense.	Obligation to Pay: Unlike a utility service, which can be turned off, the lease-to-own agreement requires consistent payment until the contract ends, regardless of the customer's changing circumstances.
Flexible Payment Options: Payments are spread over time, often in smaller, manageable instalments that align with the customer's financial capability.	Risk of Asset Reclamation: If the customer is unable to keep up with payments, the energy service provider has the right to reclaim the asset, which can be disruptive and result in a loss of investment for the customer.
Immediate Benefits: Customers can immediately start using the energy asset and reap the benefits (like reduced energy costs or increased efficiency) even before they fully own it.	

Example ESCOs: We.tility and E.ON

E.ON

E.ON's vision, "Connecting everyone to good energy," reflects a commitment to integrating various sectors – energy, heating, and mobility – to create a new, eco-friendly energy ecosystem¹¹.

E.ON offers customers instalment-based payment plans over a few years, ultimately leading to ownership of the energy solutions. For example it has the 'energise package'. This offering is designed for optimal performance with E.ON's lowest-priced solar panels, ideal for roofs without shading. The package covers a typical 6-panel (2.43 kWp) system, making it an accessible option for those looking to harness solar energy efficiently. It also has the 'Optimise package' which is targeted at homes with roofs experiencing partial shading from elements like trees or chimneys. It incorporates SolarEdge technology, known for its industry-leading performance.

E.ON also recognizes the importance of flexible payment options for solar panel installations. Customers have the choice to pay in full, make a deposit, or take advantage of E.ON's flexible payment plans. They also offer Smart Pay-As-You-Go: This service merges the flexibility of pre-paid energy tariffs with the advanced features of a smart metre. They also follow the Smart Export Guarantee (SEG) Scheme. Launched by the government, the SEG scheme allows domestic and business customers to be compensated for excess energy they generate through renewable sources like solar panels.

¹¹ <https://www.eon.com/en/about-us/strategy.html>

We.tility Energy

We.tility¹² based in South Africa is driven by a mission to power Africa through innovative energy solutions. Their flagship offering, the all-in-one Beast Bundle, is a comprehensive solution that combines Tier 1 solar panels, lithium-ion battery storage, and a hybrid inverter. Customers are presented with a variety of bundles to choose from, along with a selection of optional extras to tailor the system to their specific needs. The company has structured an accessible 36-month subscription model for this bundle, providing customers with an option to own the system at the end of the subscription period. This approach reflects their commitment to making sustainable energy solutions both affordable and accessible, aligning with their broader goal of energy independence for the African continent.

Conclusion

The business models discussed in this paper highlight pathways to scale consumer renewable solutions. They provide flexible terms and reduced upfront costs making a climate-safe world more accessible. By streamlining transactions, these models allow consumers to access affordable energy, with the savings potentially being reinvested in more renewable solutions. However, more efforts to scale these business models are needed.

To effectively scale a variety of business models, strategic recommendations involve cultivating collaborative ecosystems through public-private partnerships and industry engagement. This collaboration is pivotal to bridging the gap of market disarticulation. Opportunities in certain African countries, marked by high energy costs, unreliable energy sources, and governmental support for clean energy, provide a favourable landscape for the ESCO market.

Enhancing technological and business model readiness is also crucial for cleantech adoption and scale. Strengthening the market and building trust among key stakeholders are essential steps. For example, many countries exhibit a robust market for financing vehicles, offering established procedures allowing cars to serve as collateral, facilitating recovery mechanisms in case of default, and enabling resale in a secondary market.

Financial mechanisms, such as green funds or venture capital, can play a pivotal role in providing initial capital for expansion. Addressing market conditions requires a two-fold approach: conducting targeted awareness campaigns to educate businesses and consumers about the long-term benefits of sustainable practices and developing standardised metrics for measuring sustainability impact.

Smart financing that attracts and unlocks capital from the consumer's perspective is vital. Innovative business models and ESCOs can offer consumers clean technology solutions that meet their needs along with financing options to pay for the system over time, often with no upfront costs. This approach increases access to finance for ESCOs, connecting them to local and international funding sources. Moving from selling products to selling services is an increasingly important business model for renewable energy companies, offering a way to differentiate from competitors. ESCOs can distinguish themselves by providing unique, tailored services, especially in offering renewable energy-as-a-service, fostering collaboration for more complex and attractive services.

¹² <https://www.wetility.energy/>

Together, these business models and ESCOs not only enhance financial accessibility but also foster a wider adoption of renewable and efficient energy technologies, steering the sector towards a more sustainable and economically resilient future.