

Swimsol

Solar energy for tropical islands



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- Solar energy for tropical regions
 - Heavy-duty systems for islands & coastal areas
 - Floating solar platforms
 - Planning, implementation and financing
- 20 years of solar expertise
 - Affiliate of two German solar companies
 - Jointly over 500 installations, more than 100 MW_p
 - Systems from 3 kW_p to > 1 MW_p



Scientific Partners



Industrial Partners



TittmannSolarGmbH
Your competent partner in photovoltaics



Finance Partners



Austrian
Development Agency

Marketing Partners



- Solar energy less expensive than diesel energy
- Land scarcity → Large solar systems not feasible on land
- Malé feasible solar PV deployment potential only 5 MW (in yellow)

Study and Picture by International
Renewable Energy Agency
www.irena.org
published in “*Maldives renewable
energy roadmap*” 2015



Floating PV in freshwater lakes is an established technology

- Water regulation pond Yasugi, Japan
- System size: 1 MW_p
- Grid connection 2013
- System surface: 1.23 ha

But until 2014 no technology available for floating PV on saltwater.



Partly reclaimed land for PV projects close to sea

- Japan, partly reclaimed land – 1,2 km² (area Malé 5,8 km²)
- System size: 70,000 kW_p
- Grid connected in 2013
- **Costly solution!**



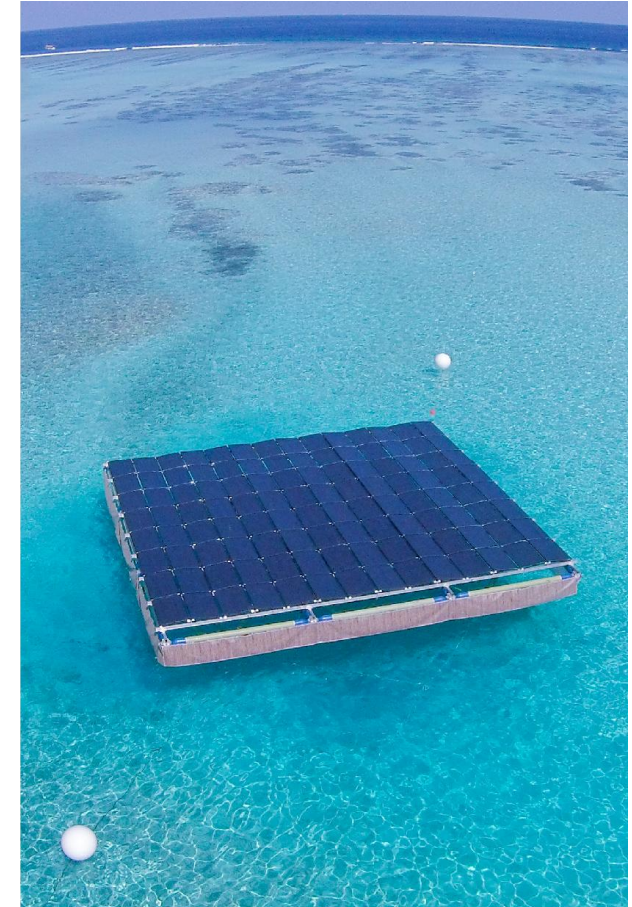
Since 2014 Swimsol installs floating PV platforms in saltwater!



- Rooftop system at Addu High School
 - 2.8 kW_p (May 2014)
 - Awarded the Zayed Future Energy Price, 2015
- Floating solar platforms at resort islands
 - 15 kW_p (November 2014)
 - 28 kW_p (April 2015)
- Project pipeline
 - 100 kW_p currently being installed on local island, finalized January 2016
 - Total pipeline of ~1.5 MW_p in 2015/16



- Platform specifications
 - Dimensions: 14 x 14 meters
 - Power: 24 kW_p (96 modules x 250 W_p)
 - Wave/wind resistance: 1.5 meters, 100 km/h
 - Output: Up to 10% higher than roof system mainly due to cooling effect of water
- System setup
 - Heavy-duty panels designed for tropical climate
 - Mounted on floating platform
 - Series of platforms form large solar park
 - Connected to land by underwater power line



- Swimsol uses heavy-duty solar panels
 - Glass on the front- and backside plus edge sealing and protected junction box
 - Tested thoroughly in damp heat & salt mist corrosion tests
 - Long-lasting high efficiency and up to twice as durable as standard panels
- Conventional solar panels not suited for tropical climate
 - Not protected against humidity through backside foil
 - Efficiency losses and low durability

Heavy-duty panels



No corrosion



After damp heat test

Conventional panels



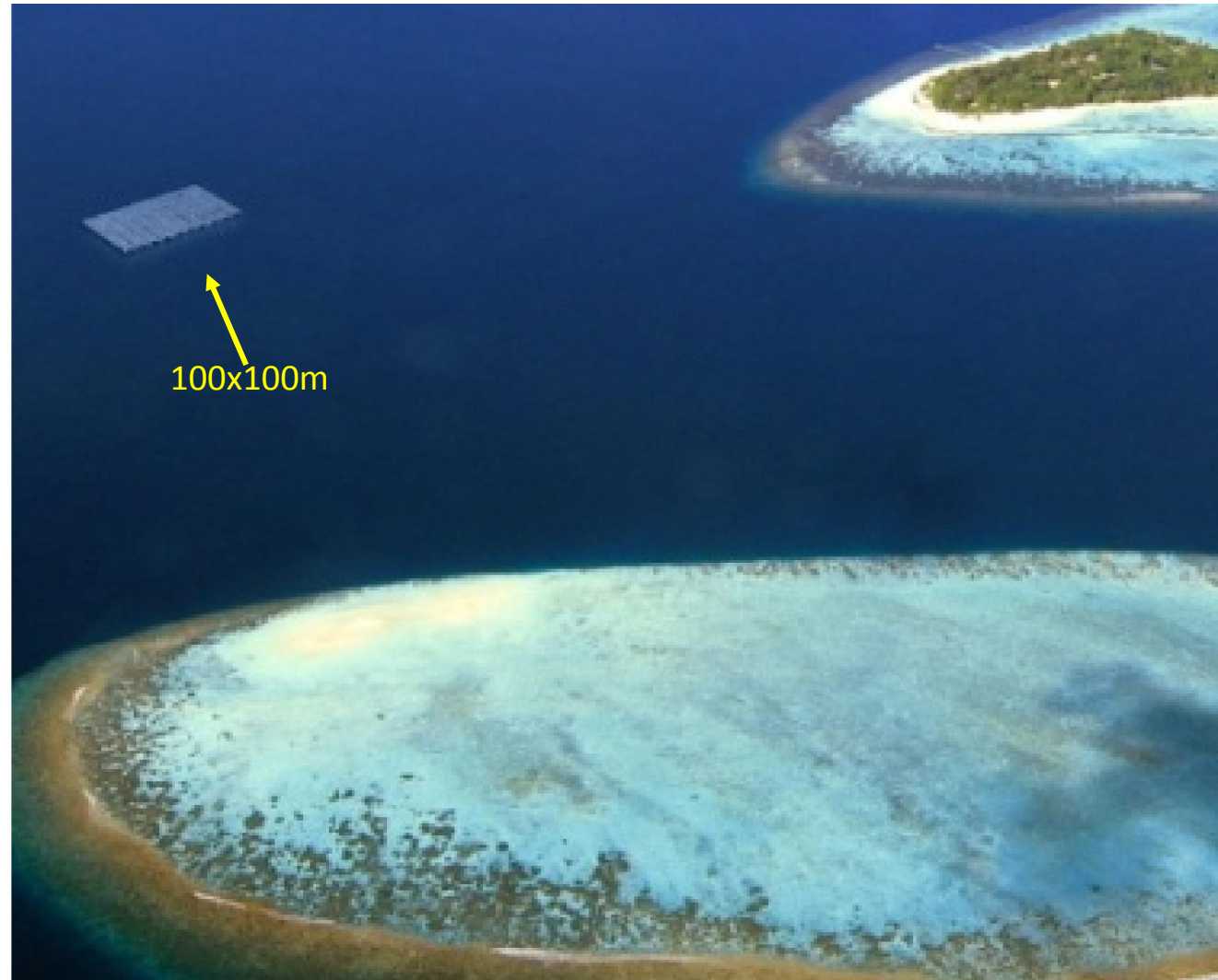
Corroded panel in Maldives



After damp heat test

Visualisations for 1 MW (one hectare, 1.4 soccer fields)

- Covers ~25% of average resort's consumption
- Costs of 3 Mio. \$



Visualisation of 10 MW_p solar energy park for Malé



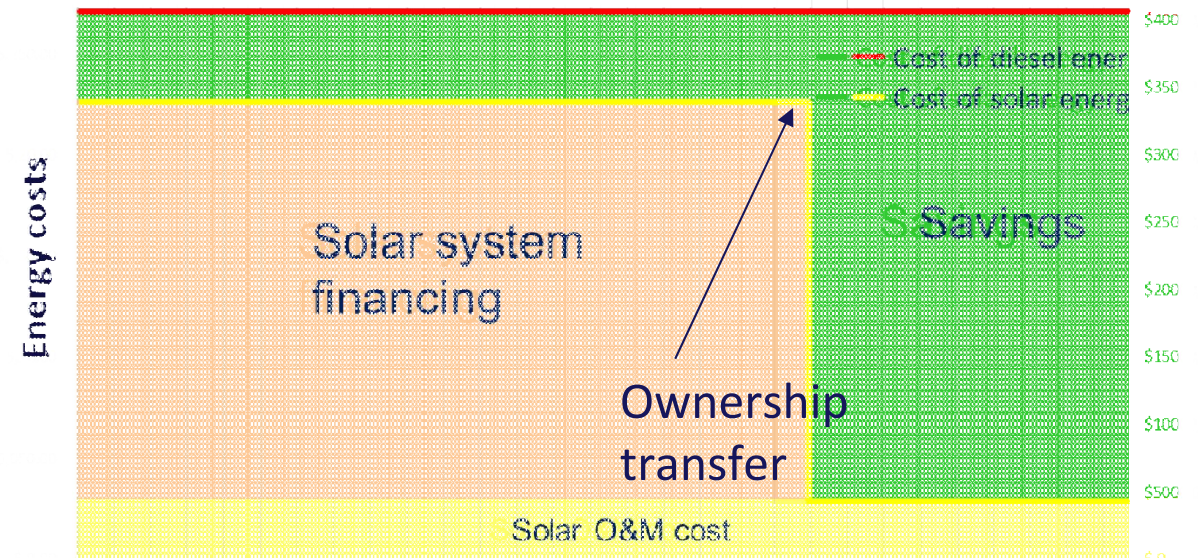
Project specification 10 MW_p solar energy park for Malé

- 10 MW_p floating solar park: 400 platforms → 300m x 200m space requirement
- Could power 10% of Malé's yearly energy demand
- Many suitable locations available, connection to Malé with medium or high tension submarine cables
- Cells can be coloured e.g. flag of Maldives. Landmark and tourist attraction, visible by google earth.
- Investment costs of 30 Mio \$ can be borne by Swimsol and international investors.



Financing 10 MW_p floating PV – 30 Mio \$

- Swimsols finances, builds, owns, operates system in Phase 1
- Swimsol sells electricity to STELCO via FIT
 - FIT either fix (3,42 MVR per kWh)
 - or FIT bound to oil price and STELCO`s diesel production costs in Male. E.g. solar price can be 10% lower than STELCO`s current diesel production costs. As such STELCO and Rep. of Maldives assure that solar FIT is always lower than energy produced by diesel. In graph below STELCO`s savings indicated in green colour.
- Potential transfer of system in Phase 2



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