

Managing Safety for Rooftop Solar Installation

Work at Height Symposium 2023
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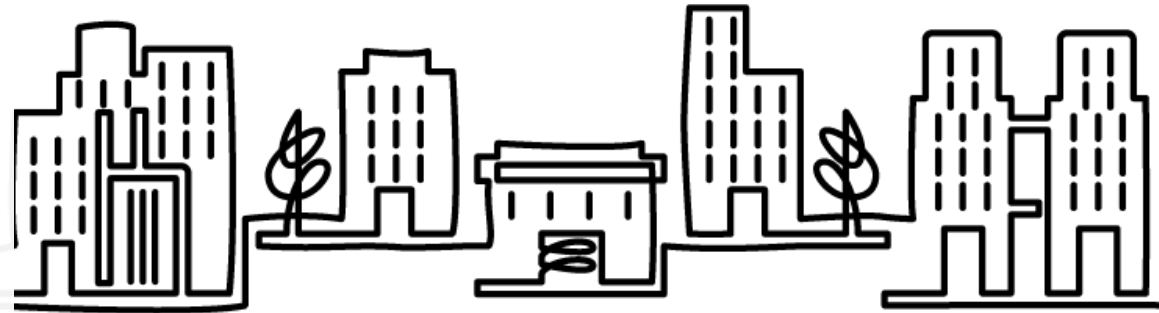
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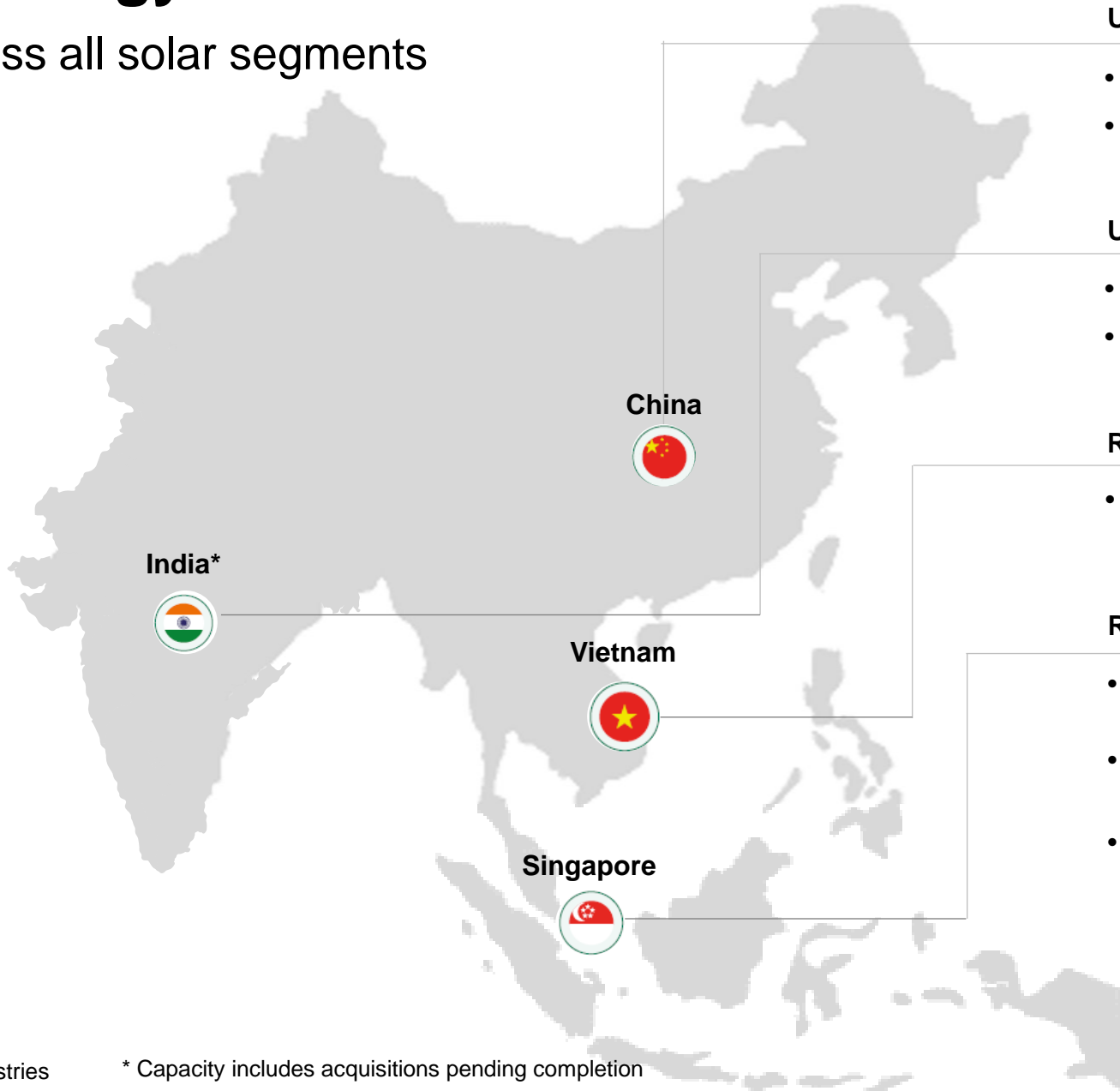
Outline

- Introduction to Sembcorp Industries
- HSSE Management System
- Managing Safety at Rooftops
- Training & Competency for Employees & Contractors
- Encouraging Safe Workplace Practices
- Conclusion



Our Solar Energy Portfolio

Capabilities across all solar segments



UTILITY SCALE & ROOFTOP

- 1,466MW installed
- 100MW under development

UTILITY SCALE

- 548MW installed
- 507MW under development

ROOFTOP

- 72MW (86MWp) of contracted capacity

ROOFTOP • FLOATING • UTILITY-SCALE

- 432MW (535MWp) of contracted capacity
- More than 4,100 sites operational or under development
- Contributing to more than $\frac{1}{3}$ of Singapore's national 2025 target

Sembcorp Solar Singapore – Leading Solar Developer



**SINGAPORE
ENERGY
AWARD**



Sembcorp Solar Singapore was awarded the Singapore Energy Award 2022 by Energy Market Authority, presented by Minister Gan Kim Yong.

The Award recognizes exemplary and outstanding contributions to Singapore's energy sector.

FROST & SULLIVAN

**2020 & 2021 Singapore
Solar Power
Company of the Year Award**

Sembcorp Solar Singapore was named the **2020 and 2021 Singapore Solar Power Company of the Year** in the Frost & Sullivan Best Practices Awards.

The Award recognises best-in-class companies that have demonstrated excellence in their respective industries.



**SINGAPORE APEX
CORPORATE
SUSTAINABILITY
AWARDS 2020**

Sembcorp Industries is the **APEX Winner** in the 'Sustainable Solutions' category of the 2020 Singapore APEX Corporate Sustainability Awards.

The Award recognises companies whose business solutions have demonstrated excellence in embodying the Ten Principles of the United Nations Global Compact.



**Enterprise Exemplary Award
2022**

Sembcorp Solar Singapore was awarded the BizSafe Enterprise Exemplary Award 2022 by WSH Council

The Award recognizes exemplary risk management and workplace safety and health performance

Rooftop Solar



C&I Rooftop PV at Changi Airport for SATS



HDB SolarNova @ Choa Chu Kang

Safety as Top Priority

Safety Record (2022)

Key Objectives & Targets

- ✓ Prevent injuries and property damages
- ✓ Prevent any incidents involving members of the public
- ✓ Implement and maintain an effective, uniformed HSSE programme



Total Man-hours

Achieved
1.2 million Safe Man hours



Lost Time Injury (LTI)

Zero LTI Recorded



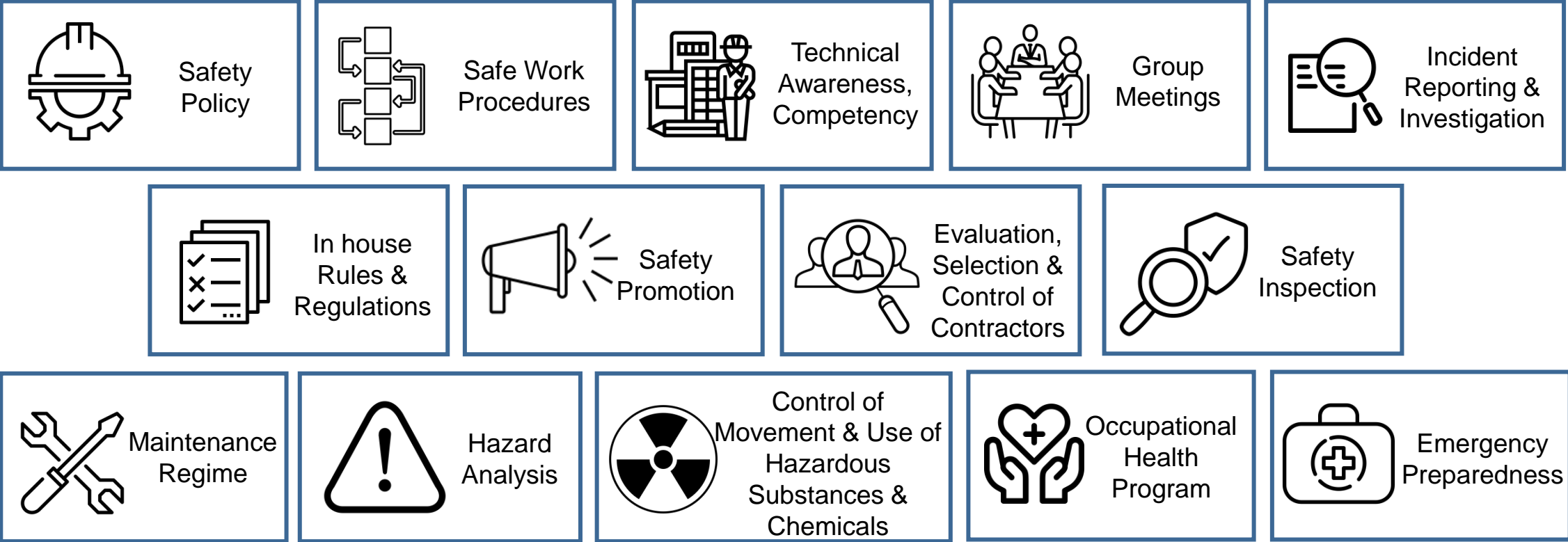
Solar Installers Trained

300 Certified Solar
Installers for Sembcorp
Solar Singapore Projects



Sembcorp HSSE Management System

Third-party audited; customised to the Solar installation and working environment.

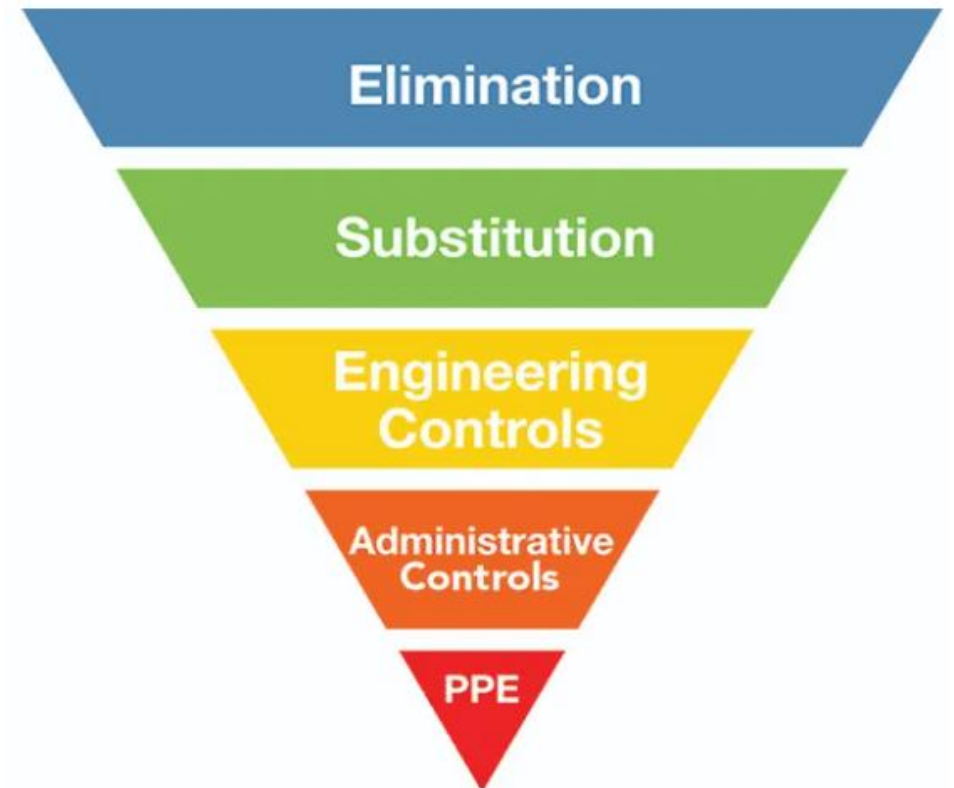


Key Challenges faced at Rooftops

Key Challenges/ Risks when working on rooftops

- No access to verify roof conditions;
- Varying work situations/roof conditions when work commences
- No anchorage points for 100% tie-off
- No edge protection at roof edges
- Space constraints for safe operations
- Workers' health conditions
- Weather conditions

Risk Control Hierarchy



Managing Safety at Rooftops

- Solarising more than 4100 sites across Singapore, most of which are rooftops.
- Work-at-Height is a high-risks activity performed regularly by our employees and contractors.
- Strong Safety Management System critical to ensure safety

SolarNova (Reinforced Concrete)







C&I (Metal)



Managing Safety at Rooftops

Holistic assessment to ensure safety at our work sites

H.S.S.E OFF THE ROOF

-  **H**ook-up to anchorage point
-  **S**ite specific Risk Assessment
-  **S**urveillance program
-  **E**ducation and Training



Managing Safety at Rooftops

Donning the right fall protection equipment, consistent with the Risk Assessment.



100% tie-off to anchorage point



Solar panels secured on roof

RISK ASSESSMENT FORM			
Department: S.M.E. Electrical Co. (Pte.) Ltd.	RA Team Leader: Mohd Hidayat Bin Hamzah Designation: WSH Officer	Approved by: 	Reference No.: RA001/SN7-PV/SME/2022 (Rev0-A)
Process: Solar PV Installation Works - PV Panel Installation and Electrical Works	RA Member 1: Hossain Shafiqat Designation: WSH Coordinator	Signature: 	
Activity Location: Solar Leasing of Grid-Tie Solar Photovoltaic System (Solamova Phase 7)	RA Member 2: Krishnan Pandiselvam Designation: Project Engineer		
Original Assessment Date: 18 August 2022	RA Member 3: Hoo Khak Ting Designation: Senior Site Supervisor	Name: Michael Too 	
Last Review Date: 01 December 2022	RA Member 4: Kadir Designation: WSH Supervisor	Designation: Project Manager 	
Next Review Date: 30 November 2023	RA Member 5: Hossain Md Manik Designation: Site Supervisor	Date: 02 December 2022 	

Site-specific risk assessment

Managing Safety at Rooftops

Management Participation in Safety Supervision Programme

H.S.S.E Supervision

- **Participate in Tool Box Meeting Talks**
- **Daily Site Safety Inspection on the Roof**
- **Audit on Risk Assessment. Checking on compliance**
- **Audit on Permit to work**
- **Communicating on observation and immediate closure of observations**

Managing Safety at Rooftops

Temporary Anchorage points are used for 100% tie off methodology for works near roof edge

Metal Roofing



- Establishment of Control Restricted Zones and Warning Signage and complying with 100% tie off for works near roof edge

- Site Specific Risk Assessment and Fall prevention Plan to mitigate fall from height



- Implementation by contractors on Red/ Green Demarcation zone on roof

Managing Safety at Rooftops

Establishment of physical demarcation visible warning to prevent workers from going to the edge, prior to installation of railings.

Reinforced Concrete Roofing



- Selection of rigid temporary anchorage points on the roof during site survey
- Establishment of Control Restricted Zones and Warning Signage on RC Roof for HDB and complying with 100% tie off for works near roof edge
- Installation of Build to Edge railings as a fall prevention system
- Site Specific Risk Assessment and Fall prevention Plan to mitigate fall from height

Managing Safety at Rooftops

SMS Implementation



- ❑ Establish risk assessments and safe work procedures for various work at height (WAH) activities.
- ❑ Implement Site Specific Fall Prevention Plan (FPP)
- ❑ Establish a Permit-to-Work system
- ❑ Establish Safe Work procedures for Works on Roof

Training and Competency



- ✓ Contractors have attended all mandatory WSQ Courses
- ✓ Educate employees on the proper use of fall prevention system & devices (e.g. securing to a suitable anchor point and maintaining 100% tie off).
- ✓ In House Training conducted by Sembcorp Solar. Field safety induction, Solar installer training and Built to Edge courses are conducted to contractors.

Enforcement thru Inspection



- Provision of safe access/egress to and from areas with difference in heights for workers.
- Provision of individual fall arrest system (e.g., safety harness) for workers working at height.
- Slips, Trips & Fall and Protruding hazards are identified by administrative controls.
- Observation of workers well-being and regular feedback session.

Encouraging Safe Workplace Practices

Setting safety standards with site contractors

- Daily Site Safety inspection by Sembcorp Solar HSSE Officers/ Coordinators
- Site Spot Check by Sembcorp Solar HSSE Lead and HOD
- Site Spot Check by Sembcorp Solar and Group HSSE
- Monthly Management Walk-down
- Permit To Work Audit
- Method Statement and Risk Assessment Audit
- Adhoc Safety Audit

Encouraging Safe Workplace Practices

Employee Engagement & Contractor Commendation

- Safety promotions Voucher
- Contractor Appreciation
- Internal circular and communication
- Behavioral based safety observations

Encouraging Safe Workplace Practices

Safety Reporting & Audits

- Monitoring of observations
- Digitalized Safety Inspection reports
- HSSE Data Analysis for safety observation tracking
- Monthly Management Safety Walkdown
- Management Site Safety Audits
- Site Spot check by corporate HSSE Team

Conclusion

- Safety is everyone's responsibility
- Establishment of SMS and guidelines for all staff and contractors working on the projects
- Clear inspection and enforcement regime
- Importance of providing learning platforms for employees and contractors
- Walking the talk to incentivise good workplace behaviours