H HEURISTICS

H HEURISTICS POSITIVE PATHWAYS INITIATIVE · FRAMEWORK REPORT

Positive Pathways

A framework for the development loops that can cut human exposure to polycrisis this century



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The initiative. Positive Pathways is the H Heuristics research initiative on positive development feedback loops. It builds on Sustainable Convergence and Polycrisis Resilience, concepts developed by Hunter Hughes, Founder of H Heuristics.

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Data and methods. All data are public (World Bank, UN, WHO, ITU, Our World in Data). Pace benchmarks, person-year ledgers, the cross-lagged loop test and the pathway screen are the author's calculations and judgements. Blue text links to sources; figure, table and section references link within the document.

EXECUTIVE SUMMARY

Executive Summary

Polycrisis conditions may worsen through this century, but how many people they reach, and how hard, is not fixed. This report sets out a framework for the H Heuristics Positive Pathways initiative: research on the development loops that compound, the gates that block them and the clocks that make the next decade decisive.

H Heuristics has spent 2026 measuring how interconnected crises reach people: heat, polluted air, floods, debt, food shocks and the ways they stack. That work established the problem. This report turns to the response. It proposes that H Heuristics concentrate its next research programme on **positive feedback loops**: investments in clean energy, digital access, clean cooking, health and learning that pay for and speed up the next round of progress, and that cut human exposure before hazards peak. Risk sets the deadline; development decides the outcome.

32 bn
person-years without basic services avoided in 2026–2050 if lagging countries move at a pace their peers have already achieved

57–62%
of that gain is forfeited if acceleration starts in 2035 instead of 2026

99%
of 181 countries have internet use no higher than electricity access: power is the gate for the digital loop

3–7 m
deaths from household air pollution that faster clean-cooking adoption could avoid by 2050

Principal findings

- **Development has already been the most powerful exposure-reduction tool in history.** The world's child mortality rate fell from 11.9% in 1980 to 3.7% in 2024; the death rate from natural disasters is roughly forty times lower than in the 1920s; solar modules are about 1,101 times cheaper than in 1975 (Figure 1). These are positive loops, and they are still running.
- **The gaps that remain are concrete and countable.** On the latest data about 2.3 billion people are offline, 2.0 billion cook with polluting fuels, 1.5 billion lack basic sanitation, 1.4 billion adults have no financial account, and 691 million and 655 million lack basic water and electricity (Figure 2).
- **On current trends many of these gaps outlast 2050.** For the median lagging country, near-universal clean cooking arrives around 2067 and basic sanitation around 2084. At the pace already achieved by the top quarter of peers, the same milestones arrive around 2050 and 2050 (Figure 8).
- **Time is the scarcest input.** Moving every lagging country to proven pace from 2026 avoids about 32 billion person-years of life without these services by 2050. Each year of delay costs roughly 2.0 billion person-years, and a ten-year delay forfeits 57–62% of the gain (Figure 10).

- **Loops run upward from physical foundations to digital ones.** In 36 tests across developing economies, 15 links were significantly positive and only 2 negative: countries with more electricity, water, sanitation and vaccination in 2010 then gained internet use and clean cooking faster, holding income constant. Internet use did not speed up physical services (Figure 5).
- **Gates decide whether a loop spins.** Power, affordability, skills, the cost of capital and institutions determine whether an investment compounds or leaks. Some 1.38 billion people already have electricity yet still cook with polluting fuels, an open gate that has not been walked through (Section 5).
- **Ten pathways pass a transparent screen.** Scored on lives, reach, speed, loop strength, cost-effectiveness and exposure reduction, preventive primary health, early warnings, clean cooking, digital public infrastructure and distributed clean power lead; preventive health ranks in the top three under 88% of 20,000 random weightings (Figure 7).

The framework in one paragraph

The initiative rests on one umbrella idea, **Positive Development Dynamics**, and four working terms. **Multipliers** are the investments that start loops. **Loops** are the mechanisms that make gains compound: learning curves, network effects, human-capital returns, fiscal reinvestment and demonstration. **Gates** are the conditions that let a loop spin or make it leak. **Clocks** are the reasons timing matters: demographic momentum, infrastructure lock-in and rising hazards. Progress is scored in a **Ledger** of lives saved, person-years of exposure avoided, people reached and losses avoided, not GDP alone. Sustainable Convergence and Polycrisis Resilience, the two existing H Heuristics concepts, become the applications: the development path and the protection it buys (Figure 3).

Recommendations for H Heuristics

- **Adopt an editorial principle:** lead with what can be changed. Treat polycrisis research as the rationale and the denominator, and publish on the levers that shrink it (Section 9).
- **Name fewer concepts and test them harder.** Keep three flagship concepts and four working terms; fold more than forty candidate labels into report topics or retire them as synonyms (Table 8).
- **Launch a flagship series, *Development Multipliers of the 21st Century*,** with one evidence report per pathway in the order of the screen, each ending with 2030 and 2035 milestones.
- **Publish an annual Positive Pathways Ledger** that tracks the six access gaps, the pace of each country against its peers and the lives and person-years at stake.
- **Report failures as carefully as successes.** Rural grid extension in Kenya, the HAPIN cookstove trial and early generative-AI trials all show loops that did not spin. That honesty is what will make the positive agenda credible.

SECTION 01

Why a Positive Agenda, and Why Now

The case for the pivot is not optimism for its own sake. Exposure is the product of hazard and of choices about development, and only the second is in reach within decades.

IN BRIEF

- Risk is hazard times exposure times vulnerability; development acts on the last two.
- Development has already cut child and disaster deaths by large multiples.
- The century is a race between rising hazards and compounding protection.

1.1 From documenting risk to building protection

The H Heuristics series has documented, in detail, how climate, pollution, economic and geopolitical pressures interact and how the burden falls on the people least able to carry it (H Heuristics, 2026; Hughes, 2026b). The findings were often grim: rising heat exposure, stacked hazards in the same places, slow recovery after shocks. Continuing to publish only on how bad things could become has two costs. It risks fatalism in readers, and it under-uses what the research has actually found, which is that exposure tracks development more closely than it tracks hazard. People in richer, better-served places live through the same heatwaves, storms and price shocks with far lower death rates.

The conventional risk identity makes the point formally. Risk equals hazard multiplied by exposure multiplied by vulnerability. Over the next few decades hazards are largely locked in by past emissions; a world on its current path warms by roughly two tenths of a degree per decade whatever happens in policy rooms this year. Exposure and vulnerability are different. They depend on where people live, what their homes are made of, whether they have power, clean air, cooling, early warning, savings, a phone, a clinic. Those are development variables, and they can move within years. The positive agenda is therefore not a change of subject from the polycrisis. It is a change of lever.

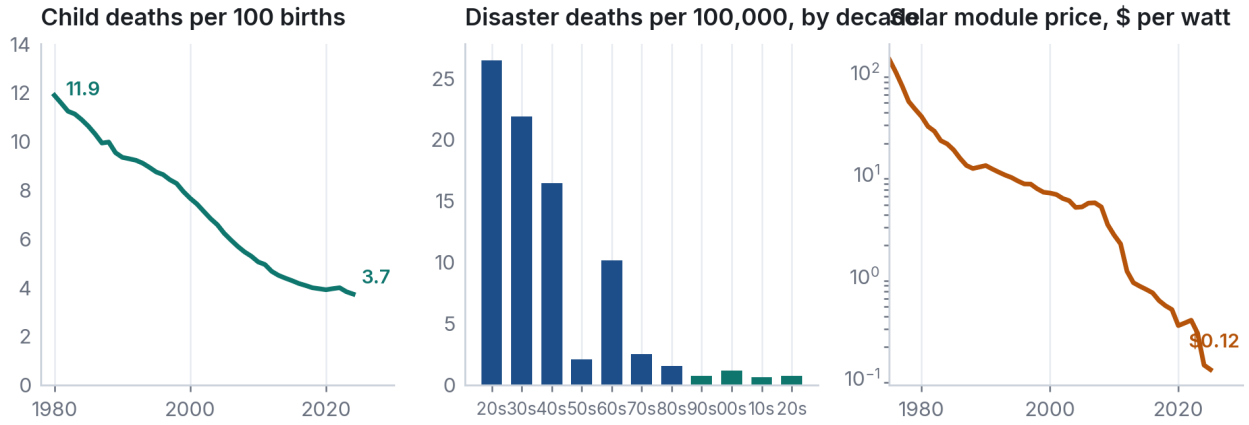
> *"Polycrisis conditions may intensify, but the degree of human exposure to them is not predetermined. It is decided by what is built, financed and learned in the next two decades."*
>
> Editorial principle proposed for H Heuristics

1.2 The positive record

The strongest evidence that positive loops work is the record of the past half-century (Figure 1). The world's under-five mortality rate fell from 11.9 deaths per 100 births in 1980 to 3.7 in 2024 (UN IGME, 2025). Deaths from natural disasters per 100,000 people fell from about 26 a year in the 1920s to under one in the 2010s (EM-DAT, 2025), even as population, exposure and asset values in hazard zones rose. The price of a solar module fell from about $132 per watt in 1975 to $0.12 today (Our World in Data, 2025). Behind each curve sits a loop: vaccines and clean water lowered child deaths, which encouraged investment in each child; warnings and shelters cut disaster deaths, which justified more warnings; deployment cut solar costs, which drove more deployment.

Figure 1 Development has already cut exposure by large multiples

World child mortality, disaster death rates by decade, and solar module prices (log scale)



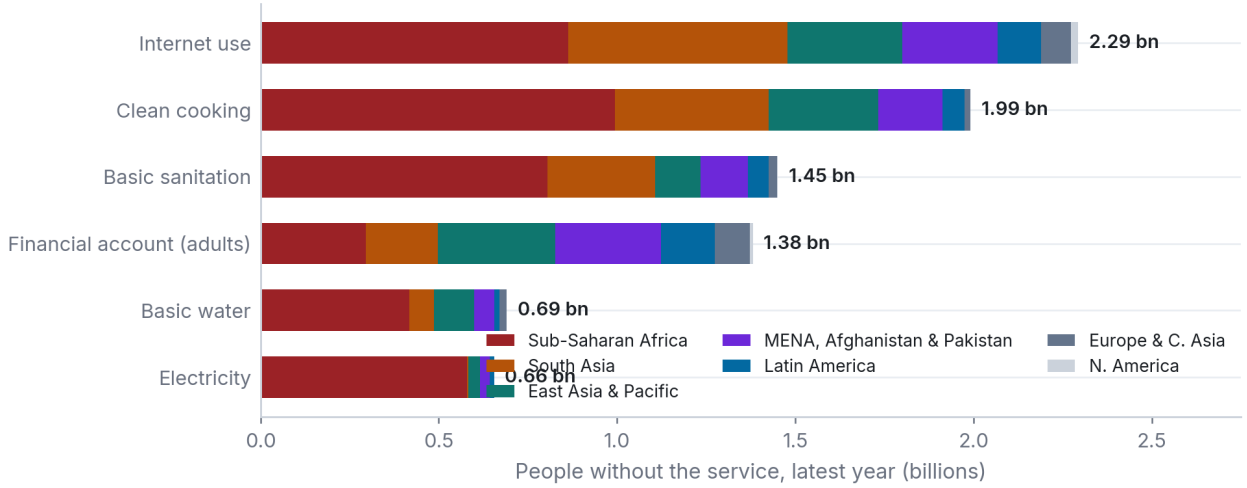
Source: UN IGME via Our World in Data (UN IGME, 2025); EM-DAT via Our World in Data (EM-DAT, 2025); solar module prices via Our World in Data (Our World in Data, 2025). Disaster deaths are decade averages; the 2020s cover 2020–2024.

1.3 The gaps that remain

The same data show how much is left to do (Figure 2). On the latest World Bank figures, about 2.3 billion people do not use the internet, 2.0 billion cook with polluting fuels, 1.5 billion lack basic sanitation and 1.4 billion adults have no account at a bank or mobile-money provider (World Bank, 2026). These totals match the headline estimates of the agencies that track them: 666 million without electricity and 2.1 billion without clean cooking in 2023 (IEA, IRENA, UNSD, World Bank and WHO, 2025), 2.2 billion offline in 2025 (ITU, 2025) and 1.3 billion unbanked adults (World Bank, 2025). Sub-Saharan Africa holds 88% of the electricity gap and half of the cleancooking gap; South and East Asia hold most of the rest of the cooking and connectivity gaps.

Figure 2 **Billions of people still lack the services that protective loops are built on**

People without each service, by region (billions)



Source: H Heuristics calculations from World Development Indicators (World Bank, 2026) and UN population estimates (United Nations, 2024). Latest year available per country (mostly 2023–2024); financial accounts count adults.

1.4 A race, not a forecast

The question for this century is whether protective development compounds faster than hazards grow. Earlier H Heuristics work framed this as a race between technology S-curves and system budgets. The Positive Pathways initiative takes the same race and asks which investments make protection compound fastest. Three facts make the race winnable in principle. First, the technologies that cut exposure, from solar and batteries to vaccines, phones and early warning, are cheap and getting cheaper. Second, the gaps are concentrated: on the World Bank data used here, twelve countries hold roughly three fifths of the people without electricity, without clean cooking and without internet, and 52% of the offline population lives in lower-middle-income economies. Third, the fastest adopters show what is possible; the gap between the median country and the top quarter of its peers is large, and closing it requires replicating, not inventing.

The race is also losable. Hazards compound too, finance has tightened since 2022, and loops can stall or reverse. This is why the framework gives as much weight to gates and clocks as to loops: it is meant to identify where a dollar or a year of effort buys the most protection, and where it would leak.

SCOPE

What the pivot does not mean

- It does not mean dropping the evidence on harm. Polycrisis research remains the denominator: the measure of how much protection is needed and where.
- It does not mean assuming that every reinforcing loop is good. Rising air-conditioner use, fossil lock-in and debt spirals are reinforcing loops too.
- It does not mean forecasting a good outcome. The framework is a way of choosing investments under a worsening baseline, not a claim that the baseline will improve on its own.

SECTION 02

Intellectual Foundations

Positive feedback in development is an old idea. What is new is cheap modular technology, digital rails and measurable exposure, which make it possible to engineer loops on purpose.

IN BRIEF

- Cumulative causation and the big push describe reinforcing development.
- Learning curves and network effects make modern loops faster.
- Positive tipping-point research supplies the vocabulary of triggers and thresholds.

2.1 Cumulative causation and the big push

Gunnar Myrdal argued in 1957 that development is governed by *circular and cumulative causation*: a region that gains an advantage attracts capital and skills, which strengthen the advantage, while a lagging region can be pulled into a downward spiral (Myrdal, 1957). The same mechanism runs in both directions. Paul Rosenstein-Rodan's big push, later formalised by Murphy, Shleifer and Vishny, showed why coordinated investment across complementary sectors can move an economy from a low equilibrium to a high one when piecemeal investment cannot (Rosenstein-Rodan, 1943; Murphy, 1989). Both ideas imply the same practical lesson as this report: what matters is not any single investment but whether investments are arranged so that each raises the return to the next.

2.2 Learning curves, diffusion and increasing returns

Theodore Wright observed in 1936 that the cost of building an aircraft fell by a fixed share each time cumulative production doubled (Wright, 1936). Solar modules, lithium-ion batteries and LEDs have followed the same law for decades, and forecasts built on it have consistently beaten forecasts that assumed costs would level off (Way, 2022). A learning curve is a loop: deployment cuts cost, and lower cost drives deployment. Diffusion research adds the demand side. Rogers and Bass showed that adoption follows an S-curve driven by imitation and word of mouth (Rogers, 2003; Bass, 1969), and Comin and Hobijn documented that the lag between invention and adoption in poorer countries has shortened sharply over two centuries (Comin, 2010). Brian Arthur warned that the same increasing returns can lock societies into inferior technologies (Arthur, 1989); loops amplify whatever they start with.

2.3 Human capital, capabilities and dividends

James Heckman's work on skill formation shows that capabilities beget capabilities: investment early in life raises the return to every later investment (Heckman, 2006). Amartya Sen's capability approach reframes development as the expansion of what people are able to do and be, which is why the ledger in this report counts lives and access rather than income alone (Sen, 1999). Disaster-risk research has shown that resilience investments yield a *triple dividend*: avoided losses, unlocked investment that was previously too risky, and co-benefits in ordinary years (Tanner, 2015; Rodin, 2014). The resilience dividend is an established idea; the initiative should cite and build on it rather than claim it.

2.4 Positive tipping points

The most direct precursor is the research on positive tipping points led by Timothy Lenton and Simon Sharpe (Lenton, 2022; Sharpe, 2021). It identifies thresholds beyond which a clean technology becomes self-propelling, for example when electric vehicles become cheaper to own than petrol cars, and argues that small policy pushes near those thresholds can trigger cascades across sectors. Donella Meadows' hierarchy of leverage points supplies the systems language: the strongest interventions change the structure of feedback loops, not just the size of flows (Meadows, 1999). Positive Development Dynamics extends this lens from decarbonisation to human development and exposure reduction, and adds two things the tipping-point literature has rarely measured: who is left behind by the cascade, and how long they wait.

Table 1 What the initiative borrows and what it adds

Tradition	Core idea	What Positive Pathways takes	What it adds
Cumulative causation	Advantage and disadvantage both self-reinforce	Loops run both ways; direction is a choice	Measured loop links across 120 countries
Big push	Complementary investments must arrive together	Sequence and bundle pathways	Gates that show which complement is missing
Learning curves	Costs fall with cumulative deployment	Cost decline as a loop engine	Who benefits, and how fast, in lagging countries
Diffusion of innovations	Adoption follows imitation-driven S-curves	Peer pace as the realistic benchmark	Person-years lost to slow diffusion
Human capital	Early investment raises later returns	Learning and health as compounding stocks	Learning-to-earning as the test, not enrolment
Resilience dividends	Protection pays in good years too	Co-benefits as part of the return	Exposure avoided as a headline metric
Positive tipping points	Small pushes near thresholds trigger cascades	Triggers, thresholds, cascades	Extension to access, health and exposure

Source: H Heuristics synthesis of the works cited in this section.

SECTION 03

The Positive Pathways Framework

One umbrella theory, four working terms and one ledger. The framework is deliberately small so that every element can be measured.

IN BRIEF

- Positive Development Dynamics is the umbrella theory.
- Multipliers start loops; gates let them spin; clocks set the deadline.
- Five loop engines explain why gains compound.

3.1 The umbrella concept

Positive Development Dynamics

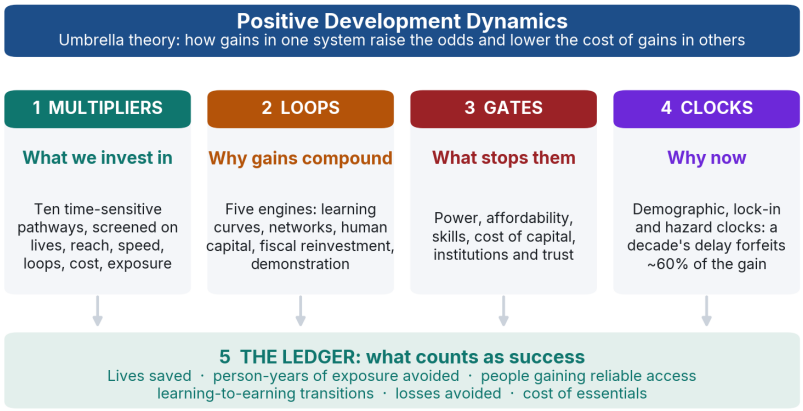
Positive Development Dynamics are the reinforcing relationships through which a gain in one system, such as energy, connectivity, health or learning, lowers the cost or raises the return of gains in others, so that well-chosen investments compound over time and reduce human exposure to interconnected risks.

Proposed working definition for the H Heuristics Positive Pathways initiative

The definition has three parts that each need evidence. *Reinforcing* means the link runs in the direction claimed and is large enough to matter. *Lowers the cost or raises the return* means the mechanism is economic, not merely correlational. *Reduce exposure* ties the concept to the polycrisis research: a loop counts only if it leaves people less exposed or less vulnerable to the hazards H Heuristics has documented.

Figure 3 The Positive Pathways framework: multipliers, loops, gates, clocks and a ledger

How the umbrella theory, the four working terms and the ledger fit together



Applied through the two flagship concepts: Sustainable Convergence (the development path) and Polycrisis Resilience (the protection it buys)

Source: H Heuristics.

3.2 Four working terms

Beneath the umbrella sit four working terms and a scorecard. Each is defined so that it can be measured, and each is examined with data in a later section of this report (Table 2).

Table 2 The working vocabulary of the initiative

Term	Meaning	How it is measured	Example
Multiplier	An investment that starts or speeds up a reinforcing loop and benefits several outcomes at once	Screen of six criteria (Section 6)	Distributed solar that powers clinics, pumps and phones
Loop	The mechanism by which a gain feeds the next gain	Link-by-link evidence; cross-lagged tests (Section 4)	Mobile money users attract merchants, who attract users
Gate	A precondition that lets a loop spin or makes it leak	Ceilings and bottlenecks in the data (Section 5)	Internet use almost never exceeds electricity access
Clock	A reason that the timing of investment changes the size of the return	Person-years lost per year of delay (Section 7)	Cooling and building stock locked in for decades
Ledger	The scorecard used to judge success	Lives, person-years of exposure, people reached, losses avoided (Section 8)	Deaths avoided by faster clean-cooking adoption

Source: H Heuristics.

3.3 Five loop engines

Positive loops are not all alike. Five distinct engines recur in the evidence, and each implies a different policy lever. Most pathways run on two or three engines at once, which is part of what makes them multipliers.

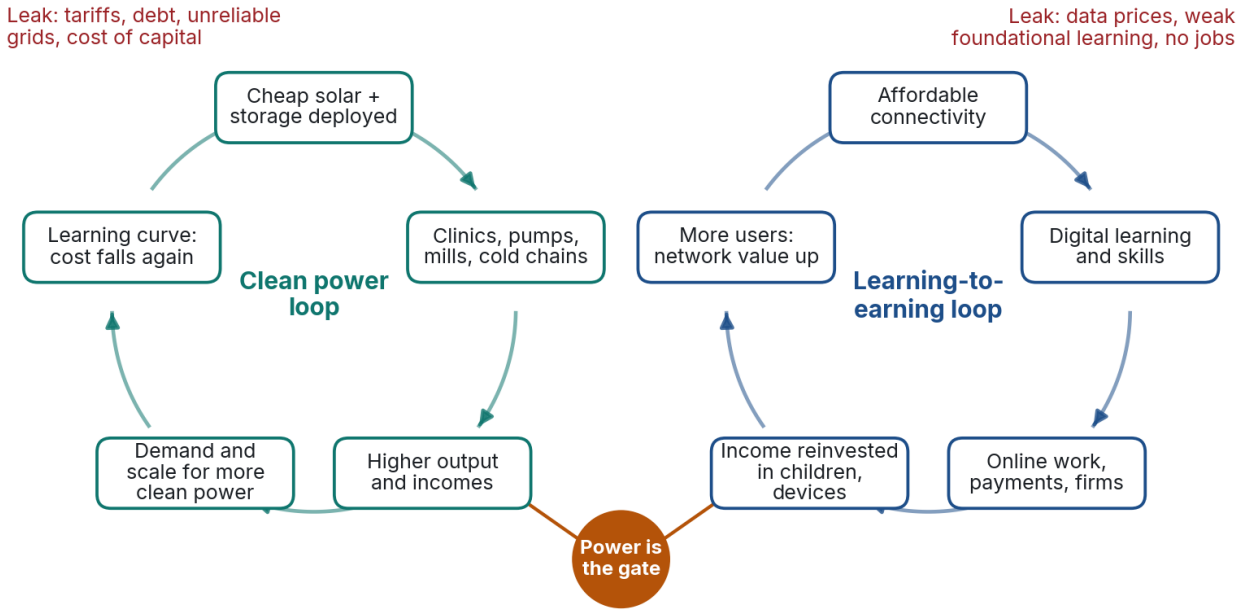
- **Learning-curve loops.** Deployment lowers unit cost, which widens the market. Solar modules, batteries, LEDs, efficient motors and heat pumps. Lever: volume, standards and open trade (Wright, 1936; Way, 2022).
- **Network loops.** Each new user makes the network more valuable to the next. Connectivity, mobile money, payment systems, digital identity. Lever: interoperability and low entry prices (Suri, 2016; Duarte, 2022).
- **Human-capital loops.** Healthier, better-taught children learn more, earn more and invest more in their own children. Vaccination, nutrition, foundational learning. Lever: early, universal coverage (Heckman, 2006).
- **Fiscal and reinvestment loops.** Output, tax revenue and avoided losses fund the next round. Digital payments that cut leakage, resilient assets that are not rebuilt twice. Lever: budgeting that counts avoided losses (Muralidharan, 2016; Hallegatte, 2019).
- **Demonstration loops.** Visible success changes what neighbours, firms and governments believe is possible. Rooftop solar spreading street by street in Pakistan; peer adoption of clean stoves. Lever: early, visible, local proof (Rogers, 2003).

3.4 Loop anatomy

Every loop can be drawn as a chain of links that returns to its start, plus the gates that open it and the leaks that drain it (Figure 4). The chain is only as strong as its weakest link. A loop in which each of four links passes on 70% of the previous gain returns about a quarter of the initial impulse; one in which each passes on 90% returns about two thirds. The analytical job of each Positive Pathways report is therefore to find the weak link and the leak, not to celebrate the loop.

Figure 4 Two coupled loops share one gate: electricity

The clean-power loop and the learning-to-earning loop, with their main leaks



Source: H Heuristics. Illustrative; link strengths are examined pathway by pathway in Section 6.

METHOD

A simple rule for loop strength

Write each link as the share of a gain that is passed on to the next stage. The loop's **gain** is the product of those shares. A loop with gain above zero reinforces; one whose gain plus fresh investment exceeds the leaks each cycle grows on its own.

This is a heuristic, not a model. It makes two practical points. Strengthening the weakest link raises the loop gain more than strengthening an already strong one. And a single broken link, such as unaffordable data or unreliable power, can stop the whole loop.

SECTION 04

The Loops Are Already Running

Each of the five engines can be seen at work in the past decade, sometimes at astonishing speed. The data also show which way the loops run: from physical foundations towards digital ones.

IN BRIEF

- Learning curves made clean power the cheapest new electricity in most of the world.
- Network loops took payment systems and digital ID to most adults within years.
- 15 of 36 cross-service links are significantly positive; foundations lead.

4.1 Learning-curve loops: clean power

In 2024, 91% of newly commissioned utility-scale renewable capacity produced power more cheaply than the cheapest new fossil-fuel alternative, and new solar averaged about 4.3 US cents per kilowatt-hour (IRENA, 2025). Lithium-ion battery packs fell to $108 per kilowatt-hour in 2025, and stationary storage packs to $70, down 45% in a single year (BloombergNEF, 2025). These are not one-off price drops but the visible output of learning-curve loops that have run for four decades and that forecasters have repeatedly underestimated (Way, 2022). For a developing economy the implication is that the cheapest way to add electricity, pump water or run a cold chain is increasingly also the cleanest, and it can be bought in modules rather than in decade-long megaprojects.

CASE

Pakistan: a demonstration loop in real time

Pakistan imported about 17 GW of solar panels in 2024, more than double the year before, against a national peak demand of roughly 30 GW (Ember, 2025). Installed solar capacity was estimated above 27 GW by early 2026 (pv magazine, 2026).

No national programme planned this. Households and firms facing high grid tariffs and outages saw neighbours install cheap panels, did the arithmetic and followed: a demonstration loop riding on a learning-curve loop.

The episode also shows a leak. Midday grid demand fell, utilities lost paying customers and the cost of the grid shifted onto those who could not install, prompting changes to net-metering rules. Loops that bypass institutions can strain them; the gate of grid and tariff reform has to open alongside.

4.2 Network loops: payments and identity

Network loops are the fastest the world has seen. India enrolled more than a billion people in its Aadhaar digital identity system within about six years of launch (Gelb, 2018). Brazil's Pix instant-payment system, launched in November 2020, was used by about two thirds of Brazilian adults by the end of 2021 (Duarte, 2022). Kenya's M-Pesa, studied over a decade, lifted an estimated 2% of Kenyan households out of extreme poverty, with the largest effects for women-headed households (Suri, 2016). Globally, account ownership has reached about four in five adults, up from about half in 2011, with mobile money doing much of the work (World Bank, 2025). Each new user made the network more valuable to merchants, governments and the next user, and each lowered the cost of the next service delivered over the same rails, from cash transfers to pensions.

4.3 Human-capital loops: vaccines and survival

Immunisation is the clearest human-capital loop on record. A WHO-led analysis estimates that vaccines saved about 154 million lives over the 50 years of the Expanded Programme on Immunization, 101 million of them infants (Shattock, 2024). For ten vaccines in 94 low- and middle-income countries the return is about 26 dollars for every dollar spent on a cost-of-illness basis, and roughly twice that when the broader value of longer lives is counted (Sim, 2020). Surviving children attend school, and parents who expect children to survive invest more in each of them; the loop runs from health to learning to earning to the next generation's health.

4.4 Testing the loops in the data

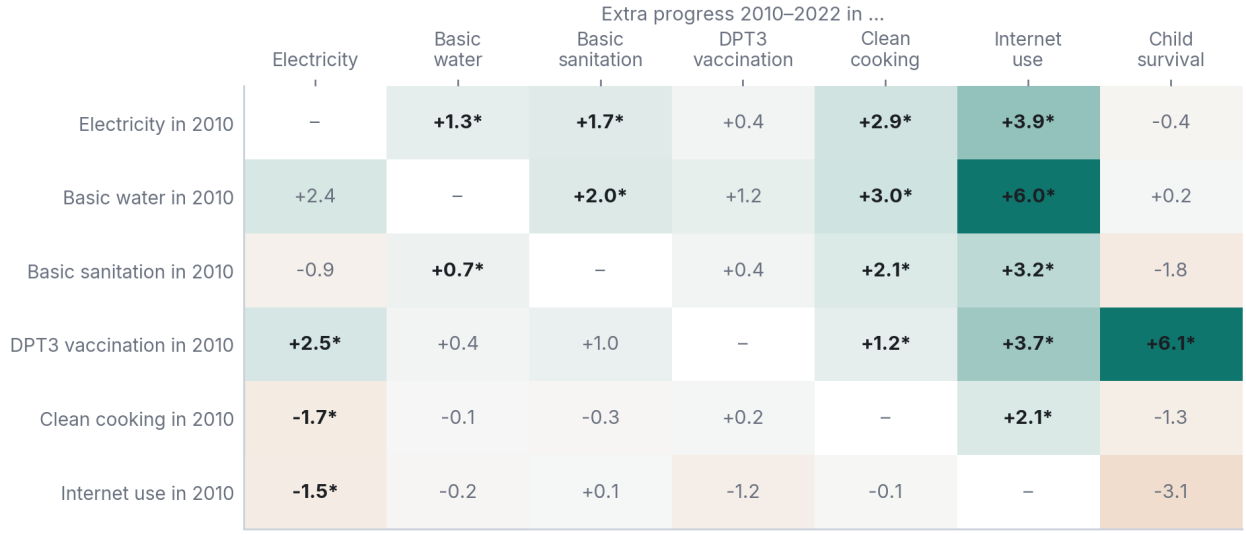
Case studies show that loops can run; they do not show how general the pattern is. As a first systematic test, this report estimates a cross-lagged model for developing economies: progress in each service between 2010 and 2022 is regressed on the level of every other service in 2010, holding constant the starting level of the service itself and income per person. A positive coefficient means that countries that started with more of service A went on to gain service B faster than equally rich countries that started with less of A (World Bank, 2026).

The results support the existence of positive cross-service loops but give them a direction (Figure 5). Of 36 links, 15 are significantly positive and only 2 significantly negative; 67% of all point estimates are positive. The links run upward. Electricity in 2010 predicts faster gains in internet use (+3.9 points per 10 points of electricity), clean cooking (+2.9), water and sanitation. Basic water predicts faster internet (+6.0) and clean-cooking gains (+3.0). Vaccination coverage predicts faster falls in child mortality (+6.1% per 10 points) and faster gains in electricity and internet. Internet use, by contrast, predicts nothing significant elsewhere, and its coefficient on electricity is negative. Counting significant positive links sent, electricity and vaccination lead with 4 each, water and sanitation follow with 3 and 3, and internet sends 0.

The finding has a practical meaning for the initiative. Digital loops are powerful, but they sit on top of physical ones. A programme that pushes online learning or digital finance where power, water and basic health are missing is building the upper floors first. That is why the framework treats electricity and primary health as keystones and why the pathway screen in Section 6 rewards loop strength that feeds other pathways.

Figure 5 **Physical foundations predict faster digital and household-energy gains, not the reverse**

Extra progress 2010–2022 associated with 10 more points of each service in 2010, holding income constant



Source: H Heuristics calculations from World Development Indicators (World Bank, 2026). Developing economies (low, lower-middle and upper-middle income). Each cell is the coefficient on the row service in 2010 from a regression of 2010–2022 change in the column service on the row service, the column service's own 2010 level and log income per person; units are percentage points per 10 points of the row service (child survival: % fall in under-five mortality). * robust t ≥ 1.96.

METHOD

What this test can and cannot show

- It is a conditional association, not a causal estimate. Countries with more electricity in 2010 may also have had better governments, which independently sped up everything else.
- Ceiling effects matter. A country near 100% in one service cannot gain much more, which can produce negative coefficients that are artefacts, such as internet predicting slower electricity gains.
- The pattern is still informative. Reverse links are consistently weak while upward links are consistently strong, which is what a sequence of gates would produce. Future reports should test individual links with stronger designs: natural experiments, rollouts and randomised trials.

SECTION 05

Gates: What Stops a Loop

A loop spins only if every link holds. The evidence points to five recurring gates. Some are physical, some financial, some institutional, and most can be opened faster than they are today.

IN BRIEF

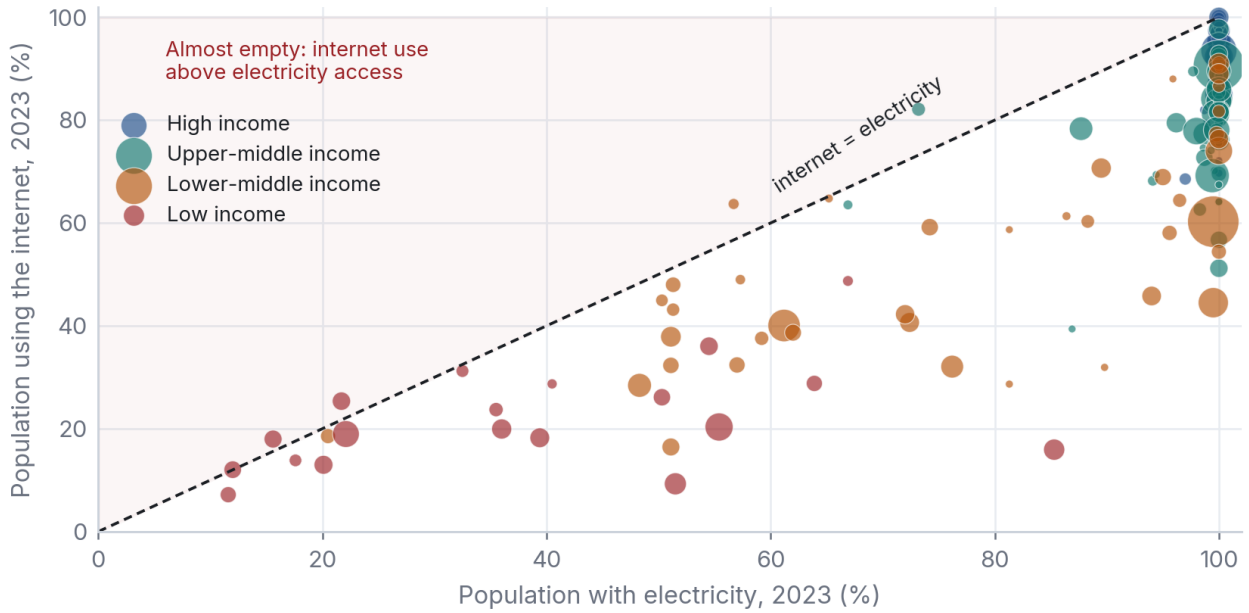
- 99% of countries have internet use at or below electricity access.
- 1.38 bn people have power but still cook with polluting fuels.
- Unreliable supply and high capital costs explain why some loops stall.

5.1 Electricity is the first gate

Of 181 countries with data for 2023, 179 have internet use no more than five points above their electricity access rate, and the two series are correlated at 0.85 (Figure 6). There is almost no country where more people are online than have power. The digital loop, which the initiative's original question put at the centre, cannot spin until the electricity gate is open. This is the strongest single argument for treating distributed clean power as a keystone multiplier rather than as an energy-sector project.

Figure 6 Almost no country has more internet users than people with electricity

Electricity access and internet use, 2023, by income group



Source: World Development Indicators (World Bank, 2026). Bubble area proportional to population.

5.2 Open gates that are not walked through

An open gate does not guarantee a loop. Some 1.38 billion people live in households counted as having electricity but cook mainly with wood, charcoal, dung, coal or kerosene (World Bank, 2026). The largest numbers are in India (309 million), China (156 million), Bangladesh (123 million) and Pakistan (113 million). For them the binding gates are the recurring cost of clean fuel, the reliability of supply and the habit of stacking new and old stoves, not physical access. The same pattern appears in electrification itself: a large randomised study in rural Kenya found that newly connected households used very little power and that the costs of residential grid extension exceeded measured benefits (Lee, 2020). The connection was made; the loop to productive use did not follow. By contrast, electrification in South Africa raised women's employment by freeing time from fuel collection (Dinkelman, 2011). The difference lies in the gates around the connection.

5.3 The five gates

Across the pathways, five gates recur. Each has a recognisable symptom when it is closed, an indicator that can be tracked and a lever that is known to open it (Table 3).

Table 3 Five gates that decide whether an investment compounds

Gate	Symptom when closed	Indicator to watch	Lever
Power	Digital and cooking gains stall; clinics and pumps idle	Access, hours of supply, outage losses	Distributed solar and storage; grid reliability
Affordability	Connections made but little use	1 GB data or monthly fuel cost as % of income	Targeted subsidies, pay-as-you-go, competition
Skills	Access without benefit	Learning poverty; digital skills	Foundational learning first; structured pedagogy
Cost of capital	Cheap technology, expensive projects	Weighted average cost of capital for clean energy	Guarantees, local-currency finance, blended capital
Institutions and trust	Leakage, capture, non-use	Payment leakage; service reliability; trust surveys	Digital payments, transparency, local ownership

Source: H Heuristics synthesis; see text for references.

Affordability is a binding gate for the digital loop. The long-standing benchmark is that one gigabyte of mobile data should cost no more than 2% of average monthly income; no low-income country has met it, and the target has since been raised to five gigabytes (A4AI, 2021). The cost of capital is the binding gate for clean power: in many emerging economies it is two to three times the rate in advanced economies, which can double the cost of a solar project whose hardware is identical (IEA, 2024). Skills and institutions bind everywhere. Technology without foundational learning, or payments without trust, produce access statistics without development.

SECTION 06

Ten Development Multipliers

Ten pathways meet the initiative's test: they can be scaled this decade, reach hundreds of millions, show results within five to fifteen years, cut future exposure and feed other loops. A transparent screen ranks them.

IN BRIEF

- Six criteria, scored 1–5, with ranks tested under 20,000 random weightings.
- Health, early warning, clean cooking, digital rails and clean power lead.
- The ten form three bundles: protect now, build rails, compound capability.

6.1 How the pathways are screened

Each pathway is scored from 1 to 5 on six criteria: **lives** (the mortality burden it directly addresses), **reach** (people in the gap), **speed** (time to a measurable benefit with today's technology), **loop strength** (how many reinforcing engines it runs and how many other pathways it feeds), **cost-effectiveness** (published benefit-cost evidence) and **exposure cut** (how much it lowers future polycrisis exposure). A separate evidence grade records how certain the underlying research is. The scores are judgements, documented in the profiles below, so the ranking is tested under 20,000 random sets of criterion weights.

Table 4 The Positive Pathways screen

Pathway	Lives	Reach	Speed	Loops	Cost	Exposure	Evidence	Mean
Preventive primary health	5	4	5	4	5	4	5	4.50
Early warning & climate information	4	4	5	3	5	5	4	4.33
Clean cooking	5	5	4	3	4	4	3	4.17
Digital public infrastructure	2	4	5	5	5	4	4	4.17
Distributed clean power	3	4	5	5	4	4	3	4.17
Affordable connectivity	2	5	4	5	4	3	4	3.83
Heat protection & efficient cooling	4	4	4	3	3	5	3	3.83
Water & sanitation	4	4	3	3	4	4	4	3.67
Digital learning-to-earning	2	5	3	4	4	3	3	3.50
AI & digital productivity tools	2	3	4	4	3	2	2	3.00

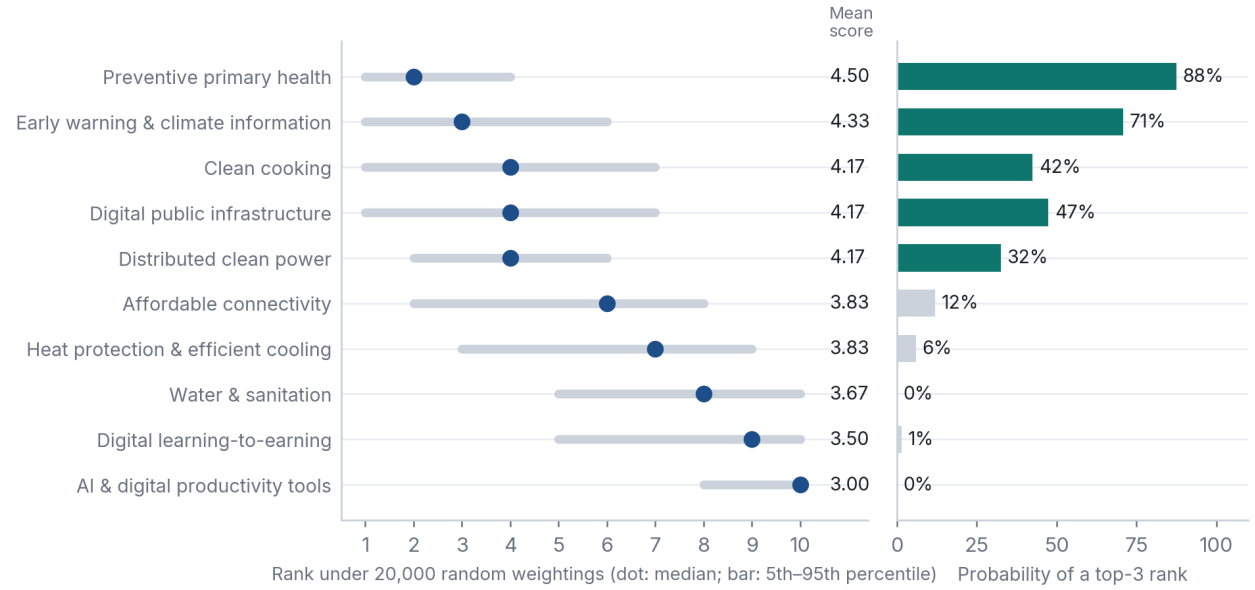
Source: H Heuristics scoring from the evidence cited in Section 6. Scores 1 (low) to 5 (high). Evidence is the strength of causal evidence that the loop works at scale; it is reported, not averaged in.

Preventive primary health ranks first and is in the top three under 88% of weightings; early warning follows at 71%. Clean cooking, digital public infrastructure and distributed clean power share a mean score and trade places depending on whether lives or loop strength is weighted

more (Figure 7). Affordable connectivity and heat protection sit in the middle. Digital learning-to-earning and AI tools rank lowest, not because they matter little but because their benefits take longer to show, depend on other gates, and rest on thinner evidence. Weighting each score by its evidence grade leaves the order almost unchanged: Preventive primary health, Early warning & climate information, Digital public infrastructure, Clean cooking, Distributed clean power.

Figure 7 Health, early warning, clean cooking, digital rails and clean power lead the screen

Rank distribution and probability of a top-three rank, by pathway



Source: H Heuristics. Criterion weights drawn from a flat Dirichlet distribution, 20,000 draws.

6.2 Preventive primary health

Loop. Vaccination, maternal and child care and basic diagnostics keep children alive and healthy; healthier children learn more and earn more; families and governments with surviving, productive children invest more in the next cohort.

Evidence. Vaccines have saved about 154 million lives in 50 years (Shattock, 2024) and return roughly 26 dollars per dollar (Sim, 2020). In the cross-lagged test, vaccination coverage in 2010 is the strongest predictor of faster child-mortality decline and also predicts faster gains in electricity and internet use (Figure 5).

Gate and clock. Health-worker supply and last-mile delivery. The clock is the size of birth cohorts in Sub-Saharan Africa, which will keep rising for decades. **Research question.** Which primary-care packages generate the largest human-capital returns per dollar under rising heat and disease pressure?

6.3 Early warning and climate information

Loop. Forecasts reach people in time; people act; losses fall; trust in warnings rises, so the next warning is heeded faster; avoided losses justify further investment in observation and communication.

Evidence. Twenty-four hours' warning of a storm or heatwave can cut damage by about 30%, and spending $800 million on early warning in developing countries could avoid $3–16 billion of losses a year (Global Commission on Adaptation, 2019); the WMO's own estimates are more conservative but still strongly positive (WMO, 2024). Bangladesh cut cyclone deaths from hundreds of thousands in 1970 to a few thousand in 2007 through warnings, shelters and volunteers (Haque, 2012). The UN aims to cover everyone by 2027 (United Nations, 2022).

Gate and clock. The last mile, which is where this pathway meets connectivity: a warning that reaches a phone is only useful if the phone is charged and the owner trusts the sender. **Research question.** How much does joining early warning to mobile money and digital ID, for anticipatory cash transfers, raise the return?

6.4 Clean cooking

Loop. Clean fuels cut household smoke; health improves, especially for women and young children; hours once spent gathering fuel go to work and school; demand for electric cooking grows the market for cheap solar and efficient appliances.

Evidence. Household air pollution caused an estimated 3.2 million deaths in 2020 (WHO, 2024), and about 2.1 billion people still cook with polluting fuels (IEA, IRENA, UNSD, World Bank and WHO, 2025). Indonesia moved tens of millions of households from kerosene to LPG in about five years (Budya, 2011). But the HAPIN trial, which gave LPG stoves to pregnant women in four countries, found no effect on birthweight, a reminder that partial switching leaves exposure high (Clasen, 2022).

Gate and clock. Affordability of recurring fuel costs and full rather than partial switching. 1.38 billion people already have electricity, so electric cooking is the fastest route for many. **Research question.** What combination of fuel pricing, appliance finance and electric cooking produces complete switching rather than stacking?

6.5 Digital public infrastructure

Loop. Digital identity and interoperable payments let people prove who they are and move money cheaply; governments reach them with fewer leaks; firms reach new customers; more users make the rails more valuable to everyone.

Evidence. Aadhaar passed a billion people in about six years (Gelb, 2018); Pix reached two thirds of Brazilian adults in about a year (Duarte, 2022); biometric smartcards in India made welfare payments faster and less leaky (Muralidharan, 2016); M-Pesa lifted about 2% of Kenyan households out of extreme poverty (Suri, 2016).

Gate and clock. Trust, data protection and interoperability. The clock is shock response: emergency transfers can be paid quickly only if identity and payment rails exist before the shock arrives. **Research question.** How large is the fiscal reinvestment loop when leakage falls and transfers can be targeted at people exposed to a specific hazard?

6.6 Distributed clean power

Loop. Cheap solar and storage power clinics, pumps, mills, cold chains and phones; output and incomes rise; demand and scale push costs down again; reliable supply opens the gate for digital and cooking loops.

Evidence. New solar is cheaper than new fossil power in most of the world (IRENA, 2025), and storage costs are falling fast (BloombergNEF, 2025). Yet residential grid extension alone produced little measurable benefit in rural Kenya (Lee, 2020). The productive-use link is the weak one.

Gate and clock. The cost of capital and productive use. About 655 million people still lack electricity, most of them in Sub-Saharan Africa; on trend, the median lagging country reaches 95% access around 2054. **Research question.** Where does pairing power with productive appliances and finance turn a connection into a loop?

6.7 Affordable connectivity

Loop. Affordable data and devices bring people online; information, markets and services become cheaper to reach; firms enter and export; more users raise the value of the network and the content on it.

Evidence. About 2.2 billion people were offline in 2025, 96% of them in low- and middle-income countries, and only 23% of people in low-income countries use the internet (ITU, 2025). The arrival of fast internet in Africa raised employment, including for less-educated workers, through firm entry, productivity and exports (Hjort, 2019).

Gate and clock. Electricity first (Figure 6), then affordability of data and devices (A4AI, 2021). The offline population is falling quickly; the clock here is about quality and use, not just coverage. **Research question.** What is the employment return to connectivity once power and data prices are held fixed, and who captures it?

6.8 Water and sanitation

Loop. Safe water and sanitation cut diarrhoeal and infectious disease; children grow and learn; time saved fetching water goes to school and work; healthier, more productive towns can finance networks.

Evidence. Inadequate water, sanitation and hygiene was linked to about 1.4 million deaths in 2019 (WHO, 2023), and global benefit-cost ratios are around 5 for sanitation and 2 for water (Hutton, 2013). In the cross-lagged test, basic water in 2010 predicts faster later gains in internet use and clean cooking.

Gate and clock. Networked systems are slow: the median developing country gains well under one point of coverage a year, and on trend near-universal sanitation in lagging countries arrives around 2084. **Research question.** Which off-network and utility reforms can double the pace of basic coverage in fast-growing towns?

6.9 Heat protection and efficient cooling

Loop. Shade, ventilation, cool roofs and efficient cooling protect health and work capacity; productivity and incomes hold up in hot seasons; cold chains protect food and vaccines.

Evidence. Heat-related deaths averaged about 546,000 a year in 2012–2021, and heat cost about 640 billion potential labour hours in 2024 (Romanello, 2025). The global stock of air conditioners is projected roughly to triple by 2050 (IEA, 2018), and more than a billion people face high risk from a lack of cooling (SEforALL, 2023).

Gate and clock. This loop has a dangerous twin: inefficient air conditioning run on fossil power warms the climate that drives demand. Building and appliance stock locks in for 15 to 50 years, which makes this the clearest lock-in clock. **Research question.** What mix of passive design, efficiency standards and clean power breaks the cooling-demand feedback while protecting the poorest?

6.10 Digital learning-to-earning

Loop. Affordable, adaptive learning raises foundational skills; digital skills open online work, payments and entrepreneurship; higher incomes are reinvested in children's schooling and devices; more learners improve the tools.

Evidence. About 70% of ten-year-olds in low- and middle-income countries could not read a simple text in 2022 (World Bank, 2022). Well-designed adaptive software produced large gains in mathematics and language in months in urban India (Muralidharan, 2019), and structured pedagogy and teaching at the right level are among the most cost-effective 'smart buys' (GEEAP, 2023); hardware alone is not. Online gig work engages an estimated 154–435 million people, 4.4–12.5% of the global labour force (Datta, 2023).

Gate and clock. Foundational learning, power, connectivity and payments all have to be in place, so this loop depends on the others. The clock is demographic: the cohort entering school now will work until about 2090. **Research question.** How often does digital learning lead to a measurable rise in earnings, and which links in the chain fail most often?

6.11 AI and digital productivity tools

Loop. Cheap AI and software raise the productivity of small firms, farmers, teachers and health workers; gains fund wider adoption; usage improves local tools and data.

Evidence. Evidence is early and mixed. In a field experiment with Kenyan entrepreneurs, an AI business mentor had no average effect: stronger firms gained while weaker ones did worse (Otis, 2024). Earlier H Heuristics work found AI usage concentrated heavily in high-income countries (H Heuristics, 2026).

Gate and clock. Every other gate, plus local language and data. The clock is fast adoption: patterns of who benefits are being set now. **Research question.** Under what conditions do AI tools narrow rather than widen productivity gaps between firms and countries?

6.12 Three bundles, not ten projects

The pathways are strongest in combination. They fall naturally into three bundles that differ in what they do and how quickly they pay. **Protect now**: preventive health, early warning and clean cooking, which save lives within years and need little else in place. **Build the rails**: distributed clean power, digital public infrastructure and affordable connectivity, which open gates for everything else. **Compound capability**: learning-to-earning, heat protection, water and sanitation, and AI tools, which pay over longer horizons and depend on the rails. A country portfolio, or an H Heuristics research year, should draw from all three, weighted towards the first two where the gates are still closed.

Table 5 Three bundles of development multipliers

Bundle	Pathways	Main loop engines	Gates it opens for others	Payback
Protect now	Preventive health; early warning; clean cooking	Human capital; demonstration	Healthy, surviving cohorts for learning and work	1–5 years
Build the rails	Distributed clean power; digital public infrastructure; affordable connectivity	Learning curves; networks; fiscal reinvestment	Power, payments, identity and data for every other pathway	3–10 years
Compound capability	Learning-to-earning; heat protection; water and sanitation; AI tools	Human capital; learning curves; fiscal	Skills, productivity and protection that persist for decades	5–20 years

Source: H Heuristics.

The bundles also suggest a sequence for countries where most gates are closed. Protective interventions come first because they save lives quickly and need little else. The rails come next, or alongside, because they open the gates for everything that follows. Capability-building pays most once the rails are in place, though its clock, the cohort now in school, means it cannot simply wait.

SECTION 07

Clocks: Why the Next Decade Decides

Compounding rewards an early start. Three clocks, demographic, lock-in and hazard, make the years to 2035 worth far more than the years after it. The data put a number on the cost of waiting.

IN BRIEF

- At proven peer pace, most lagging countries reach near-universal access before 2050.
- Acceleration from 2026 avoids about 32 bn person-years of deprivation by 2050.
- Starting in 2035 instead forfeits 57–62% of that gain.

7.1 Three clocks

- **The demographic clock.** Most of the world's population growth to 2050 will occur in countries where the gaps are largest (United Nations, 2024). Children born and schooled in the next decade will be in the workforce until the 2080s and 2090s. What they learn, and whether they survive and grow, sets the human-capital stock of the second half of the century.
- **The lock-in clock.** Power plants, buildings, cooling equipment, cooking habits and city layouts last 15 to 60 years. What is built between now and 2040 largely determines exposure in 2060. Loops amplify their starting conditions, so the first choices matter most (Arthur, 1989).
- **The hazard clock.** Heat, flood and drought pressures rise each decade on any plausible emissions path. Protection installed before a hazard peaks avoids losses for its whole life; protection installed after a disaster mostly rebuilds what was lost (Hallegatte, 2019).

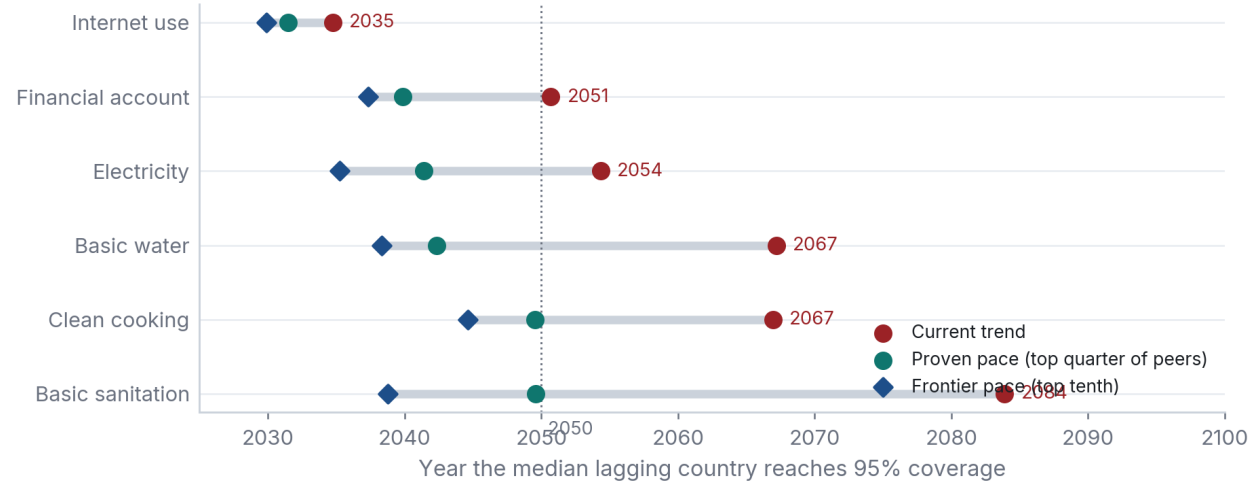
7.2 How fast is fast enough?

To turn the clocks into numbers, this report fits each country's 2012–2024 trend in six services on a logistic (S-curve) scale, which captures the slowdown that occurs near full coverage. It then asks when the median lagging country, defined as one below 95% coverage, would reach 95% under three paces: its own trend; **proven pace**, the 75th percentile of trend growth among peers that started between 5% and 90% coverage; and **frontier pace**, the 90th percentile (World Bank, 2026).

On current trends, many gaps outlast 2050 (Figure 8). The median lagging country reaches nearuniversal electricity around 2054, clean cooking around 2067, basic water around 2067 and basic sanitation around 2084. At proven pace the same milestones arrive around 2041, 2050, 2042 and 2050. The share of lagging countries that would still be short of 95% electricity access in 2050 falls from 56% to 11%. Internet use is the exception that proves the point about network loops: even on trend the median lagging country reaches 95% around 2035.

Figure 8 Proven peer pace pulls most access milestones well before 2050

Year the median country below 95% coverage reaches 95%, by pace



Source: H Heuristics calculations from World Development Indicators (World Bank, 2026). Logistic trend fitted to 2012–2024 data for each country; proven and frontier pace are the 75th and 90th percentiles of trend among peers starting between 5% and 90% coverage.

7.3 The cost of delay

Person-years without a service is a simple, intuitive ledger: one person living one year without electricity, clean cooking or a safe toilet counts as one. Using UN population projections for each country (United Nations, 2024), the report compares three paths to 2050: current trend, proven pace from 2026, and proven pace from 2035 (Figure 9).

Table 6 Person-years without each service, 2026–2050

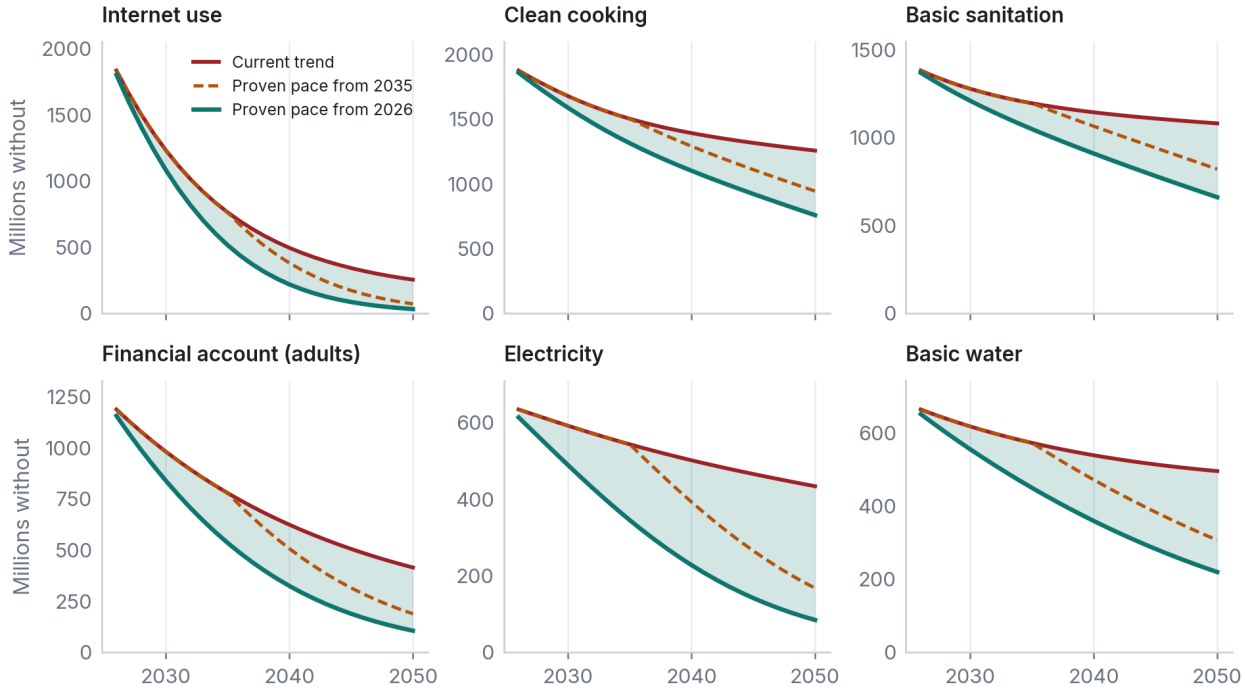
Service	Current trend (bn)	Proven pace from 2026 (bn)	Avoided (bn)	Lost if start is 2035	People without in 2050: trend vs proven (m)
Internet use	18.6	13.2	5.4	62%	254 vs 32
Financial account (adults)	18.1	12.1	6.0	62%	415 vs 105
Electricity	13.1	7.5	5.6	57%	434 vs 84
Basic drinking water	14.0	10.2	3.8	59%	495 vs 219
Clean cooking	37.0	30.7	6.3	61%	1,257 vs 758
Basic sanitation	29.6	24.5	5.1	61%	1,080 vs 660
Total, six services	130	98	32		

Source: H Heuristics calculations from World Development Indicators (World Bank, 2026) and UN World Population Prospects 2024 (United Nations, 2024). Financial accounts count adults only. Countries without a usable 2012–2024 trend are excluded, so totals are lower bounds.

Across the six services, moving every lagging country to proven pace from 2026 avoids about 32 billion person-years of deprivation by 2050. Starting in 2035 forfeits 57–62% of that gain, depending on the service (Figure 10). Put differently, each year of delay costs about 2.0 billion person-years across the six services. This is the quantitative core of the initiative's sense of urgency: the benefit of acting is large, and most of it belongs to the first decade.

Figure 9 Starting in 2026 rather than 2035 decides most of the gain

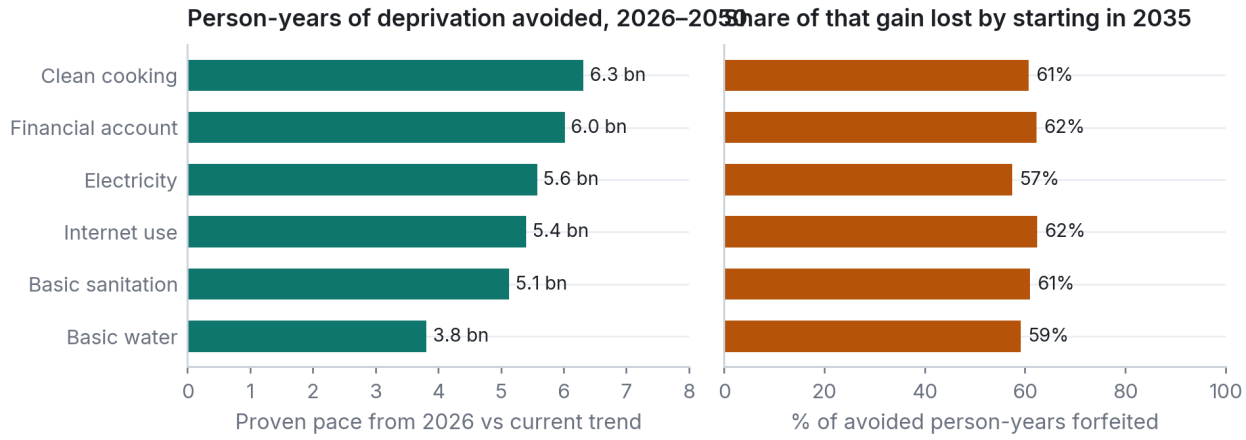
People without each service, 2026–2050, under three paths (millions)



Source: as Table 6. Shaded area: person-years avoided by moving to proven pace in 2026.

Figure 10 Each service loses roughly three fifths of its gain if acceleration waits until 2035

Person-years avoided by proven pace from 2026, and share lost by a 2035 start



Source: as Table 6.

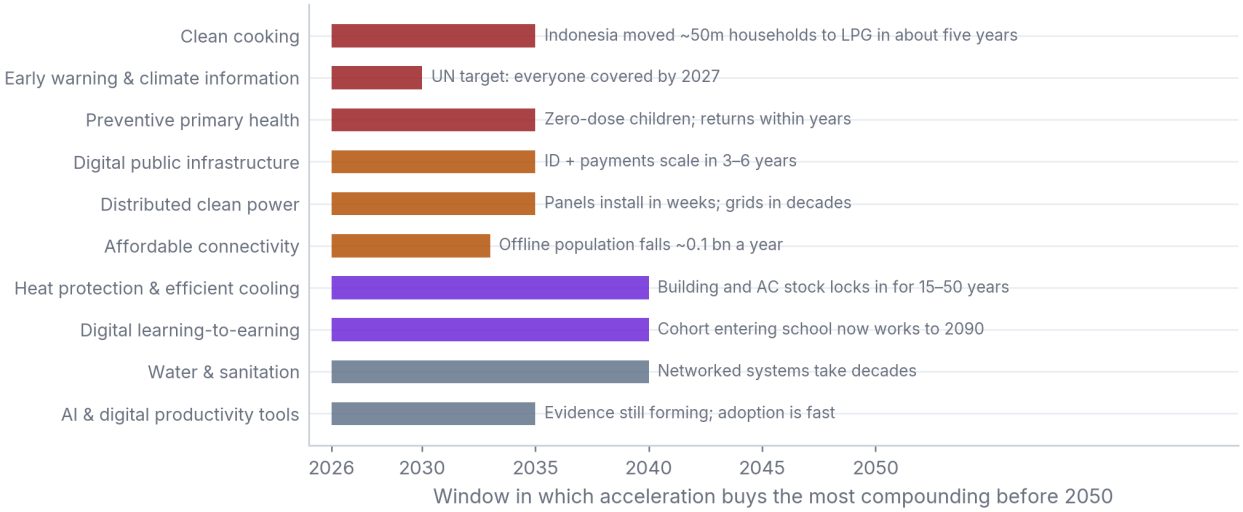
7.4 Which windows close first

The pace benchmark covers services that are tracked well. The other pathways have windows too, set by their own clocks (Figure 11). The protective pathways, early warning, preventive health and clean cooking, have the shortest windows because their benefits arrive within years and the lives at stake are counted annually; every year of delay is a year of avoidable deaths. The rails, clean power, digital public infrastructure and connectivity, have windows set by lock-in and by the fact that other pathways wait on them. Cooling and learning-to-earning have longer windows but sharper lock-in: air-conditioning stock and school-age cohorts are being fixed now for decades.

Compounding is what makes early action worth more than late action of the same size. A loop that starts in 2026 has had more cycles of cost decline, network growth and reinvestment by 2050 than one that starts in 2035. The person-year results understate this, because they hold the pace fixed once acceleration begins; a loop with a rising gain would widen the advantage of an early start further.

Figure 11 Every pathway has a window, and most close in the 2030s

Windows of maximum return by pathway, with the reason the window is time-limited



Source: H Heuristics judgement from the evidence in Section 6. Windows show when acceleration buys the most compounding before 2050, not when action should stop.

SECTION 08

The Ledger: Measuring What Matters

If the initiative is to save lives and cut exposure, it has to count them. The Positive Pathways Ledger scores progress in lives, person-years, people reached, losses avoided and the cost of essentials.

IN BRIEF

- Faster clean-cooking adoption could avoid 2.9–6.7 m deaths by 2050.
- Five headline measures replace GDP as the scorecard.
- Affordable living becomes a measured outcome, not a slogan.

8.1 Five headline measures

The Ledger replaces income growth as the headline test of the initiative's work. It keeps five core measures and adds a sixth, the cost of essentials, so that affordability is tracked alongside access (Table 7).

Table 7 The Positive Pathways Ledger

Measure	Definition	Data source	Why it matters
Lives saved	Deaths avoided relative to a stated counterfactual	WHO, IHME, UN IGME; H Heuristics models	The ultimate test of exposure reduction
Person-years of exposure avoided	Years lived without a service or above a hazard threshold, avoided	WDI, UN WPP, hazard grids	Counts both how many and how long
People gaining reliable access	Net new users with service of usable quality	Tracking SDG 7, ITU, Findex, JMP	Access that is used, not merely counted
Learning-to-earning transitions	Learners who move into higher-earning work	Labour surveys; platform data	Tests the digital loop where it is weakest
Losses avoided	Economic losses avoided by protection, including labour hours	EM-DAT, Lancet Countdown, insurers	Funds the fiscal reinvestment loop
Cost of essentials	Monthly cost of power, cooking fuel, data and water for the poorest 40%, as a share of income	Price surveys; A4AI; utilities	Makes affordable living measurable

Source: H Heuristics.

The ledger deliberately puts affordability alongside access. The original question that prompted this initiative named affordable living as a goal. Learning curves make it achievable for energy and connectivity: the same loops that cut the cost of solar and data cut the cost of a basic basket of modern services. Measuring that basket for the poorest households turns a slogan into a target that can be tracked country by country.

8.2 An illustration: lives in the clean-cooking ledger

To show how the ledger links pace to lives, take clean cooking. WHO estimates 3.2 million deaths from household air pollution in 2020 (WHO, 2024) among roughly 2.1 billion people using polluting fuels (IEA, IRENA, UNSD, World Bank and WHO, 2025), about 1.5 deaths per 1,000 users a year. Moving lagging countries to proven pace from 2026 avoids about 6.3 billion person-years of polluting-fuel use by 2050. Because switching is often partial and the chronic diseases involved respond with a lag, the report assumes that only 30–70% of the average death rate is avoided per person-year switched. That gives about 2.9–6.7 million deaths avoided by 2050, with a central estimate of 4.8 million; each year of delay costs about 292 thousand lives at the central rate.

METHOD

Why the illustration is cautious

- The HAPIN trial found that giving LPG stoves to pregnant women did not raise birthweight (Clasen, 2022), which shows that partial switching can leave exposure too high to change some outcomes. The 30–70% realisation range reflects this.
- Ambient air pollution, which depends on outdoor sources, is not included, so the full air-quality benefit of the wider clean transition is larger.
- The figures are illustrations of the ledger method, not forecasts. Each pathway report should build its own ledger with pathway-specific dose-response evidence.

8.3 Benchmarks for 2030 and 2035

Every report in the series should end with milestones that can be checked. Proven peer pace gives a defensible benchmark: it asks a country to match what comparable countries have already achieved, not to invent a new speed. On that basis the initiative can track, for each country, whether it is moving at trend, at proven pace or at frontier pace in each service, and how many people are still without it in 2030 and 2035. Globally, proven pace would reduce the number of people without electricity in 2030 from about 592 million on trend to 489 million, and without clean cooking from 1.68 to 1.59 billion. The larger gains arrive later, which is exactly why the clock matters: the lines diverge slowly at first and then steeply.

SECTION 09

The H Heuristics Research Programme

A research identity built on a few well-defined concepts, one flagship series and an annual ledger, with editorial rules that keep the work constructive without making it complacent.

IN BRIEF

- Three flagship concepts and four working terms; forty-plus labels folded in.
- Flagship series: Development Multipliers of the 21st Century.
- Six editorial principles keep the work honest and useful.

9.1 Editorial principles

- **Risk sets the deadline; development sets the outcome.** Polycrisis evidence is used to size and locate the need, and every report leads with the levers that reduce it.
- **Pair every harm with a lever.** No number about deaths or losses appears without the investment, policy or behaviour that would reduce it and an estimate of how much.
- **Count lives and person-years.** Headline results are reported in the Ledger's units, with GDP as a supporting measure.
- **Honest optimism.** Null and negative results, such as rural grid extension in Kenya or the HAPIN trial, are reported with the same prominence as successes.
- **Time-stamp the window.** Each report states what must happen by 2030 and 2035 for its pathway to pay off before 2050.
- **Few concepts, hard tests.** New labels are introduced only with a definition, a measurement and a falsifiable claim.

9.2 Concept discipline

The brainstorm that prompted this report generated more than forty candidate concepts. Many are useful report titles; few should be presented as original theoretical contributions. Several already exist in the literature, notably resilience dividends, positive tipping points, leapfrogging and the big push, and H Heuristics should cite them and build on them. Table 8 proposes a tiering that keeps the H Heuristics vocabulary small and defensible.

9.3 The flagship series

The proposed flagship series, *Development Multipliers of the 21st Century*, follows the screen and the bundles. Each report uses a common template: the loop map, the gates, the evidence including nulls, the clock, a country-level pace benchmark, a ledger estimate and 2030 and 2035 milestones. Companion essays on Substack carry the main finding to a general audience, and the web edition hosts interactive versions of the pace and ledger charts.

Table 8 Tiering the candidate concepts

Tier	Concepts	Role
Flagship concepts	Sustainable Convergence; Polycrisis Resilience; Positive Development Dynamics	Defined, measured and defended as H Heuristics contributions
Working terms	Development Multipliers; Loops; Gates; Clocks; the Positive Pathways Ledger	The framework's operating vocabulary
Established terms to cite	Resilience dividend; triple dividend; positive tipping points; leapfrogging; big push; cumulative causation	Used with attribution, never claimed
Report topics	Digital-to-Development Convergence; Clean Development Multipliers; Household Environmental Health Convergence; Thermal Resilience Convergence; Water–Health Development Convergence; Accelerated Innovation Convergence	Titles for pathway reports in the series
Fold in as synonyms	Positive Systems Transformation; Compounding Human Development; Compounding Resilience; Humanity's Development Trajectory; Long-Term Human Development Optimization; Sustainable Human Progress; Proactive Global Development; Human Opportunity Multipliers	Absorbed into the three flagship concepts to avoid dilution

Source: H Heuristics.

Table 9 A first publication cycle

Order	Report	Bundle	Core analysis
1	Positive Pathways (this report)	Framework	Loops, gates, clocks, screen, ledger
2	Clean Cooking as a Development Multiplier	Protect now	Electrified-but-polluting households; lives ledger by country
3	Digital Public Infrastructure and the Fiscal Loop	Build the rails	Leakage, transfer speed and shock response
4	Distributed Clean Power and Productive Use	Build the rails	When connections become loops; cost of capital
5	Early Warnings and Anticipatory Finance	Protect now	Warning reach × payments × losses avoided
6	Primary Health as the Keystone Loop	Protect now	Vaccination, child survival and later human capital
7	From Connectivity to Earnings	Build / compound	Learning-to-earning chain, link by link
8	Cooling Without the Heat Trap	Compound capability	Efficiency, passive design, clean power
9	Water, Sanitation and the Health Loop	Compound capability	Doubling the pace of basic coverage
10	AI and the Productivity Gap	Compound capability	Who gains from AI tools, and how to widen it
Annual	The Positive Pathways Ledger	All	Six gaps, peer pace by country, lives and person-years

Source: H Heuristics proposal.

9.4 Data and methods to build

Three methodological assets will serve every report. The first is the **pace benchmark** used in Section 7, extended to more services and to subnational data where it exists. The second is a **looplink evidence library**: for each link in each loop, the best causal estimates available, their settings and their nulls, so that loop gains can be estimated rather than asserted. The third is the **ledger model**, which converts faster access into person-years and lives using population projections and dose-response evidence. Together they make the initiative cumulative: each report strengthens the next.

9.5 Measuring the initiative's own impact

A research programme that asks others to count outcomes should count its own. An earlier H Heuristics self-assessment found that the series was still early in its uptake by other researchers (H Heuristics, 2026). The initiative should therefore track a small set of indicators of its own: citations and downloads of each report, reuse of its data and code, requests from practitioners, and, most importantly, whether its pace benchmarks and ledgers are adopted by people who make investment decisions.

It should also build partnerships with those who hold the data the ledger needs, from household surveys to utility and platform records, and publish its methods openly so that others can test and improve them. The positive agenda will be judged on whether it changes what gets built, not on how hopeful it sounds.

A realistic cadence is one pathway report each quarter, each with a companion essay and a web edition, plus the annual ledger each December. That pace allows each report to add new data rather than restate the framework, and it lets the screen be revised each year as evidence accumulates and as countries move between trend, proven and frontier pace. Over three years the series would cover all ten pathways twice: once to establish the evidence and the benchmark, and once to report what has changed.

SECTION 10

Limits, Risks and Next Steps

A constructive agenda is only as credible as its caveats. The framework has clear limits, and the positive loops it studies carry risks of their own.

IN BRIEF

- Scores are judgements; cross-country tests are associations.
- Some reinforcing loops are harmful and must be broken.
- The next step is the first pathway report and the 2027 ledger.

10.1 Limits of this report

- **The screen is judgement.** Scores are grounded in cited evidence but are not estimated. The robustness test shows which rankings are stable (preventive health, early warning, AI tools at the bottom) and which are close calls (the middle five).
- **The loop test is correlational.** The cross-lagged regressions control for income and starting levels, not for governance or geography, and ceiling effects distort some cells. They indicate direction, not causal size.
- **Proven pace is a benchmark, not a promise.** Countries differ in fragility, conflict and fiscal space. Some lagging countries are lagging for reasons a pace benchmark cannot fix.
- **The ledger is partial, and the data lag.** It counts access and selected deaths, not quality of service, ambient pollution or wellbeing, and most series end in 2023 or 2024.

10.2 Harmful loops to watch

Positive feedback is a mechanism, not a value. The same engines that drive protective development can drive harm: cooling demand that raises emissions that raise cooling demand; fossil infrastructure whose sunk costs keep it running; digital platforms that concentrate gains among the already connected; debt that crowds out the investments that would generate repayment capacity. Each pathway report should name the harmful twin of its loop and show how its recommendations avoid feeding it.

10.3 Next steps

- Publish this framework as the launch document of the Positive Pathways initiative, with a short public essay explaining the editorial shift.
- Begin the first pathway report on clean cooking, where the lives at stake are largest and the electrified-but-polluting finding offers a fast, original contribution.
- Build the pace benchmark and ledger model as reusable code so that every report and the 2027 annual ledger share one method.

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