SolarPath

ECO-ENERGIZERS
Texas A&M University at Qatar

A.Al-Fakhroo	BSc in Electrical Engineering
H.Fakhroo	BSc in Electrical Engineering
J.Massalkhi	BSc in Electrical Engineering
M.Jarrar	BSc in Chemical Engineering
P.Pande	BSc in Mechanical Engineering
R.Al-Khaldi	BSc in Electrical Engineering

Context

1 Need to reduce dependence on fossil fuels

2 Promotion of sustainable development

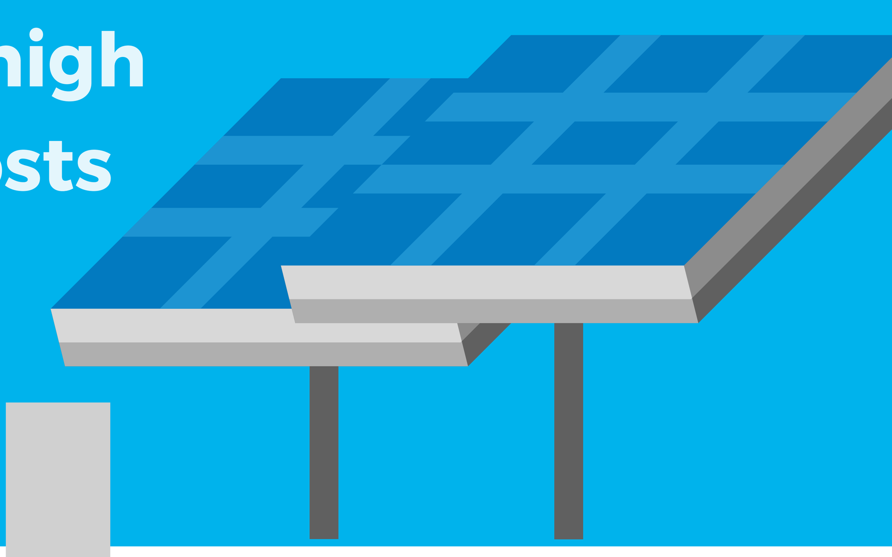
3 Solar energy is the most abundant, globally

4 How to make solar panels more prevalent?

5 Address issues with solar panels

Problem

Solar panels have low efficiency with high maintenance costs



Approach

Design Requirements	Pyramid Lenses	Self-Healing Materials	Nanocoating Technology
Long-Term Cost-Effectiveness	✓	✓	
Power Conversion Efficiency	✓		
Low Maintenance		✓	✓
Eco-Friendly Production	✓	✓	
Durability		✓	

Solution

Pyramid Lenses +

Self-Healing Materials =

SolarPath

SolarPath fulfills the requirements and more:

- **Fast Fabrication** Close-Spaced Sublimation (CSS)
- **Safe Production** Non-toxic materials
- **Earth-Abundant** Raw materials are easily available
- **All-Day Use** Lenses focus light no matter the incident angle
- **High Power Conversion** Efficiency of cell + lenses ≈ 25%

Pyramid Lenses
- Glass + Polymers -

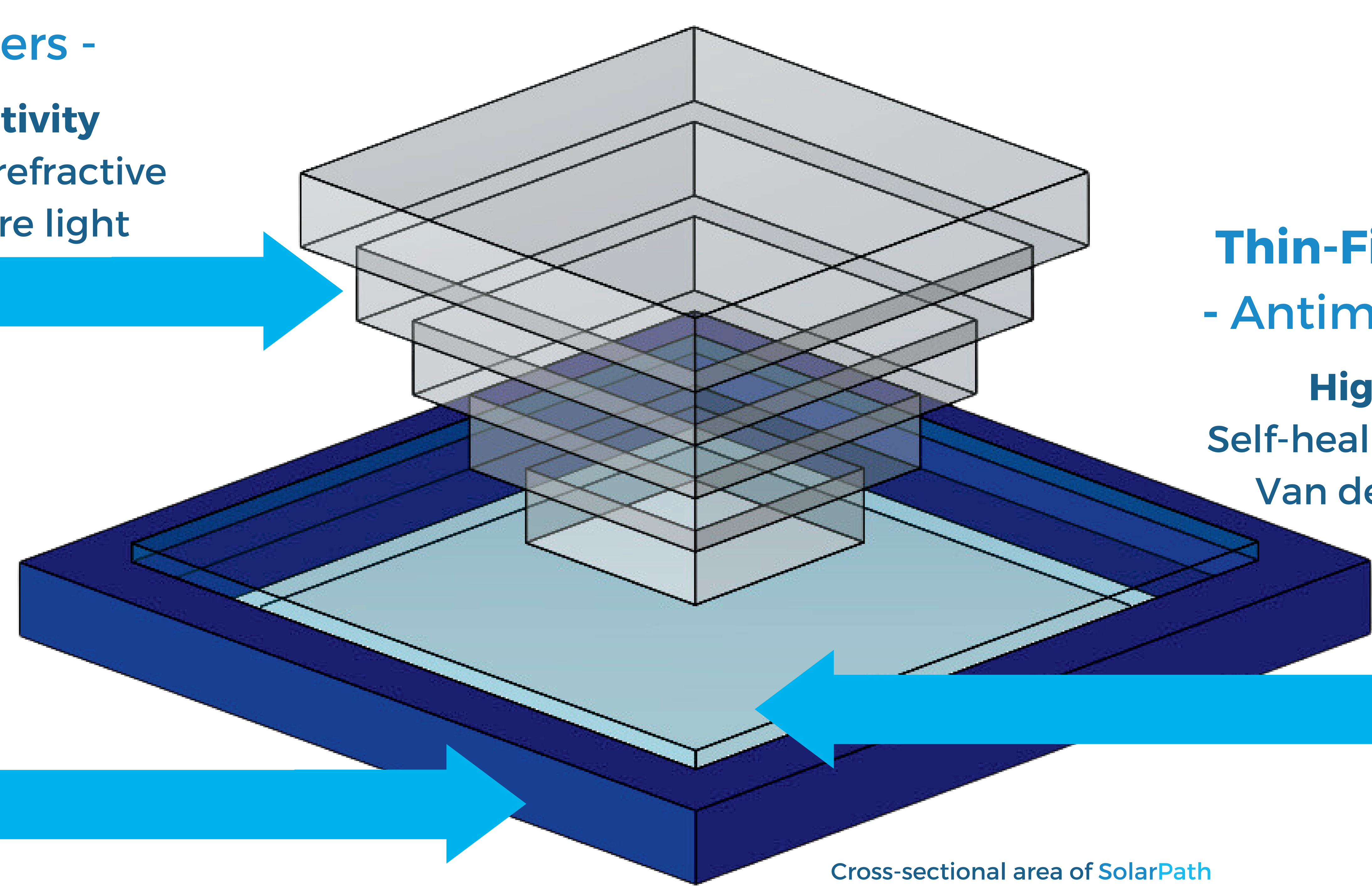
Increased Productivity
Layers with different refractive indices capture more light

Thin-Film Solar Cell
- Antimony Selenide -

High Durability
Self-healing through weak Van der Waals forces

Traditional Solar Cell
- Crystalline Silicon -

High Efficiency
21% for this layer only, more with lenses and thin-film



Cross-sectional area of SolarPath