

ASIA CLEAN ENERGY FORUM 2023

NAVIGATING TOWARD A CARBON-NEUTRAL FUTURE THROUGH
CLEAN ENERGY SOLUTIONS

13 –16 June 2023 | ADB Headquarters, Manila

Advancing Energy Efficient and Green Cooling through Sustainable Public Procurement [SPP]

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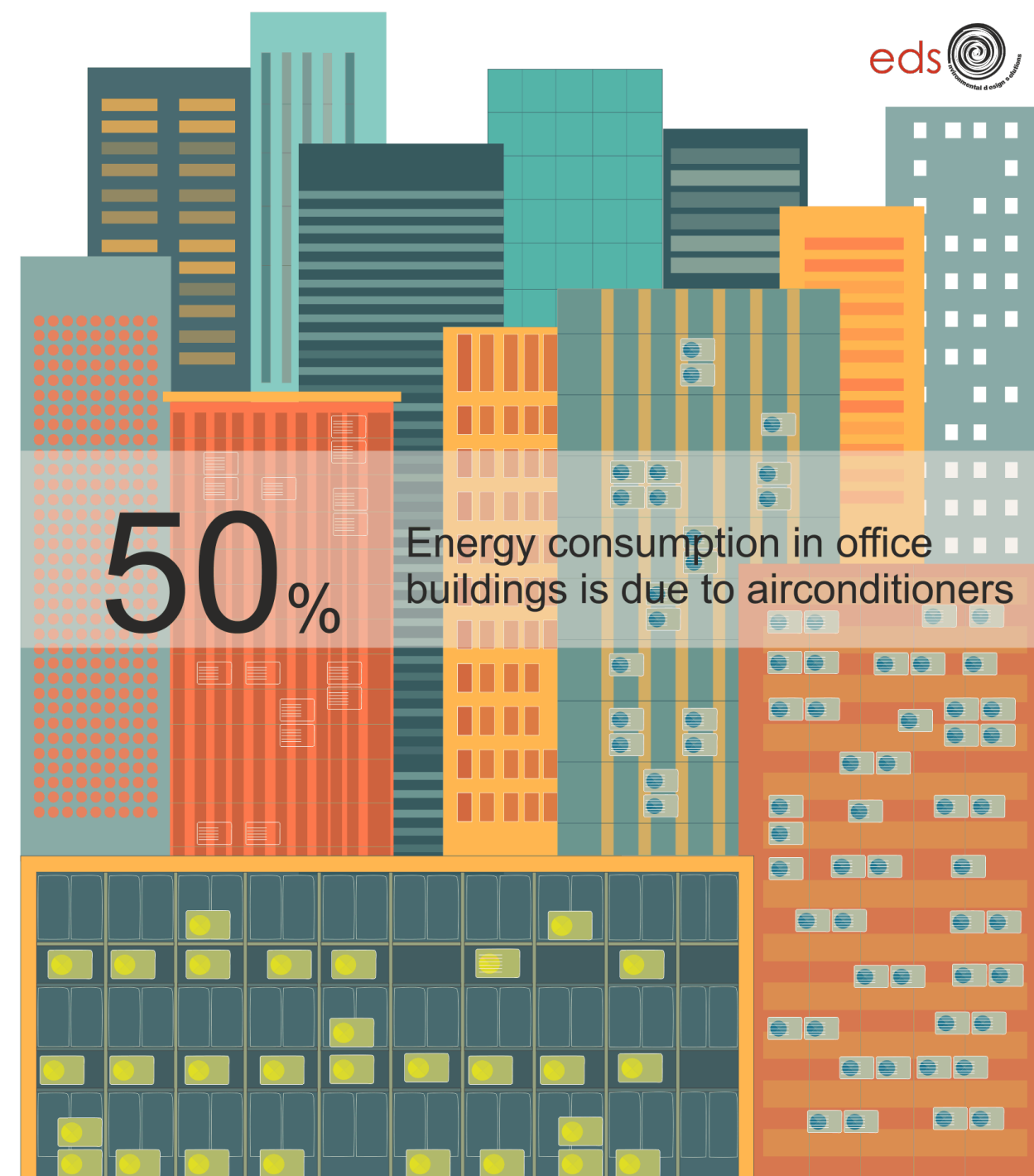
Cooling Challenge

Key Drivers for Rising Cooling Demand:

- Rising Global Temperatures
- Rapid Urbanization
- Increasing Disposable Income

Globally **cooling is responsible** for close to **10% of all annual GHG emissions**, more than those from air travel and ocean shipping combined.

Space cooling represents a significant proportion of the overall GHG emissions. **50% of the energy consumption in office buildings is due to air-conditioning.**



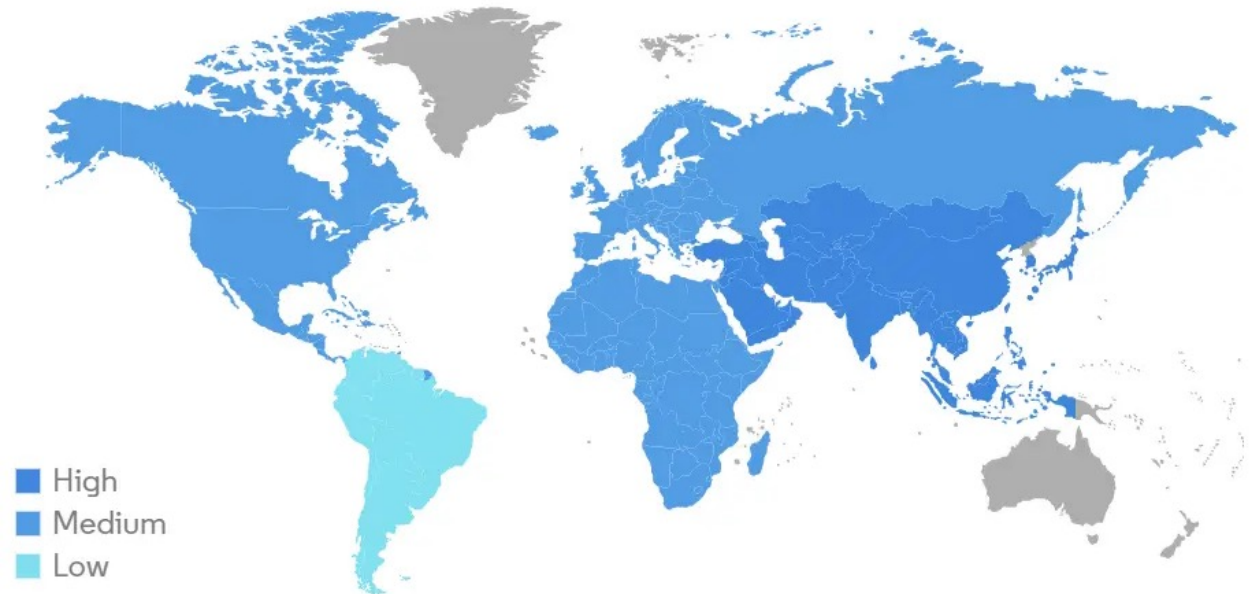
Escalating Cooling Demand results in growing demand room air conditioners.

Globally, the number of room air conditioners is estimated to be **4.5 billion units by 2050**.

67% of households across the globe will own ACs by 2050. → 70% of this demand is from emerging economies.

Air conditioner sales in India → Annual growth rate 10% - 15% per year.

India's cooling-related energy demand from room air conditioners will increase 20-fold from 94 TWh in 2016 to 1,890 TWh in 2050.



Air Conditioner Market - Growth Rate by Region (2021-2026)

(Source: Mordor Intelligence)

Sources: Shah et. al, Benefits of Leapfrogging to Super efficiency and Low Global Warming Potential Refrigerants in Room Air Conditioning, (2015)

Sachar, Sneha, Iain Campbell, and Ankit Kalanki, Solving the Global Cooling Challenge: How to Counter the Climate Threat from Room Air Conditioners. Rocky Mountain Institute, 2018.



Public procurement as a lever for market transformation - Green and Energy Efficient cooling.

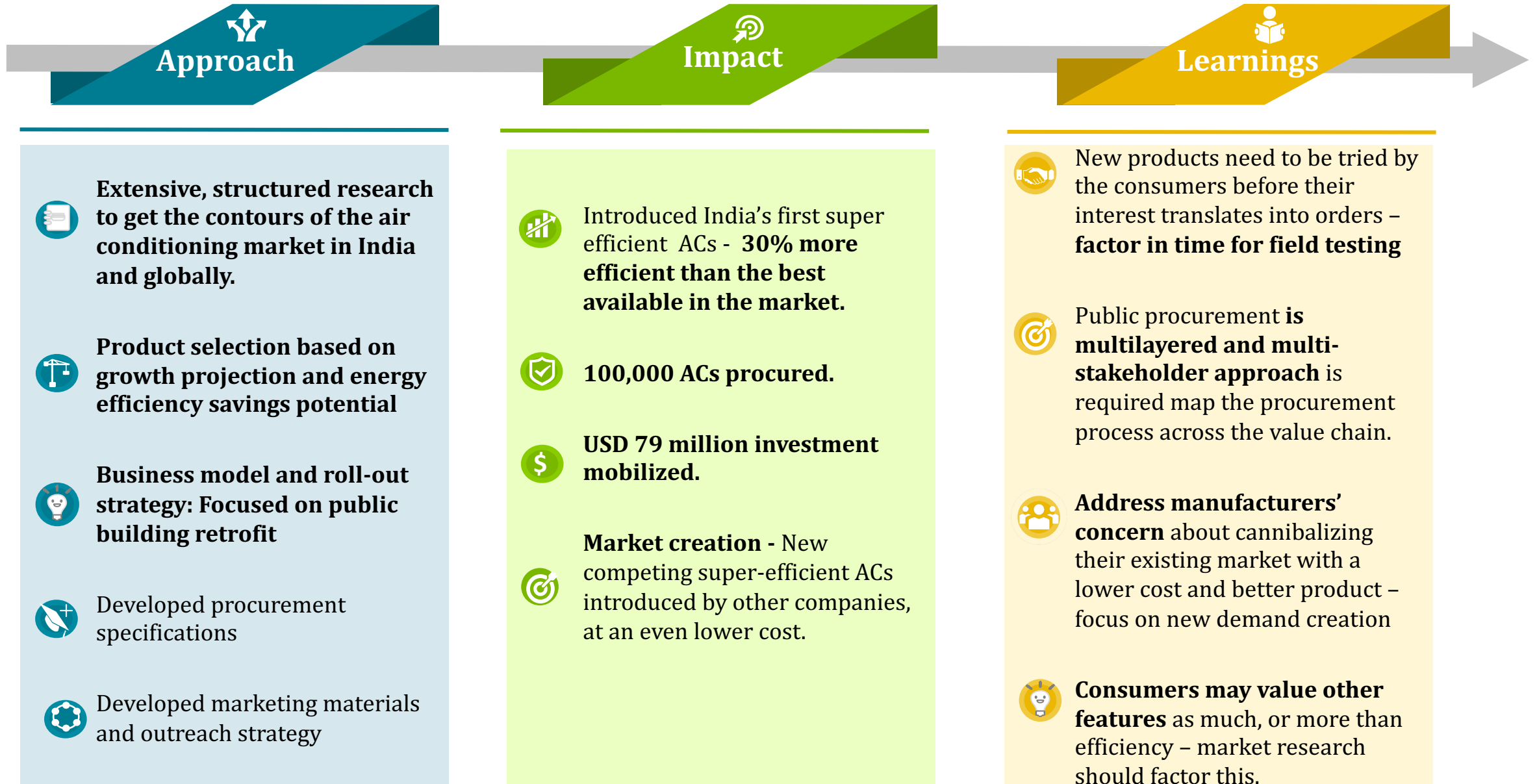
EESL (Energy Efficiency Services Ltd)

Super-Efficient Air Conditioning Program



The program was rolled out in 2019 to support India's commitment to Paris Climate Agreement, Kigali Amendment, and **India Cooling Action Plan**.

Designed on the **bulk procurement model to push the cooling technology markets in India toward competitively priced, high energy-efficient ACs that also use climate-friendly refrigerants.**



Government e-Marketplace (GeM)

Green Room Air Conditioner

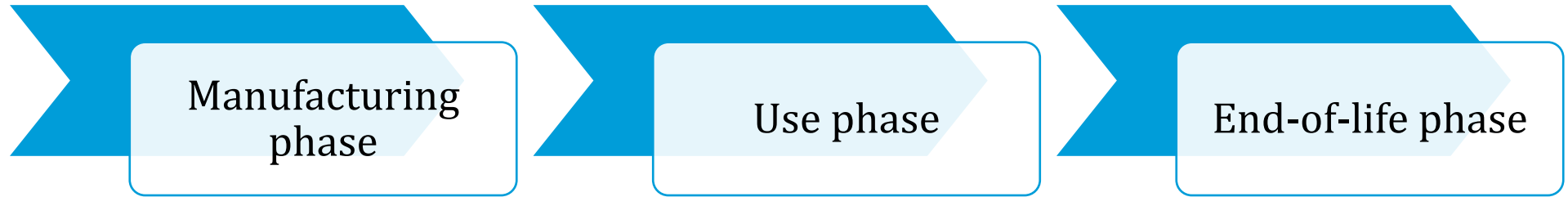


The Government e Marketplace (or e-Marketplace) (GeM) is an online platform for public procurement in India.

Building on the success and lessons learnt from the EESL's super-efficient air conditioning program,

- a) Developed an SPP framework for India.
- b) Integrate sustainable procurement (pilot product) in the national procurement ecosystem.

Lifecycle of a typical room air conditioner



Key Environmental Impacts

1. Finite resources.
2. Pollution (air, water, soil)
3. Bioaccumulation due to hazardous constituents.

1. GHG emissions.
2. Leakage of refrigerants.
3. Health impacts due to noise.

1. Generation of waste materials.
2. Refrigerant disposal.

Sustainable Public Procurement Approach

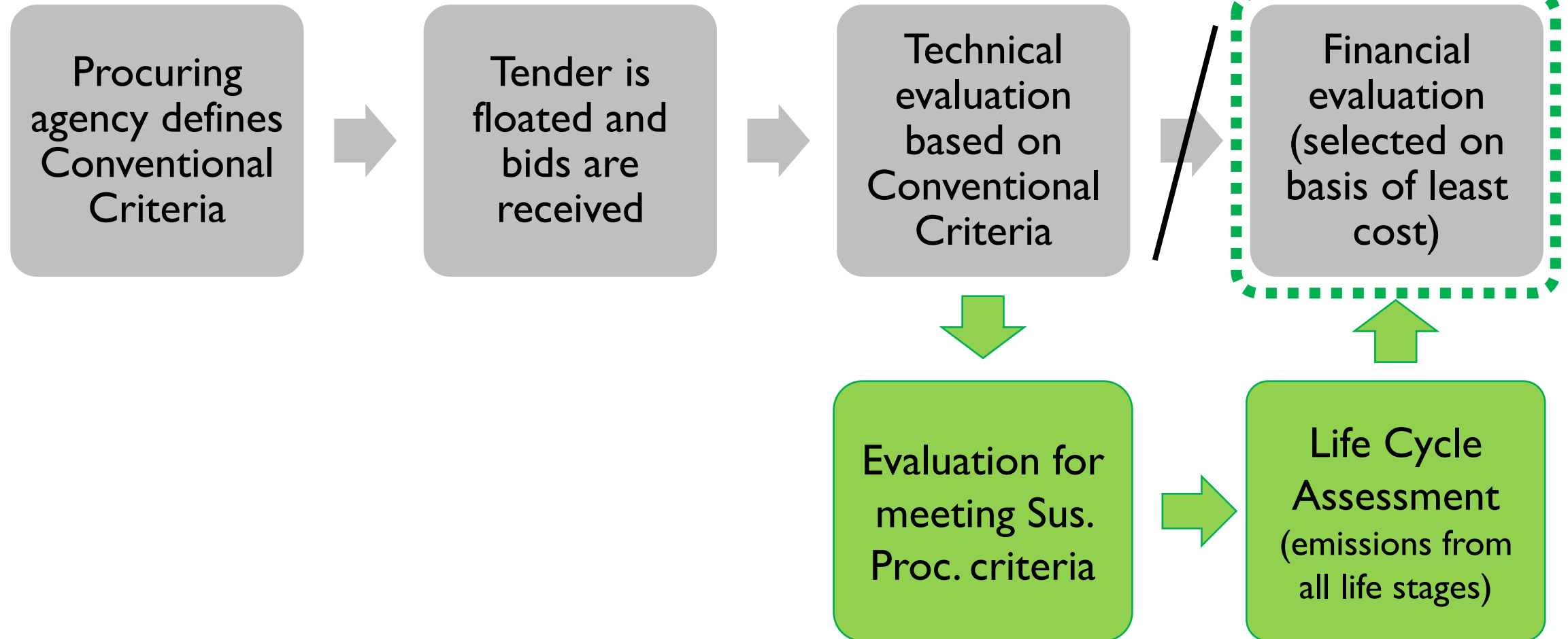
Procurement of RAC's from manufacturers:

1. Use recycled materials
2. Follow relevant environmental protection & waste management rules.

1. Minimize CO₂ emissions.
2. Minimize or eliminate use of refrigerants with high GWP.
3. Minimize product noise.

1. Procurement of RAC's from manufacturers that follow sustainable end of life practices.
2. Minimize or eliminate the use of refrigerants with high GWP.

Sustainable Procurement Tender Process



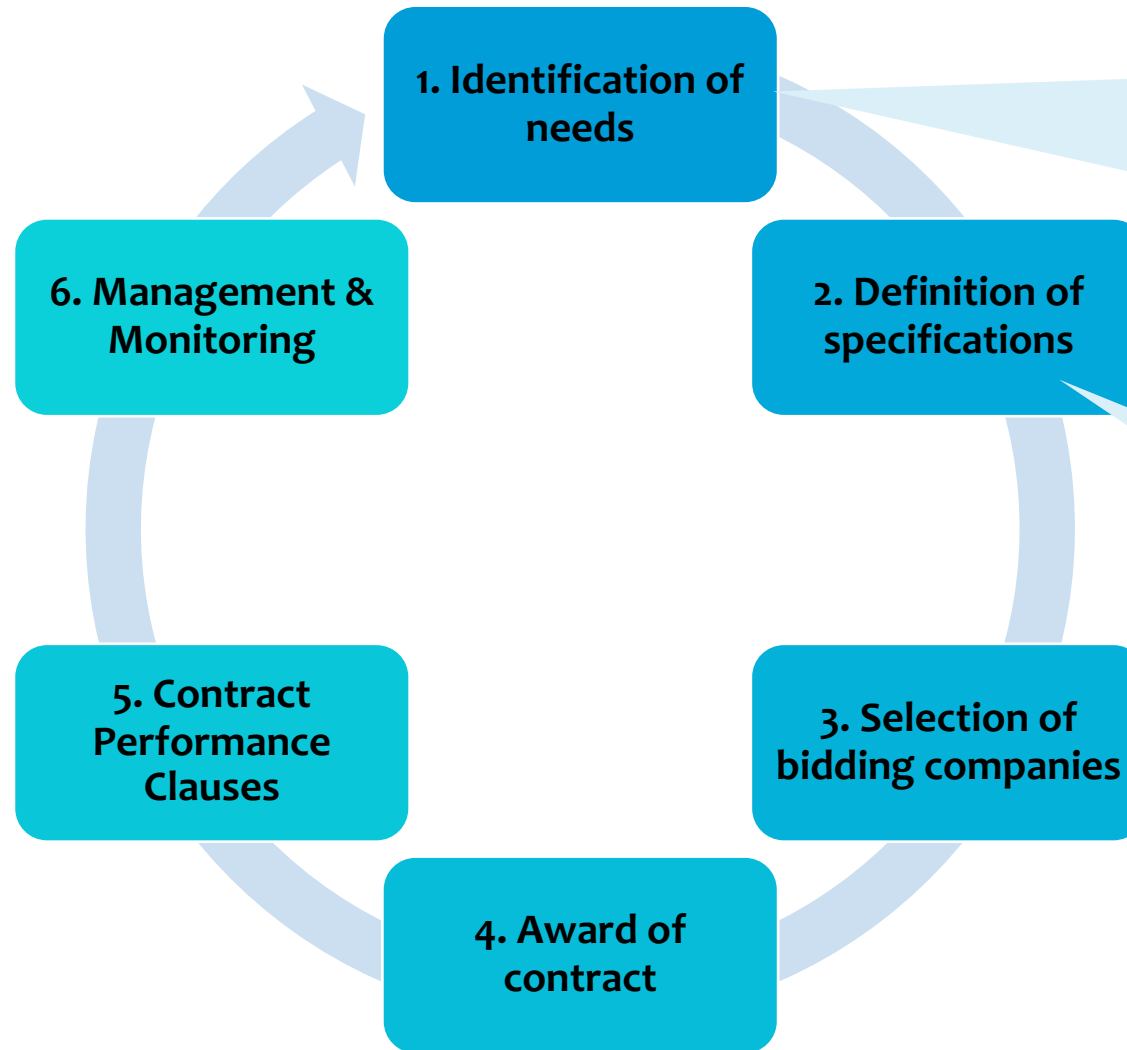
Sustainable Public Procurement Framework

Criteria:

Conventional criteria → Business as usual practices.

Core criteria → are designed to allow for easy application of SPP, focusing on the key area(s) of the environmental performance of a product.

Comprehensive criteria → consider more aspects or higher levels of environmental performance. This can be in the form of stringent specifications, method of evaluation for bids and products, etc.



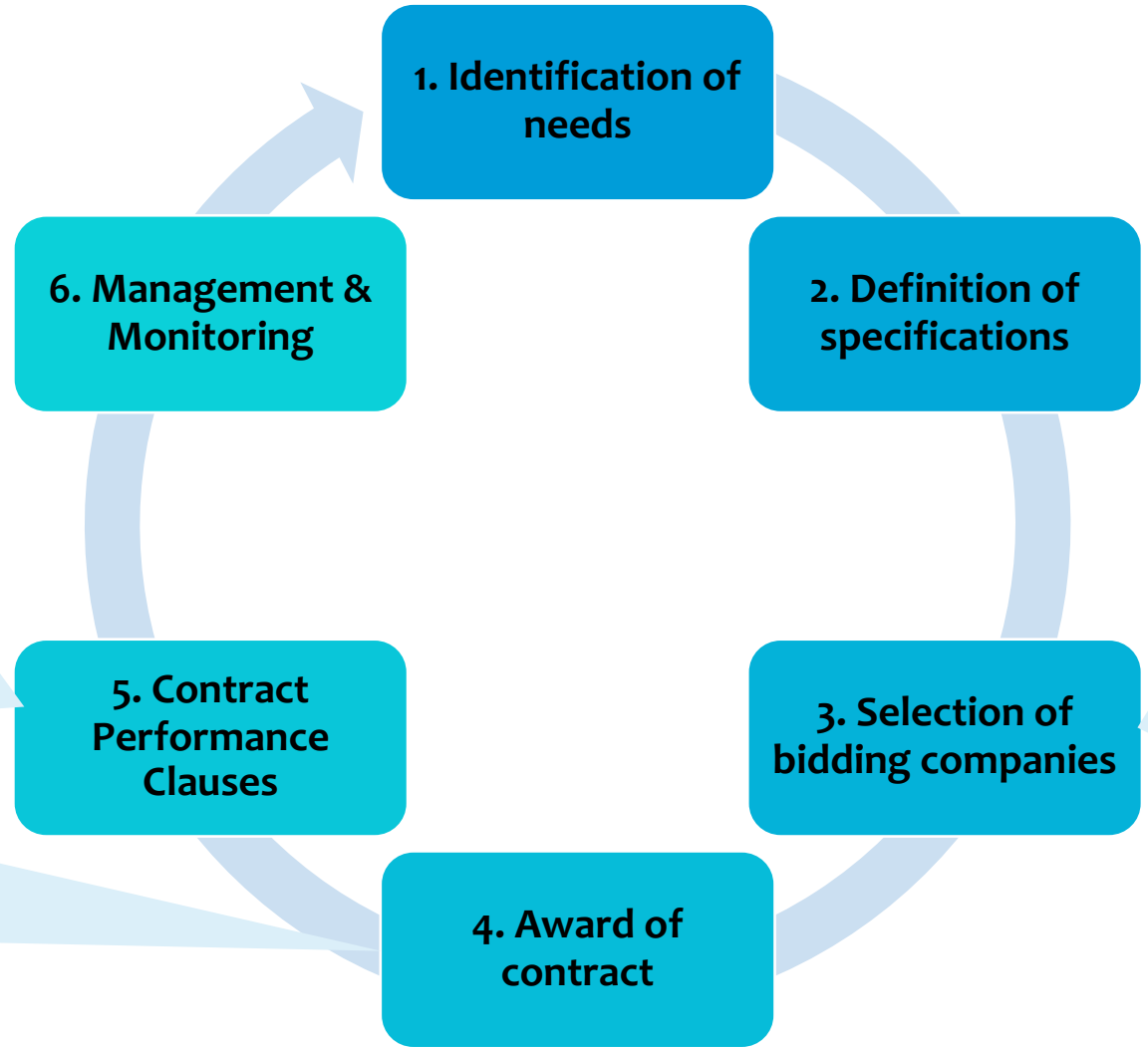
Identification of need- Air-conditioner as a product or “Cooling as a Service.”

Requirements - Quantity, type of air conditioner, capacity, nature of service -replacement or new procurement.

Support phase out of in-efficient products – Specify variable speed instead of fixed speed air conditioners.

Specify technical and functional performance specifications related to product criteria – Safety and performance, Product noise, Energy performance (EER), Refrigerant (Global Warming Potential, Ozone Depletion Potential), Recycled plastic component percentage, Paint and Packaging

Sustainable Public Procurement Framework



Green clauses for Safe Disposal

Option 1: Include True Cost of end-of-life strategy.
 Option 2: “Buy-back” or “take back”

Evaluation Criteria -

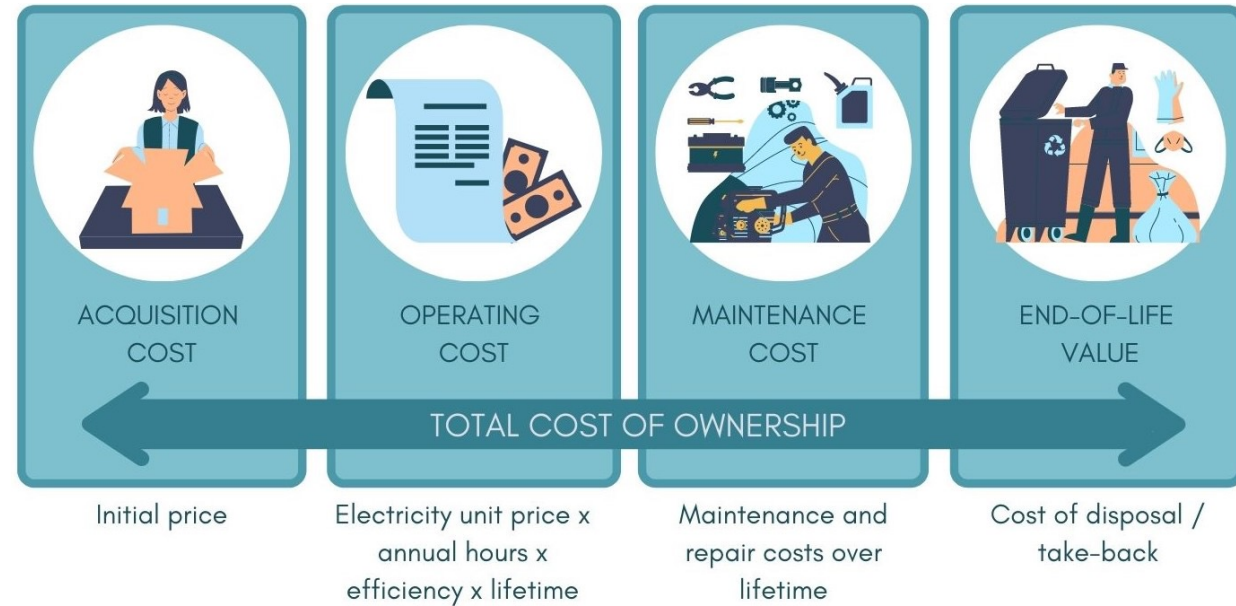
Option 1: Total Cost of Ownership (TCO)
 Option 2: Life Cycle Based Evaluation - Climate Performance (LCCP) or Direct Emissions due to refrigerants

Organization criteria – Adherence to Laws and Regulations such as Hazardous substance management, Noise Pollution, Ozone Depletion, Environmental Management Systems (EMS) Certification, Corporate Social Responsibility

Social Criteria – Adherence to Labour laws, Requirements for employee well-being and Gender Inclusivity

Total Cost of Ownership (TCO)

example for 1.5 TR RAC



Comparing a 1.5 TR 5-star Split RAC with Green RAC

5-Star RAC initially costs
₹ 42,000 - ₹ 70,000 (558 - 930 USD)

Green RAC initially costs
₹ 42,000 - ₹ 75,000 (558 - 997 USD)

On an average, consuming
890 kWh/year

On an average, consuming
750 kWh/year

Total Cost of Ownership over 7 years is
₹ 141,880 (1886 USD)

Total Cost of Ownership over 7 years is
₹ 122,090 (1622 USD)

GHG emissions over its lifetime
5,110 kg CO₂

GHG emissions over its lifetime
4,300 kg CO₂

Green Room Air Conditioner Specifications

Compressor Type	Variable speed
Safety and Performance	Conform to the requirements for quality, safety and performance prescribed in IS 1391 Revised /IEC 60335-2-40 (under preparation) and all requirements specified as under.
Product Noise	Air conditioner noise levels shall be as notified under the Environment (Protection) Act, 1986, and as per BIS (IS 1391 Revised).
Energy Performance	3517 W to 5240 W (1-1.49 TR) ISEER greater than or equal to 5.8 5275 W to 6682 W (1.5-1.99 TR) ISEER greater than or equal to 5.4
Refrigerants	Refrigerant should have Zero ODP. Global warming potential (GWP) not exceeding 700 (100 years)
Recycled Plastic Components	Product shall be designed to promote recycling Utilizing at least 80% by weight of plastics for recycled plastic components
Paint	Paints used in the product shall not contain heavy metals or their compounds include mercury (Hg), lead (Pb), cadmium (Cd) and hexavalent chromium (Cr).
Packaging	The air conditioner packaging shall be made of recycled or biodegradable materials. Plastic packaging shall not contain halogenated hydrocarbon.
Green Disposal	Take-back or buy-back option is available with the manufacturer.

RECAP: Key highlights of the specified criteria

1. **Organization & social criteria** in addition to product-specific sustainability criteria.
2. **Energy Efficiency**
 - Shift from fixed speed → Variable speed
 - Higher Energy Efficiency (ISEER) → Better than 5 star labelled products
3. **Low Global Warming Potential**
4. **Sustainable Packaging**
5. Contract clauses include - **“take-back” / “buy back”** options
6. Product **evaluation is based on “Total cost of ownership”**

Conclusion

1. Incremental change is a first step in public procurement.
2. Readiness in market is important for public procurement.
3. Multi-disciplinary team - Expertise in both domain / sector + procurement processes.



Thank You

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