

DB Schenker Digital Challenge Call Wishlist for Digitalization

Items highlighted in RED are priorities in the wish list.

Energy Consumption Monitoring

1. Total energy consumption for each site, *real-time*
2. Energy consumption of each function:
 - a. Lighting
 - b. ACMV
 - c. Cold Room
 - d. Receptacle Loads such as lift, robot, conveyor belt, automation system, ...
3. Energy consumption breakdown per level/ tenant

Water Consumption Monitoring

4. Total water consumption for each site, *real-time*
5. Able to detect leakages

ACMV

6. Machine learning capability of chiller plant and air system (water + air side) to ensure efficiency and sustain energy savings

Lighting

7. Optimization of light usage on different areas within the sites/ buildings
 - a. Proposed lighting system for common warehouse areas that requires constant lighting: alternate lighting system
8. Fault Management and Usage Tracking Capability

Solar Panel

9. Ability to integrate solar monitoring dashboards from solar vendor to warehouse's building management system (BMS)
10. **Solution to provide demand response capability to alternate power supply between grid and renewable energy**

Building Management System/ Digital Twin Dashboard

11. Customized dashboards with key features including:
 - a. Energy consumption real-time monitoring
 - b. Water consumption real-time monitoring
 - c. Total System Efficiency monitoring:
 - i. Chiller plant system (water-side) efficiency
 - ii. Airside efficiency
 - d. Solar panel generation real-time monitoring
 - e. Temperature monitoring
 - f. Air quality monitoring

12. **All sites' BMS should be integrated into a central BMS where one dashboard is able to access all sites' building performance and monitoring**

Others

13. **Integration of Building Performance Data Monitoring into Building Certification platform**
14. Management of faulty automatic shutters
15. Air quality monitoring: CO2, TVOCs, temperature, RH

Financing Options

16. Availability of grants from government for digitalization initiative
17. Return on investment for optimizing building performance by going digital

Relevant Target Reference

| Industrial | | | |
|--|------|----|----|
| High Tech Industrial Buildings | N.A. | | |
| Light Industrial Buildings | 50 | 45 | 35 |
| Warehouses, Workshops/Logistics and Others | 50 | 45 | 35 |

| Additional Notes | New | Existing |
|------------------------------------|---------------|----------|
| AC Total System Efficiency (kW/RT) | 0.8 | 0.9 |
| Occupancy rate for EUI | 100% (design) | ≥60% |
| Renewable Energy included | On-Site | |

Warehouses, Workshops/Logistics and Others

| WAREHOUSES/ WORKSHOPS/ LOGISTICS/ OTHERS | | | |
|--|------------------------------|-------------------|--|
| PARAMETER | Gold ^{PLUS} EE >50% | Platinum EE ≥ 55% | SLE EE ≥ 60% |
| Reduced Heat Gain (ETTV) [New Development only] | 40 | 40 | 40 |
| Non-AC Areas | - | 30% | 40% |
| ACMV TSE | 0.8 | 0.75 | 0.7 |
| Lighting Power Budget | Table 2A | | |
| Mechanical Ventilation | Table 2B | | |
| Integrated Energy Management & control Systems | - | - | Energy consumption monitoring and benchmarking system. |
| On-Site Renewables - replacement to make up any deficiencies from the above list, with safety factor | 1.4 | | |

| | Pathway 3 – Energy Savings | | |
|--|------------------------------|------------------|-------------|
| | Gold ^{PLUS} EE >50% | Platinum EE ≥55% | SLE EE ≥60% |
| Saving from BAU (2005 Code) | 50 | 55 | 60 |
| Saving from Current Reference (Annex C) <i>*Including buildings supplied by DCS/DDC/CCS</i> | 30 | 35 | 40 |

| Additional Requirements | New | Existing |
|--|--------|----------|
| AC Total System Efficiency (kW/RT) | 0.8 | 0.9 |
| Airside efficiency for buildings supplied by DCS/DDC/CCS (kW/RT) | 0.2 | 0.25 |
| Savings from onsite Renewable Energy | no cap | |
| Savings from Passive Design | no cap | |