CITY OF CAPE TOWN
ISIXEKO SASEKAPA
STAD KAAPSTAD

SSEG for Municipal Buildings
Challenges and Pitfalls

Energy/Sustainable Energy Markets/BJones

Making progress possible. Together.

Overview

- Area of Supply
- Building Ownership/Control
- Financial Considerations
- Building and Roof Suitability
- Connection to the Grid
- Size of Generation
- Internal Site Reticulation
- Building Planning Permission
- Procurement Considerations

Area of Supply

- Whether the building is supplied by Eskom or the City
- Eskom's specific requirements
- The fact that the City would have to apply to Eskom for grid connection of PV in an Eskom supplied area. There are application fees in this regard.

Building and PV Installation Ownership/Control

- Any plans to sell the building in the short to medium term
- Whether the City is subletting the building to a third party which will benefit from the reduction in the electricity purchases bill due to the generation of rooftop energy.
- Who will own the PV installation?
- Who will be responsible for the operation and maintenance of the system?
- Has upfront written permission been obtained from the relevant facility managers and other stakeholders (e.g. tenants) regarding the actual installation (including location of inverters and metering, and routing of cables), storage of materials during installation, requirements regarding contractor access to site, operation of PV (including any change in standby generator start up procedures), use of internet, security, maintenance and repairs of the proposed rooftop PV installations

Financial

- The estimated cost of the installation, and subsequent annual operating costs
- The business case for the PV installation
- Who will pay capex for the PV system?
- Who will pay for operating and maintenance costs?
- Who will pay for interest, depreciation
- Will the installation need to be insured? By whom?
- Budget for repairs and bracing required to roofs before the PV can be installed
- Budget for grid connection fees where the grid needs to be upgraded (Eskom and the City) and for changes to metering
- Budget for grid connection application fees (Eskom)
- Who will insure the PV installation?
- Will the owner of the PV installation rent related land or roof space from another department and if so, on what basis?

Building and Roof Suitability

- Significant building developments on adjacent properties (shading)
- The orientation and slope of the roof
- The various impacts on the PV system's design where a site has multiple roofs including routes to lay cables.
- The structural ability of the roof to carry the proposed installation
- Additional bracing which may be required - bearing in mind that the bracing must be suitable for the actual installed product not for an estimated design used for the pre-feasibility study
- Repairs which might be required to the existing roof supporting structures
- The condition of the roof and its suitability to carry rooftop PV (e.g. tin sheeting, and /or waterproofing (for flat roofs) and whether the City has plans in place to repair /maintain the existing roof.

Building and Roof Suitability (continued)

- The existence of obstructions on the roof such as aerials, hatches and skylights, and air conditioning vents
- Shading and sources of pollution
- Future access requirements to the roof for maintenance/replacement- and ease of removing the PV installation to obtain this access
- The nature of fixing the PV panels to the roof (ballast, clips etc.) and the impact on the water-tightness of the roof.
- Ease of access to the roof for installation, repairs and maintenance
- Security of the site regarding theft and vandalism
- Execution of repairs and bracing to existing roofs required prior to installation of PV
- Whether the internal reticulation to each building is sufficient to carry the PV generation (voltage rise calculations etc.)

Building and Roof Suitability (continued)

- The presence of emergency generators on site and how they are connected to the internal reticulation- if there is automatic changeover; the point of connection of the "out of bounds relay" to the internal network should be upstream of the automatic changeover switch.
- The requirement for centralised disconnect switches for installations over 30 kW (For installations connected to the City's grid)
- Where will the disconnect switches be located?
- Where will the "network and system protection out of bounds" (required for aggregated generation on one site > 30 kVA) relay be located?
- The requirement for a IS&T internet connection (required for installations with an aggregated generation capacity > 100kVA) for Grid Code communication and control requirements.
- Suitable secured space for the installation of inverters, local metering of gross inverter output etc.)
- The availability of spare cable ducts and cable racks for the routing of power, control and data cables.

Building and Roof Suitability (continued)

- Whether certain roof types should always be excluded (e.g. metal roofs due to the need for periodic replacement; flat roofs often leak water and need to be repaired.)
- Is there a water point within easy access of the panels for cleaning? If not, should one be included in the installation?
- Particular safety concerns e.g. skylights- installers could fall through (old and brittle), very steep or exposed roofs. (If potentially dangerous, there must be compliant safety rigs for all installation work and O&M. (O&M more difficult because the safety rigs must be regularly checked)
- Is lightning protection required?
- Obtain Property Management approval if conditional exemption of building plans for PV installations is not complied with.

Connection to the Grid

- Whether the complex covers one or multiple erven?
- What tariff is intended- SSEG or wheeling?
- Will the installation be connected to the grid through the existing supply point or through a separately metered separate/second supply point?
- Metering and isolation points (from where are the buildings associated with each roof to be fitted with PV supplied?)
- Whether the building associated with each roof to be fitted with PV is separately metered by the City or is the site supplied by a bulk meter?
- What type of meter currently feeds the load? Does it need to be changed to an AMI meter?
- At what tariff is the building/site currently supplied?
- Is the supply to the site single or three phase?
- Do additional metering panels need to be accommodated?
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Size of Generation

- What is the NMD of the supply point?
- Is it considered a dedicated or shared feeder?
- What voltage is the supply point?
- Has the Electricity Department agreed to the proposed installation?
- The existing and future site load profiles and annual electricity consumption
- Is there agreement from the Electricity Department that the proposed installation can be connected to the grid- taking into consideration the "net consumer" and NMD restrictions?
- If the generation is over 1 MW, will/has NERSA issued a generation license?

Internal Site Reticulation

- Where will the inverters and combiner boxes and centralised disconnect switches (where required) be physically located?
- Where will the protection and network control "out of bounds" voltage relay "pick-up" the presence of grid voltage? (Must be upstream of any automatic generator changeover switch).
- How and where will power and data cables be routed? Are there spare cable ducts?
- What site as built drawings are available showing electrical reticulation and ducts on the site?
- Is the site's internal cabling sufficient to carry the power from the inverters?
- Are there emergency generators on site?
- How emergency generators are safely connected and disconnected to the site's internal grid?

Building Planning Permission & Other

- Has special building approval been obtained where conditional exemption of building plans for PV installations is not complied with (if the proposed structures by their proposed design/layout are not excluded from this requirement due to their design?)
- What other authorisations are required? (EIA etc.?)
- Generation license?
- Wheeling?

Procurement Considerations

Project phases:

Establish Municipal strategy regarding rooftop PV

- Who pays, who benefits from electricity purchase savings, who owns, who maintains? (Funded by Rates, Water, Electricity, other departments)
- Go/no go- PV at what cost? Basis for decision-?

Initial List of sites

Establish capital spend budget per year

Pre-feasibility filtering of sites

Detailed feasibility studies

Final list of buildings/properties

Do detailed design for each property

Draft, issue and adjudicate tender for installation of PV systems

Place order

Manage the contractor

- Installation
- Commissioning
- Handover
- Maintenance

A Project Execution Strategy

1. Contract a consultant for 3 years to :
    1. Conduct Pre-feasibility studies (with the City)
    2. Conduct feasibility studies
    3. Identify projects for next few years (With the City)
    4. Do detailed designs and draft tenders on selected projects(technical specifications)
    5. Assist City with Tender Adjudication
    6. Manage the PV installation contractor/s
2. Issue tender/s (managed by the consultant) for identified project matched to identified budgets per financial year (Capex takes place in years 2 and 3 of consultants term)
3. Issue tender for maintenance of City PV systems for periods of 3 years (Framework tender)

Q- how to estimate consultant costs per year and how to contain consultant's costs- Rates based? Item based? – for best quality and keen price.

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Thank You

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Making progress possible. Together.