Creating a Conducive Environment for the Development of a Local ESCO Market

Ark Energy | Energy Transition, Cleantech and Digitalization Advisory

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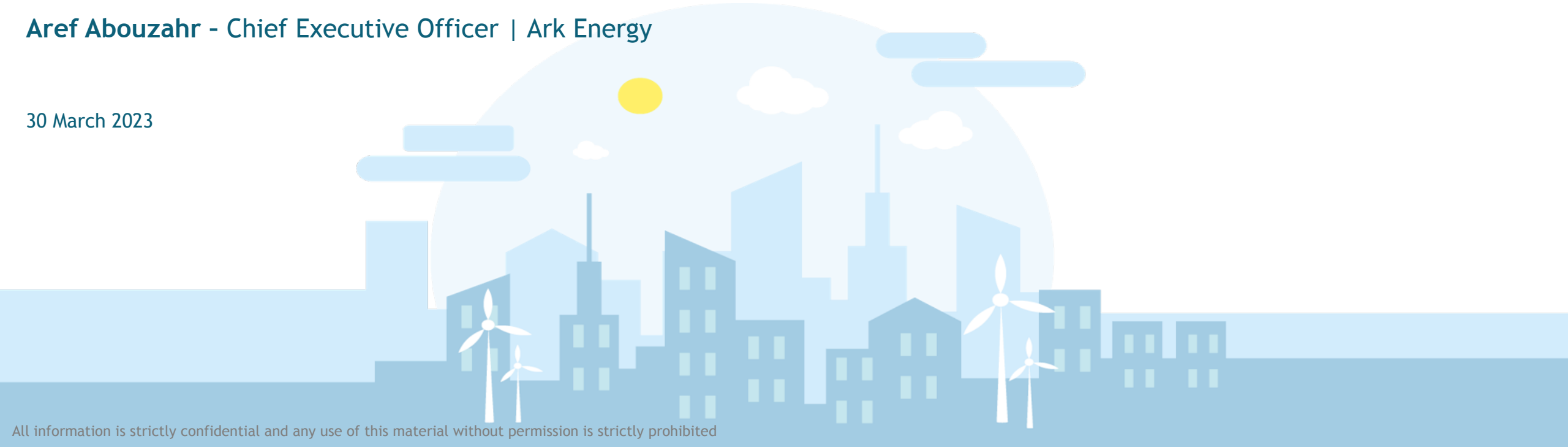

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Net Operating Income, cashflow and ESG goals are the driving KPIs for all businesses, and are severely impacted due to rising energy costs, and (in some cases) carbon tax

Business Key Drivers

Net Operating Income, Cashflow and ESG are driving KPIs for businesses in all sectors

Net Operational Income

Cashflow

Corporate Environment, Sustainability and Governance (ESG) Goals

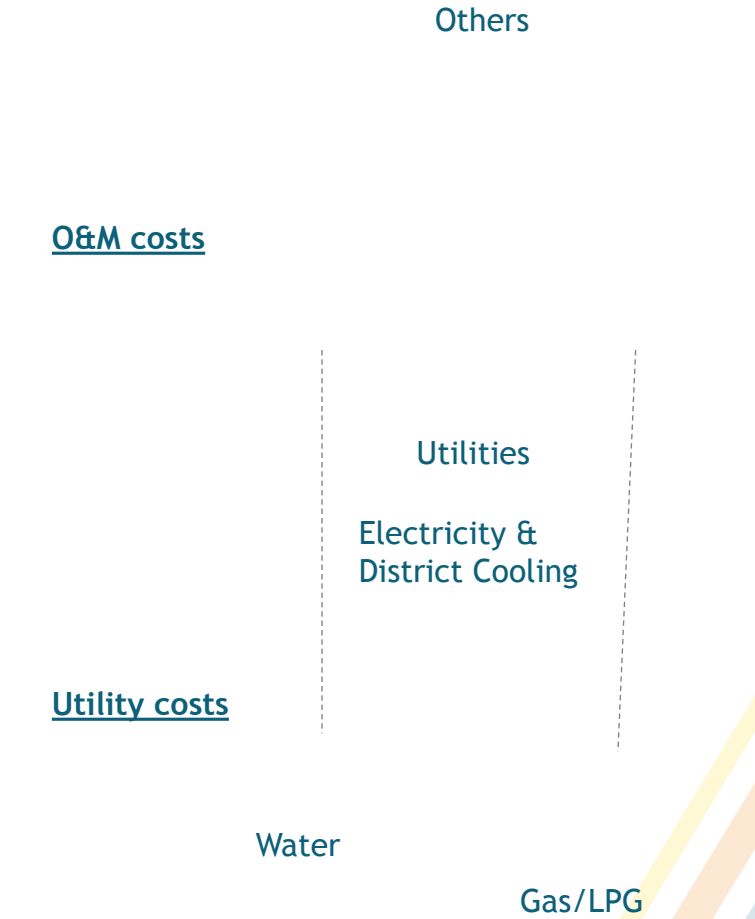
Market Challenges

All sectors are experiencing rising energy, labor and O&M costs, reduced traffic and increasing competition

- Increasing Utility Bills
- Rising Cost of Diesel/Gas
- Increasing Cost of Labor
- Intensifying Competition *(existing/future)*
- Reduced Customer traffic and spend

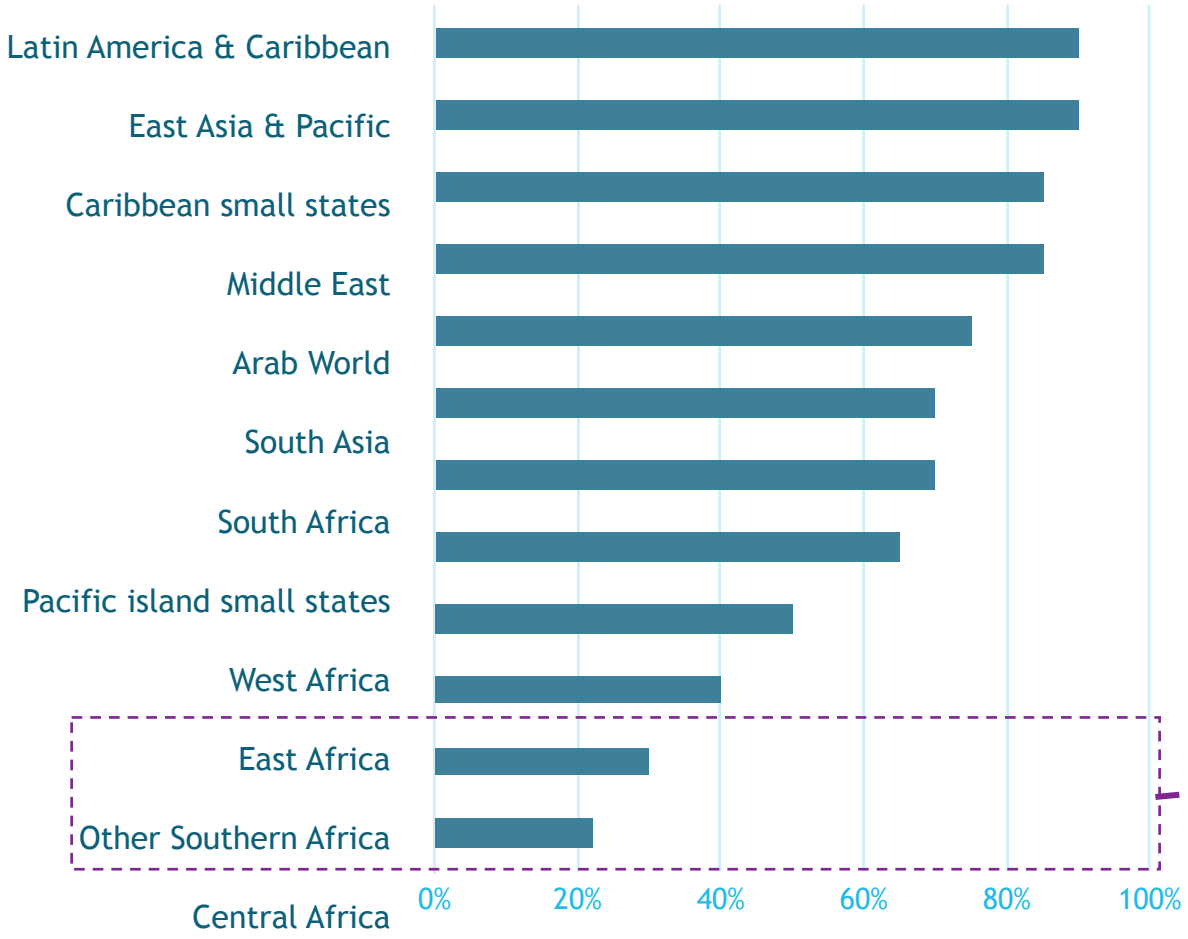
Addressable Costs Breakdown

Utilities constitute 15 - 30% of total O&M costs in most businesses and are hence a primary target for cost-cutting initiatives



At the same time, over a billion people do not have access to quality electricity or stable grid, drawing most of their energy from Diesel gensets and other “dirty” fuel resources

Business Global Access to Electricity *(% of population)*



Key Challenges Facing the Electricity Sector

- Unstable Grid
- Power outages
- High tariff rates from (often) a monopoly of micro-generators
- Expensive liquid fuel to run existing power plants
- .. And often insecure supply of liquid fuel
- Remote areas with no connection to the power Grid
- Out-dated and unreliable baseload turbines
- Energy dependence
- Unreliable grid

Source: World Bank Enterprise Surveys

Energy Efficiency Retrofit cuts down utility costs, enhances asset lifecycle, improves standards of comfort and reduces carbon footprint with 2 to 4 years average payback time

Lowers utility costs and enhances equipment lifecycle with sustainable and integrated energy conservation measures

15 - 40%
Lower Utility Bill

Adds up to
3 to 6%
to the bottom line

- Upgrade of HVAC and Boiler Systems (install VFDs, economizers, etc.)
- Power Quality and Harmonics Improvement, and Enhanced Equipment Lifecycle
- Insulation to walls/roofs and changing windows and doors to improve air tightness
- Repairing Inefficient Compressed Air Systems (Fixing Leaks)
- Digitalization of Energy Operations and Building Automation Systems — arkEMIS
- Efficient Industrial Lighting Installation — LED
- Delta-T Rehabilitation

… and improves standards of comfort across different key areas of the building

- Humidity
- Temperature
- Air Flow
- Indoor Air Quality (lower particulates of formaldehyde and CO_2)
- Light efficacy

… and reduces carbon footprint

1 MWh

600-900 kg CO_2

Notes: CO2 – MWh conversion is based on Dubai Energy Efficiency Strategy (2019). Number may change based on the energy mix

Data has emerged as the most important resource for this Digital Age

Was the resource of the
AGRICULTURAL AGE

was the resource of the
INDUSTRIAL AGE

is the resource of the
DIGITAL AGE

Based on our experience in GCC and Levant, and lessons learned from EELA projects in EAC & SADC region, we identified 4 overarching market challenges preventing Energy Eff. project adoption

Challenges

Data are based on market study conducted in 2018-2019 covering 1,900 respondents in Dubai, UAE from government, industrial, commercial and residential sectors

	Challenges	Energy Users	Energy Service Providers	Financiers
72%	***Lack of available capital*** to spend on non-core projects or Asset Class (financiers)	✓		✓
60%	***Lack of experience, relevant technical or legal knowledge*** *in energy performance contracting models or execution of energy eff. Projects (incl. audits, energy/financial simulation, ECM design and integration, tech.)*	✓	✓	✓
52%	***Constrained resource bandwidth*** or ***capacity***, and ***lack of focused*** project ownership (energy users)	✓	✓	
38%	***Low client awareness***, or ***trust / confidence*** in energy efficiency and optimization projects	✓		✓

Key Market Players *(impacted)*

Source: Ark Energy Market Assessment (2019, Dubai UAE)

Governments are key to creating market enablers that can be conducive to Energy Efficiency (Retrofit) projects

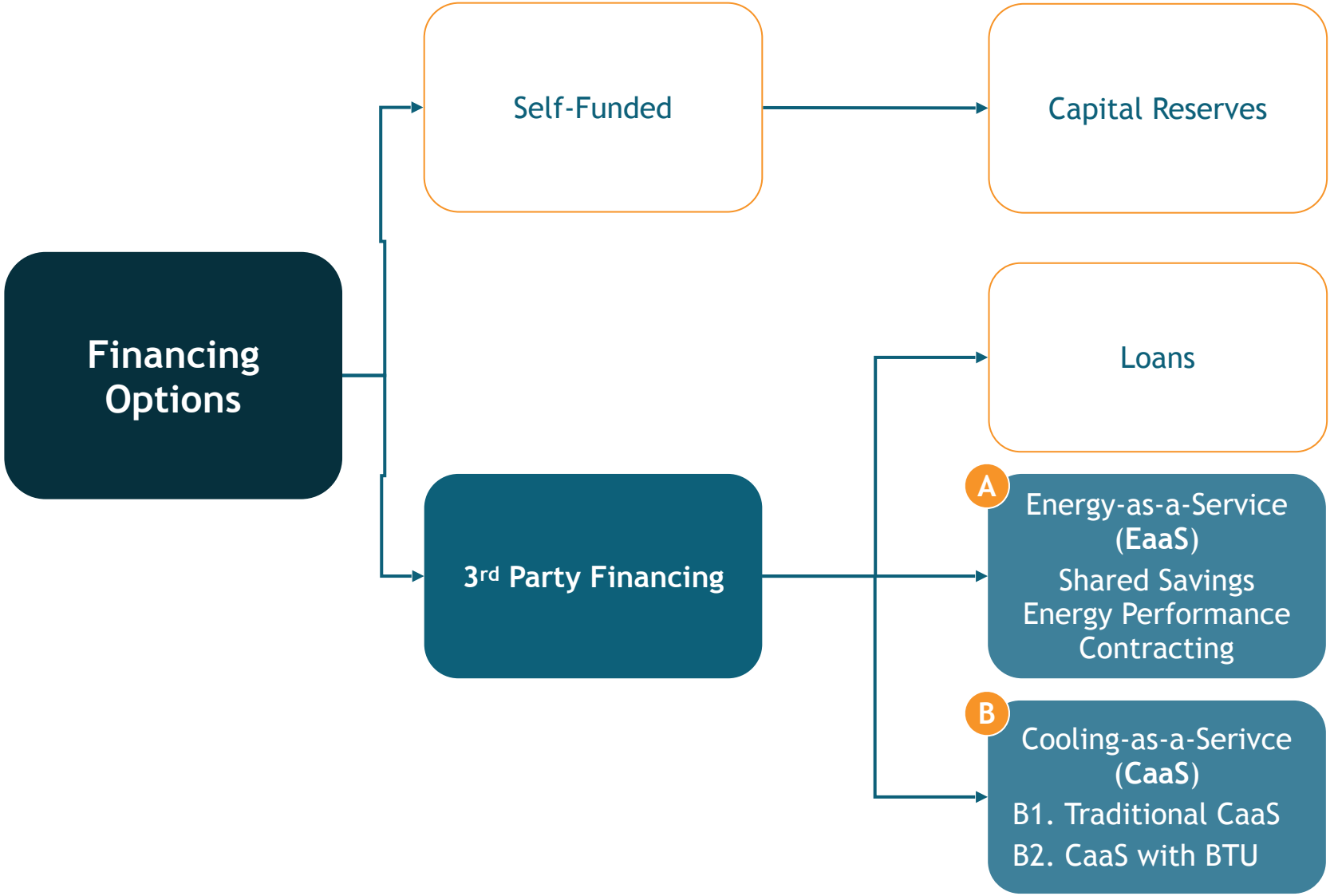
Enablers / Mechanisms	Objective
POLICIES & REGULATIONS	Enforce policies and regulations to **drive implementation of energy efficiency projects and efficient appliances (MEPS)**, with government leading by example Introduce accreditation schemes to ensure min. quality is maintained amongst ESCOs
CREATIVE FINANCING	Develop **creative blended financing mechanisms** that can attract private sector funding to support the implementation of energy efficiency projects
DATA, MEASUREMENT & VERIFICATION (M&V) OF SAVINGS	Ensure proper measurement, evaluation and monitoring of savings to **inject confidence in energy performance contracts** (by safe-guarding investments) Provide market-data to shorten energy eff. projects sourcing
AWARENESS IMPROVEMENT AND ENGAGEMENT	Develop and execute general and targeted information campaigns as well as **education, home reporting and labeling schemes** to change consumers' behavior and encourage energy efficiency project development
CAPACITY BUILDING	Introduce and subsidize **training and certification** programs to **improve ESCOs value proposition**, and **equipment testing centers** capabilities
TECHNOLOGIES & DIGITALIZATION	Introduce and localize new efficient technologies, and conduct key studies to enable faster adoption of energy efficiency / energy transition projects

Non-Exhaustive

With such enablers, governments can actively help to address market challenges that are delaying or even prohibiting energy efficiency projects adoption

Potential benefits	Policies and Regulations	Creative Financing	Data and Measurement & Verification	Awareness Improvement & Engagement	Capacity Building	Technologies / Digitalization
Improve access to affordable funding for small and medium tickets (< $1 Mil. in CapEx)	On-bill Payment	Standard EPC / Solar leasing contracts Blended Financing	Transparency and standardization of M&V (IPMVP)	Roadshow / narrative to banks / funding institutions	Certification programs to bankers (e.g., PCF)	Digital EMIS
Improve ESCOs value proposition and quality of delivery	Accreditation Scheme for ESPs / ESCOs and Energy Managers	-	Enforce M&V Audits to be part of EPC agreements	Provide consultative support to ESPs	Certification programs and training workshops	Digital EMIS
Increase capacity of ESCOs and local efficient product suppliers / OEMs	Lead by Example MEPS	Blended Financing / JV Approach to funding EPC projects	-	-	Certification programs and training workshops	Digital EMIS
Increase stakeholders' awareness / confidence in Energy Eff. projects	Lead by Example	-	Transparency and standardization of M&V (IPMVP)	Extensive awareness campaigns	-	Digital EMIS
Complexity to implement	**Medium**	**Medium**	**Low**	**Low**	**Low**	**Low**
Benefit of outcome	**High**	**High**	**High**	**Medium**	**Medium**	**High**

Capital allocation and risk appetite drive decision-making to select the most suitable funding mechanism



Highlights

- Working capital depletion
- NPV and IRR driven selection process
- Board decision

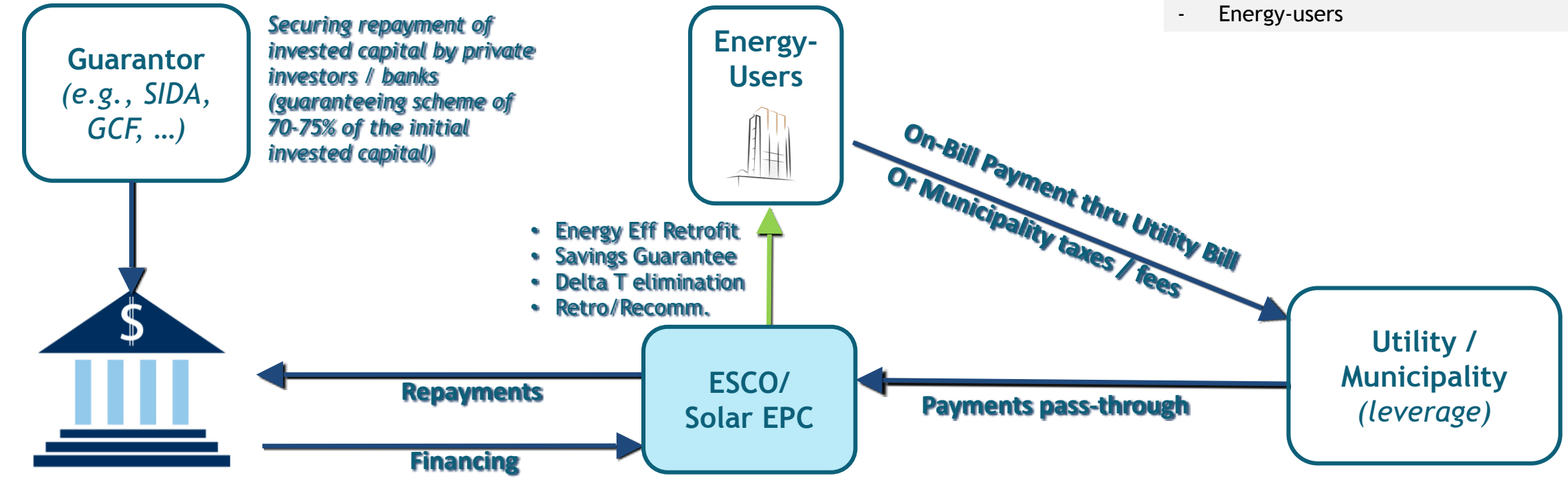
- Bonds
- Collateral
- Corporate guarantees
- On Balance sheet

- 3rd party investor
- Off Balance sheet
- OpEx, not CapEx
- Savings guarantee

- 3rd party investor
- Payments are agreed upon as a function of actual usage
- OpEx, not CapEx

A funding mechanism with On-Bill payment and Repayment Guarantees can significantly reduce cashflow risk for the investor, and increase adoption by eliminating Capital constraints of end-users

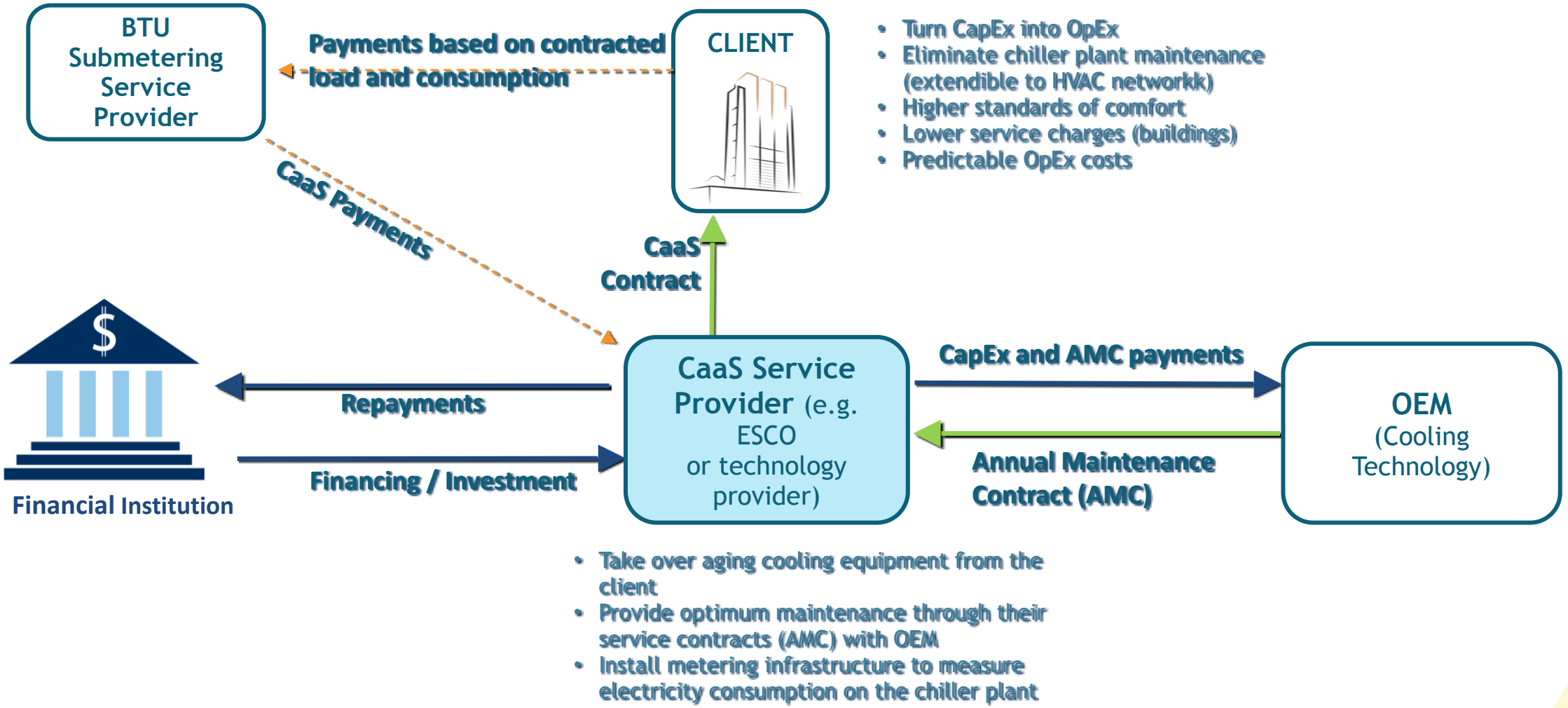
Either one of 2 parties can be funded:
- ESCO
- Energy-users



- *Audit / site survey*
- *Detailed engineering and design*
- *Integration of ECMs (energy retrofit)*
- *Solar installations*
- *O&M and savings Guarantees (if ESPC or EaaS contract)*
- *M&V of Savings*

- *1st line of defense: collect payments from energy-users (in a EPC funding models, debt financing, convertible grants, Leasing agreements etc.)*
- *Payment pass-thru either to the ESCO (if ESCO is funded), or directly to PFI (if the End-User is the party being funded)*

With BTU Submetering model integrated with CaaS, Client off-loads CaaS payments onto the BTU SSP, and chiller plant / HVAC network upkeep onto the CaaS service provider



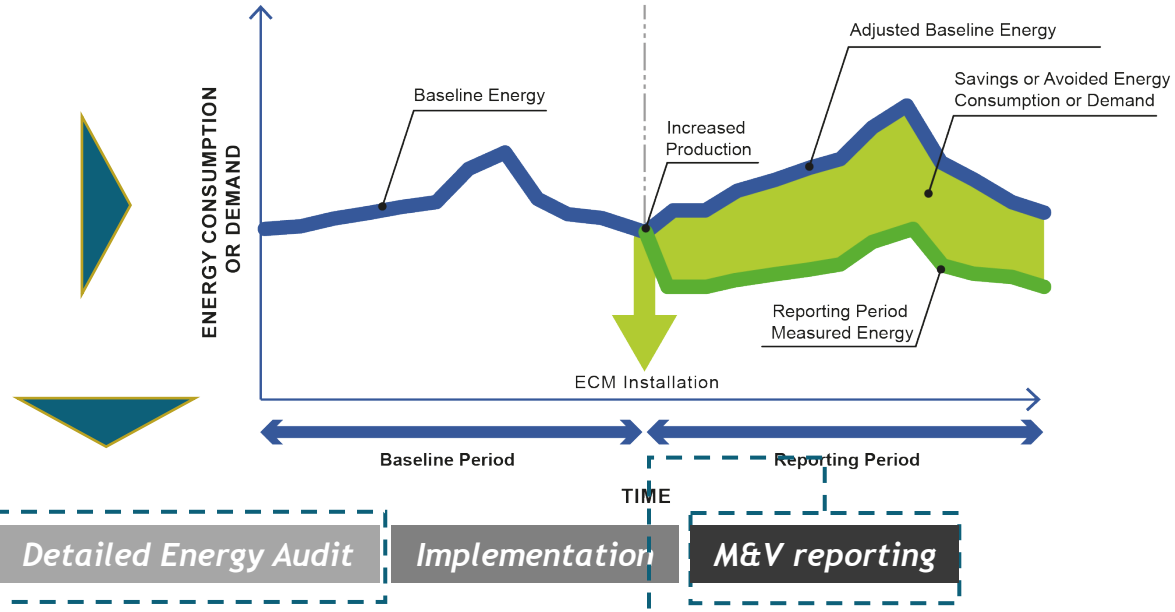
- Turn CapEx into OpEx
- Eliminate chiller plant maintenance (extendible to HVAC networkk)
- Higher standards of comfort
- Lower service charges (buildings)
- Predictable OpEx costs

- Take over aging cooling equipment from the client
- Provide optimum maintenance through their service contracts (AMC) with OEM
- Install metering infrastructure to measure electricity consumption on the chiller plant

M&V Audits using IPMVP standards are critical to safe-guard investments in energy efficiency and solar projects for both the energy-users and financiers

Key Drivers for M&V Reporting Period Issues

- **Lack of technical knowledge** of the M&V formulas and regression modeling methodology used to create them
- **Lack of ownership** of the M&V reports
- Lack of experience in assessing the **adjusted baseline** *(core of the IPMVP protocol)*, static factors, routine or non-routine adjustments
- Lack of capability to **identify discrepancies** or engage the ESP in a rational dispute on energy savings
- *(at times)* Lack of proper M&V reporting (incomplete dashboard)



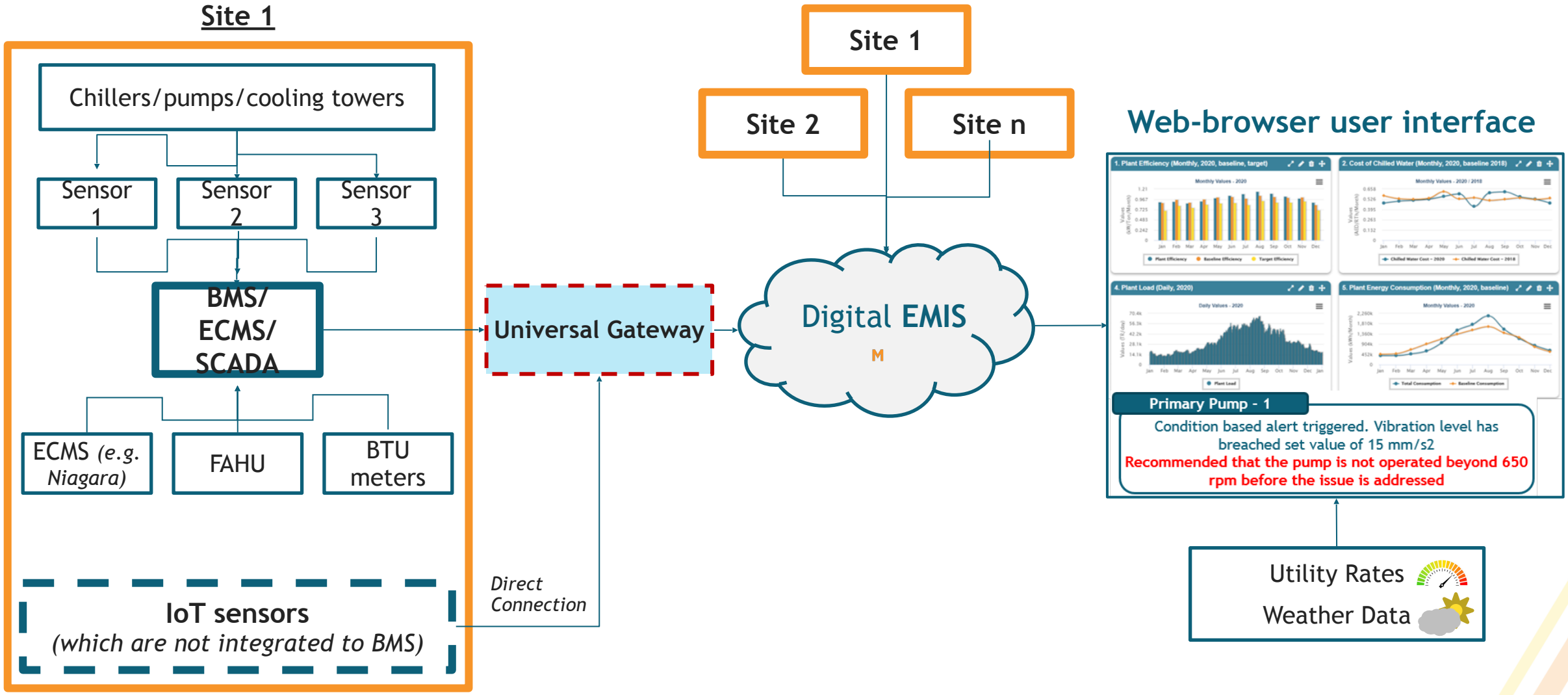
Mitigating Risks during the M&V Plan

- **Select the right M&V Option** depending on the retrofit plan
- **Utilize our proprietary M&V model** to develop adjusted baseline regressions
- **Identify and validate independent variables** to minimize model uncertainty
- Capture independent variables datasets from **trusted market sources**
- **Back-test** the M&V model using historical data
- Assess static factors and quantify their impact

Mitigating Risks during M&V Reporting Period

- Monthly Energy Savings report evaluation
- Quarterly Energy Savings Audit
- Annual Energy Savings Audit
- **Digitalized Measurement and Verification of savings with automated reporting and EMIS (e.g., arkEMIS)**

Cloud-based energy management platform that integrates into any BMS/SCADA, linking sensor data to provide visibility, reporting, AI-analytics and more



Some Gateways can integrate IoT sensors/devices directly into the Cloud (if they are NOT integrated into the BMS/SCADA). They can also integrate those sensors into the BMS/SCADA, and *act as a ECMS for monitoring and control, if programmed accordingly*

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accelerating smart energy transition

For clarifications or questions, please contact:

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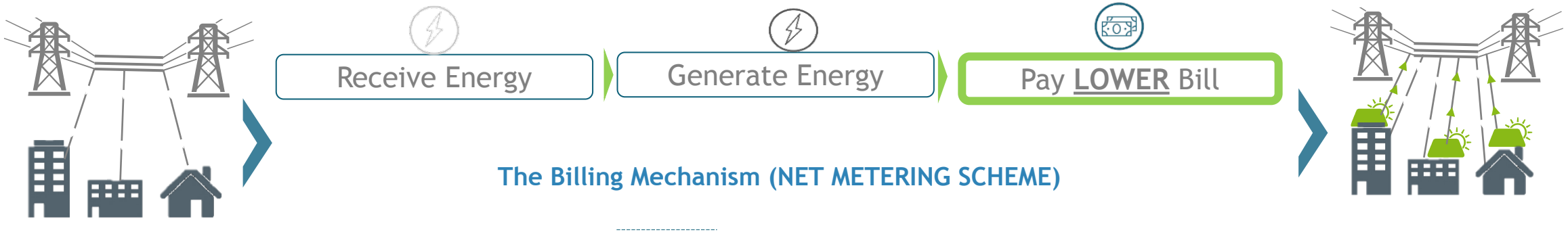
Installing Solar PV allows end-users to generate electricity, transfer any surplus to the utility (grid), and offset excess generation from future electricity bills

Solar Panels and Net Metering



The Billing Mechanism (NET METERING SCHEME)

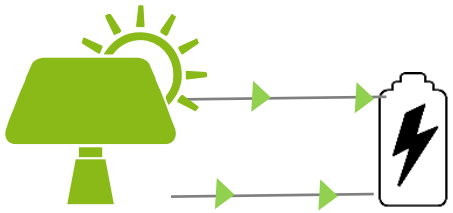
Surplus

Solar Production

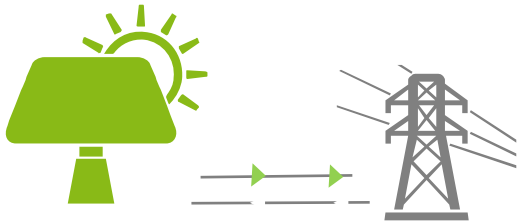
Building Consumption

Surplus Electricity Metered to Grid

Types of Solar Application



OFF GRID APPLICATION



ON GRID APPLICATION