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PARTICIPATORY FUTURES FOR ZIMBABWE'S CLEAN ENERGY TRANSITION REPORT

Introduction

This work sought to illuminate the critical enablers and conditions necessary for Zimbabwean communities to meaningfully shape their energy futures in ways that support both climate resilience and long-term sustainability.

Over recent decades, numerous community-led initiatives have emerged across Zimbabwe to address the persistent challenge of energy poverty. Among these, waste-to-energy systems, particularly biodigesters, have been widely promoted as decentralised, household-level solutions that could empower communities to generate their own sources of clean cooking energy.

While many of these initiatives were initially heralded as successful by civil society organisations (CSOs), success was often measured by the number of units deployed rather than their sustained functionality or long-term impact. Academic research suggests that although the cumulative number of biodigesters available in Zimbabwe increased by approximately 40% between 2012 and 2019 [1], only a fraction of these remained operational [2], indicating a significant gap between deployment and durability. These insights point to systemic challenges, including maintenance barriers, limited community ownership, and the absence of adaptive support systems. Such shortcomings not only undermine the long-term functionality of biodigesters but also pose risks to the broader sustainability of these interventions, as lack of community consultation and weak maintenance mechanisms can erode local trust, diminish adoption, and jeopardise the durability of business models built around these projects.

Recognising the need to move beyond past assumptions and to challenge dominant narratives of success, in 2024, Sandile Mtetwa (an emerging foresight practitioner and Fellow of the Next Generation Foresight Practitioners) initiated a strategic foresight project with a Zimbabwe-based research team. The aim was to explore not only the current state but also the future aspirations of communities regarding energy systems over a 30-year horizon. Central to this effort was understanding whether and how communities envisioned taking stewardship of waste-to-energy systems and other off-grid energy technologies in alternative, preferred futures. This work sought to illuminate the critical enablers and conditions necessary for communities to meaningfully shape their energy futures in ways that support both climate resilience and long-term sustainability.

[1] Kaifa J & Wilson P. (2019) A Study of the Current State of Biogas Production in Zimbabwe: Lessons for Southern Africa

[2] Kajau G et al. (2019) Analysis of the Zimbabwe biodigester status

Methodology

The foresight initiative was structured in three deliberate phases of multi-stakeholder engagement, each designed to surface diverse perspectives and incorporate intergenerational insights into Zimbabwe's energy and climate futures. Together, these methods enabled a participatory, systems-informed, and futures-oriented dialogue that captured both community agency and the complexities of Zimbabwe's evolving energy landscape.



Phase One: Expert Dialogue

Who: Entrepreneurs, academics, NGOs, consultants

What: Online dialogues to challenge assumptions and explore system-level energy dynamics

Why: To test dominant narratives and uncover emerging opportunities and constraints



Phase Two: Youth Engagement

Who: 43 youth participants (aged 13–18)

What: Visioning exercises to articulate preferred futures for Zimbabwe's energy and climate system

Why: To integrate an intergenerational perspective and consider long-term impacts of today's energy decisions



Phase Three: Community Based Workshops

Who: 53 participants from two distinct communities – Gweru (urban, Midlands) and Mbire (rural, north-west)

What: In-person foresight workshops using the Horizon Framework and Futures Triangle tools

Why: To ground foresight insights in local realities and co-create context-specific energy and climate pathways



Mbire workshop participants conducting visioning exercises

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Voices across Zimbabwe
contributed to shaping
these energy futures

Findings

Phase One

This phase explored current realities of clean energy adoption, surfacing how community frustrations, systemic barriers, and misaligned approaches shape the present energy landscape.

Reframing the problem: Across multiple stakeholder engagements, it became clear that Zimbabwe's clean energy transition is constrained not only by infrastructure gaps but also by a mismatch between dominant approaches and the lived realities of communities. Energy is often framed as a technical deficit, yet the true barriers are social, financial, and institutional. For example, the uptake of climate-friendly technologies such as biogas remains low not because communities reject the idea, but because systems are often introduced without cultural fit, behavioural alignment, or financial feasibility. Despite years of awareness campaigns and training initiatives, there is growing fatigue and frustration among communities who feel over-trained, under-consulted, and left with systems that are difficult to sustain. According to a climate change consultant interviewed during this phase, *"Communities are tired of these awareness programmes. They are aware of the basic concepts of climate change; however, they lack the resources and support to move forward."*

Emerging Signals and Shifts: Weak signals suggest that a new form of energy transition is emerging. One that is community-led, context-sensitive, and productivity-driven. Households are beginning to use biogas not only for cooking but also for heating, refrigeration, fish farming, and even lighting. This points to the rise of productive uses of energy. Hybrid models, for example households using solar for lighting and biogas for cooking and heating, are also gaining traction. This community-driven innovation reflects a post-grid paradigm, where resilience and independence matter more than grid connectivity. Trust and uptake increase significantly when people see functioning systems, particularly those explained by peers or community masons who built them. Importantly, the demand for clean energy solutions grows when they are connected to tangible wellbeing outcomes i.e. time saved, smoke-free kitchens, healthier families, and income generation rather than abstract energy or climate narratives.

Clean energy is also quietly stimulating local labour and enterprise ecosystems. Entrepreneurs and small to medium enterprises (SMEs) are experimenting with affordable technology models, offering training, installation, and after-sales support, while mobilising community labour for construction and maintenance. These developments suggest that employment creation and small business growth could become critical drivers of wider adoption, if systemic barriers related to finance, recognition, and policy support are effectively addressed.

Systemic constraints: The key blockages undermining scale and sustainability of clean energy adoption in Zimbabwe are:

1. Maintenance and daily use routines – Biogas systems require consistent feedstock and daily engagement. Once these routines are disrupted, the entire system may fail, leading to mistrust and misuse.
2. High costs – The standard cost of clean energy solutions remains beyond the reach of most rural households. For instance, a fixed-dome biodigester capable of serving a six-person household costs at least US\$900 [3]. In comparison, Zimbabwe's estimated rural living wage in 2024-2025 ranged from US\$88 [4] to US\$309[5] per month. At those income levels, acquiring such a system would require saving an entire income for at least six months, an unrealistic prospect given other essential living expenses. Even revolving funds, where they exist, have often collapsed under economic volatility.

[3] Sibanda, G. et al (2013) A Feasibility Study of Biogas Technology to Solving Peri-urban Sanitation Problems in Developing Countries. A Case for Harare, Zimbabwe

[4] ZimLAC (2024) 2024 Rural Livelihoods Assessment Factsheet

[5] Anker Research Institute (2025) Reference Value Report: Living Wage Report and 2025 Update for Rural Zimbabwe

Findings

3. Policy untethered to institutional muscle – Government agencies support clean energy solutions in principle but continue to rely on NGOs and donors to implement programmes due to limited public funding and weak delivery infrastructure. As a result, SMEs in the renewable energy sector (such as local biogas providers) remain under-supported. Despite their strong potential to generate employment through construction, training, maintenance services, and productive applications (for example, aquaculture and agriculture), these businesses face systemic barriers, including the absence of tax incentives, limited access to credit, and minimal recognition within national energy policy frameworks.

4. Cultural and gender dynamics – Women are the primary users of household energy yet are seldom the decision-makers in technology adoption. Energy systems that overlook these cultural and gendered realities often fail to take root or achieve sustained impact.

Phase Two

This phase captured how different generations, especially youth, envision Zimbabwe's energy futures, highlighting pragmatic aspirations, intergenerational dynamics, and opportunities for collaboration.

The Future is Now: When envisioning Zimbabwe in 2050 and beyond, one might expect Gen-Z scholars to imagine bold futures featuring space-based solar power, hydrogen energy, fusion, and AI-assisted grids. Yet, visions are shaped by positionality, which influences how futures are perceived. While some ideas were ambitious, around 90% focused on making existing technologies accessible to all. Youth prioritised realistic and equitable solutions to current needs. This raises an important question: is such pragmatism commendable, or are today's hardships narrowing their imagination? Still, the strong alignment in thinking between young people and older stakeholders presents a valuable point of convergence. This shared ground provides a promising foundation for reducing friction when designing inclusive energy interventions and technologies suited to Zimbabwe's future.

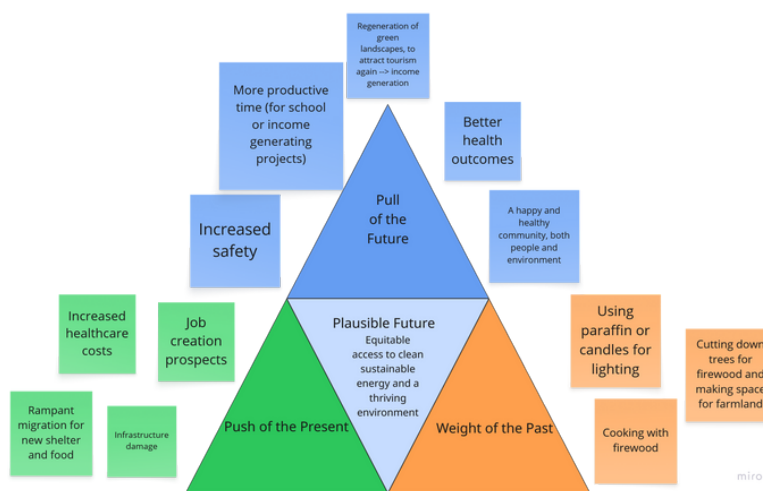
From celebratory to participatory: Young people in Zimbabwe have clear, passionate visions for the country's energy and climate futures. However, innovation programmes often operate in silos, celebrating youth ideas without meaningful follow-through. Each year, creativity is applauded and then forgotten, with concepts recycled in future competitions. Initially, this research did not include youth participants, but this disconnect prompted an exploration of genuine intergenerational collaboration. It is not enough to simply hear young voices through innovation competitions and forums. Their ideas must be meaningfully implemented and integrated into decision-making. While progress is being made, clear and lasting models for sustained, impactful youth engagement in shaping locally driven solutions are still emerging and urgently needed.

Youth at the Forefront of Energy and Climate Technologies: A key trend within youth visions was a strong focus on the technical aspects of energy technologies, unlike earlier dialogues with older stakeholders, which emphasised the socio-economic impacts of biodigesters. This contrast highlights a valuable opportunity: youth interest in mechanics could help address one of the major barriers to biodigester sustainability, namely, the lack of technical knowledge and maintenance skills. Engaging young people in system rollout and upkeep can bring innovation while filling these technical gaps. It also enables intergenerational collaboration, where youth lead on technology and elders provide insight on cultural and economic factors. Integrating this dynamic into existing community structures could foster more sustainable, locally owned energy solutions.

Findings

Phase Three

This phase applied foresight tools to map aspirations, drivers of change, and legacy barriers, enabling communities to articulate the tensions and possibilities that will shape long-term energy transitions.



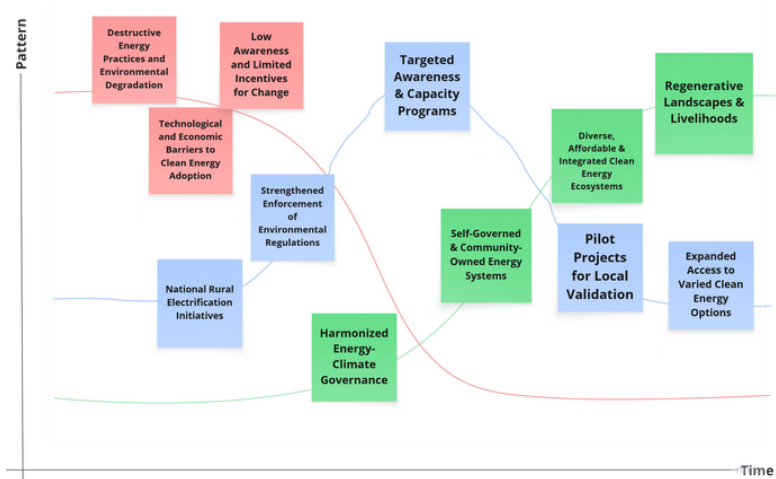
Futures triangle representing community feedback on Zimbabwe energy and climate futures (created by Miro)

The **Futures Triangle** was applied to explore the community's pulls of the future (their aspirations and visions), the pushes of the present (the current drivers of change), and the weights of the past (barriers and legacy challenges that may constrain progress).

This technique facilitated a structured exploration of the tensions between these forces and enabled communities to articulate what is desirable, what is possible, and what must be overcome to realise their preferred futures [6].

The **Three Horizons Framework** was used to map near-term, mid-term, and long-term developments, allowing participants to identify signals of change, emerging drivers, and long-range trends that could shape Zimbabwe's energy and climate future.

This tool provided a structured means for communities to connect their immediate energy challenges with emerging innovations and long-term aspirations. Rather than treating the future as separate from the present, the framework helped participants recognise how current systems (H1), experimental alternatives (H2), and preferred futures (H3) overlap and interact. This made visible the tensions between what is fading, what is emerging, and what communities ultimately wish to sustain - a depth of dialogue that standard needs assessments or linear planning tools often overlook [7].



Three Horizon Framework representing community feedback on Zimbabwe energy and climate futures (created by Miro)

[6] While the Futures Triangle was valuable for surfacing community perspectives, it does not by itself explain how past, present, and future dynamics interact across time. In this study, we therefore paired it with the Three Horizons framework to trace how these forces might evolve as trajectories rather than static categories.

[7] While the Three Horizons framework enabled participants to explore alternative trajectories of change, it is not a predictive tool; rather, it highlights the coexistence of multiple logics and the tensions between them, which may persist without resolution.

Key insights & opportunities



COMMUNITIES ARE NOT PASSIVE. THEY'RE LEADING, BUT SYSTEMS MUST CATCH UP

Zimbabwean communities are signalling a powerful desire to shape their own energy and climate futures. Far from being passive recipients of top-down energy solutions, many are actively pursuing self-governance of local energy systems. In contexts where national energy delivery has faltered, these community-led initiatives are not optional; they are essential. However, these efforts exist within a complex web of social, cultural, political, and economic systems. A one-size-fits-all energy model risks undermining local agency. Interventions must be tailored, participatory, and place-specific, honouring the diverse ways in which communities organise, prioritise, and govern themselves.



INDIGENOUS FORESIGHT IS ALREADY EMBEDDED. IT NEEDS TO BE RECOGNISED AND CENTRED

Futures thinking is not foreign to these communities. It is deeply embedded in Zimbabwe's cultural heritage. Traditional practices such as protecting sacred groves or observing taboos that conserve natural resources are longstanding examples of indigenous foresight. Energy transitions that draw from these cultural logics, rather than override them, are more likely to succeed. When energy planning reflects how communities already understand sustainability, time, and interdependence, transitions may be slower, but they are more durable - grounded in identity and belonging.



INTERGENERATIONAL KNOWLEDGE EXCHANGE IS A SYSTEMIC LEVERAGE POINT

Younger people are well-positioned to operate and advance new energy technologies, while older generations hold critical social and cultural knowledge. Yet, these knowledge streams often remain disconnected. Intentional, ongoing intergenerational dialogues can create a powerful feedback loop, where technical innovation is continuously shaped by cultural wisdom. Tapping into existing cultural structures, where young people traditionally carry community responsibilities, can naturally accelerate this exchange and strengthen community agency over time.



ENERGY INEQUALITY UNDERMINES PARTICIPATION AND FUTURES THINKING

However, this vision cannot materialise without first addressing the most fundamental system barrier: energy access inequality. When basic, reliable, and sustainable energy remains out of reach for many, the capacity for communities to engage in long-term, collective futures thinking is severely limited. Energy inequality fragments participation, concentrates decision-making among the privileged, and undermines the potential for broad-based, community-driven transitions. Closing these basic access gaps is a critical enabling condition. Only when energy is equitably available can all community members fully participate in shaping inclusive, resilient energy futures.

Proposed Interventions

1. Deep Co-Creation and Embedded Capacity Building

Addresses: Awareness, co-creation, capacity-building overload

- **Problem:** Despite numerous awareness and training efforts, communities remain unclear about the linkages between energy, climate, and long-term value. This signals a disconnect between content and context.
- **Strategic Response:** Transform capacity building from top-down “training” into long-term, collaborative learning processes rooted in trust and community pace.

This can be achieved by reframing capacity building from one-off training sessions or short pilot phases to long-term models (6–24 months) that prioritise gradual co-creation processes, where energy planning emerges organically from within community priorities rather than through pre-scripted toolkits. Embedding facilitators or partners within these communities, instead of relying on external actors delivering fixed content, is also crucial. Interventions should recognise that communities often resist training not because of unwillingness, but due to irrelevance, overload, or lack of contextual fit. Therefore, shifting from one-size-fits-all training to locally tailored learning grounded in lived realities is essential. Within these co-creation activities, programmes should be designed to centre women as decision-makers, trainers, and business owners, considering their vital role in household energy use. Adoption rates tend to be highest when women drive the process.

Lastly, foresight tools such as storytelling and community visioning can be powerful in deepening understanding of the links between energy and climate, as well as the long-term cost savings of sustainable energy alternatives. For example, a community visioning exercise might involve villagers gathering to co-create a map of the future, illustrating how their settlement could look in 2050 with biodigesters, solar panels, and smoke-free kitchens. Storytelling, on the other hand, could take the form of future diaries or newspaper headlines from tomorrow, where participants imagine how their lives, health, and incomes might change once clean energy is widely adopted [8]. Facilitating shared community imagination, rather than short-term knowledge injection, will help realise more meaningful and lasting outcomes.

Foresight tools such as storytelling or community visioning can be powerful tools to help deepen understanding of energy-climate linkages and long-term cost savings of sustainable energy alternatives.



AI generated image

[8] Similar approaches have been used in UNESCO's Futures Literacy Labs and the Seeds of Good Anthropocenes project, where creative narratives become powerful tools for shared planning and decision-making.

Proposed Interventions

2. Acknowledge and Navigate Governance Readiness Diversity

Addresses: Unsustainably managed cleaner alternative energy systems

- **Problem:** Many households lack the resources, skills, or confidence to manage stand-alone systems. Expecting individual governance in such settings risks exclusion and failure.
- **Strategic Response:** Develop shared or collective governance models, such as energy cooperatives or stewardship clusters that spread responsibility and build resilience. Ground these in local social structures and use foresight practices to shape adaptive governance pathways.

Participatory assessments can be used to map governance readiness and identify existing capacities and gaps. This includes understanding who holds decision-making power, who is trusted, and who manages conflict within the community. Network theory is particularly useful in this regard, as it helps to reveal local power dynamics, trust relationships, and conflict mediation pathways. Such insights can inform the development of foresight processes that nurture leadership emergence over time, rather than assuming governance readiness from the outset. Foresight approaches can also help communities to identify governance challenges and map their contingency plans for enforcing accountability and maintaining resilience under future energy conditions.

3. Bundle Technology with Narrative, Value and Function

Addresses: Technology as part of a holistic offer to incentivise uptake

- **Problem:** Communities are often offered partial or under-supported technologies (e.g., biodigesters without storage systems or long term service support), making adoption unappealing or unworkable. Many also lack awareness of the broader value these systems can deliver.
- **Strategic Response:** Ensure complete, functional technology bundles are delivered with appliances, storage, safety, and usage support included. Pair this with culturally grounded narratives and foresight tools that help communities imagine full-system benefits, not just isolated hardware.

Technology should be provided as a full-system solution (for example, biodigesters with gas storage and stoves, or solar systems with batteries and appliances). Beyond this, technology should not be presented merely as hardware, but rather embedded within meaningful narratives of social and economic value such as saving money, protecting health, increasing income, and freeing up time for other responsibilities. Focusing on complete systems encompassing awareness, appliance compatibility, local entrepreneurship, and maintenance networks can be a critical step towards successful scaling. Foresight tools can also be used to help communities visualise future lifestyles with integrated energy technologies, highlighting both the tangible and intangible benefits, including improved health, long-term cost savings, and new opportunities for local employment and community livelihoods.

Proposed Interventions

4. Advocate for Long-Horizon funding

Addresses: Short-termism in funder expectations

- **Problem:** While peer influence is strong, disparities in access to clean energy tech mean only a few can adopt and showcase solutions slowing community-wide transition.
- **Strategic Response:** Introduce targeted, equity-oriented funding models that prioritise under-resourced households or groups. Support slow-burn adoption patterns and design financing to enable inclusive, peer-led uptake over time.

Advocacy should focus on establishing multi-year funding cycles (typically three to five years) with flexible, milestone-based evaluations. These evaluations can be guided by community-led indicators of progress that reflect cultural, participatory, and resilience outcomes rather than simply measuring kilowatts or cost savings. Households could benefit from affordable, staged payment options aligned with their income cycles, rather than one-off, capital-heavy investments. Blending carbon finance, microloans, innovation-based patient capital, and community pooling could help to ease financial burdens.

Foresight and systems literacy can also be used to help shift funder mindsets from rapid scaling to deep, inclusive system transformation, encouraging a recognition of the long-term costs of deploying technology without local anchoring. Once funding is secured, it is vital to begin by investing in demonstration digesters to build peer-led, visible models of diffusion. These should be complemented by co-created models and youth-led, hands-on demonstrator activities where knowledge is developed collectively rather than transmitted top-down. Such participatory approaches not only strengthen local skills but also help to counter the fatigue many communities experience with conventional training, leading to more meaningful and sustained engagement.



Gweru workshop participants conducting visioning exercises

Foresight and systems literacy can be used to help shift funder mindsets from rapid scale to deep, inclusive system transformation helping them see the long-term losses of rapid deployment without local anchoring. Once funding is obtained, it is vital to start by investing in demonstration digesters, to help build peer based and demonstrable diffusion models.

Next Steps

This foresight initiative was conceived as a phase-one introduction to futures thinking within a Zimbabwean community context. As such, it is essential to recognise its limitations while identifying opportunities for future development. The project's deliberately narrow scope, designed as an introductory exercise, generated valuable insights into community perceptions and systemic enablers but was constrained by its limited duration and scale, which restricted the range of perspectives captured. The methods employed (the Futures Triangle and the Three Horizons Framework) successfully stimulated dialogue but did not extend to more advanced foresight techniques such as backcasting or scenario development. Moreover, participation from donors, private sector actors, and government institutions was only partial, leaving certain viewpoints underrepresented. Finally, resource and time constraints limited the project's ability to conduct follow-up activities or validate the community visions developed during the process. The next phase of this work will prioritise the following:

01

Expand engagement

Expanding foresight activities across multiple communities, organising safe space women-only sessions and engaging more donors, private players and public policymakers.

02

Deepen Scope

Using more advanced and creative foresight methods such as mental maps, scenario planning, systems mapping, and backcasting to translate visions into concrete pathways and actions.

03

Enable longitudinal learning

Establish iterative processes that revisit community visions over time, allowing for adaptation, validation, and stronger ownership.

04

Link to policy and practice

Connecting foresight outputs more deliberately to energy policy, funding mechanisms, and implementation strategies

05

Build local capacity

Embedding foresight capacity within communities and local institutions to reduce reliance on external facilitation.

Conclusion

Zimbabwean communities are signalling a powerful desire to shape their own energy and climate futures. Far from being passive recipients of top-down energy solutions, many are actively pursuing self-governance of local energy systems. In contexts where national energy delivery has faltered, these community-led initiatives are not optional; they are essential.

This foresight exercise confirms that communities are signalling a clear message: the transition to sustainable, clean energy cannot be achieved through top-down technical fixes or donor-driven deployments alone. Rather, it requires a recalibration of the entire system, one that centres on local agency, cultural foresight, intergenerational exchange, and adaptive governance.

The findings from all three phases of engagement reveal a powerful convergence: communities are not passive; they are ready to lead. However, systemic misalignments in financing, governance, capacity building, and technological design continue to hinder long-term uptake and ownership. What is now needed are holistic technology offerings and improved relationships - between communities and institutions, between generations, and between imagination and implementation.

At the same time, this study should be regarded as a phase-one introduction. Its scope was narrow, its methods introductory, and its participation uneven, meaning the findings offer only a preliminary glimpse of what is possible. Yet these early insights provide a valuable proof of concept. Future phases can build on this foundation by deepening methodologies, broadening engagement, linking outputs to policy and funding mechanisms, and investing in local foresight capacity so that communities continue to lead their own energy transitions. The proposed interventions respond directly to these system-level insights. By embedding long-term co-creation, enabling shared governance, bundling technology with purpose, and advocating for patient capital, they provide strategic entry points into futures that are locally defined, socially grounded, and ecologically sustainable.

Zimbabwe's clean energy transition is not waiting to be imagined. It is already being practised, in fragments, experiments, and aspirations. The challenge now is to bring these futures into focus, align systems around them, and resource them for the long journey ahead.

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