Value Engineering – Is it Just Technical?

"Value Engineering" (VE) is a day-to-day term in the design-build industry. A systematic and continuous process of improving the value of a project/ product, or a service throughout the life cycle without any quality compromise.

But it has been misunderstood as just technical optimisation there by reducing the capex, by many sectors and practices, especially in the ever-evolving Renewable Energy sector.

VE involves technical analysis, which helps to improve the efficiency and reduces the risk, thereby creating a more efficient system. On the other hand, the value engineering needs to consider the life cycle cost reduction of the project, sustainability, and reduction of environmental impact, project management and risk management, Flexibility and Resilience, stakeholders management, and overall financial feasibility.

The **Value Engineering of Renewable Energy** should be carried out for the entire life cycle of the project from cradle to grave or cradle to cradle and must be a continuous process.

1. Life cycle cost reduction & Financial feasibility

- With the help of a comprehensive cost analysis, procurement plan can identify more cost-effective solutions/ products with same function and quality.
- Proper assessment of warranty and other services of the product is always beneficial and advances the value of the overall plant.
- Initial cost of grid connections and other auxiliary works need to be considered similar to the main system at the preliminary stage of project plan.
- Operational cost is a less discussed area in the Renewable industry, value engineering in this area can both reduce the cost as well as improve the performance and life of the plant.
- Renewable energy projects benefit from subsidies or tax incentives. VE helps ensure that projects are designed in such a way that they can fully capitalize on these incentives.
- In renewable Return of Investment (ROI), duration of the return of investment is the driving force for investors, thus the financial feasibility should be a key factor of VE.

2**. Sustainability and reduction of environmental impact:**

Renewable Energy systems are never carbon free or 100% green. The value Engineering must focus on the sustainability outcomes, optimal use of resources, along with reducing environmental impact throughout the life cycle.

- VE ensures that the renewable energy systems' lifecycle is optimized. This involves choosing materials and designs that minimize waste, energy consumption, and environmental impact over the project's entire lifespan.
- VE can prioritize use of low carbon materials in the supply chain and products, which can reduce the lifecycle environmental impact.
- Since the renewable projects, especially solar & Energy storage, have a predetermined comparatively less life span, the end-of-life plans (repowering, reusing, recycling) need to

be considered, which can bring both environmental values and financial value to the project.

- Resource optimisation should be considered part of value engineering which includes optimal land use, reducing wastages, and lower impact to the ecosystem and biodiversity.

3. **Project Management & Risk management**

Effective project management with proper stakeholder engagements must bring value to the project. Timely execution and energy generation can only bring the value at the ever-advancing industry,

- VE can help identify risks in the supply chain (e.g., delays, price fluctuations, or material shortages) and suggest alternative sources or technologies that reduce those risks.
- In the renewable energy sector, regulations play a significant role. VE helps ensure that designs comply with regulations while remaining cost-effective. It can also help anticipate future regulatory changes and adapt the project designs accordingly.
- Proper stakeholder engagement can avoid inherent risks and delays.

4. **Flexibility and Resilience**

- The renewable industry is evolving at the same time it is intermittent, so the flexibility and reliability of the system are very important in terms of VE.
- VE can recommend flexible designs for renewable energy systems, making them more adaptable and scalable. This is particularly important as renewable energy systems like solar farms that can be reconfigured as energy demands change over time.
- Since huge capex is involved and the benefit is purely dependent on the Energy generation, the VE should be resilient enough to all kinds of impacts (climate, socio-economic, etc).

5. **Operational Efficiency.**

- In general, the renewable energy sector is hugely focused on efficiency improvement and innovations in the initial designs and almost neglects the operational phase. The value of the energy systems lies in the actual energy generation, thereby it is always important to have VE approach to optimise the operational phase.
- Adequate strategies and systems are required to have informed decision making on the operational phases of the renewable energy system to optimise the performance. Where it can bring value addition to the project

It can be concluded that Value Engineering in the renewable energy sector is a cross-disciplinary approach, combining technical, financial, environmental, and operational considerations. It aims to reduce costs while improving the overall value, efficiency, and sustainability of renewable energy projects.