

Women leading in energy solutions and change;

Case study of Iluméxico and Kessel
in the contexts of Mexican women

Reporting period:
March 31 to May 31, 2025

Prepared by:



María del Pilar Montero Garduño,
Blanca Cárdenas Carrión,
Guadalupe Isaac Carreño,
Isabel Domínguez
and Germán Castellanos.

www.bitacorasocial.com

In collaboration with

IRRAZONABLES®

www.irrazonables.org



Index

Introduction	04
Methodology	07
Structure of the report	
1. Who are these women, and in what context do they live?	13
2. Family structures and male figures	35
3. The arrival of energy and the energy transition: Kessel and Iluméxico	41
4. Decisions, solutions, and adjustments: the identity formed through technology	55
5. In conclusion: what technology reveals — a closing that opens conversations	64
References	71

Introduction

When energy reaches a home, it does more than light up a couple of bulbs or power a fan. It reshapes the night, redefines time, improves rest, reconfigures productive domestic life, and reveals who ensures that everything keeps running when household life becomes complex. This document offers an anthropological reading of that moment — the arrival of solar energy through Iluméxico's panels or Kessel's solar water heaters — in homes led by women across different regions of Mexico: the Rarámuri highlands in Chihuahua, the Isthmus coast of Oaxaca, the urban outskirts of Tecoh in Yucatán, and working-class neighborhoods in Naucalpan, State of Mexico.

This study does not aim to turn the everyday into something exceptional. It does not seek to glorify the arrival of a technology as if it alone could signal modernity or dignity, nor does it turn energy into a metaphor for development. What matters here is not the promise of the service, but what actually happens when an energy solution arrives in homes shaped by longstanding material inequality — where the burden of sustaining life has historically fallen on women across the country.

At Bitácora Social, we offer a cultural reading — not a technical or quantitative one, but a situated lens that listens to what women do to keep life going when external solutions do not arrive, when it arrives poorly, or when it arrives too late. How are these technologies inhabited? What do they reorganize, what is rejected, what gets adapted? What does it truly mean to “improve” life conditions when those very conditions — familial, communal, institutional — have been molded by lack of infrastructure, chronic overload, and constant adaptation?

The interviewed women were not selected merely for being beneficiaries or clients, but for their central practical roles within their homes and communities. Some are heads of households, others are mothers or caregiving grandmothers, still others are daughters, sisters, or daughters-in-law who have taken on the emotional, economic, and logistical organization of family life. Not all of them identify as leaders, but all of them take decisions. Not all claim formal status, but all exert authority in their own way.

The territories explored in this research are not strictly comparable in geographic or cultural terms, but they do share a structural trait: the role of the woman as the figure who makes things happen. Whether through the structural silence of the Rarámuri, the commercial autonomy of San Blas, the pragmatic containment of Tecoh, or the relational management of Naucalpan, these women have had to implement solutions — not because the system allowed it, but because no-one else did.

This anthropological research does not seek to determine whether the energy service works or not. What interests us is understanding how technology and energy become — or fail to become — part of the everyday fabric of life: how they are adopted, repaired, ignored, or replaced. For many of these women and their families, technical solutions are not synonymous with progress — they are synonymous with usefulness. Moreover, what is useful, stays. What is not, is replaced or discarded.

Thus, this document does not aim solely to present answers, but rather to pose more conscious questions, in dialogue with the reader:

- What does it mean to have access when everything else remains inaccessible?
- What kind of agency is exercised from a sense of duty, rather than from choice?
- What technologies are truly capable of integrating into the rhythms of everyday life?
- What narratives of modernization or empowerment fail to recognize the real ways in which women sustain the world?

Ultimately, this is a critical reading of the present energy landscape from the lens of domestic life and gender. It is an attempt to observe — more precisely, more deliberately — how lives are reorganized when a solution arrives, while governmental structures and plans remain long-term projections.

To fully understand the experiences detailed in this research report, it is also necessary to know who the actors are that made the arrival of these technologies possible. Iluméxico is a Mexican social enterprise dedicated to bringing solar energy to rural, semi-rural, and underserved urban communities seeking access to electricity. Its model goes beyond panel installation for individual customers — it involves territorial and social proximity, accessible payment schemes, and community engagement. In places like Bocoyna, San Blas, or Tecoh, its presence is not felt as a technical intrusion, but as a progressive connection enabling new ways to sustain everyday domestic life.

Kessel, on the other hand, operates within a more urban framework. Its solar water heaters are implemented in areas like Naucalpan, where basic services may be available but are not always constant, affordable, or efficient. The inclusion of a solar heater does not aim to resolve total scarcity — rather, it improves demanding routines marked by long workdays, time constraints, and economic juggling. Its offer resonates with a desire for practical stability: having hot water without relying on gas or expensive electricity, thus integrating a technological solution that reshapes routines and domestic finances.

From different geographies, operational modes, and service logics, both projects enabled us to meet women who adopted these technologies and reshaped them through their lived experience. We are deeply grateful to Iluméxico and Kessel for supporting this research, opening their doors to us, and providing contact with their users. It is precisely at that point of contact — between innovation and daily life — that this document begins.



Methodology

In this study, methodology was not a neutral pathway to data collection, but a **conscious and critical means of constructing knowledge with and from people**. The research developed by Bitácora Social was grounded in a clear conviction: understanding energy life requires entering the social contexts in which it is produced, interpreted, and transformed. Methodology was not a mere channel for collecting opinions, but a device for reading living conditions, family dynamics, economic decisions, and the everyday tensions that shape consumption. For this reason, we adopted a **qualitative approach rooted in anthropology**, capable of capturing what indicators cannot measure: the meaning people assign to their practices.

Fieldwork focused on observing and interpreting how access to energy solutions is lived, negotiated, and reconfigured in contexts where **inequality, economic informality, and institutional distance** are structural components of reality. The research design was articulated through three main tools: **in-depth semi-structured conversations with women users, family exercises with members of their household, and anthropological field diaries**.

Fieldwork was conducted with a total of 18 families, selected for having incorporated renewable and non-conventional energy solutions into their households through the programs of Iluméxico and Kessel. These were women and families who chose to open their homes to new forms of energy access—whether for electricity generation or water heating—in contexts where conventional alternatives are often costly, unreliable, or insufficient. Iluméxico's solar panels were implemented in the rural and semi-rural communities of Bocoyna (Chihuahua), San Blas Atempa (Oaxaca), and Tecoh (Yucatán), while Kessel's solar water heaters were used in the urban context of Naucalpan (State of Mexico).



Nine families used Kessel solar water heaters, acquired through direct product purchase; while the other nine families received Iluméxico solar panels as part of a program in which the infrastructure is provided by the company and the energy generated is paid for through a subsidized model, involving periodic user payments in the form of recharges. Each family participated in two complementary conversations: an individual interview with the female user and a family conversation focused on domestic organization and economic co-management. This structure resulted in a total of 36 ethnographic conversations, evenly distributed across both technologies and their respective territorial contexts.

Each region reflects distinct material, social, and symbolic realities—from the geographic and linguistic remoteness of Indigenous communities to the urban density and relational fragmentation of peri-urban settings.

In parallel, **anthropological field diaries** were produced for each region, functioning as critical instruments of observation. These diaries did not simply record what happened but interpreted what often remains unsaid: the use of domestic space, the position of objects, waiting routines, tacit interaction rules, household hierarchies, and links with the surrounding environment.

Grounded in a rigorous ethnographic strategy and enriched through detailed field diaries, the study engaged in-depth with

approximately 88 individuals

—including household members, neighbors, and other relevant community stakeholders in the areas studied. This fieldwork was carried out over two months of intensive engagement, from February to April 2025.

In total, the research accumulated over

1,040 hours

of direct ethnographic work, combining individual interviews, group sessions, and systematic field journaling. This extensive immersion ensured not only the depth of each encounter but also the contextual thickness required to interpret everyday life in its social and cultural complexity.



This methodological structure was not a formula, but a strategy grounded in the need for contrast and context. Individual conversations allowed researchers to trace energy trajectories from the perspective of those managing the household; family exercises revealed the relational frameworks that sustain, reproduce, or contest energy use; and field diaries operated as analytical tools embedded in living contexts, documenting the material, spatial, and temporal dimensions of everyday life.

In this approach, anthropology is not a discipline of anecdote collection, but one that detects patterns through **perceptions, imaginaries, values, and historical and everyday worldviews**. Its validity lies not in the quantity of cases, but in the **depth of interpretation** applied to each one. Each conversation was treated as a **complex analytical unit**. The aim was never to prompt opinions “about energy,” but to reconstruct how lives had changed, what decisions it required, what tensions it created, and what priorities it displaced. Pauses, silences, interruptions, and contradictions were recorded as key dimensions of **qualitative data density**.

This design enabled the creation of an observational system responsive to disparate contexts. It did not involve applying a uniform protocol, but rather adapting times, locations, and interactional styles to each territory and household. In Tecoh, for instance, some women could only engage in conversation after finishing their food sales; in Bocoyna, some families lived over an hour’s walk from the nearest road. In Naucalpan, interview timing was dictated by work shifts and extended public transport commutes. These conditions were not logistical obstacles but **observed variables** that revealed dimensions of the **structural fragility** that these women face in organizing their energy lives.

Bitácora Social’s methodological work was guided by a set of analytical categories previously defined as **axes for observation and interpretation**. These sociocultural variables were not emergent findings, but **deliberately selected lenses** that made visible how structural conditions shape energy experiences in each context and household. The anthropological aim was not to quantify resources or parallel indicators, but to read **gaps and asymmetries** through how energy is lived, negotiated, organized, and represented. What follows is the **conceptual framework** that preceded the analyses; each variable functioned as an entry point for understanding diverse and often excluded realities beyond conventional technical approaches.

• Irregular income

This variable was used to observe the rhythms, margins, and vulnerabilities of household income. The aim was not to quantify earnings, but to reconstruct how money is perceived, managed, and distributed depending on whether income sources are stable or not. The concept allowed us to analyze energy as a resource subject to uncertainty, interruptions, and spending hierarchies. Conversations revealed that income in many families is not calculated in weeks or months, but in days that “stretch” or don’t. In Tecoh, for example, some women reported earning up to 300 pesos per day, with only 80 to 100 pesos (approx. 4.5–5.5 USD) remaining after purchasing supplies and covering household needs.

- **Discontinuous economy**

This category helped us understand that income sources are not derived from a single job or activity, but from multiple, often temporary occupations, subject to seasonal or communal shifts. It was useful for interpreting how energy consumption fluctuates according to each family's economic cycle. Methodologically, it required understanding productive time as non-linear and non-exclusive. In Bocoyna, for instance, people alternated between embroidery, selling crafts during tourist season, agricultural support, and local commerce—without a predictable pattern.

- **Redistributive family structure**

This concept enabled analysis of how the household economy operates as a relational system in which income, decisions, and caregiving responsibilities are shared or rotated. Most families in Oaxaca, Chihuahua, and Yucatán belonged to lower socioeconomic levels (E), while in Naucalpan they were classified as lower-middle (D+). Unlike the traditional model of a sole provider, this structure suggests that access to and maintenance of energy technologies depends on intra-family agreements and collective contributions. The family conversation tool helped map this arrangement in cases as Nancy's (Naucalpan), where three adult women share housing, expenses, and decision-making—without a single formal hierarchy, though symbolic roles which are still present.

- **Structural fragility**

This variable made visible the material limitations of the environment that constrain technology use—irregular water supply, dirt floors, makeshift electrical installations, or homes lacking formal infrastructure or land tenure. It was especially important in the field diaries, which documented how such conditions affect the maintenance and long-term adoption of energy systems. In San Blas and Bocoyna, for example, many homes lacked formal utility connections and depended on improvised adaptations to operate solar panels or water heaters.

- **Institutional distance**

This concept aimed to interpret the perceived disconnection between social institutions and certain communities in Mexico. Rather than measuring gaps numerically, it explored how people perceive the presence—or absence—of government support in their personal and social environments. In Tecoh, for instance, several users associated government attention with the state capital and described a lack of nearby institutional presence. Similarly, in San Blas, even with the arrival of the Trans-Isthmus Train project, a deeper sense of state proximity was absent.

• Language as a boundary

This variable examined how linguistic differences shape access to information, accompaniment, and agency—particularly in technological services. In Bocoyna and San Blas, many participants spoke Rarámuri or Zapotec as their first language. Methodologically, several interviews required internal support to translate or adapt meanings. While these boundaries did not prevent dialogue, they revealed a profound cultural asymmetry that limits autonomy in understanding and operating energy technologies, as well as navigating other systems of service delivery.

• Uneven geography

Geography was treated as a structural dimension that defines access, cost, and the physical effort required to maintain energy systems. The study included remote rural areas (Bocoyna), semi-urban territories (San Blas and Tecoh), and densely populated peri-urban neighborhoods (Naucalpan). These differences were not merely territorial, but functional, affecting everything from water transportation to access to productive spaces or system repairs. In Bocoyna, for example, walking 40 minutes to reach a neighboring town is common, while in Naucalpan, long commutes via public transit are a daily reality.

• Relational conditions of technological appropriation

This variable was used to understand how energy use depends on domestic agreements, shared routines, and internal hierarchies. Contrary to an individual consumption model, the research showed that using a panel or water heater involves negotiation—who needs it, who can operate it, who is responsible for maintenance. In Eduardo's household (Naucalpan), the system stopped being used due to poor coordination around bathing schedules. Energy, in this sense, does not circulate autonomously—it is negotiated, shared, and at times, abandoned.

To fully understand the energy experience in contexts of inequality—often deep and persistent in Mexico—qualitative research proved essential. Beyond merely recording usage, access, or satisfaction, it became necessary to observe how structural conditions permeate daily life and shape the ways technologies are received, utilized, or ultimately set aside. The methodological design and the sociocultural variables that guided the initial phase of analysis laid the groundwork for interpreting the complexity of everyday life in socially diverse and often precarious environments.

This approach allowed for a situated, in-depth, and reflective lens on what it means to inhabit a technological improvement in settings marked by discontinuity and inequality. Ethnography was not simply a style of inquiry, but a rigorous system of observation and interpretation, grounded in adapted tools, clearly defined analytical categories, and critical listening. By shedding light on lived realities, anthropology operated not as a decorative discipline, but as a legitimate, necessary, and robust avenue for producing applicable, ethically grounded knowledge—one capable of interpreting human perceptions and the structural conditions in which they unfold.

1

Who are these
women, and in what
context do they live?

Mexico is a country of deep contrasts — geographical, cultural, and in how people inhabit, organize, and access the essentials of life. Across the national territory, densely connected cities coexist with highly dispersed communities, such as Mexico City or Monterrey alongside rural or semi-rural municipalities where basic services are managed collectively, through family networks, or community arrangements. This diversity not only defines the landscape, but also shapes the everyday strategies people develop to sustain life.

This anthropological study focuses on four particular contexts: the Tarahumara Sierra in Chihuahua, where Rarámuri social organization is marked by distance and self-sufficiency; the Isthmus region of Oaxaca, where trade and mobility define the pace of daily life despite promises of government infrastructure projects like the Interoceanic Corridor; the municipality of Tecoh in Yucatán, where rural ties blend with emerging urban dynamics; and Naucalpan, in the State of Mexico, where women operate within complex family and urban structures that are equally challenged by the demands of city life and its pace. These are not exceptional territories, but they are representative of a reality often rendered invisible: one where the State arrives late — or not at all — and where life is sustained through other means.

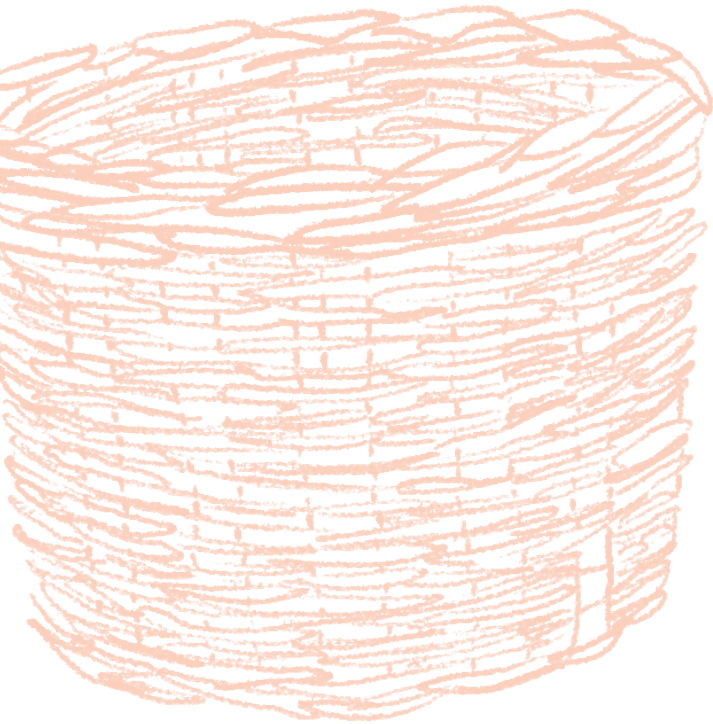
The conditions surrounding these households cannot be reduced to deprivation. They are complex environments where domestic organization, care, economic management, and decision-making are deeply shaped by regional histories, local cultures, and the roles women have assumed — or have been assigned. From this perspective, the study does not aim to measure vulnerability, but to understand what forms of authority are exercised in the everyday, what kinds of relationships are activated, and what room for maneuver exists for those who keep life running when institutional support is insufficient.

In each of these places, the arrival of an energy solution — be it a solar panel or a solar water heater — does not occur in an emptiness. It enters homes that already operate with their own order, norms, accumulated knowledge, and problem-solving practices. The energy that arrives does not replace these logics: it challenges them, accompanies them, or, in some cases, integrates if it proves to be useful. That is why, before analyzing how technology is appropriated, it is necessary to understand **to whom** it arrives, **when**, with **what promises**, and under **what conditions**.

This chapter describes the living conditions in each of the four territories and explores how the women who were interviewed organize their households, their time, their authority, and their social ties. Rather than sketching out “profiles,” the goal is to offer a situated and comparative reading where regional differences intersect with shared modes of sustaining life — not through discourse, but through practice.



Chihuahua: between dispersion, operational silence, and time containment



To understand the women and the families of Chihuahua, one must situate them in the Tarahumara Sierra — a place where the relationship with land is not merely a backdrop, but a structural condition. In northern Mexico, the Sierra is home to Rarámuri Indigenous communities where paths are long, homes are separated by kilometers, and public services arrive only intermittently — if at all. Territorial dispersion is not just a geographic fact, it's a way of life that demands autonomy, foresight, and a wealth of domestic knowledge.

The interviewed women in Bocoyna and nearby communities around Creel live in scattered homes, often far apart, with limited infrastructure and government institutions that operate sporadically — in part because the state capital absorbs most attention. These are not randomly isolated places: they are territories that have historically been neglected by the Mexican State and sustained through the silent and continuous labor of those who remain.

These lands have long been inhabited by the Rarámuri people, who have not only resisted cultural colonization and territorial displacement, but have also formed their own logic of life, where time, speech, and conflict follow a different rhythm. In many of these communities, the family is not restricted to a nuclear unit of mother, father, and children, but extends into a broader network: siblings, nieces, ill mothers, orphaned grandchildren, sisters-in-law, uncles passing through. This familial flexibility is not a sign of precarity — it is a cultural form of organization. In this framework, the elder woman — mother, responsible daughter, caregiving sister — becomes the organizing center, even if she does not verbalize or claim that role explicitly.



In the Sierra Tarahumara, solutions are neither immediate nor standardized; they are sought confrontationally. Decisions are not made hastily, but with clarity — because the essentials are organized based on what's available, and what's available is often scarce or intermittent. Life is tied to the cycles of certain crops, but also to the tourism that occasionally arrives in the region.

These women — Marisepa, Lucía, and Luz Elena — are artisans, mothers, caretakers of ill relatives, wood collectors, vendors during tourist fairs, agricultural day laborers during harvest season, daily budgeters when money comes in — and when it doesn't. Their home is not merely a physical space: it is a multi-functional containment unit, where sleeping, teaching, caregiving, accounting, and protection all happen under one roof.

It is important to note that in this context, family is inseparable and a moral and emotional responsibility. In many cases, families are extended and matrifocal: a woman may live with her elderly mother, her young children, a sister, or even grandchildren. Men — if present — often work far away, are seasonal migrants, or appear only sporadically. However, day-to-day life is managed by women.

Here, the everyday is organized without proclamations. The male figure represents symbolic authority, but in daily life, women's authority is operational: the one who organizes, decides. The one who sustains, coordinates. Rarámuri women do not name themselves as leaders or heads of household, nor as role models, but in practice, their presence orchestrates time, space, economy, and the pace of the day — whether that means hauling water in buckets from a spring or calling a water truck because there is no water in the house or in the community well.

This way of acting is not an exception — it is the norm. The community has not disappeared, but it no longer functions as a total network; it activates around family affinity, close neighbors, or shared urgency. Knowledge circulates not through discourse but through example. In the face of precarity, solutions are not improvised — they are inherited, replicated, and adapted.

Learning flows between women, across generations, through everyday practice. In this context, technology is not an external element — it becomes part of the social fabric only if it aligns with the logic already in place. From the perspective of Bitácora Social and Irrazonables, we read this unnamed agency as a **cultural form of sustenance**: it does not need recognition to be real. That's why any intervention — including energy — does not enter into an empty space, but into a domestic system already in operation. The question, then, is not whether a solution is needed, but whether it can be integrated without disrupting the delicate balance these women maintain. In this context, **change is not proclaimed — it is tested.**

“I take care of everything.
Even taking my mom
to the hospital.”
—Marisepa



San Blas Atempa: daily movement, fragmented economy, and affective authority

San Blas Atempa is located in the Isthmus of Tehuantepec, a southern region of Mexico shaped by historical, social, and economic contrasts. Geographically close to cities as Tehuantepec and Juchitán – both with greater population density, political weight, and public infrastructure – San Blas remains on the margins of those regional dynamics, even as it draws some benefit from them. It coexists with those cities, but it does not absorb their institutional stability. It is a community that observes development from the outside, without seeing tangible improvements in daily life. Even with the anticipated arrival of the Interoceanic Corridor project, these communities do not seem to feel part of a promising future. The discourse of transformation does not circulate here. What occupies their present concerns are the buses that never arrive, the growing insecurity, and electricity that doesn't reach every household.

The Isthmus represents a different kind of distance – not just one of kilometers, but of rhythms and dynamics. San Blas Atempa lives between the mobility of the market and the density of domestic life. There are no mountains or cold weather, but there is intense sun, constant humidity, salty wind, and tin roofs that turn midday into an oven. The women who were interviewed here, live in neighborhoods like Santa Rosa, Álvaro Obregón, and Nisabindani, where access to water depends on a water truck, electricity is unstable, and public transportation frequently fails.

What remains active and strong is the local circulation of goods, food, knowledge, and relationships. In addition, in that system, women are not complementary participants – they **structure it**. In the Isthmus region, it is common to hear that “women are in charge,” and while that phrase might sound like an exaggeration or a stereotype, in San Blas it reflects a practice: women not only sustain the home, but they also sustain exchange. They are central figures in informal and community-based commerce, selling fruit, fish, vegetables, and more.

From a young age, girls learn to sell, offer, and calculate. Mothers teach daughters how to make *totopos*, *tamales*, *atoles*, shrimp dishes, and *empanadas*. Thus, this is not just about “making food” or “women’s work” — it’s about building a **street economy**, a **market economy**, and a **neighborhood economy** that nourishes and circulates. This practice is not marginal; it is culturally recognized as a feminine task. However, behind those gender roles and social expectations lies a **productive agency** that generates development. In contrast, a masculine stereotype circulates — one of men who don’t contribute, who drink, who are absent. While not universal, the imbalance in labor distribution is a recurring theme in women’s accounts.

“Men sometimes don’t help —
they say it’s women’s work”

Families here tend to be flexible, as in many southern regions: they may include daughters-in-law, grandchildren, intermittent sons, partners who come and go. The emotional and the operational are intertwined. What doesn’t change is the woman at the center: organizing, calculating, working in commerce. These women work from home and, when needed, in local markets. They understand the local economy, the role of taxis and *mototaxis*, the market’s rhythm according to the weather or calendar — including patron saint festivals. Also, in that everyday knowledge lies a form of agency that does not declare itself as empowerment — it simply **functions**.

“Here I sell, I prepare food,
I take care of the bills.”



“I spend 500 pesos every three or four days. All of it goes to food.”
— Guadalupe

Beyond selling, these women maintain small support networks: they take care of one another as *comadres*, recommend clients, and help each other during illness. They may not be part of visible organizations, but they are embedded in **affective circuits of exchange and resolution**. If the husband is gone, the daughter has migrated, or there's no gas — they already know what to do. It becomes clear in the interviews that women do not improvise: they possess **operational memory**, **scarcity memory**, and **repetition memory** that works.

In San Blas — where the discourse of development does not resonate clearly and insecurity is a persistent concern, especially at night or along the road to the highway — the role of women is not just domestic or economic. It is **symbolically structuring**, because they are the ones who make visible what the community needs in order to continue: to work, to adapt, to move forward.

From Bitácora Social and Irrazonables, we acknowledge that these expressions do not reflect performative or tokenistic leadership, but **authority built through consistency**. These are women who work quietly but are never invisible. The community's rhythm depends on their ability to adjust the day, anticipate needs, and resolve problems with what is available — or what can be found. It is in this often-invisible everyday space — overlooked by regional development — that the essential is upheld: **continuity at home**.



Tecoh: between intermittent work and pragmatic autonomy

Tecoh is a municipality in southern Yucatán that moves between rural and urban realities — between its proximity to Mérida and the ongoing presence of more traditional ways of life. As the idiom goes, the farther one moves from the capital, the more development fades. While it is not a completely marginalized area, it is also not fully integrated into the metropolitan development corridor. The women who were interviewed live in dispersed neighborhoods, not densely populated urban settlements: they inhabit areas connected by dirt roads, scattered *tienditas* (small stores), shared patios, and unpaved stretches, where familiarity with one's surroundings does not necessarily imply trust — it often means vigilance.

In this context, women are not seeking explicit recognition. However, with careful attention, it becomes clear that they are the ones sustaining the present — even emotionally. There is no fixed market, but there is a constant search for sales or small, sporadic jobs in other towns. There are no organized networks, but there are **practical family arrangements**. These women combine domestic duties with occasional work: they sell *mondongo*, *tamales*, shaved ice; offer informal services in construction; or care for their grandchildren while managing the little income they earn. They do not describe themselves as heads of household, but they are the ones everyone turns to when something needs to be solved.

“If we need to talk to the shopkeeper or go pay something, I’m the one who does it. My son works, but I organize everything else.”



Income is not constant, but it is monitored and recognized. Interestingly, these women know the **cost of living** through their connection to the capital, which is their reference point for productivity and earning. The household economy functions like an **echo chamber**: if money is spent today, they must plan what to adjust tomorrow, or what leftovers from the last sale can be reused. Things are saved, measured, controlled – even when purchasing small improvements for the home. The women of Tecoh do not demand external aid, but they assess with precision whatever arrives from outside: if it works, they keep it.

“I don’t wait for anyone to give me things anymore. I get moving. I sell, buy, cook – I take care of it all.”

Unlike San Blas, where the street functions as a market, Tecoh’s economy appears more fragmented. Women produce from within their homes, but with **impressive clarity** about their roles: if there’s food on the table, it’s because they prepared it and paid for it. If there’s electricity, it’s because they figured out how to charge the panel or asked for help. The male figure is not entirely absent, but often plays an auxiliary or episodic role – if he exists in the household at all.

The family, in these cases, is **more compact**. There may be children, grandchildren, daughters-in-law, but these are not expansive or emotionally dense networks. People live with whoever is present and cooperate with whoever is responsive. There is no community ideal, but there is **domestic realism** that organizes life without grand declarations – solutions are not romanticized, they are adopted as they become viable.

From this perspective, Bitácora Social and Irrazonables observe that the women of Tecoh do not engage in politics with their voices, but with their decisions. Their agency is visible not only through discourse, but through **continuity**. These are women who seek control over daily rhythms; who act through care-giving rather than through the representational figure of leadership.



Naucalpan: between domestic planning and relational control of urban life



Naucalpan is part of the metropolitan corridor of the Valley of Mexico, but its margins do not reflect the imaginary of an orderly city – nor do they fit the image of marginal poverty. The women interviewed live in urban working-class neighborhoods where proximity to the capital does provide access to services, opportunities, and a certain sense of safety – but not effortlessly. Transportation is abundant but exhausting. Income arrives but must be distributed with surgical precision, as life in the city is expensive. **Family life is sustained through a logic of planning, not improvisation.**

Here, women do not “save” the household – they manage it collaboratively. Their labor is not framed as sacrifice, but as **every-day planning**. Many of them have studied, others work or combine both roles. Some took over domestic responsibilities at a young age. Others care for aging parents or are mothers of college-aged daughters who live under the same roof. There is no single-family model here, but one constant remains: **women make the central decisions** that have been delegated to them – either because they always have, or because everyone else cooperates around them.

“At home it’s like we’re equals now, but I’m the one my parents and sister rely on.”
– Nancy

“We hold family meetings where we make suggestions, but mom is the one who decides.”
— Eduardo

In this urban environment, **authority is assumed through affection, but also through order**. The domestic sphere operates as a simple but effective system: expenses are calculated, purchases are postponed, if necessary, decisions are made about when to buy a solar water heater or when to renovate the house. Women in this study do not face daily scarcity as a constant emergency, but rather as a **variable to manage**, because stability must be constructed according to the demands of urban life. In this case, autonomy is a **method of possibility**.

Unlike in Tecoh or San Blas, the economy here is not fragmented — it is integrated into a broader structure. The city demands efficiency, and families know this. The logic at home resembles that of a **micro-enterprise**, with women acting as the executive committee. Although the urban context offers a different vision of lifestyle, it does not guarantee full autonomy or freedom in family decision-making — families still struggle against many external demands.

For Bitácora Social and Irrazonables, the case of Naucalpan illustrates a **different form of female agency**: not the kind that arises from a lack of institutional support, but one that **administers from within the relative stability that still remains incomplete**. The bottom line is the same: women sustain their home — economically, relationally, and emotionally, and they do not do it for recognition — they do it because that is how the household has functioned, and because they understand that **family is a form of privilege and the pathway to development**.

Comparison: resonances across extremes

Those women living in these four regions do not conform to a single profile, nor do they operate under a unified system of meaning. Yet, when observing their place within the everyday life of their communities, it is not difficult to identify a set of **structural resonances**: it is women who uphold what is essential and what is a priority – without proclaiming it, without asking for recognition, and often without that role being formally acknowledged as authority. Their agency, though diverse in form and tone, does not stem from a recent empowerment process. Instead, it is the **continuation of roles they had long been shouldering** – often alone and outside the symbolic frameworks of male strength or institutional legitimacy.

Interestingly, the ways in which they refer to themselves and the manner in which they exercise authority reveal **four different grammars of female agency** in their homes and communities.

In **Chihuahua**, agency is contained – almost ritualistic – because it is traditional. Rarámuri women describe themselves in reference to others – “mother of,” “sister of” – and yet, within that familial structure, they exercise a profound moral authority even if they remain in the background. They are as they are because of their proxemics, their culture, and their language. For instance, **in the Rarámuri language, nouns and adjectives do not describe fixed entities – they describe things in the process of becoming.**

Thus, these women do not impose themselves, but neither do they relinquish their responsibilities. It is expected from them that the household will function. Their legitimacy derives from caregiving, experience, and the sobriety with which they assume responsibility. They do not speak in terms of “I,” but when they do speak, they make it clear that **everything runs through them**:

“**I’m a good mother, I’m strong.
This is my role, and I do it.**”
– **Lucía Rodríguez**

This way of speaking is not a lack of identity – it is a **cultural code** operating under alternative registers of family and community order. In contexts where power has been historically coded in masculine and public terms, they construct authority from the domestic sphere – without defying it, but without depending on it either, because **their daily reality is more confrontational than symbolic**.

In **San Blas**, by contrast, female authority is lived more directly, more openly negotiated. Women speak in first person, manage household income, make decisions about energy use, and demand accountability when something doesn’t work. There is no distant male figure being invoked – there is a woman who is present, who acts, who trades. This assertiveness is not a modern performance – it is **part of an economic tradition where commerce, the street, and exchange have long been female territory**.

“**Everything I do, I do on my own. I don’t ask anyone.**”
– **Guadalupe**

This decision-making capacity does not translate into formal leadership or political representation. However, it does represent a **non-negotiable operational authority**, an agency that structures life through daily efficiency and spending: What are we selling today? How much is it worth? Who’s going to the market? How do we recharge the panel? The public voice of these women is not ideological – it is **functionally assertive**.

In the case of **Tecoh**, we see another form of organization: a **silent, but highly strategic and confrontational autonomy**. These women do not speak in political terms or occupy public spaces, but they are **well-connected to other towns**, understand the boundaries of informal labor, and seek income where and when it’s possible – and they find it. Their agency is more fragmented, more tactical, but no less solid. These are not chaotic households – they are homes where a woman decides **how and when to solve**, and from there builds legitimacy. They stabilize the home **both internally and externally**.

“**I don’t wait for anyone to give me anything. I move.**”



Naucalpan, in contrast, reveals a more formalized register: authority is exercised through organization, strategy, and emotional containment within “more modern” urban families. Resource management is more structured due to more regular income. They do not constantly battle uncertainty, but the logic remains: a woman coordinates, decides, measures, plans. Dialogue may exist, but **balance revolves around her figure**. Decisions are made with others — but not without her.

In all four contexts, **the male figure tends to orbit rather than anchor** daily life. Sometimes through absence, migration, sporadic work, or choice. In no case is he perceived as the operational axis. Even when unspoken, this becomes evident across their stories. The women who were interviewed are not filling a gap — they are occupying a role they had long held, **even if it had never been named as such**.

These differences in domestic organization — the **silence** in Chihuahua, the **assertiveness** in San Blas, the **containment** in Tecoh, the **rationality** in Naucalpan — should not be seen as decorative variations. They are **family-world structures**— configurations shaped by gender, territory, socio-economic and cultural levels, and the histories of each state and locality. Together, they produce **different meanings of what it means to ‘keep the home running.’**

When a technology source such as solar energy enters these homes, it does not spark a transformation. Instead, it is **put to the test within an already functioning system**, which is why it is crucial to understand that these women are not grateful users nor reluctant opponents — they are **practical evaluators** of what serves their lives and households together with everything they must already resolve.

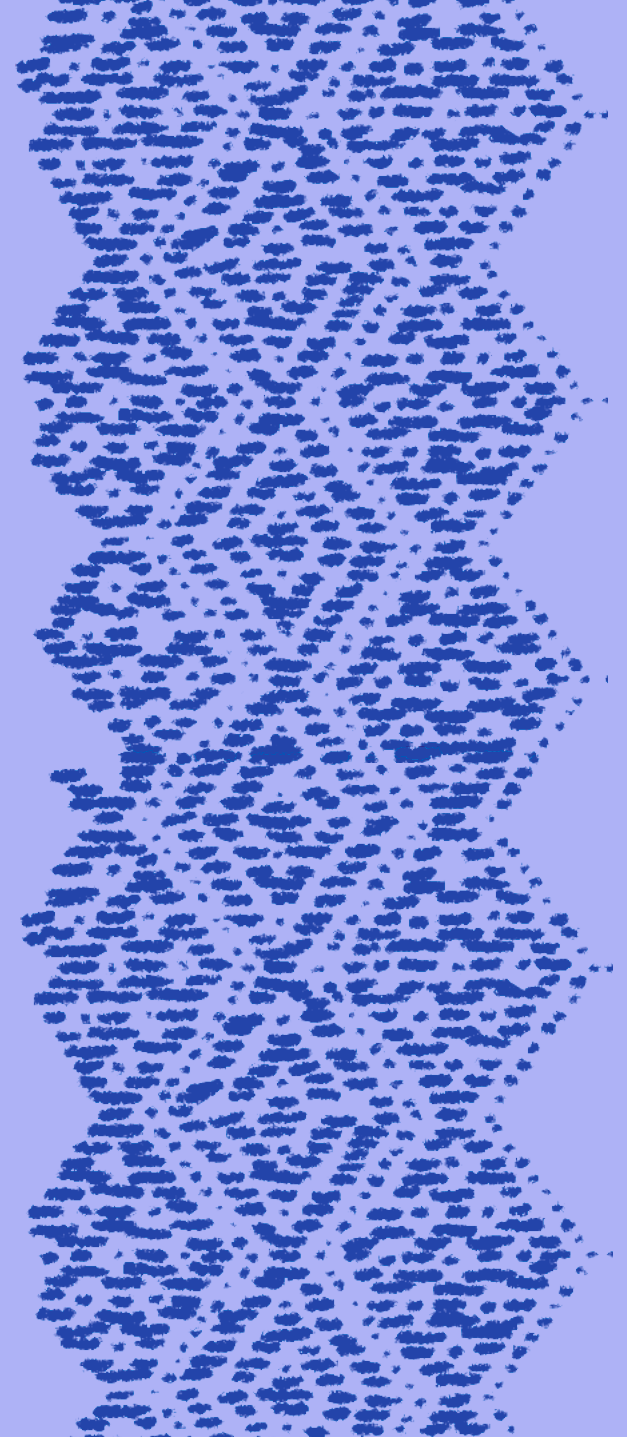
“I taught her. Now she doesn’t struggle with that anymore.”

These forms of knowledge-sharing — teaching a neighbor, explaining how to recharge, fixing a cable — do not require formal structure to function as a network. The everyday solutions in these households do not stem from institutions, but from **affective coincidence**. There is an unwritten pedagogy with a deep intention to care for one’s surroundings.

In light of this, the word *empowerment* takes on a different meaning: **none of these women idealize it**. They live in the present with a mix of realism, accumulated experience, and sustained pragmatism, and that way of being in the world — whether discreet or visible, planned or improvised — may well be **the deepest form of domestic agency** we can observe today. They don’t need to call themselves leaders — **but without them, nothing works**.

2

Family structures and male figures



In the interviews conducted in Chihuahua, San Blas, Tecoh, and Naucalpan, the word “family” appears frequently — though never in the rigid form of a traditional model, even in socially conservative environments. What emerges is not a fixed structure defined by legal ties or idealized stability, but a **flexible network of functional, emotional, or necessary relationships** organized around the experience of sustaining the present. In every case, what allows domestic life to function is not kinship alone, but **women’s ability to adapt** to disparate conditions in the absence of external structures guaranteeing balance.

The women who participated in this study do not describe family as an ideal nuclear unit. Instead, they describe a **network activated by necessity, proximity, urgency, or emotional bond**. Some households include grandmothers, grandchildren, unmarried adult children, daughters-in-law with babies, nieces — or simply whoever had nowhere else to go. This flexibility is not a sign of dysfunction. It is a **real way to sustain the present with what is available**.

“Here it’s all of us: my daughter, my granddaughters, and a niece who came to live with us because her mom couldn’t manage anymore. Sometimes someone leaves, sometimes someone arrives, but I’m the one who organizes everything.” — Elsa, Naucalpan

In the **Tarahumara Sierra**, this reorganization takes on a tone of structural sobriety. Many women live with their children, their elderly mothers, or grandchildren — and not necessarily with a stable partner. Some are widows, others were abandoned by their husbands, others never cohabited with the father of their children. In none of the conversations is male absence dramatized — but its withdrawal leaves a mark: **women have assumed the order of their home without replacing it symbolically**.

“I take care of a lot of things.
When there’s no water in the
well, I have to call the truck.
If I don’t, who will?”
— Marisepa

It’s not that the home endures “despite everything,” but that it has been **reconfigured from within** — a system where time, spending, caregiving, and material organization all depend on a single figure who is unannounced but expected. That figure, in almost every case, is a woman. She does not declare herself the head of household — sometimes she doesn’t even mention it — but as she describes her day, it becomes clear that she manages life in all its dimensions: **from emotional caregiving and teaching daughters, to water logistics, food provision, education, health, and household economy**.

In **San Blas**, family structure is more fluid. There are intergenerational arrangements that adjust based on space, emotional ties, or financial need. Living with daughters-in-law, children, grandchildren, or sisters happens without formal rules. Nevertheless, as in Chihuahua, **decision-making is not delegated**. It is a woman who defines spending, decides whether to buy meat or just tortillas, whether to recharge the solar panel or wait a day, whether to tell the neighbor there was no electricity, or whether to find fruit to sell at the family stall.

“My son isn't here. He left for work. But I'm here with my daughter-in-law and grandkids. If there's no money, I find something to sell. Sometimes I make tamales, sometimes shrimp. If it doesn't sell, I save it, and the next day I try something else.”
— Guadalupe

Here, the male figure circulates but does not form part of the structure. He may be present, but without total organizational weight. What remains constant is that **even when men are around, daily management falls on women.**

Tecoh presents a different model — quieter, but equally resolved and active. Women take care of others, sell, run errands, clean, organize, and travel to the capital. They do not wait for someone else to make decisions — they don't have time for that. What distinguishes Tecoh is that families appear more **reduced, functional, or geographically dispersed**, with many relatives working in cities as Cancún due to a lack of local employment. Households may consist of a mother and a child, a grandmother with two grandchildren, or a woman who works in Mérida during the week and returns on weekends to be with her family and **recharge emotionally** before heading back to work.

“No-one helps me here. My daughter sometimes visits. I sell mondongo on Sundays. If it sells well, I buy groceries for the whole week. If not, we eat beans. But I don't wait for someone to come and tell me what to do.”



The word *help* appears, but **without expectation**, because they know neighbors and relatives face similar struggles. They are aware of their complex environment and **acknowledge the shared challenges**. Help is a gesture, not a guarantee – so authority here is exercised with total clarity.

In **Naucalpan**, the situation is somewhat different. Family structure may **initially resemble a “traditional” nuclear model** – parents, mothers, children – but in practice, it is the mother who decides, distributes, listens, organizes school calendars, finances, purchases, outings. She manages both the household and the emotional environment of the family, and while male presence is more evident here, it **does not necessarily mean coordination or leadership**. Women are recognized as **pillars of order and foresight**, and in this case, people explicitly say “my mom is in charge” or “she’s the head,” not as a symbol of empowerment, but as a **practical fact**.

“At home, my mom handles everything. From the electric bill to whether we can buy a new TV. We all give our opinions, but she’s the one who decides. It’s always been that way.”

This scenario reveals something essential: **the female figure has not displaced the male one – she has absorbed it functionally**. She fills his absence – and in some cases, even his nominal presence – through everyday action. Interestingly, this is not spoken of as power, nor seen as taking control. She simply **makes things work**, because before power comes **order**, and with it, **the priority of giving continuity to the family**.

From our perspective, these forms of reorganization should not be interpreted as the result of *empowerment* – at least not if that term implies a deliberate, celebrated claiming of power in contemporary life. In none of the territories analyzed do women define themselves as empowered. They do not use that word. Instead, they speak of **strength, happiness, duty**. In fact, when asked how they feel, many respond with terms rooted in **responsibility or necessity**.

“It’s not that I want to make the decisions. It’s that if I don’t, no one will.”

“I had to take charge. It’s not something I chose.”

This raises a key question: **What does empowerment mean when one is living without options? Is autonomy what emerges when everything else is fragile? Or is it simply a burden assumed efficiently?**

There is no single answer. Yes, there is autonomy — but it is one **shaped by exclusion, gender gaps, and economic instability**, not necessarily by access to equity or recognition. There is a form of female authority that does not arise from validation, but from **the need to sustain**. Furthermore, that authority, while functional, **does not repair the inequalities that produced it across Mexico**.

That is why what we observe is not empowerment as conquest — but as **response**. A form of empowerment **not declared, not named, not celebrated** — but entirely operational. These women’s agency does not emerge from ideological transformation, neither from a program that recognizes them, nor from an external narrative. It stems from the simple fact that if they don’t make things work in their homes, **no one else will**. And that silent agency — **burdened with responsibility, not always with freedom** — is what structures the day-to-day.

Drawing from Latin American feminist theory, Rita Segato suggests that there are forms of power that lie **outside dominant systems of representation** — a kind of “female potency not domesticated by the system of representation.” This insight is essential for reading these practices: they **do not seek external validation**, because they **don’t need it**. Instead, they express **forms of power not narrated** but exercised with continuity. This lens is necessary to understand what we hear in these women’s stories: they are not outside the system — but **they were never invited to decide within it**, and yet, they have made it work.

If this gesture is not named as political, it may be because public language has yet to register that, in many Mexican homes, **politics begins with the stove lit, with the search for something to sell, with the child who ate today, or with the decision to leave home for work**.

3

The arrival of energy
and the energy
transition:
Kessel and Iluméxico

Speaking of energy transition in working-class and rural contexts in Mexico refers not only to a technological shift, but to a **material and everyday reordering** that runs through families, their financial decisions, and the forms of care they sustain. It is not a matter of abstract access to an alternative source, but rather of a **concrete process** in which energy – whether electric or thermal, via solar power– becomes part of households where its presence **reshapes time, expands margins of action, and redefines relationships with the environment**.

This section analyzes how the arrival of solutions like solar panels (Iluméxico) and solar water heaters (Kessel) triggers **domestic processes** that go beyond consumption – involving **practical, emotional, and operational reorganizations**. Rather than projecting an idealized scenario or a narrative of radical transformation, we propose to observe, in detail, how energy becomes embedded in ways of solving, sustaining, and improving what was already in motion.

We will see how, in Chihuahua, San Blas, and Tecoh, solar energy enters not as a sought-out option, but as one that is **quickly evaluated, adjusted, and integrated** when it proves useful. And how, in Naucalpan, the solar water heater represents an **efficiency-oriented improvement**, where active comparison between previous and new options shapes the decision to adjust daily routines.

Throughout this text, we draw on the voices of women who live through these transitions from the standpoint of **daily responsibility**, analyzing how energy reconfigures the organization of time, safety, practical autonomy, and their ties with other women. **This transition is not declared – it is rehearsed: and what endures is not what was promised, but what works.**

Women leading in energy solutions and change;
by Iluméxico and Kessel in the contexts of Mexican women



Iluméxico in Chihuahua, San Blas, and Tecoh: Energy as a Resource, not a miracle

In the communities of Chihuahua, such as Guarachique and its surrounding areas, electricity is intermittent or nonexistent. Geographic distance becomes political distance: the water trucks don't arrive, power lines don't climb the hills, and the government doesn't show up. Nevertheless, life continues. When Iluméxico's panels arrived, they did so not as a response to a citizen demand, but as an offered possibility. What became decisive was what happened next: the **silent evaluation by women**.

The women who were interviewed, were not engaged in a campaign to solve the absence of electricity. It was the presence of the device itself, and the relationship with the person who introduced it, that triggered the opportunity. What was truly active was the **process of decision-making and appropriation**. It wasn't about receiving a service; it was about making it work, understanding how it functioned, verifying its usefulness, and sustaining it within the rhythms and priorities of their home. Some women even waited at their doors, hoping to find the company's transport to negotiate a deal for their houses.

In Chihuahua, where many homes are isolated, scattered, and without access to the electric grid, the light brought by Iluméxico didn't represent a leap into development — but it did **restructure daily time**. Several interviewees agreed that beyond the symbolic benefit of "having light," what truly changed was the ability to remain active after the sun had set.

“I used to have to finish everything early, because there was no light. Everything had to be done before the sun went down. Now I can keep going, and that helps. I can fold clothes, sew, cook. I’m not racing the end of the day anymore.”
—Luz Elena

Here, energy, though simple in form, **regulates time**. The day no longer ended with the sunset, and that changed women’s operative roles. Some extended their tasks. Others were able to rest more. Some offered light to a neighbor — but with that light, also a space for connection was found. They could stay up and talk about their workday.

This gesture reveals something deeper: the energy wasn’t privatized. It became a **communal resource**, embedded in networks of affection and trust. There was no ecological discourse, no public policy narrative — there was a minimal materiality (four lightbulbs, a panel, a battery) that was **reinterpreted as a possibility for continuity**. Not a futuristic continuity, but a present-day one: improving routines, easing caregiving.

For example, in San Blas, light also enabled new forms of social interaction. In an area where heat is intense and the streets remain active late into the evening, lighting allowed household life to spill into the streets — and vice versa. It eased the burdens of daily life. From washing clothes by hand to being able to power a washing machine at midday, when the solar charge was strongest — domestic labor could be managed with greater support. **Any opportunity that arises in these communities is a chance to resolve, compensate, or lighten the load of daily life.**

“When I saw it worked, I passed the light to my comadre. She lives further down, and she didn’t even have that. We shared.”
—Tecoh

“We had Christmas dinner outside for the first time. With the panel light. Before, it was candles or flashlights, and we were afraid something might happen. Not anymore. My children, my grandchildren — they were all there.”
—Marisepa

This statement doesn't just narrate an event — it signals a **shift in the emotional experience of dwelling**. Night no longer marked a closing, but opened a space to celebrate and share. For these women, this wasn't a triumphalist story — it was the **re-signification of domestic space** as a shared, safe, even festive place. Not only because energy solved everything, but also because it offered a **sense of control over uncertainty**.

However, not all experiences were harmonious. There were frustrations, technical learning processes, and misunderstandings. In San Blas, several women said they had to learn how to “measure” their energy use — it wasn't like being connected to the electrical grid, but a **finite system** that required **careful attention**.

“At first, we thought it worked like normal electricity, but if something was left on, it would run out. Or if we tried to plug in too much, it wouldn't work. Therefore, we learned to take turns. To use it when it was actually needed.”



Yucatán
Proyecto Piloto Comunitario
de Rehabilitación de Viviendas
en el Municipio de Progreso
Yucatán, México

GENY
GARCIA

This learning was central. The panel didn't just bring energy — it brought a **new mode of consumption management**. The technology demanded adaptation, but also generated knowledge. These women didn't just become users — they became **operators**: they understood the system, integrated it into their priorities (a fan at night, a phone charger, a kitchen light), and adjusted it to the context.

This knowledge is valuable — not because it's technical, but because it is **situated**. It arises from experience, not from manuals. Especially in communities where bilingualism and literacy gaps shape communication, knowledge travels differently, and it circulates **through women's networks**: they are the ones who teach others, share warnings, trade tips, and recommend the company if it worked.

In Tecoh, the arrival of the panel also activated **new forms of connection and autonomy**. In a context where many women work selling food or goods, and where cell phones are essential for taking orders, having battery power stopped being a limitation.

“Now I know how it charges, when to disconnect it, how to get the most out of it. They explained everything quickly, but with time, I learned it myself.”

“I used to sell tamales, but sometimes I couldn't afford to keep people updated. Now I charge my phone with the panel, and I can tell who wants what, how much, and whether I'll drop by. I didn't use to do that.”



Here, the impact wasn't just domestic — it was **economic**. The panel became a **tool to sustain income**, to manage client relationships, to operate in a more organized way, but also, to feel capable. While there are shared elements, the sense of connection to energy activates different aspects of protection — some women strengthen their work, others their personal relationships, others their rest or contemplative space. In each case, energy comes to **accompany their efforts and daily organization**.

“Before, I used to ask people to help me charge my phone elsewhere. I was embarrassed. Not anymore. Now I have my own light.”

That feeling of gain is not just symbolic — it is **structural**. It reflects a transformation in dependency, in the ability to choose **when and how** to use a resource. While energy doesn't create abstract power, it does redistribute small decisions — and in doing so, **reshapes relationships with everyday life and the home**.

In all cases —Chihuahua, San Blas, Tecoh— the arrival of Iluméxico marked a turning point not for its spectacle, but for its **adaptability**. Technology was accepted **because it didn't impose an external logic**, but because it could be read and adapted from within everyday life.

“It's not that we live better now just because we have light. It's that we no longer have to live so cautiously, worrying there won't be any.”
—Woman in San Blas

This phrase captures a key insight: **energy is not experienced as a right, but as a relief**. Not because they don't understand it as a right, but because life has been so unstable that any improvement is interpreted as a **practical victory**, not a structural repair.

Additionally, this is the most important nuance: **technology does not transform women – women transform technology into something useful.** Their agency is not about being good recipients of a service, but about deciding whether it stays, whether it works, whether it can be sustained, whether it can be integrated – or whether it should be discarded. Women are **active agents**, making the solution viable, seeking options, managing resources – **to gain control over their daily activities.**

Lighting the home with solar panels allows for “living better”:

- It provides **security** from strangers, insects, and dangerous animals
- It fosters **community**, as neighbors without energy can be offered light
- It enables people to **work later or start earlier**
- It extends **family bonding and enjoyment** – listening to music, using the internet
- It improves **communication**, since phones can stay charged
- It allows for **more food diversity**, thanks to refrigeration
- It prolongs the **lifespan of appliances**, as there are no blackouts
- It improves **comfort**, by powering fans during hot weather

Iluméxico has not entered just any community. It has been adopted in households where **technology is filtered through lived experience, the memory of scarcity, organizational capacity, and the feminine strength that sustains everyday life.**

The lightbulb may seem small and limited in capacity – but it **opens up time**, allows for choice, protects, connects, teaches. **That is the energy transition that matters:** the one that becomes part of the domestic fabric, not an abstract promise.

Kessel: technology that accompanies, not disrupts

In urban contexts such as Naucalpan —where material conditions are not critical, but still complex due to its location on the metropolitan periphery of Mexico City— the arrival of a solar water heater is not experienced as a turning point, but as a **precise, targeted improvement**, designed to ease already-saturated routines and strained finances. Here, energy didn't "arrive" — it was already present, but in ways that were costly, unreliable, or inefficient. The transition is not symbolic — it is a gesture of **practical efficiency**.

The women we talked to were not waiting for an external solution — they were seeking to reduce their dependence on gas, avoid leaks, and lower costs. Kessel inserts itself exactly into that logic: not to resolve a total absence, but to **optimize a strained presence** and a complex expenditure. The solar heater is not evaluated by its promises, but by its ability to **adapt to household rhythms without causing disruption**. It is an improvement that respects the order already in place.

Here, women's autonomy is not activated by the arrival of the product — it was already in motion. Nonetheless, these women investigate, ask questions, compare options; they make technical decisions from **lived experience**, not abstract theory. Even so, there is a dimension of **protection** that manifests in their expectations around family care. When choosing a solar heater, it is the women who evaluate **how much time will be saved in the morning, whether the water will heat properly, whether the investment is more worthwhile than the gas tank they refill every month**.

This kind of domestic rationality is neither abstract nor emotional — it is a **pattern of sustained care** that goes beyond contemporary urban life. It is both logistical and operational, linked to the feminine role of running their home — a role that they have been expected to fulfill. Within this context, there is also a **shared cultural valuation**: any device that enters their home must **reinforce the control already exercised over the environment**, not generate new dependencies.

That's why a **recommendation from another woman**, a close experience, carries more weight than a product's marketing message. The final decision is easier when it comes **backed by someone they trust** — not just the company or brand, but the idea of the solar heater itself.

“I already had a gas one, but it would run out and then I'd have to wait. With this one, I've got hot water in the morning, and I don't worry anymore.”

This expression doesn't dramatize the everyday — nor does it romanticize it — but it clearly communicates the value of **an improvement that sustains what has already been achieved**. The solar heater may not reorganize the household's time entirely, but it **eases the daily routines**. It doesn't redistribute roles, but it **reduces the burdens** associated with them — especially the little tensions involved in preparing to face a day that starts early, and that difference —subtle but structural— is what makes the promised benefit real.

From the perspective of Bitácora Social and Irrazonables, what matters is not the device itself, but the way women turn it into an **extension of their organizational capacity**. Even if a given technology is convincing on its own, the important point is that women **don't delegate everything to it** — they incorporate it into a **matrix of decisions** that already has criteria, hierarchies, and ways of evaluating value.

It's also important to note that this incorporation is not driven by ideological conviction; whether in the city or in rural and semi-rural zones, **energy transitions play out in pragmatic terms**, based on concrete utility. If it works, it stays. If it doesn't, it is replaced, and what “works” is not just what heats the water — it's what avoids family arguments, reduces tasks, and **buys minutes for something else**. In these women's lives, **time is the most valuable resource**.

In this sense, **solar energy in Naucalpan doesn't represent a cultural shift**, but a transition toward **simplification and operational reliability**. It doesn't transform the entire domestic landscape, but it makes it **more livable**. In the homes where the solar heater is added, tension is relieved — and in the process, **money is saved to be used elsewhere**.

Curiously, this type of improvement is not spoken of as a conquest — it is told as a **strategic decision**. There is no transformation promise — there is a **calculation of benefit**. That doesn't make it less meaningful. On the contrary — it reveals a form of **autonomy that doesn't need to be declared as empowerment in order to be in motion**. It is a need that was already present, and that simply found in Kessel a tool that **doesn't lighten tasks but reduces friction and cost**.



In households, where women had already assumed the emotional, logistical, and financial work of sustaining the home, this technology enters **to be discreet, useful, and verifiable**. Kessel succeeds because it doesn't demand new learning curves, it doesn't require reconfiguring the environment — **it just removes friction**.

“I no longer have to heat the water on the stove or worry about whether the gas will last. That's in the past now.”

This statement may sound simple, but it synthesizes what matters most: that **life continues with fewer interruptions**. That kind of continuity is no small thing. In domestic systems where **everything must align — bathing time, the gas left in the tank, departure times for work**— any variable that stabilizes the system counts as **structural improvement**.

The difference with rural cases is not just how technology arrived, but in the **role assigned to it**. In those cases, illumination represented a new possibility. Here, heating water means avoiding wear and tear. Both are transformations — but **of a different order**, and that calls for different interpretive lenses.

The solar water heater ends up representing an **active pursuit**, as it is tied both to **economic concerns** and to making an essential activity —bathing— more efficient. The desire to save both money and time drives women to seek out the best option for their families and schedules.

The case of Kessel reveals an energy transition aimed at **routine stability**, but one of **high effectiveness**. It may not be a spectacular change, and it doesn't spark discourse — but it delivers relief, and that —relief, rest, peace of mind— is a **right rarely recognized as a victory**, especially when it stems from a personal investment.

That's why this case should not be read as a lesser one. On the contrary — it shows what happens when a solution doesn't claim to solve everything but **solves something with precision**. In that modest but decisive adjustment, **urban energy transition finds its legitimacy**.

4

Decisions, solutions,
and adjustments:
the identity formed
through technology



The incorporation of technologies such as solar panels or solar water heaters into domestic life was not merely the result of obvious or practical decisions. It also represented an **identity-based, logistical, emotional, and relational act**. Based on field analysis, we identified multiple layers that explain how women in different contexts —like San Blas, Chihuahua, Tecoh, and Naucalpan— choose to integrate energy into their routines.

With this in mind, we can see that in both Iluméxico and Kessel's cases, this is not a matter of passive acceptance, but rather of **active capacity** — the ability to incorporate and understand what allows women to continue, adjust, improve, or sustain their world, a world already saturated with responsibilities. Within this capacity lies not only a technical need but also a **symbolic position** in the household: **who has the authority to decide what enters the home, for what purpose, and how it integrates into a daily logic that was already functioning?** The answer, again, is: **they do**.

Based on the research, we can identify a series of decisions, solutions, and adjustments that women participating in the study allow us to understand:



1. Deciding is not about choosing — it's about sustaining

Women leading in energy solutions and change;
Case study of Iluméxico and Kessel in the contexts of Mexican women

Contrary to the narrative of empowered consumers who make rational choices between options, women in this study do not “choose” from a catalog. They decide from a place of **practical urgency**, careful calculation, and a lived history of having to manage things in contexts that demand constant comparison, speed, and improvisation. Energy does not enter as an abstract improvement — it enters as an **extension of the responsibility** they already carry.

“At first, I thought it was too expensive, but then I saw I could pay the first part, and then I would organize myself. Now I don't worry about the gas running out.”

The decision is not based on evaluating alternatives in ideal conditions — it's about **whether they can take the initial risk without destabilizing everything else**. Women decide whether something can be incorporated **not because they want it**, but because they see it can improve their rhythm **without breaking the equilibrium** they already maintain.

2.

The solution is not in the promise — it's in the use

Women leading in energy solutions and change;
Case study of Iluméxico and Kessel in the contexts of Mexican women

Usefulness is not projected — it is **tested, measured, and adapted through experience**. What enters their home becomes a solution **not when it arrives, but when it proves it can sustain the logic already in place**. A blender is used because it's now possible. A lightbulb is valued not because it illuminates, but because it allows late-night work. The heater is not useful on its own — it's useful **because it allows a quick, accessible shower** without having to negotiate over how to light the old gas heater.

“Before, we heated water on the stove, and then it was one at a time, fast. Now everyone can shower, and I have time.”

Use defines value, especially in limited environments like those studied, but more than technical use, it's **relational use**: what facilitates tasks, avoids family conflict, reduces physical strain, and lessens fatigue.

3.

Invisible adjustments that reorganize everything

Women leading in energy solutions and change;
Case study of Iluméxico and Kessel in the contexts of Mexican women

Technology doesn't restructure life visibly or all at once. Its deepest impact lies in what it allows to **quietly be reorganized without stress or noise**. It's in the **silent adjustments** where its relevance becomes clear: being able to use the washing machine, not needing to monitor the gas, turning on a fan, having a TV, listening to the radio, and/or lighting additional rooms.

In San Blas, for example, a woman described how, thanks to more lighting, she was able to sleep better during the heat. In Tecoh, another woman shared her light with neighbors, received family at night, and saved money on candles. These may not seem like major gestures, but they **reorganize affections, time, and relationships**.

“When my light reached over there, the neighbor said she could finally see — she didn't need to light her candle anymore. She was happy.”

These **micro-adjustments have structural consequences**: they prevent accidents, improve sleep, reduce anxiety, increase autonomy. They are not anecdotes — they are the **foundation of a more livable life** amid the financial and structural instability that many of these families face.



4. Management as a form of power

Women leading in energy solutions and change;
Case study of Iluméxico and Kessel in the contexts of Mexican women

Women may not be focused on the technical maintenance of these devices, but they are keenly aware of their **management**: how long they last, what they cost, what to do if something fails. With Iluméxico, it's about whether they can continue making payments; with Kessel, whether installation would require extra expenses or home modifications. Financial rationality, in these cases, is not separate from care — it's part of a logic of **practical effectiveness**.

“I clean it if dust falls on it — because if I don't, it doesn't heat as well. They told me they'd come check it, but I prefer to take care of it myself.”

This reveals a form of **domestic governance** that is not always recognized as such. Women in this study don't just accept the technology — they take care of it, make it work, and integrate it into their **existing control systems**. If they can't sustain it, they don't incorporate it. That decision is not technical — it's **domestic politics**, because it defines what expectations must be managed and what trade-offs are acceptable when adding a panel or heater.

5. Between continuity and change: living with technology

Women leading in energy solutions and change;
Case study of Iluméxico and Kessel in the contexts of Mexican women

Technology does not redefine family values — but it is incorporated if it allows women to sustain the **demands of their household roles**. These women were not looking to reinvent their lives — they were seeking support for what they already do: caring, providing, planning, improving. Energy becomes useful not when it proposes a new lifestyle, but when it **lets them continue living the one they've built**.

“Now we have more light — but we're still the same. Just now the day lasts longer.”

This encapsulates a kind of philosophy that guides the whole process: **to remain the same, but with less burden, less wear, more control**. The change is not outwardly dramatic, but it is **deep**. It doesn't break with the past or the context in which these women live — but it improves it. It doesn't overturn the order — but it reinforces it.

6. Clear ecology, without rhetorical sustainability

Women leading in energy solutions and change;
Case study of Iluméxico and Kessel in the contexts of Mexican women

In the contexts studied, ecology is not framed as a moral or ideological imperative. It does not appear in discourse, but it is **lived as practice**. While not a verbal priority, it is a tacit horizon: in places like San Blas and Tecoh, the relationship with the land does not need to be labeled as “ecological” — it is already inscribed in the natural routine of the territory: in water care, reuse practices, and the management of resources like fruit for market sale.

“We don’t throw water away.
If there’s leftover water from
the bathroom, we use it for the
plants. And if it rains, we put a
bucket out.”

In truth, **sustainability is already present** in the way resources are administered. It shows in how water is collected, waste is avoided, impact-free solutions are preferred, and things are repaired rather than discarded. Ecology isn’t a shift in mindset — it’s a **regime of attention to what one already has**. In these households, that attention has existed long before the arrival of technology, and for technology to matter, its value **doesn’t lie in its origin** — it lies in what it allows.

5

**In conclusion: what
technology reveals —
a closing that opens
conversations**

The arrival of technologies such as solar panels and solar water heaters did not trigger an energy revolution, but in each territory, they opened a new lens to observe what was already there: **women's labor dynamics, community ties, everyday management, and the capacity to reorganize life amid scarcity** — clearly, to make life more livable.

These devices channeled energy —yes— but they also made visible the **invisible structures that sustain life**. What was electrified was not just a house, but the way of seeing those who inhabit it. The adjustments women made to support these technologies were neither imitations of urban progress nor traditional rejections. Rather, they were **singular adaptations**, often unspoken, that connect with **relational ways of understanding technology, power, and the reinforcement of their surroundings**.

Based on the study, we believe these transformations should not be read as “cases of evolution,” but as **cultural expressions of negotiation** between the promises of innovation and the structural conditions of the social world.

For this reason, we propose here an interpretive closing, built around **three conceptual axes** that emerged from field observations and resonate with contemporary theoretical frameworks. Each axis allows us to consider not only what happens with energy, but also what it makes visible: **ways of life, silent agency, symbolic disputes, community redefinitions, and the limits of representation** that challenge normative notions of development and the semantic frameworks that shape contemporary identities.



1. Low-voltage modernity: Technologies that reorganize without uprooting

The arrival of technologies such as solar panels or water heaters did not signify full integration into the urban-modern imaginary, but this does not make them less significant. On the contrary, it revealed a type of response in which **incorporation does not reject the new**, but neither does it adopt it as a symbol of rupture. In the homes of Chihuahua, Tecoh, and San Blas, the technology was not experienced as a redemptive promise or total change, but as a **contained, practical, and deeply valuable improvement**. Iluméxico and Kessel did not bring modernity in heroic terms, but rather **conditions that allowed life as it already existed to function better**: extending the day, saving time, lighting the street, heating water, ventilating a room.

The notion of *low-voltage modernity* allows us to understand that these technologies do not **colonize or replace** what families and women had already decided for their homes — they **coexist with it**. They insert themselves into local rhythms **without demanding acceleration**. As Silvia Rivera Cusicanqui reminds us: *“women’s social practice is not always visible, but without it, the structure collapses.”*¹ Moreover, it is precisely that practice that shapes how technology is inhabited. **Time is stretched, not accelerated**; comfort is gained, not status; everyday life is reorganized without altering its deeper coordinates.

This type of incorporation resonates with the idea of **relational technologies** proposed by Domínguez-Rué, where value does not lie in technical advancement, but in the **affective and functional reconfiguration it generates**. A blender used at midday because the panel is charged; a lightbulb that extends family conversation; a fan that enables rest. These are not grand gestures, but they are **vital**, because they **refine the daily experience** — and in doing so, **response matters more than paradigm shift**.

¹ Rivera Cusicanqui, S. (2010). Ch’ixinakax utxiwa: A reflection on de-colonizing practices and discourses. Tinta Limón.

2. Self-sufficient femininity: Agency without an empowerment narrative

The women at the center of this study do not speak of empowerment, yet they construct a language rooted in **decision-making, sustainability, and central reorganization**. Even if they don't use a discourse of vindication, they are reorganizing the household, managing resources, overseeing electricity use, and recommending technologies to other women and homes. They do not wait for symbolic approval from men or family members, nor do they seek recognition from their environment. Within this framework, women act – and in doing so, **they already structure the slow, continuous transformation of homes, mothers, daughters, grandmothers**. As Judith Butler has stated: “Gender is not only named, it is performed.”² And here, it is performed through **tasks, vigilance, everyday resolution, and purpose**.

In Chihuahua, for example, the abandonment some men inflicted on their families did not erase their symbolic weight: many women are not recognized as heads of household unless a male figure legitimizes their role. Even in sustained and significant decisions, there is still an **echo of unacknowledged identity**. As Rita Segato sharply observes: “Patriarchy is not defined solely by the domination of men over women, but by men's power to organize the spaces of meaning – even when they are no longer present.”³

The female autonomy revealed in this study is therefore **doubly active**: women sustain life without structural support and **reconfigure legitimacy through the everyday practice** of making homes function and protecting others.

This **self-sufficient femininity**, without a public stage, emerges as a **force of silent adjustment**. There are no slogans, but there is effectiveness. No speeches, but strategies. No institutional empowerment, but relational authority. Iluméxico and Kessel are peripheral allies: where technology enables – but it does not lead. **What leads is the woman's judgment**, her way of reading **what is useful, without embellishment**.

² Butler, J. (1990). Gender trouble: feminism and the subversion of identity. Routledge.

³ Segato, R. (2003). The Elementary Structures of Violence. Prometeo.



3. Technologies as adapted tools

Neither the solar panel nor the solar water heater arrived as myths of progress — they appeared more like **supporting companions**. In the field narratives, technology does not awaken illusion — but it does raise expectations for resolution. It is observed, tested, learned. There is a clearly defined **instrumental rationality**: technology stays **only if it meets a need and can be maintained**. There is no room for technological fetishism. As Sarah Pink writes: *“The value of innovation lies not in its design, but in its ability to integrate into domestic rhythms.”*⁴

From this perspective, Iluméxico is not seen as an agent of inclusion, but as a provider that allows cooking faster or avoiding extra walking. Kessel is not viewed as a symbol of the future, but as a **more efficient replacement for gas or electric resistance**. Adoption is more strategic than emotional — but through that strategy, women develop **basic technical competencies** that used to add stress to their day and now allow them to **operate and sustain energy use**.

This does not mean that technology lacks symbolic or personal value, but rather that **its symbolism is not predetermined** by what it represents. Instead, it **earns its place through use**. A fan may come to mean rest; a light may come to mean safety. Technology as symbol becomes **experience** — not an abstract concept of change or moral ecology.

In all this, the key lesson is this: **it was not technology that transformed their lives — it was life that absorbed technology**, and that absorption does not diminish its power — on the contrary, solar panels and heaters became **quiet catalysts for re-organization**. Their integration was not decorative, but deeply cultural, as each device **activated a new domestic rationality**, one shaped by the limits of each territory — and interpreted by those who were **already holding everyday life together**.

Technologies did not impose a new order — they offered a **real possibility**: to extend the day, lighten the routine, expand margins of action, declare support, and the brands that facilitated their arrival — Iluméxico, Kessel — did not enter with paternalistic rhetoric. They were **mediated through relationships of trust, close recommendations, and practical adaptations**. In this delicate process, technology does not replace autonomy — it **amplifies it**. That may be its greatest innovation: **allowing other life models to be strengthened without being replaced**.

Women did not transform their lives because they received technology — they knew how to turn it into a **useful, reasonable, and everyday tool** that improved aspects of life from the social to the economic. The real value of this transition lies in what it reveals: a **feminine center of gravity** capable of absorbing the new without rejecting the familiar, reconfiguring without abandoning confidence, and sustaining without visibility. What these stories teach us is not just how people live better — but how a future becomes possible under conditions that, until now, **had not even been recognized as viable**.

⁴ Pink, S. (2004). Home truths: gender, domestic objects and everyday life. Berg publishers.

The most revealing aspect of this energy transition was not the arrival of technology, but the **kind of decision that made it possible**: a decision not made in ideal scenarios, but in the midst of ambiguity. These women did not choose from a place of comfort — they chose from a place of **accumulated experience**. They trusted in what works, in what solves problems without compromising the essential, in what can be added without demanding sacrifice, and in that gesture —apparently simple— lies a **profound strategy**: turning what's available into continuity, without romanticizing or fearing change.

This capacity to decide within contradiction — between scarcity and autonomy, between overload and reorganization — should not be read as resignation, but as an **active way of governing daily life**. It is not that everything is solved — it is that there is a constant will to **keep solving**. Technology helped — without a doubt — but what sustains this transformation is how it was absorbed: **with judgment, with boundaries, with reasoned adaptation, and with pride**. What this study ultimately shows is that the **future does not always begin with innovation** — it begins with the way women decide when, how, and for what purpose to integrate it.



References

Rivera Cusicanqui, S. (2010). *Ch'ixinakax utxiwa: A reflection on decolonizing practices and discourses*. Buenos Aires: Tinta Limón.

Butler, J. (1990). *Gender trouble: Feminism and the subversion of identity*. New York: Routledge.

Segato, R. (2003). *The elementary structures of violence*. Buenos Aires: Prometeo.

Pink, S. (2004). *Home truths: Gender, domestic objects and everyday life*. Oxford: Berg Publishers.

