



Energy Sector Management
Assistance Program



On-bill financing for residential energy efficiency

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TAMARA BABAYAN
SENIOR ENERGY SPECIALIST, ESMAP



On-bill financing: upfront purchase into a utility-enabled service



Barrier

High upfront cost

Efficient appliances, insulation, heat pumps cost several months of income



Respond

No upfront payment; cost recovered in 2-8 years through a line item on the bill

Unaffordable credit

Households face high consumer-loan rates



Utility payment history instead of credit checks; concessional funding or utility capital lowers the rate

Small, dispersed transactions

Thousands of US\$300–8,000 projects are unattractive to banks or ESCos



Standard packages and one billing platform aggregate projects into an investable pipeline

Split incentives

Landlords do not pay the bill, and tenants do not own the asset



Meter-based (tariffed) charges stay with the house/apartment and transfer to the next occupant

WHAT IT IS

Models, where a utility, bank or program pays for eligible upgrades and recovers the cost through a dedicated charge on the customer's electricity, gas or heat bill.

WHAT MAKES IT WORK

- Charge set below estimated savings (conservative)
- Standardized measures with predictable savings
- Utility with reliable billing system
- Clear rules for arrears, moves and consumer protection

Important Households that cannot carry any repayment need grant-first option. On-bill option enhances the market above that floor.

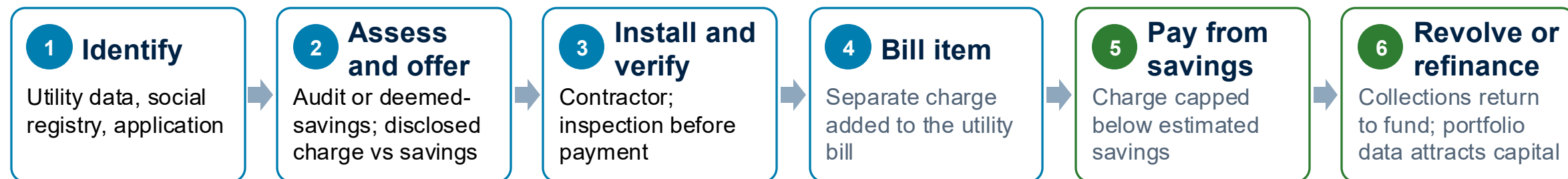
On-bill is between grants and ESCOs in risk, reach and fiscal cost



	Grants and vouchers State or donor pays part or all of the measure; no repayment	On-bill financing Fund/utility/lender pays; household repays through the utility bill	ESCO/performance contract ESCO performs; paid from verified savings over the contract
Who pays upfront	Public budget or donor	Utility, fund or third-party lender	ESCO (often with bank loan)
Who carries performance risk	Household; no savings test	Household, savings cap and remedy clauses	ESCO guarantees savings; needs baseline and M&V
Who carries repayment risk	None	Lender or utility; low with bill collection	ESCO on client payments; hard for households
Household segments reached	Poorest; renters if landlord agrees	Moderate income; renters via meter-tied tariffs	Creditworthy owners, multifamily associations, district heating
Transaction cost and scale	Low per unit; scale limited by budget	Low once standardized; scale via utility platform	High per project; viable above ~US\$50k–100k
Fiscal cost per household	Full or large share of cost	Interest buy-down, first loss, admin	Guarantees or TA; little direct subsidy
Typical measures	Appliances, LEDs, basic weatherization	Appliances, insulation, HVAC, solar water heating	Building-wide retrofits, heating systems, lighting
Weak spot	Crowds out markets; stops when budget ends	Needs billing capacity, legal basis and real savings at tariff	Small projects, split incentives, weak M&V make residential ESCOs rare

Important: use grants for households that cannot repay, on-bill for the next segment and renters, and ESCOs where projects are large and savings can be guaranteed.

Upgrades flow to the household; repayments flow to utilities via the bill



Who does what

Ministry / energy agency

Mandate, subsidy window, alignment with national EE and affordability goals

Regulator

Approves bill treatment, partial-payment and arrears rules, disclosure, data sharing, mandate of utility

Utility

Customer data, billing platform, collection, communication; sometimes capital or guarantee

Fund / lender

Capital, portfolio tracking, co-financing; receives collections; reallocates for the next round

Program administrator

Enrollment, contractor certification, verification, complaints, reporting; proposing changes

THE SAVINGS-CUSHION RULE

Monthly charge $\leq$ 80–90% of conservatively estimated monthly savings, so the household is cash-positive from the first bill in a normal year.



Mexico: bill collection made US\$490 million of consumer credit bankable

1.88 million

refrigerators and air conditioners replaced (2009–14)

US\$490 million

consumer loans issued by NAFIN, 4-year term, 14% p.a.

9,242 GWh

cumulative electricity saved; 5.07 MtCO₂e avoided

Rarely used

US\$35 million guarantee facility, because bill collection worked

How the mechanism is built

Two instruments by segment: IBRD-financed vouchers (instant discounts) for low-income consumers; NAFIN credit at preferential rates for qualifying consumers.

Collection: monthly instalments added to the CFE electricity bill; eligibility tied to a CFE account in good standing.

Blended capital: US\$50m CTF, US\$65m KfW and US\$374m NAFIN own funds; CTF concessionality and a GoM/GEF guarantee brought NAFIN in.

Delivery: FIDE operated the program through retailers; old units collected and recycled in 100+ centres with refrigerant recovery.

Why it scaled

- A single standardized measure with predictable savings
- Mass media campaign created demand nationwide
- Concessional funds lowered NAFIN's cost of capital; CFE bill collection cut default risk

Tips for replication

- 14% consumer rate is high; affordability relied on large per-unit savings
- Implementer capacity (FIDE) and lender risk perception were the binding constraints at scale-up

Lesson: pair grants for the poorest with on-bill credit for the next segment, and use concessional finance to buy down lender risk rather than the household price.



India: on-bill instalments bridged the LED price gap

368 million

LED bulbs distributed by Nov 2021 (133 million by July 2016)

Rs 310 → Rs 38

procurement price per LED, 2014 to 2017 (about –90%)

Rs 10 + EMI

upfront payment, balance in bill instalments over 5–10 years

~5%

reduction in annual household bills

How the mechanism is built

Aggregator: EESL, a public ESCO, bulk-procured LEDs and distributed them through DISCOM kiosks to any metered consumer/household.

Pay-as-you-save option: Puducherry pilot (2014): Rs 10 per month for 8 years on the bill; Andhra Pradesh: EMIs over 5 years; defective LEDs replaced during the EMI period.

Alternative: upfront purchase at the subsidized price for households that preferred it.

Exit: as procurement prices fell to Rs 70 retail in phase three, consumers shifted to upfront purchase and the on-bill option faded.

Why it scaled

- Small ticket size and certain savings made equal monthly installments in the on-bill almost risk-free
- Demand aggregation dropped prices faster than any subsidy could
- DISCOM billing gave reach without new payment infrastructure

Watch-outs for replication

- Works for commodity products; appliances and retrofits need underwriting and quality assurance
- DISCOM financial health and billing accuracy determine collection performance

Lesson: on-bill repayment can be a time-limited bridge: use it while the price gap is wide, then let the market take over once prices fall.



Operations: packaging capital, grant window, billing and safeguards

Component 1	Component 2	Component 3	Component 4
Residential efficiency investment facility Revolving fund or credit line pays certified contractors after verified installation; collections return via the utility	Low-income grant and affordability window Vouchers, low-interest, first-loss reserve so high-burden households are included, not harmed	Utility billing and implementation platform Billing-system upgrade, data integration, repayment reporting, call-centre training, data protection	Market development, M&V and consumer protection Contractor certification, product standards, savings protocols, complaints system, impact evaluation

Sequence



Results to track (and to link to disbursement where PforR is used)

- Verified vs projected savings
- Repayment rate; write-offs;
- Share of low-income and renters
- Net bill savings, energy-burden change
- Complaints received and resolved
- Private capital mobilized after pilot

ILLUSTRATIVE SCALE-UP TRIGGERS

- Verified savings $\geq 80\%$ of projections
- Repayment rate $> 95\%$; write-offs $< 1\%$
- Complaint resolution $> 90\%$ within deadline



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Thank you

tbabayan@worldbankgroup.org