



به نام خداوند جان و خرد



- ❑ Intelligent system for cleaning solar panels
- ❑ Self-cleaning glass for making solar panels

Alirza Barani

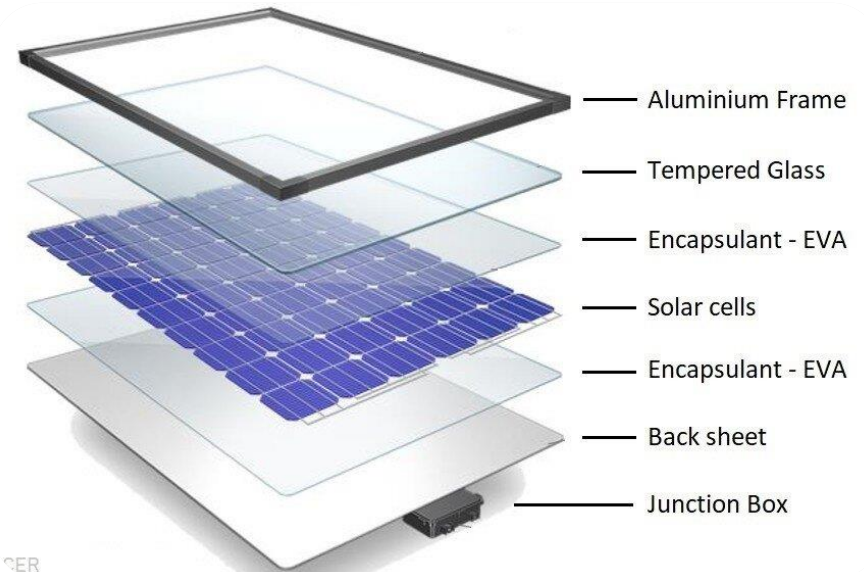
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Glass Application in Solar Panels

- ☐ Protecting solar cells from mechanical damage
- ☐ Preventing environmental factors



- ☐ Good strength
- ☐ Good recyclability
- ☐ Good corrosion resistance
- ☐ Low cost
- ☐ Good transmittance
- ☐ Good cleanability



www.cleanenergyreviews.info



- ☐ Soda-lime
- ☐ Borosilicate
- ☐ Lead crystal glass



- ☐ Cleaning techniques

Effect of Dust on Output Power

76.7% of Isfahan is dry.

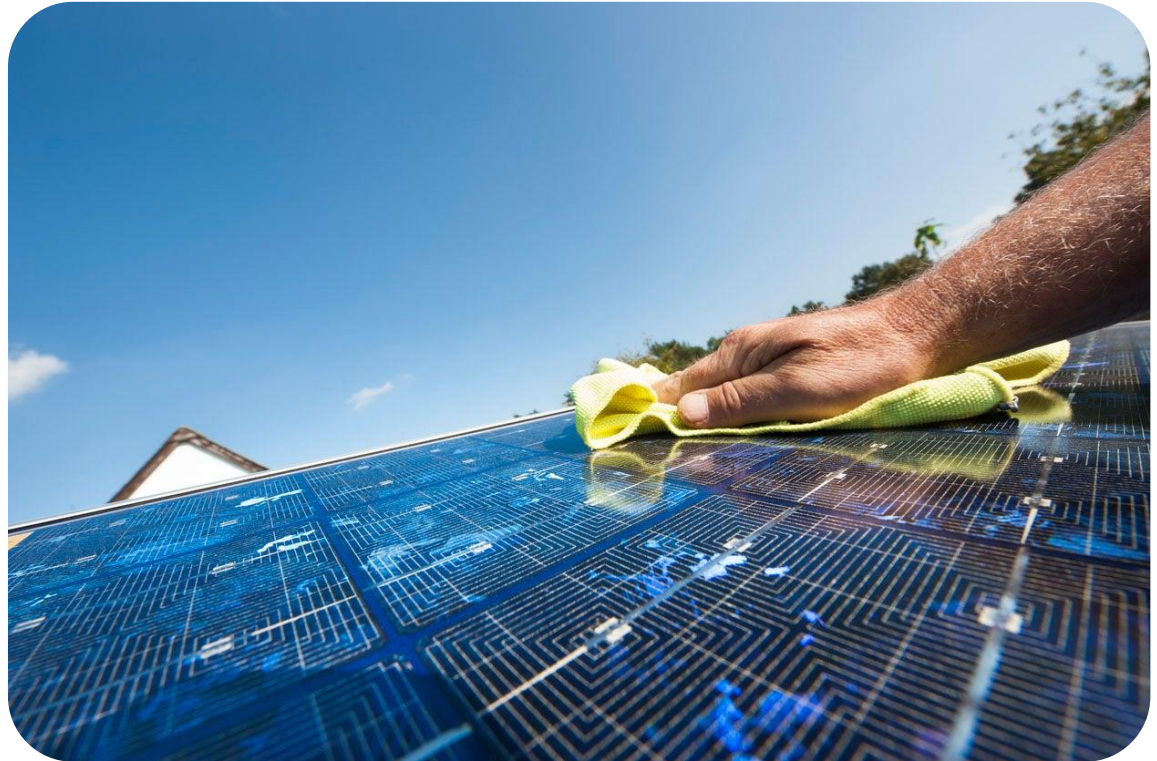
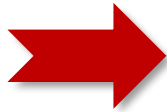
16 dust generation sources

ISNA PHOTO

Aria Jafari

Washing Methods of Solar Panels

Manual Methods



www.bobvila.com



Time-consuming



High risk



Low reputability



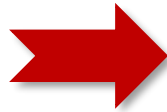
Labor intensive



Cleaning by water

Washing Methods of Solar Panels

Manual Methods



<https://www.sunbrushmobil.com>



Requiring flat land



Low reputability



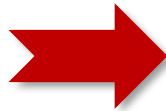
Surface damage



Cleaning by water

Washing Methods of Solar Panels

Automatic Method



High risk



Manual transportation



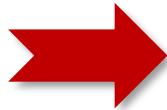
Surface damage



Cleaning by water

Washing Methods of Solar Panels

Robotic Methods



www.rob-sys.de



Requiring flat land



Manual transportation



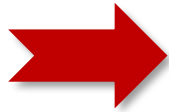
Surface damage



Cleaning by water

Washing Methods of Solar Panels

**Robotic
Methods**



Cleaning by water

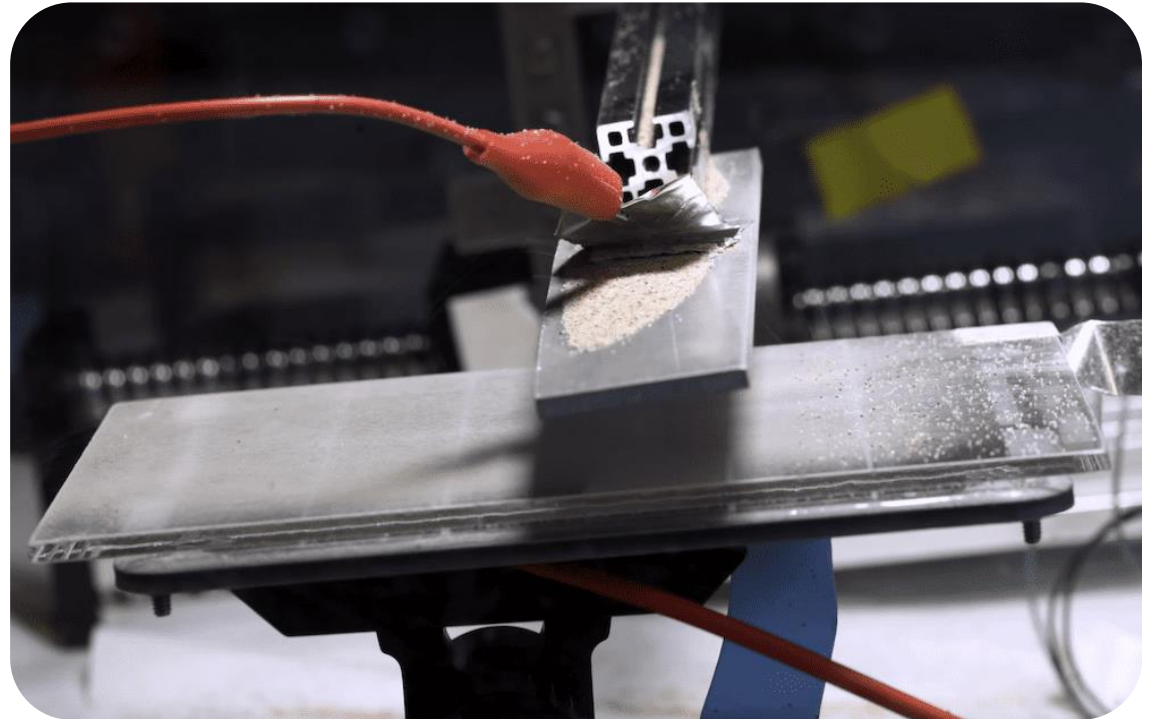
Self-cleaning Glass

Cleaning by electrostatic repulsion

**Electrodynamic
Screens (EDS)**



**Removing 95% of
dust particles**



Desired Washing Technique

- ☐ Intelligently detecting dirt
- ☐ Working automatically
- ☐ Running with minimum electrical energy
- ☐ Cleaning with minimum water usage
- ☐ Applicable for panels installed in different height

Self-cleaning Glass

Cleaning by hydrophobicity
(Vanadium dioxide)

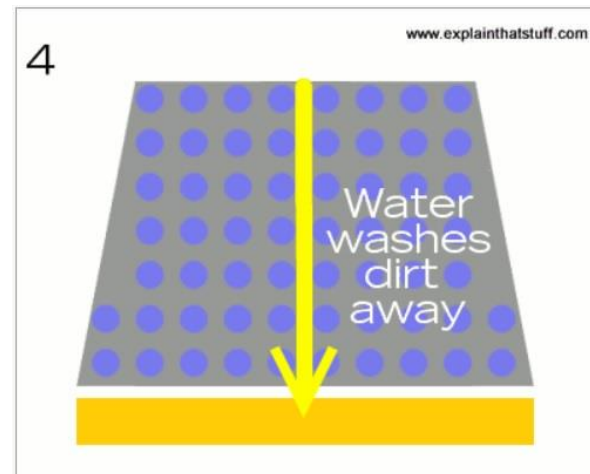
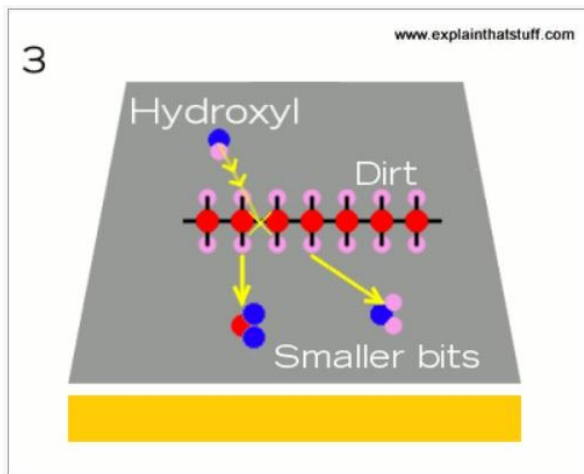
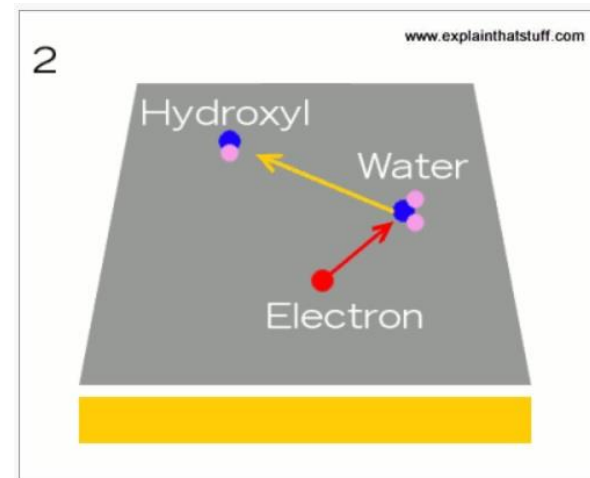
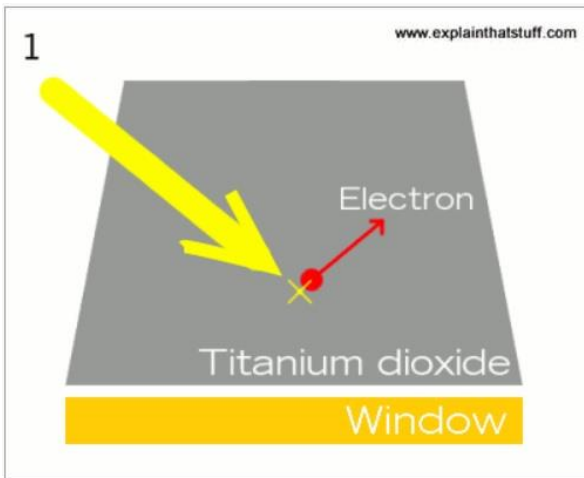


www.indiamart.com

technologies
Bajaj

Self-cleaning Glass

Cleaning by hydrophilicity (Titanium dioxide)



Desired Self-cleaning Technique

- ☐ Not dependent on water
- ☐ Not affecting optical properties
- ☐ Applicable for implementing on manufactured panels



در کف ما مشعل توفیق نه
ره به نهانخانه تحقیق ده
جامی

روی عبادت به تو آریم و بس
چشم عنایت ز تو داریم و بس



MASHAL POUYA

Thank You

Achievable Solar Energy

