Energy Efficiency Insurance

Global & Indian scenario

Building a better working world

International Energy Efficiency Insurance Product Scenario

Some international products studied were:

1. Energy Savings Insurance
Implementing Agency: Danish Energy Agency
Geography: Mexico (Pilot phase)
Sector: Agro-industry sector

2. Energy Savings Insurance
Implementing Agency: Danish Energy Agency
Geography: Colombia
Sector: Hospitals, Clinics, Hotels and Public Administration buildings

3. Energy Efficiency Insurance
Insurer: HSB Engineering; Reinsurer: Munich RE
Geography: International

4. Energy Savings Warranty
Insurer: Energi; Reinsurer: Hannover RE
Geography: USA, Canada and Puerto Rico

Key Findings:

- The premium for the insurance offered is usually 1-5 % of the guaranteed savings.
- Coverage is provided only on guaranteed energy savings.
- Product by HSB provides coverage for material damage as well.
- Reinsurer cover about 80% of insurer's risk

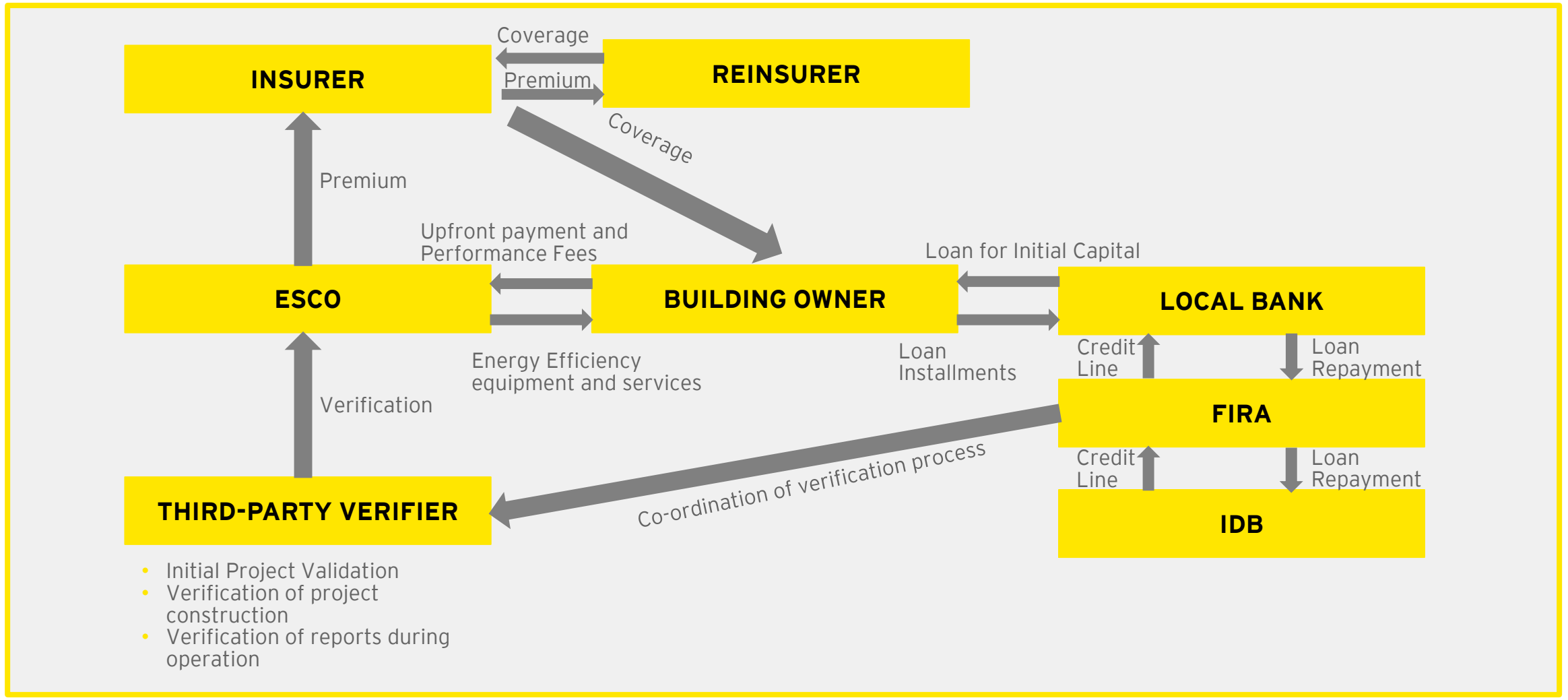
Interventions / technologies covered:
1. HVAC
2. Co-generation systems
3. LED lighting
4. Solar water heating systems
5. Compressed air systems
6. Refrigeration systems

Reluctance of consumers to invest in capital intensive energy efficiency solutions:
1. Financial risk posed by the uncertainty of achieving energy savings.
2. Lack of technical competence to verify project design, technologies installed etc.
3. Possibility of disputes with ESCO companies over achieved savings.
4. Few financing options available due to technical incompetence of banks to assess investment in this space.

Energy Savings Insurance (Mexico): Key stakeholders

IMPLEMENTATION AUTHORITY	The **Inter-American Development Bank (IDB)** is supporting the implementation of the program by extending a credit line to the local national development bank FIRA. The IDB is also responsible for setting up verification protocols, development of standard contracts, identification of appropriate insurance instruments and carrying out training activities.
INSURER	**Local insurance companies** issue the insurance to the eligible ESCOs.
BANK	After the loan request passes through an initial credit review, the project proposal is passed on to **FIRA – (Fideicomisos Instituidos en Relación con la Agricultura;** is an agricultural bank**)**. FIRA on receiving the project proposal requests the verifier to validate the ESCO and the project details. If the assessment by the verifier is positive, credit lines are extended by FIRA to the local banks which further disburse the credit to the building owners covering up to 80% of the upfront investment project cost.
VERIFIER	**The National Association of Normalization for the Electric Sector (ANCE)** is the verifier for the program. The verifier is also responsible to resolve any disputes that may arise between the ESCO and the building owner. The M&V related costs are borne by public funds.

Energy Savings Insurance (Mexico): Operational Modalities



Product Implementation Timeline

1. **BUILDING OWNER**
2. **ESCO**
3. **GUARANTEED SAVINGS CLAUSE & BASELINE**
4. **INSURER**
5. **THIRD-PARTY VERIFIER**
6. **PREMIUM**
7. **PRODUCT**

1. The building owner approaches the ESCO for installation of energy efficient technologies.

2. The ESCO surveys the facility and analyses the usage pattern of the building including parameters such as occupancy, power usage trends, floor area under usage, and seasonal variations in power usage for both the current and past scenarios. A power usage baseline is developed and energy efficiency interventions are proposed.

3. The ESCO provides a guaranteed savings clause under which it is liable to pay the building owner any difference in the guaranteed and the achieved savings.

4. The ESCO, to balance its financial risk, contacts the insurance company for an insurance against unachieved guaranteed savings.

5. A third-party verification of the ESCO, guaranteed savings clause and the developed baseline is conducted.

6. The ESCO pays the premium up-front and in-turn the insurance company agrees to pay any difference in the achieved and the guaranteed savings to the building owner based on the periodic reports by the ESCO.

7. The product is functional.

Exclusions in product design

Areas or factors not covered by the insurance Product are explicitly mentioned in the term documents. These factors are known as Exclusions. Exclusions are made in the product policy to effectively define the risks covered and to keep the premium low. Some of the observed exclusions in most international Energy Efficiency Insurance Products are:

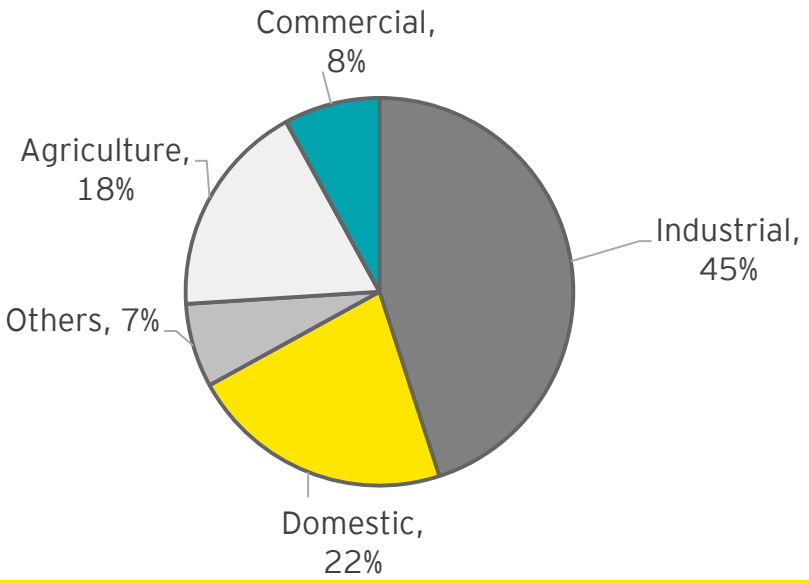
1. Addition of new end uses that increase energy use: This clause prevents any claims due to the addition of end uses. Contracts should have a provision for the adjustment of the baseline if new end uses are installed or removed.
2. Sabotage/misuse/vandalism of the installed technologies.
3. Physical damage to equipment: Physical damage or wear and tear is usually attributed to lack of maintenance by the responsible party.
4. Inadequate maintenance: The responsibility for maintenance should reside with the ESCO. The requirements for maintenance should be stipulated in the contract.
5. Changes in energy prices: Contracts should have a provision for the adjustment of the baseline if the energy prices change.
6. Failure or malfunction of data acquisition systems.

Highlights- Indian Energy Efficiency Scenario

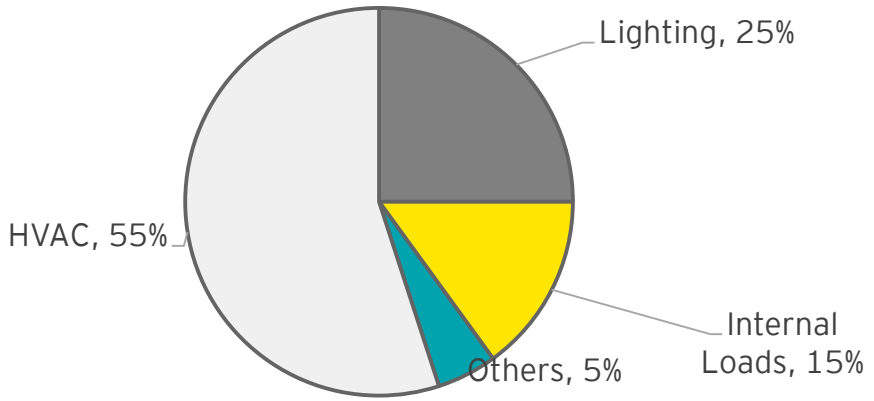
The overall size of energy efficiency market is estimated to be INR 74,000 crores **Source: EESL**

Recently, World Bank has pegged India's energy efficiency market at INR 1.6 lakh crore, four times the INR 44,000 crore in 2010 against the backdrop of the success of the government's UJALA scheme to distribute LED bulb **Source: World Bank**

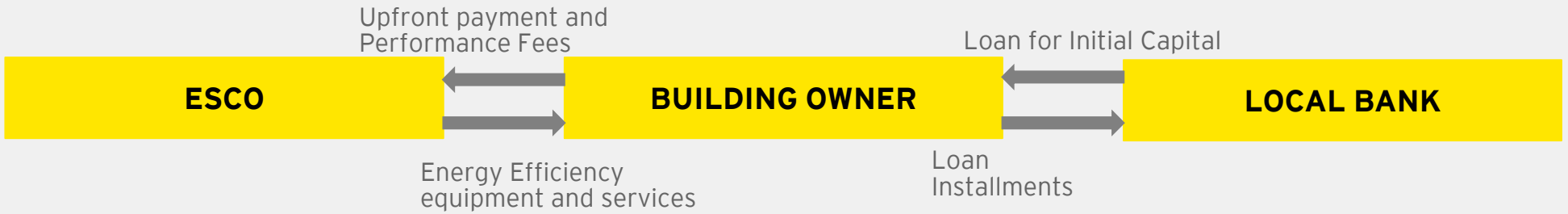
Energy Consumption Pattern in India (%)



Energy Consumption Pattern in Commercial Buildings



Highlights- Indian Energy Efficiency Scenario



To gauge the Indian energy efficiency scenario, desk research and stakeholder consultations were conducted:

BEE empaneled ESCOs were contacted for soliciting their views on the current energy efficiency scenario in India.

Responses were / are being received by:

- Carrier
- DESL
- Megawatt Solutions Pvt. Ltd.
- Energy Audit Services Ltd.
- RE Cube Energy Pvt. Ltd.

Key Findings:

1. ESCOs in India do not specialize in multiple interventions. Most ESCOs provide services for 1-2 technologies.
2. ESCOs operate according to 2 savings models:
   - Shared savings: ESCO invests. Savings shared between ESCO (85%) and building owner (15%).
   - Guaranteed energy savings: Building owner invests. Complete savings retained by the building owner.
3. No insurance framework exists for energy efficiency savings.

Identified Risk Factors for the Interventions

Risk Factors identified through stakeholder consultations.

Lighting

- Reputation of ESCO (No. of projects done/ No of years in operation)
- Lighting load power factor deviation
- Supplier quality certification
- Occupancy variation in a year
- Lighting load can be reduced with help of control availability
- No of years if operation for ESCO
- No of projects done by ESCO
- Operating hour variation in a year

HVAC

- Change in operational hours in an year from mean
- ESCO Reputation
- No of years of ESCO operation
- Impact of externalities on HVAC
- Number of projects done by ESCO
- No. of steps required to reach full load
- Reduction of motor power consumption through variable speed
- Volume of Air influx degradation(6 months)
- Availability of Buffer capacity
- Load switching capacity of chillers
- Frequency of overload in an year
- System's yearly efficiency range
- Monitoring agency
- Temperature Variation
- Relative Humidity
- Mean Air Velocity (Km/hr)
- Rainfall in Inch
- Deviation in Biometric Pressure from mean
- Deviation in HR
- Heating Load Variation due to lighting
- Occupancy variation for hotels

Solar Rooftop

- Physical Protection
- Surroundings Impact
- O&M post installation
- Test certificates of panels and other equipment
- MNRE Empanelment
- Components Quality
- Plant design

Illustrative Product Framework for Indian Market

INSURER	**National Insurance Company/ United India Insurance** (Insurer) **Munich RE / Hannover** (Reinsurer)
INTERVENTIONS COVERED	▶ HVAC (Demand Side) ▶ Lighting (Demand Side) ▶ Alternative Energy (Supply Side) – Energy generation from Rooftop Solar PV
COVERAGE	The designed product will cover only unrealized energy cost savings due to energy efficiency interventions. *No insurance product is available for mitigating risk posed by variation in energy savings.*
SECTOR COVERED	Commercial building sector

Risk Computation Model- Sample Scenario

For developing an EE insurance product, a risk computation model needs to be developed. The model should quantify the various risks that can impact energy savings in a EE intervention. Based on the on-site scenario, the user can populate the matrix for computation.

For any risk factors, the following parameters can be affected:

- Savings from the intervention
- Cost of the intervention
- Cost and Savings

Risk percentage for any particular factor can be calculated as:

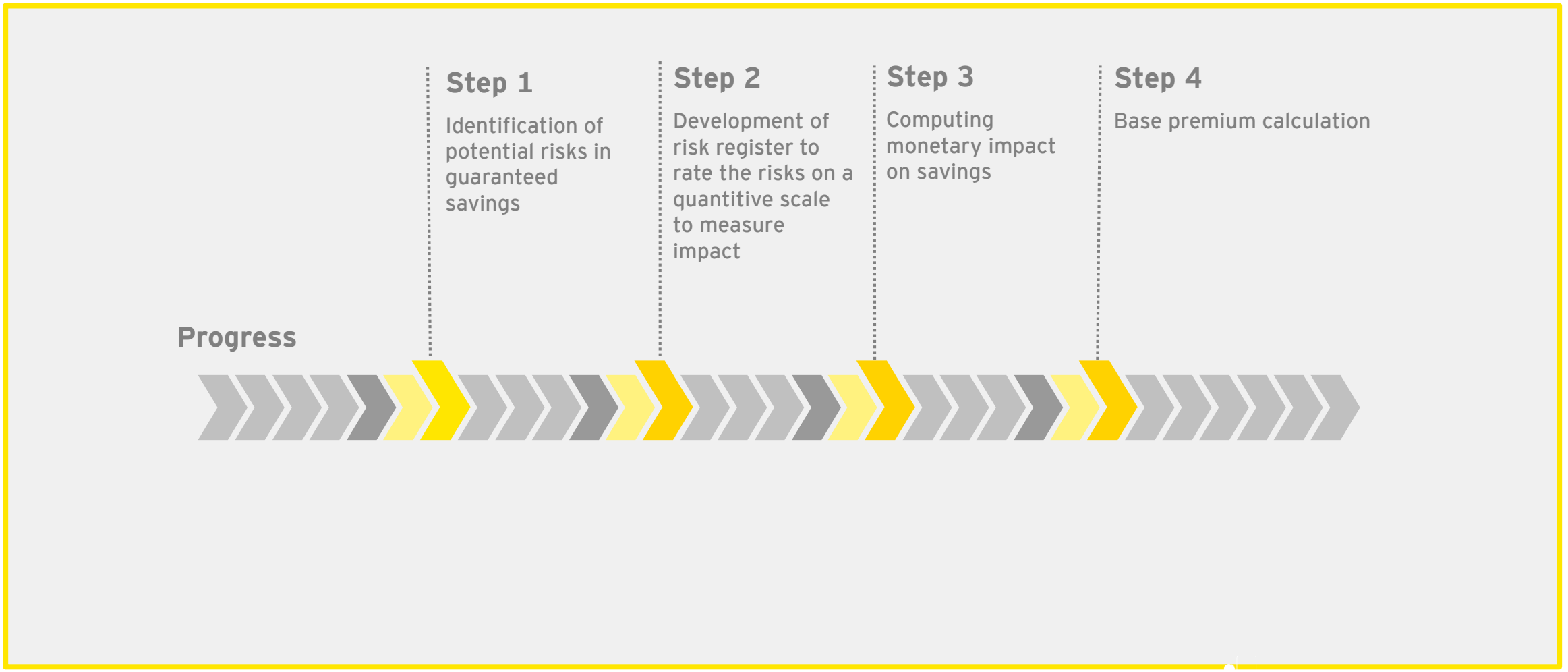
Impact on Payback X Weightage of Parameter = Risk Percentage of Factor or Parameter

Total Project Risk = ∑ Risk Percentage of Factors

SAMPLE SCENARIO OUTPUT

Categ	arameter	User Selection	Risk Output on the Basis of User Selection	Parameter Impacted on the basis of user input	Percentage change on the Parameter Impacted
Supplier Quality Certification	Compliance with India's LED Standards	Yes	Low Risk	Cost	0%
		No	High Risk	Cost	5%
	LM80 Certification	Yes	Low Risk	Cost	0%
		No	High Risk	Cost	5%
Post implementation service	O&M Responsibility	ESCO	Low Risk	Savings	0%
		Building Owner	High Risk	Savings	-10%
ESCO Reputation	ESCO Reputation – Crisil Grading	Grading 1	Low Risk	Savings	0%
		Grading 2	Low Risk	Savings	0%
		Grading 3	Low Risk	Savings	0%
		Grading 4 , Grading 5 and No Grading	High Risk	Savings	-10%

Sample Methodology for Base Premium Calculation



Methodology for Base Premium Calculation

The following is the calculation methodology for premium calculation:

Assumptions / Input parameters:		
S. No.	Parameters	Rationale
1	Internal Rate of Return (IRR) for Insurance Companies	To judge profitability for the insurance company, as normal premium calculation methodology is not applicable for the case. (Due to unavailability of historical data to assess probabilistic occurrence)
2	Risk Insured/project	To determine cash outflow (risk coverage) for the insurance companies.
3	% of companies claiming for coverage	To aggregate total time bound cash inflows for the insurance companies.
4	Tenure of the insurance contract	To determine total number of premiums, thus giving cash inflow timeline for the insurance companies.
5	Premium frequency/year	To determine total number of premiums, thus giving cash inflow timeline for the insurance companies

Output Parameters		
S. No.	Parameters	Calculation methodology
1	Base Premium	Cash outflow may be taken exactly at the mid of the insurance tenure and cash inflow may be considered based on premium frequency/year. A reference start date has to be considered. Based on the input IRR, NPV of cash outflows and inflows calculated, final NPV can ne calculated based on the % of companies claiming for premium.
2	Final Premium	Based on the risk factor calculated in the model, premium charges are imposed on the base premium.
3	Premium Schedule	Based on the tenure of contract and premium frequency, premium schedule be computed.