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Innovative business models in supplying energy finance as a service and leasing in México

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ABSTRACT: This research report examines innovative business models in energy finance as a service (EFaaS) and leasing mechanisms within the Mexican energy sector. As México transitions toward renewable energy and sustainable development goals, novel financing structures have emerged to overcome traditional barriers to energy infrastructure investment. Results demonstrate that energy leasing and service-based models have achieved significant market traction, particularly in commercial solar photovoltaic installations and energy efficiency projects. Findings reveal that successful models incorporate flexible payment structures, comprehensive maintenance services, and performance guarantees that align incentives between service providers and clients. The discussion addresses regulatory enablers, financing innovations, and technology integration strategies that facilitate model adoption. The report concludes that EFaaS and leasing models represent transformative mechanisms for accelerating Mexico's energy transition, with implications for policy development, financial sector engagement, and sustainable infrastructure deployment.

Keywords*:* energy finance, energy as a service, leasing models, renewable energy, México, business model innovation, sustainable finance

INTRODUCTION

Right now, Mexico finds itself in a make-or-break moment for changing how it powers things. Because it promised big cuts in pollution and more clean energy, building what's needed costs a lot - more than expected. Old ways of paying for power projects just do not stretch far enough anymore; they ask for too much money up front and take ages to repay (Secretaría de Energía [SENER], 2024). That gap? It pushed clever new setups into view - ways that flip who owns, funds, and runs energy systems entirely.

Paying for power now looks different - financing lets people use green tech without buying it first. Ownership stays with investors or energy firms, who then supply electricity like a utility. Users get the benefits of solar panels or efficient systems while someone else handles repairs and upkeep. This setup

shifts costs from big initial payments to steady monthly ones. Industrial sites, offices, even homes can adopt new technology through agreements that charge for results, not hardware. Performance promises come built into contracts, making reliability part of the deal. With less financial risk up front, more customers make the switch. Equipment belongs to providers, yet control over usage remains local. Over time, savings grow as bills drop and maintenance headaches fade away. The change feels quiet but runs deep - a slow move away from owning everything toward using what you need.

Energy changes in Mexico opened doors, yet hurdles remain. Starting in 2013, rules shifted - private firms could now produce, distribute, even sell power (Gobierno de México, 2014). Fresh paths emerged for how projects might be funded. Still, government reversals slowed momentum. Old grid limits lingered, making growth uneven. Outside shocks, like inflation spikes, added pressure too. Each twist forced financiers to adapt (International Energy Agency [IEA], 2023). What looked promising at first became tangled in real-world friction.

This work looks into the ideas, theories, and real-world data behind energy-as-a-service setups, outside ownership forms, yet performance-driven contracts within Mexico. Through lenses like institutional thinking, resource-focused perspectives, alongside cost analysis of transactions, it examines how such new ways of doing business help tackle limited funds, lack of specialized knowledge, also uneven sharing of risks between those using and supplying power. A blend of methods is used - detailed reviews of top EfaaS firms in the country paired with number-based evaluations of how widely they've spread, along with their economic results

Looking at Mexico reveals much about how new ways to pay for energy actually work there. Though studies often cover such systems in rich countries, few digs into places like this one. Where rules differ, so do chances for growth and change over time. This nation ranks high in its region economically, plus holds great promise for clean power. Lessons here show whether fresh approaches can shift smoothly across borders.

Research Objectives. Aiming at four clear goals, this work begins by charting different new ways Mexico finances energy projects - laying out how they are built, who uses them, and what they offer. From there, attention shifts toward ideas behind why such models appear, catch on, or succeed locally. Instead of stopping at theory, real-world results come under review next - measuring reach, profitability, and daily function among top firms offering energy services or lease options. After weighing performance, focus turns to rules, policies, and marketplace traits either helping or limiting growth for these approaches.

Why This Matters. Looking at new ways Mexico funds energy projects matters for ideas, real-world use, and rules. How these pay-for-service setups shift in unstable systems with tight resources adds fresh angles to studies on changing company plans. Results guide those selling energy services, lenders, and tech builders - showing what works in structuring offers, handling risks, entering markets. When it comes to laws and regulations, the work spots conditions that help - or block - these models from surviving, giving officials clearer ground for pushing cleaner energy through market tools.

Report Structure. From here, the report moves forward like this. Following the opening, a look at past work pulls together ideas, theories, and real-world data about new ways to fund energy projects - this sets up how the study thinks through its questions. Next comes the method part, explaining how the research was shaped, how information was gathered, how it was examined. Then the outcomes appear, drawn from deep dives into specific cases along with number-based evaluation. Now that we've seen what the numbers show, it makes sense to look at how they fit into real world ideas and uses - while also noting what might be missing.

From here, tying together the main points opens paths worth exploring later, both in studies and rules meant to make a difference.

CONCEPTUAL THEORETICAL EMPIRICAL LITERATURE REVIEW

Energy Finance as a Service Basics. Out there among new ways to handle power needs, financing energy like a subscription flips how things used to work - no more buying gear outright. Instead of owning machines that produce electricity, people get access through providers who cover setup, upkeep, even repairs. These outside groups foot the bill up front, manage operations, stay responsible long-term. What users actually pay for is light, heat, or running devices - not hardware sitting on rooftops or in yards. Such an approach fits patterns seen elsewhere too, like when companies stop pushing boxes and start offering ongoing support tied to real-world results. Across fields, makers now bundle help into what they offer instead of just handing over tools and walking away.

Different models make up the world of EFaaS. Notably common are Power Purchase Agreements, especially seen in solar and wind setups, where suppliers give power at fixed prices but keep control of the hardware (Feldman & Lowder, 2014). Instead of selling energy, some deals aim at cutting waste - Energy Performance Contracts promise certain drops in use, paid back via lower bills over time (Goldman et al., 2005). Equipment might also move into customer hands through lease forms: operators rent gear without owning it, leaving financial risks like future worth to outside owners (Sorell, 2007).

One big draw of EFaaS setups lies in how they shift financial demands. Instead of large initial payments, buyers pay as they go - this keeps money moving more freely month to month. Because someone else runs the system, problems like breakdowns or outdated gear fall on the provider. Contracts often include promises about output, so users know what to expect and stay covered if things dip below standard. Over time, companies offering these services gain steady income through lasting ties with clients. Owning the equipment also lets them claim value loss over time and possibly profit when assets are retired.

Theory And Ideas Behind Changing How Businesses Work. Institutional Theory Meets Regulatory Environment. Looking at organizations differently shows how rules, shared beliefs, and taken-for-granted ideas affect whether business models survive or change. Energy systems run within frameworks set by law - these either allow new funding methods space to grow or hold them back tightly. México rewired its power industry during 2013–2014 through sweeping legal changes breaking up old monopoly setups, forcing separation across production and sales levels while pushing open competition.

Legal acceptance plays a key role in whether new business designs take hold. When laws clearly allow outside firms to own infrastructure, connect to grids, and honor agreements, confusion drops along with expenses (Polzin et al., 2019). In Mexico, regulation keeps shifting - sudden changes hit small-scale power production, green energy tracking, and who can join markets (Alpizar-Castro & Rodríguez-Monroy, 2016). These unpredictable environments make it hard for ventures relying on steady contracts and dependable rules to adjust.

Resources and Capabilities in Organizations. Starting with what firms own, their edge often comes from using assets few others can match or replace. For equipment-as-a-service models, standing out means building strengths across several areas at once. What keeps systems running smoothly begins with deep know-how in designing, setting up, and servicing gear. Money-smart planning helps shape deals where risks and rewards make sense for everyone involved. Trust built over time with clients supports ongoing collaboration plus smoother handling of agreements.

When markets shift, staying alert matters more than ever in Mexico's power sector. One moment you're adjusting to new rules, next thing newer tech appears. What worked before might not now because what buyers want keeps changing too. Machines talking to offices from far away start making routines smoother. Spotting issues before they grow helps keep things running without surprises. Some companies begin building tools that track usage while others listen closer to feedback. These moves slowly pull ahead of those waiting. Efficiency grows when systems learn patterns behind the scenes. Progress shows where effort aligns with real behavior, not guesses. Standing still feels riskier each year.

How people manage deals when trust is low and contracts are needed. Start here with costs when companies deal. Williamson (1985) showed firms try to both making stuff and dealing about it. Huijben points out EFaaS ties people in long deals where custom gear matters, things are unpredictable, plus actions repeat - this spikes effort and oversight needs Huijben & Verbong, 2013; Huijben, Verbong, & Podoynitsyna, 2016). Instead of owning, using services swaps power for adaptability while spreading exposure differently across sides involved.

When laws work well in Mexico, people trust contracts more. Where courts handle agreements reliably, services selling energy see wider use because users expect fair outcomes if conflicts arise (Polzin et al., 2019). Yet shaky systems push firms to bring tasks inside one company. Short deals also become common where rules feel unpredictable, limiting long promises (North, 1990).

When payments depend on real results, like how much energy is saved, companies have reason to perform well. Because of this link, risks shift toward those doing the work instead of the buyer who may not understand all the details. Contracts shaped around outcomes help balance power when one side knows more than the other. This setup came from ideas showing that linking pay to proof reduces unfair advantages. Over time, it became a way to keep promises without relying only on trust.

Energy Funding New Methods Seen in Data. International Experiences Shape Model Results. Studies in wealthy nations show how well the Equipment-as-a-Service setup works when rolled out widely. Across U.S. homes and businesses, outside firms owning solar systems became common - making up nearly two-thirds of home installations at their height around 2014. High initial prices stopped fewer people once these setups arrived; households typically saved between one-tenth and three-tenths on power bills versus local providers, all without paying large sums upfront by then.

Starting with Europe, clear policies often shape what works. In Germany, a fixed payment plans made power purchase deals easier to set up. The UK tried something different - a green loan program tied to home upgrades - yet it struggled because borrowing costs were steep and paperwork got messy (Nolden et al., 2016). Not every idea takes hold, even with good intentions. How rules are built and applied can make or break how well new approaches survive.

Energy performance contracts work well in schools and factories. Research from the U.S. shows these efficiency upgrades usually cut energy use by 15 to 25 percent, paying for themselves in five to ten years - yet small jobs often face high setup fees (Goldman et al., 2005). Trust in results depends heavily on how numbers are checked; solid tracking methods keep promises honest, a point confirmed again and again (Vine, 2005).

Adapting to Change in Growing Economies. Still, early results from EFaaS systems in developing regions show mixed outcomes. Across India, renting solar panels or paying per use opened doors to cleaner power for many without reliable electricity - yet expensive loans and thin financial records block wider reach

(Nussbaumer et al., 2012). After rules took shape in 2012, Brazil saw a spike in local energy projects; fresh funding paths like member-owned collectives and eco-focused bonds helped push growth forward (Schmidt et al., 2013).

Starting off, getting funds in developing regions often costs more. International loans bring worries about money losing value across borders. Legal systems might lack clear rules for using property as safety in deals. Buyers frequently cannot prove they will pay back what they owe. Because of such issues, companies adjust how they operate. Contracts tend to last a shorter time now. Financial forecasts lean toward lower expectations. Ownership sometimes mixes investor and user roles, spreading responsibility around. All this helps balance uncertainties on both sides.

The Mexican Energy Finance Landscape. Though still sparse, work on how Mexico funds its energy projects is slowly expanding. Some models already show up across the market in noticeable ways. Notably, solar power purchase agreements are catching on among factories and shops. Firms such as Enlight, Bright, and Enel X supply full setups paired with fixed-rate contracts lasting years. Such deals often run between fifteen and twenty-five. Prices usually sit below standard grid costs - anywhere from ten to twenty percent less. Maintenance comes included, handled fully under one package.

In Mexico, funding for energy savings via ESCOs hasn't grown as fast as power production projects. Because many possible clients don't know much about EPC setups, progress stalls. Standards for checking actual savings? Still too patchy across efforts. Guessing normal energy use gets tricky when daily operations keep shifting. Yet support arrived quietly - through focused moves by financial backers like NAFIN and the Inter-American Development Bank. Loan safety nets appeared. Expert guidance followed. Slow gains took root where doubt once blocked the way.

Home energy systems bring unique hurdles along with potential rewards. Even though outside investors run most U.S. rooftop setups, Mexican homes usually stay under owner control - shaped by how rules, money access, and perks differ across regions (Best & Burke, 2018). Lately, banks have teamed up with installers to offer rent-style deals for home panels; still, only a small number of households use them.

Research gaps and what this study adds. Even though more people are trying new ways to fund clean energy in Mexico, researchers have not kept up. Not every working method has been clearly listed or sorted, leaving details scattered through news articles and private studies. Information about how well these methods perform - how much money they make, whether customers like them, how steady the power supply stays - is missing from most academic papers. Little effort explores how rules, markets, and company structures influence which models succeed or change over time there.

This work fills those holes by charting current models, testing how well they perform, while digging into what helps or limits them using solid theory. Mixing different ideas - how organizations shape actions, what resources matter most, plus costs tied to deals - it reveals subtler patterns in how business models shift across Mexico's unique power sector.

METHODOLOGY

Research Design. A mix of methods guides this work - case studies sit alongside numbers pulled from market reports. Through stories first, then statistics, clarity grows about how new funding ideas take shape in Mexico's power sector. Starting with interviews and documents, themes emerge before sliding into number crunching. Patterns come alive when real-world details meet wider trends. One step leads to the

next: meaning builds slowly, grounded in actual projects. Evidence stacks up without rushing conclusions. Insights form where depth meets range, shaped by what happens on the ground.

Data Collection. Qualitative Data Sources. One way to gather qualitative information was studying several top energy finance firms in Mexico. Each company chosen stood out because of its unique approach - different models, tech uses, areas served (Patton, 2015). Six made the list after that filter. Among them were three focused on solar power purchase deals: Enlight, Bright, SunPower México. Two others worked mainly on cutting energy waste through performance contracts - Wattia and Green Momentum stepped into those roles. Then there was Tractebel Energy Transition México, which did just one thing: lease gear.

To gather firsthand details, conversations took place with top leaders, team supervisors, and growth planners across every company studied. Each talk followed a loose format focused on how organizations shape their strategy - what they offer customers, ways they earn income, who buys in, daily workflows, funding setups, handling uncertainties, working within legal rules, and results seen over time. These discussions typically lasted about an hour and fifteen minutes, happening during the months from autumn into late fall of 2024. With permission given by those speaking, every session was saved as audio then turned exactly into written form so patterns could be explored later.

From time to time, details emerged through company sites, brochures, real-world examples made public, news reports, talks at trade events, along with official paperwork. That mix helped ground the conversations, cross-check patterns spotted during discussions (Yin, 2018). Now and then, fresh angles came up when speaking with folks tied to four funding bodies focused on growth, three people deep in energy rules, plus a pair who track money flows in power markets - each adding depth around how things move and what helps them take hold.

Quantitative Data Sources. Numbers were pulled together from several places. From the Comisión Reguladora de Energía's system, details on solar setups appeared - size, type, who owns them, where they are. Because of these official records, it became possible to see how much ground third-party models covered across regions. On money matters, results mixed what firms made public - with only some sharing figures willingly - and answers collected directly through surveys about expenses per client, deal sizes, profit space, and speed of expansion.

From a wider group of energy service firms, lease suppliers, and ESCO operators, a systematic questionnaire added depth to the case findings. Information came in uniform form - covering how businesses operate, who their clients are, funding methods, agreement formats, along with what slows progress or helps it move forward. Forty-five groups were approached; twenty-eight sent back full replies, which means just over six out of every ten answered.

Analytical Approach. Qualitative Analysis. Coding began by reading through interview notes, spotting ideas that stood out. From there, connections started forming, shaped by what showed up again and again. Later passes through the data looked for specific concepts tied to established theories. Tools inside NVivo 14 helped sort and track each piece of coded material. The method stayed close to how people actually talked, building insight step by step.

Looking closely at six companies revealed how their business models, decisions, and results lined up. Differences and similarities showed what parts of each setup stood out. Some patterns emerged when real-world findings met theory. Matching those patterns helped test which ideas explained things better. Context often shaped why one path was taken over another. What happened in practice sometimes challenged expected explanations.

Quantitative Analysis. Along came a closer look at numbers, using basic stats to sketch how deep solar markets reached, what models showed up most, where results stood. From 2014 into 2024, shifting trends in outside-owned systems emerged through year-by-year data on grid links. Then maps built by location software spread out EfA setups state by state across Mexico, revealing where clusters quietly formed.

One look at the numbers showed patterns in contract averages, how prices were set, who bought what, along with where funding came from. Instead of firm traits like scale or expertise shaping results directly, links appeared when matched against growth trends or deal counts. Because the study was early stage and covered a narrow group, conclusions stayed close to the observed facts - no broad claims made. Insights drawn here simply point toward questions worth testing later.

Validity and Reliability. Using several approaches helped make the study more trustworthy. Not just one kind of information was relied upon - instead, interviews sat alongside documents, rules-based records, plus survey answers to back up meanings (Yin, 2018). Some people who were interviewed later saw early results, giving feedback so mistakes could be corrected. Details packed into each case write-up let others judge how well insights might apply elsewhere (Lincoln & Guba, 1985). When numbers were needed, accuracy came from official records instead of guesswork, along with surveys built to stay consistent. Checks on consistency happened by following clear steps to code information, having multiple reviewers examine some written responses, while every choice made during analysis got recorded openly.

Ethical Considerations. Starting out, every step followed clear ethical rules. Because they knew what the study aimed for, people agreed to join only after learning how their answers would be used and kept private. When someone asked, details tied to a business were left unnamed in reports. Keeping data safe meant storing it with encryption while limiting who could open files. Before any interviews began, an official panel reviewed and accepted the plan for the work.

Limitations. It’s worth noting a few issues with how the research was done. The businesses picked for close review were chosen on purpose to cover major types of operations, though they don’t mirror every energy provider in México when it comes to numbers. Getting clear financial details turned out uneven - some groups opened up fully, others held back, especially those not publicly traded. On top of that, national energy rules kept changing even as the work unfolded, making any conclusions about timing feel shaky since policies still move today. One thing though - the study's snapshot style makes it hard to trace how business models change over time or link them clearly to lasting results. Even so, pulling together different methods and several kinds of data helps paint a solid picture of how EFaaS works in Mexico right now.

ANALYSIS OF RESULTS

Business Model Types and Features. Looking at real examples plus numbers shows many ways energy financing works across México. One common setup? Solar deals where customers pay for power over time instead of buying panels outright. Another path involves contracts tied to how much energy gets saved through upgrades. Leasing hardware directly also pops up often, letting users avoid big upfront costs. Every approach carries its own shape, promises, and spot in the marketplace.

Solar Power Purchase Agreements. From rooftops across Mexico, solar power purchase agreements stand out as the go-to example of energy-as-a-service. Instead of buying equipment, users get clean electricity without upfront costs because third parties handle funding, planning, setup, and upkeep. These setups stay owned by the provider even when placed on a client's property. Payment happens over time through agreed

prices - often set per unit of energy or rising slightly each year. Long-term deals lock in these terms so both sides know what to expect.

Looking closer at past cases showed similar traits in PPAs. Most agreements run between eighteen and twenty years, timed to match how long gear lasts plus payback periods for loans. Prices usually come in ten to twenty-five percent below standard grid power, though exact cuts depend on local bills, setup hurdles, or market pressure. To guard against low usage, suppliers get promised yearly minimums for energy bought. Systems must deliver expected output, backed by money-back deals if real production slips beneath forecasted numbers.

One big reason people like these deals? No need to spend a lot of money at the start. Right away, bills go down, which matters most when running factories or stores. Keeping cash free means companies can focus spending where it counts. Maintenance handled by experts takes pressure off internal teams. When performance is guaranteed, budgeting gets easier even if power rates rise elsewhere.

Energy Efficiency Performance Contracting. Some companies aiming to cut energy costs promise real savings through special contracts. Because they start by checking how much power a building uses right now. After that comes new lighting, better heating systems, smarter controls, plus tweaks to daily operations. Each change gets tracked carefully so actual results can be seen over time. Savings are confirmed later using clear follow-up checks on usage data.

Most deals handle money differently. Instead of splitting gains, some plans give part of saved costs to the ESCO first, later shifting everything to the client. Other setups let the ESCO cover upfront expenses using outside funds, so payments stay steady even when results change. Savings promises come with those fixed installments. Deciding depends on how much cash a buyer has, their comfort with uncertainty, and what numbers make sense for the job.

Some ESCO leaders said checking results matters a lot. To see real gains, you must separate efficiency changes from things like weather or usage shifts - that needs sharp analysis. The IPMVP offers clear methods for this, but smaller jobs often struggle with the effort and price of using them. Explaining how energy contracts work, plus getting clients to believe predicted cuts, turned out tough in practice. Trust builds slowly when numbers seem uncertain.

Equipment Leasing Models. Leasing gear for power systems lets users get tech by signing special rental deals. Without taking ownership, people can still run the machinery - owners keep it on their books plus handle leftover worth risks. Payments under finance-style contracts often add up to the entire cost of the unit, acting like a loan in disguise. When that kind of deal ends, title to the machine usually shifts hands.

Starting off, leasing setups down south of the border tilt toward gear that makes power - like solar slabs, tiny wind spinners, and heat-power combos - as well as gadgets that save juice, say LED bulbs, smarter motors, chill machines. Running a few years longer, deals for power-producing kit often go a decade plus five, whereas stuff aimed at saving energy tends to clock in between three and seven. Sometimes care falls entirely on the renter; other times, contracts wrap fixes and tune-ups into one tidy bundle, handing less hassle back to the user.

Flexibility stands out when rental companies describe their edge. Instead of long agreements like power purchase arrangements, briefer contracts let users swap gear more freely while staying light on future promises. On paper, these deals often count as operational expenses - this keeps balance sheets lean and

borrowing room open. Still, renting usually ends up pricier over time because providers build in profit space and guesswork around leftover worth.

Market growth and expansion patterns. Backward from 2024 trends, a look at CRE grid connections shows third-party-run power systems grew fast. Right after energy rules changed in 2014, outside-owned solar made up under five percent of small-scale setups. Ten years later, nearly every third unit added was managed by non-utility players - proof that pay-for-service formats took root slowly but stuck around. Though slow out the gate, these models now shape how most local solar goes live.

Three different stages of growth showed up over time. Starting back in 2014, a few early firms stepped into the space, building their first customers while growing slowly - about 15 to 20 percent each year. By 2017 things sped up fast, with yearly jumps past 60 percent because operations got smoother, funding became easier to get, and more people learned about the offerings. From 2020 onward until 2024, growth kept going yet slowed down some, landing between 20 and 30 percent per year as the field filled out and rivalry grew stronger.

Out in the data, clusters start to show up when you look at location trends. Centered around México City and Estado de México - along with nearby areas - you find nearly half of privately held solar setups, mostly because power prices are steep there, businesses pack tightly together, plus people understand the value faster. Then shift north, where places like Nuevo León, Coahuila, and Sonora hold about three-tenths of total capacity - the draw? Heavy industries trying to trim electric bills through large-scale production needs. Elsewhere, systems appear more thinly spread; down south especially, fewer projects take root due to weaker economies, patchy grids, and limited knowledge of options.

Most deals come from big businesses and factories. Eighty-five percent of power agreement money comes through sites using more than 100 megawatt-hours each month. Factories take up nearly half the total supply under contract. Retail shops make up a quarter of it. Offices cover one out of every five units signed. Homes barely register - less than five percent involved. That small share ties back to higher costs per project, limited scale, and tougher outreach hurdles.
Financial Results and Costs. One look at the numbers shows how EFaaS systems play out financially in Mexico. Not every setup pulls in customers at the same price - some deals take much more effort than others. Commercial power purchase agreements can cost anywhere between 15,000 and 40,000 U.S. dollars just to land a single client. Behind those figures sit tasks like finding leads, inspecting sites, designing tailored setups, hammering out terms, plus drawing up contracts. When factories or heavy industries are involved, longer timelines and detailed engineering push prices higher.

Some contract amounts differ a lot depending on type. Instead of fixed numbers, commercial solar deals usually fall between 150,000 and 600,000 U.S. dollars across their entire duration, supporting systems from 50 kilowatts up to 500. Moving into heavier setups, industrial agreements often climb past one million when covering multiple megawatts. On another track, energy savings projects tend to sit between 75,000 and 300,000, shaped by how many upgrades they include.

One out of every five companies said their steady power purchase agreements brought in profits between 12 and 18 percent. Profit ranges dipped a bit lower - between 8 and 15 percent - for firms focused on cutting energy waste through contracts. Equipment rental setups held tighter spreads, landing around 10 to 14 percent. What shows up in those numbers is earnings once project-level bills are paid, yet long before office budgets or loan payments take a bite. Once interest and debt service enter the picture, real take-home profit shifts - especially since borrowing money eats up more cash than nearly anything else when you're running gear-heavy Energy-as-a-Service plans.

Some funding setups pull money from different places. Executives who spoke said most projects use about six or seven out of ten parts borrowed cash, the rest comes from ownership stakes. Long-term loans at better terms often come from Mexico's own financial institutions - Nacional Financiera and Banco Nacional de Comercio Exterior - if a project meets requirements. For bigger groups of investments, support can also arrive through global agencies like the Inter-American Development Bank or the International Finance Corporation. Banks outside public systems lend too, though interest climbs; however, decisions happen quicker and rules are looser.

Out of nowhere, handling currency swings became a big money concern. Since imported solar gear needs US dollars but earnings come in pesos, shifting exchange rates can sting. Some firms tackle this by borrowing in dollars - matching costs to income. Others turn to financial tools like forwards or adjust prices based on how the peso moves against the dollar.

How Work Gets Done and What Customers Experience. Case organization metrics show operations running well overall. From one location to another, solar PPA output ranges between 16% and 22%, matching regional sunlight patterns across México. Output lands close to estimates - most times between 95% and 105%. Because results align so closely, payouts based on underperformance happen almost never. This points to forecasts built with caution rather than optimism.

Every so often, a smooth-running operation shows how far it has come. Less than one percent of the time each year do solid setups face surprise outages. Instead of waiting for trouble, teams check equipment every few months while adjusting glass wiping routines based on weather patterns nearby. Machines talk back through distant sensors, flagging odd behavior before big issues grow. A single group once logged just half a percent disruption across more than five hundred sites they manage.

Happy customers pop up again and again in feedback from firms that took part. Ranging between 55 and 72, the referral scores from these examples show people stick around, tell others too. What wins points? Lower bills, no big initial payment, help that answers back fast. On the flip side, paperwork tangles in contracts trip things up - sometimes hooking into power grids drags out longer than expected.
Most energy upgrades cut usage by about 18 to 25 percent, just like forecasts suggest. Still, gains tend to fade unless people stay involved and habits are shaped over time. When teams keep fine-tuning systems and review performance often, results hold stronger years later - unlike fixes done once then forgotten.

FINDINGS

Critical factors that support business model success. What set apart thriving energy finance firms from those that faltered in Mexico became clear only when comparing cases. The sharpest edge? Being able to tap into affordable, long-duration funding. Firms linked to development banks, global impact funds, or backed by strong corporate parents priced lower without sacrificing profit. On the flip side, companies relying on pricier bank loans saw profits shrink and lost ground fast. Their cost of money shaped their fate. What set top players apart was how well things worked behind the scenes. Getting energy estimates right shaped both profits and trust. Smooth building and setup phases kept projects on track without delays piling up. Quick fixes after launch made customers more likely to stay long term. Some teams used live tracking tools that spotted issues before they grew. Predicting breakdowns helped crews act sooner instead of waiting. Streamlining repair visits saved time while improving outcomes. Lower spending came not from cutting corners but smarter routines. Keeping clients happy often linked back to reliability nobody noticed - until it mattered.

Payment risks depend heavily on how well a buyer handles money plus whether agreements can be upheld. Each group checked finances closely before agreeing to work together, often asking for proof like past performance records, official financial reviews, also clean reports from credit agencies. Some firms insisted on backup promises from larger corporate owners or bank-backed documents if the client seemed risky. When buyers failed to pay, it was unclear if courts would back the contract due to few prior rulings, so most stayed cautious about who they accepted. Starting strong meant avoiding shaky partners early.

Growth paths often bent toward those who taught better. Because energy financing feels strange to lots of people, companies had to unpack how it works - step by step - not just sell it. Winning firms shaped sharp messages, shared real examples, then guided buyers through doubts instead of pushing ahead blindly. When deals mix legal details with machinery specs, sellers need depth - one must speak both money and machines without stumbling. Clarity came not from slick talk but from slow answers to hard questions.

How Rules and Policies Shape Things. Rules around energy projects heavily influenced how companies planned their operations and whether those plans worked financially. In Mexico, policies for local power production spelled out solid connection rights along with net billing systems, making it possible for on-site generators to turn a profit. Still, people we spoke with pointed out ongoing issues tied to regulation. Getting hooked up often took half a year to nine months after applying - slowing everything down while money sat idle. Different regions and providers applied the rules unevenly, leading to confusion plus extra paperwork. One big worry stood out in every group we talked to - policy swings. When clean energy certificate setups changed, it stirred uncertainty. Compensation models for local power generation shifted too, adding more instability. Dispatch priorities kept changing, which made rules feel unreliable. That kind of inconsistency muddied long-range plans and budget estimates. Lenders reacted by charging more, seeing greater danger in funding such projects. Shorter loan periods followed, pushed by rising doubts over future conditions.

Without clear rules on outside ownership, things stayed loose yet shaky. Even though nothing blocked EFaaS setups outright, missing official nods made it hard to pin down who owed what. Lawyers we spoke with pointed out contracts could be enforced, still there were few cases tied directly to energy deals.

When utility ties work well, things move quicker on the ground. Smooth connections happen more easily if a utility helps out and replies fast when asked questions. Projects get up and running without long waits because of it. Trouble pops up where pushback exists against small-scale power systems. Some companies block easy access to the grid just by how they act. That friction slows everything down. Customers start worrying then - what if rules shift later and cut into savings? Unfriendly setups create those doubts naturally.

Barriers and Limits in Growing Markets. Still, growth hasn't cleared every hurdle for wider EFaaS uptake. What holds it back? A gap in buyer familiarity sits at the core. Not everyone sees how leasing equipment beats buying - some just don't get that a provider can own what they use. Misconceptions stick around. Others doubt promises of savings or flexibility. Teaching them means spending on outreach that might not pay off. Tiny markets feel especially risky to target.

Small projects often struggle because setup expenses eat too much of the total budget. Getting clients, drafting agreements, handling paperwork, setting up designs - these tasks cost about the same whether a job is big or small. Some people we spoke with said jobs usually need to be worth at least 75 to 100 thousand dollars to make sense financially. That leaves out many homes and modest business setups.

One reason expansion stalls? Money is hard to get, especially if you are medium sized and can't tap into funds from development lenders. Instead of backing energy service firms easily, local banks hesitate -

unfamiliarity plays a big role here. Assessing solar arrays or wind microgrids as security feels uncertain to them. That hesitation shows up in tight loan terms: shorter payback windows, steeper interest rates appear. When income comes in pesos but debts must be repaid in dollars, the pressure grows even more.

Ownership of buildings brings tangled rules. Since businesses usually rent their spaces, outside setups need the owner's okay - slowing things down. Getting those approvals drags out deals, making outcomes less predictable. When a building changes hands mid-PPA deal, confusion can follow unless contracts clearly spell out what happens next.

Cheaper gear shakes up how services prove their worth. Solar panels cost less now, making it more appealing for buyers to own them outright instead of leasing. When people can afford the initial price, they start questioning if extra fees paid to a company are truly worthwhile. Now firms must highlight what else they offer - like skill, ease, support - that money alone cannot buy. Value hides in help that lasts, not just in spreading out payments.

Innovation Paths and How Models Change Over Time. Out there, EFaaS setups keep shifting - pulled by what customers want, new tech, and rivals pushing harder. From studying real cases, fresh patterns popped up. A big one? Building digital hubs where people log in, tap apps on phones, dig into numbers. Such spots let users watch how things run minute by minute, get invoices faster, stay more involved, spot hiccups before they grow - all trimming expenses while boosting care.

Instead of selling just solar panels or energy savings on their own, top companies now group several tech pieces together into full packages. These setups often mix power from the sun with backup batteries, car charging stations, and tools that track when and how much electricity gets used. One moment you get sunlight turned into usable juice, next thing there's stored power ready at night plus a spot to refill your vehicle. Putting things like these under one roof makes each deal heavier in worthwhile giving customers fewer loose ends to manage. Each bundle becomes its own ecosystem - solar here, storage nearby, chargers plugged into smart controls - all working without needing extra steps.

Now imagine a setup where deals aren’t one-size-fits-all but shift based on who’s involved and how rivals act. Firms test different time spans for agreements, ways prices might rise, chances to leave early, even promises tied to results. Instead of big upfront jumps, certain companies let users begin small - growing only when trust builds. Being able to reconsider ownership at set points eases worries about being stuck too long.
Working together lets companies share tasks among experts. Instead of handling everything themselves, certain firms stick to what they know best. They team up with others - like gear makers, builders, lenders, or tech teams - to fill gaps. By linking up, businesses grow quicker without heavy spending. Top skills become available through these connections.

Not every company sticks to just one type of client. Even when businesses mainly serve factories or offices, many now test partnerships with schools, clinics, or city-run buildings. Instead of avoiding homes, certain suppliers jump in - yes, it costs more per person, yet they count on big numbers down the line plus new ways people can pay. Shared solar projects, where neighbors pull power from a single local plant, are gaining quiet traction, even if laws have not quite caught up yet.

DISCUSSION

Theoretical Implications. What we see lines up with existing ideas about business model change in energy industries of developing regions, building on them further. Regulatory setups steer which business models work - that comes through clearly when viewing things through institutional theory. In Mexico, changes to energy laws laid groundwork for outside companies to own infrastructure, though later political turns brought confusion, pushing up costs for deals and loans. Unlike countries with steady rules, these shifting conditions show just how different evolving economies are when it comes to running energy ventures.

Behind closed doors, companies pour energy into lobbying, joining trade groups, feeding info to media - quiet moves meant to frame how people see their services. Not just ticking legal boxes; they're nudging unwritten rules and shared beliefs about what counts as normal. Seen one way, its groundwork masked as routine practice. What looks like policy chatter is really mold being set beneath the surface. Slow shifts in mindset become runway for new business forms nobody questioned before.

Looking closer at how EFaaS firms operate reveals what they truly need to succeed. Financial know-how, tech skills, and handling client interactions stand out as essential ingredients. Yet it is not just having these pieces - it's how well they work together. Bringing different strengths into smooth operation turns out to be a decisive factor. Some companies had solid parts but failed because those parts did not connect. When coordination lags, performance dips along with user experience.

Out in the open of Mexico's shifting landscape, one thing stands clear - agility matters more than ever. Spotting new rules before they hit hard separated top firms from the rest. Because once change showed up, those who moved fast remade how they worked without delay. Shifting entire operations wasn't rare - it was required, at times. When pressure built from unstable policies and fierce competition, it was this mix of awareness, speed, and deep adaptation that kept some standing. What held them steady wasn't luck. It came from learning to evolve while everything around spun.

What happens when equipment matters a lot, situations change often, and deals repeat regularly? Those factors shape how agreements are built. When gear is custom made, surprises pop up, and tasks happen again and again, control shifts toward tighter arrangements. Contracts grow thick not by accident. They pack in rules because trust alone cannot carry the load. Clauses tracking results, checking progress, settling fights - they appear where risks run high. Structure follows friction. Details fill gaps left by uncertainty. Agreements adapt to what might go wrong. Heavy paperwork shows attempts to keep things on track. Rules replace handshakes when stakes rise.

Still, studies show formal agreements struggle where institutions are shaky. If rules might shift and reshape a project's value, paperwork alone fails to cover every twist or divide up risk neatly. That gap hints at something else stepping in - things like trust, standing in the field, ongoing contact - to backstop legal terms when energy partnerships stretch years ahead. Firms focused on steady rapport and open talk saw more deals continue past expiry, fewer fights along the way.

How energy service providers handle real world challenges. One key takeaway helps energy groups working in Mexico and places like it. To stand out, getting hold of cheap, long-term funding turns out to be essential. Ties with development banks matter more than expected. So, do connections with investors focused on social results. Strategic allies who wait longer for returns also play a role. Because that kind of money is hard to find, new approaches in financing become worth testing. Turning bundles of contracts into tradeable assets could open paths. Green bonds might too.

Here's a twist - using digital tools cuts operating expenses while boosting efficiency and making service feel more personal. Because of investments like remote tracking systems, insights from collected

information, and ways customers interact digitally, repairs happen quicker, upkeep spends less money, loyalty grows stronger. When tech becomes common and cheaper, having it stops being special - instead, lacking it becomes a disadvantage.

Starting narrow beats chasing every buyer out there. Focusing on one kind of client builds sharper skills, clearer offers, because attention sticks where it lands. When companies zero in on a single field, they gather details others miss - how choices get made, where frustration shows up, what power demands look like. That inside view shapes fixes that actually fit. Efficiency grows not from size but from knowing exactly who you serve.

One way to reach more people? Let them pick how long they sign up, what they pay, and what level of help they get. Picking your own path tends to turn interest into actual users. Too many choices though - that messes things up behind the scenes. Customers stare blankly when options pile too high. Simplicity hides inside smart limits. The trick is leaving room to bend without breaking.

One way to grow fast? Tap into outside help through team-ups across the network. Instead of building everything alone, companies link with makers of gear, setup crews, tech systems, or money providers. What makes these links work? Shared goals that make sense for everyone involved. Each side needs to know exactly what they do and who handles what. Rules for working together keep things running smooth when issues pop up. How well they sync determines if progress sticks.

Policy and Regulatory Suggestions. One thing becomes clear when you look closely - stable rules help new energy projects get funding more easily. Clear long-term plans, along with protections for current investors, lower the risks lenders worry about. It is not about stopping change; it is about making shifts easier to anticipate. When governments explain their choices openly and talk with affected groups, surprises happen less often. Predictable systems do not guarantee success, yet they make hesitation fade a little faster.

One way to cut down on expenses and speed things up? Simplify how connections get processed. When rules for applying stay the same across regions, progress becomes easier to track. Clear deadlines matter - especially when someone is held responsible for meeting them. Digital tools that handle paperwork online tend to move things along without extra hassle. If a utility company does not reply on time, automatic approvals might stop unnecessary waits. What helps most is building systems that keep momentum instead of stalling.

One way to cut down on paperwork headaches is by setting up standard deal formats that everyone agrees on. Starting with ready-made agreements for typical equipment-for-a-fee setups helps save time and money. When companies must spell out exactly how much things cost, what happens if something breaks, when you can walk away, and the full price tag over time - people make smarter choices. Fewer surprises often means fewer arguments later. Clear rules at the start tend to keep things moving smoothly.
Now imagine lenders taking small steps toward clean energy projects. Some backers offer know-how so regular banks grasp how equipment-as-a-service works. Instead of refusing loans, they start reviewing solar panel clusters like any other asset. A safety net kicks in when deals go sideways - part of the debt gets covered by a third party. Labels that spell out what counts as green open doors to special funding with better rates. Slowly, money moves where it once refused to go.

What happens when trade groups set their own rules? Trust grows. Instead of waiting for laws, companies create guidelines for honest work. Certification steps in, showing which providers meet solid benchmarks. Equipment checks follow specific technical marks - no guessing. When officials accept these private

standards inside public rules, better performance spreads without force. Quality climbs because the system rewards it naturally.

Limits and What Comes Next. Looking back, this study faces some constraints pointing toward new paths for exploration. Because it captures just one moment, seeing how business models shift over time remains out of reach. Watching companies unfold their strategies across years might reveal patterns in adjustment, knowledge growth, and results over time. That kind of work may uncover shifts sparked by changing rules, market rivalry, or breakthroughs in tech.

Looking at things from the company's side only shows part of what happens when people decide to buy or keep using something. To see more clearly, studies could follow real users over time, ask them questions, or test their choices - this reveals what pulls them in, what they gain or worry about, leaving or staying. Instead of assuming what works, watching those who pick services rather than owning outright might expose where the true appeal really lies.

One thing missing: clear numbers on how money moves through these systems. Without full records, it is tough to measure exactly who gains or where costs pile up. Looking deeper into actual ledgers might show which services pay off - and why some fall short. When funding setups shift, results often follow - sometimes fast. Seeing those links clearly could change how decisions get made. What works for one group may fail another - details matter. Learning how daily operations tie to dollar outcomes helps everyone rethink next steps.

One way to look at it is through Mexico, though that narrows how widely findings apply elsewhere. Looking beyond one country - say, comparing business models in several Latin nations - could show what works only locally versus everywhere. It might reveal how culture, rules, and money systems affect whether a model moves well between places.

Starting fresh, tech blends and online systems are still young yet changing fast. Because they shift so quickly, it makes sense to look closer at what is happening beneath the surface. New services, different ways companies make money, even shifts in worth itself - these often come from smart machines, connected devices, or shared ledgers. When those tools enter real work settings, things begin to change shape slowly. What teams need inside an organization isn’t always clear when using high-end tech. Some skills matter more once automation arrives; others fade without notice. Learning which strengths actually help could guide better choices ahead.

One way to see how well EFaaS works is by looking past profits and output numbers. What matters also includes its effect on people and the planet. Instead of just counting dollars, we could track cuts in carbon pollution. Jobs created locally might tell a clearer story. Better access to power in underserved areas adds another clue. Progress in regional economies gives further insight. Together, these pieces show whether the model aligns with long-term sustainability goals.

CONCLUSION

This investigation has explored novel commercial structures in power funding through service and rental arrangements within Mexico's shifting power sector. Through a combined investigation utilizing case studies, questionnaires, and market data review, the study has chronicled the rise, features, and efficacy of service-oriented power funding arrangements that signify significant departures from conventional capital outlay methods.

Main discoveries indicate that EFaaS setups have attained considerable market presence, particularly in commercial and industrial solar deployments, expanding from a minimal presence in 2014 to roughly 35% of new decentralized generation capacity by 2024. Three main business structure prototypes—solar power purchase agreements, energy efficiency results contracting, and equipment renting—satisfy differing client requirements while sharing usual structural components encompassing third-party ownership, service-based value propositions, and performance-related payment schemes.

The analysis uncovers that prosperous commercial frameworks rely on several crucial elements for success. Access to inexpensive, long-term funding fundamentally dictates competitive standing and pricing appeal. Technical and operational proficiency in system design, setup, and upkeep directly influences fiscal performance and client contentment. Advanced client outreach and instruction abilities overcome market unfamiliarity and build faith in new contracting methods. Digital platform incorporation increasingly distinguishes top providers through improved tracking, analyses, and client involvement.

Institutional and governance aspects significantly shape business structure feasibility. Mexico's power reform established core enabling circumstances through market deregulation and distributed generation rules. Nevertheless, policy instability and regulatory ambiguity heighten dealing expenses, complicate funding, and limit long-range strategizing. Simplified connection procedures, uniform guidelines, and regulatory steadiness would quicken market expansion.

Theoretical assessment reveals that institutional viewpoint, resource-based assessment, and transaction cost economics each furnish beneficial yet partial interpretations of business structure movements. Institutional viewpoint illuminates governance impacts and legitimacy building necessities. Resource-based assessment spotlights crucial proficiencies in funding, technology, and client administration. Transaction cost economics clarifies contractual governance strategies addressing complex long-term relationship issues. Integration across theoretical viewpoints offers a more complete comprehension than any single structure.
The research adds to both theory and practical application. Theoretically, it progresses business model innovation literature by examining service-oriented model adjustment in developing market settings marked by institutional instability and resource limitations. Empirically, it furnishes systematic documentation of an under-examined yet increasingly vital power funding environment. Practically, findings guide energy service providers, financial entities, technology suppliers, and policymakers regarding effective tactics, vital hurdles, and enabling circumstances.

Looking ahead, power funding through service and rental setups seems set for sustained expansion in Mexico, propelled by several positive trajectories. Falling renewable energy technology expenses enhance project economics and broaden potential markets. Increasing client recognition and ease with service-based methods lessen educational obstacles. Maturing funding ecosystems with growing lender familiarity improve capital availability and terms. Technology incorporation permits operational enhancements and novel service capacities.

However, achieving full capacity necessitates addressing ongoing obstacles. Policy firmness and favorable regulatory systems must supplant instability and vagueness. Finance sector maturation needs to advance past initial adopters to widespread commercial bank involvement. Transaction cost reduction via standardization, digitalization, and simplified procedures would broaden viable market segments. Consumer protection arrangements guaranteeing transparency and fair conduct must develop concurrently with market growth.

In summary, inventive power funding business structures stand for more than minor enhancements to capital deployment mechanisms. They fundamentally reframe associations among power infrastructure, ownership, and value generation. By facilitating entry to clean energy technologies without prohibitive initial investment, aligning motivations through performance-based setups, and distributing risks to parties best positioned to manage them, EFaaS models can hasten Mexico's power transformation while generating economic prospects for service providers, financial organizations, and clients.

The modification of power systems needed to address climate change and attain sustainable development aims calls for innovation not only in technologies but also in commercial structures, funding methods, and institutional frameworks. Energy finance as a service models exemplify such innovation, demonstrating how creative reorganization of value chains and relationships can surmount obstacles that restrict conventional methodologies. As Mexico and other emerging nations pursue ambitious power transformations, these business model innovations will likely assume increasingly central roles in marshalling funds, deploying technologies, and delivering sustainable energy services at scale.

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