vogt solar GmbH

Solar Power Plants - Turkey

1. vogt solar – About us

2. Portfolio of Services

- 2.1 Consulting
- 2.2 Project Development
- 2.3 Engineering & Construction Management
- 2.4 Operational Support

3. Turkey

- 3.1 Turkey – Solar country
- 3.2 Solar Power Plants
- 3.3 Experience with Turkish companies

4. Conclusions

1. vogt solar – About us

vogt group SE

- Consulting, engineering & project management for PV factories
- Services from ramp-up to production optimization for PV factories
- Operational support for PV power plants
- Project development, realization & consulting for PV power plants

ib vogt GmbH
Berlin

ib vogt consulting Inc.
San Francisco

ib vogt S.L.
Madrid

ib vogt Ltd.
London

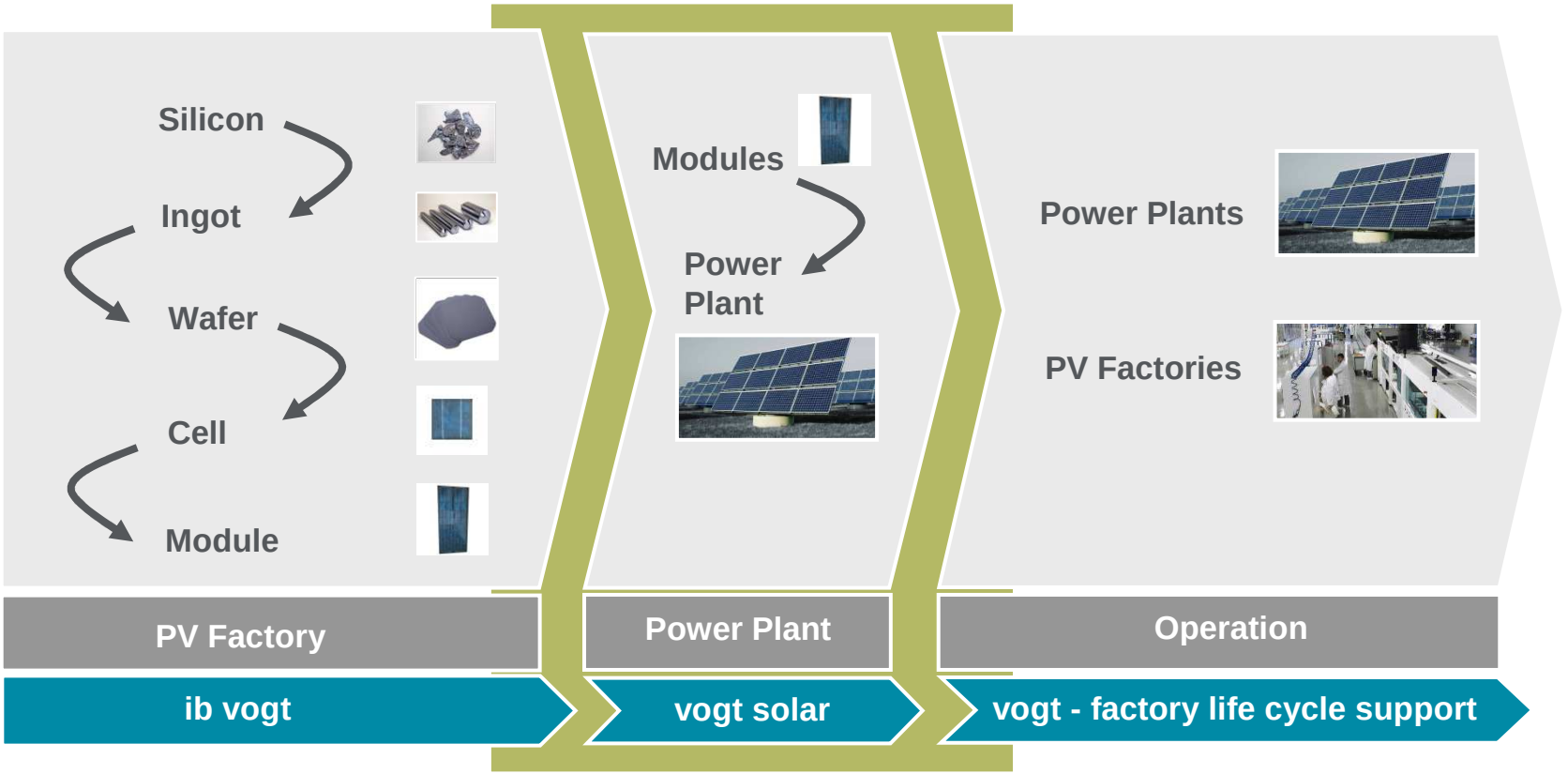
vogt - factory life cycle support GmbH
Berlin

vogt solar GmbH
Berlin

1. vogt solar – About us

- Business focus: development and realization of PV power plants
- Established in 2009 as a member of vogt group SE
- Managed by Ms. Dagmar Vogt and Mr. Carel Zwankhuizen
- More than 10 years project and industry experience
- Specialist knowledge in all PV technologies
- Large network of partners & manufacturers of solar modules and components

1. vogt solar – about us: Value chain



1. vogt solar – About us: Applications

Rooftop

Ground level power plants

Facade installations

BIPV (Building integrated Photovoltaic)

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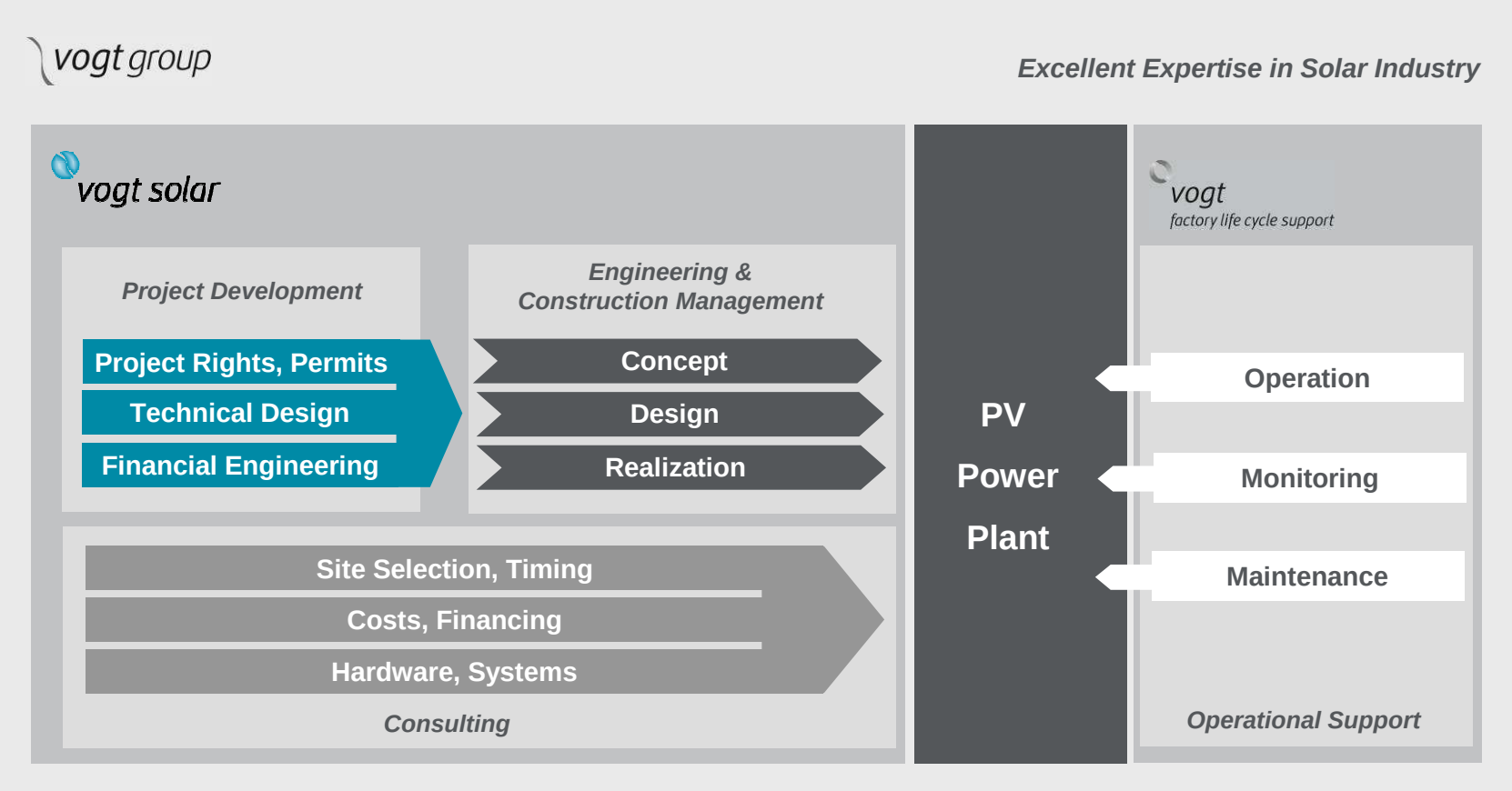
2. Portfolio of Services



2.1 Consulting

Site

Support in global site selection:

- Site assessment
- Infrastructure & logistics
- Public utilities

Technology & Market

- Market & technology overview and decision
- Data collection, cost & risk analysis
- Market allocation
- Module manufacturers, leaders, newcomers, developments

System

Support in system integrator selection:

- Turn key or bill of materials
- Request & review of supplier proposals
- Supplier workshops

2.1 Consulting

Balance of Systems

- System components
- Construction
- Operation
- Site

Timing

Support in timing/ scheduling/ sequenzing:

- Typical project timeline based on benchmark data
- Project scheduling with milestones

Financing

Support in receiving financing:

- Support in developing funding
- Analysis of federal & state subsidies & support in accessing
- Financing options
- Project finance structure

2.2 Project Development

Project Rights & Permits

- Identifying and securing land
- Management of permitting procedure
- License for implementation

Technical Design

- Feasibilitiy studies
- Preliminary design
- Pre-tendering of systems and installation

Financial Engineering

- Financial modelling
- Due diligence for investors
- Identifying investors
- Profitability calculation
- IRR (Internal rate of return)

2.3 Engineering & Construction Management

Project Design

- PV Array Layout
- System Design
- Simulation
- Permitting
- Logistics

Site Development

- Site assessment
- Infrastructure development
- Security

Construction Management

- Site management
- System supplier management
- Interface management
- Quality management
- Scheduling and controlling
- Acceptance
- Hand over

2.3 Engineering & Construction Management

Quality Control

- Incoming Hardware Inspection
- Inspection during Installation
- Pre-start up quality checks

Time

- Project time scheduling

Costs

Cost Controlling:

- Construction
- Project
- Operation

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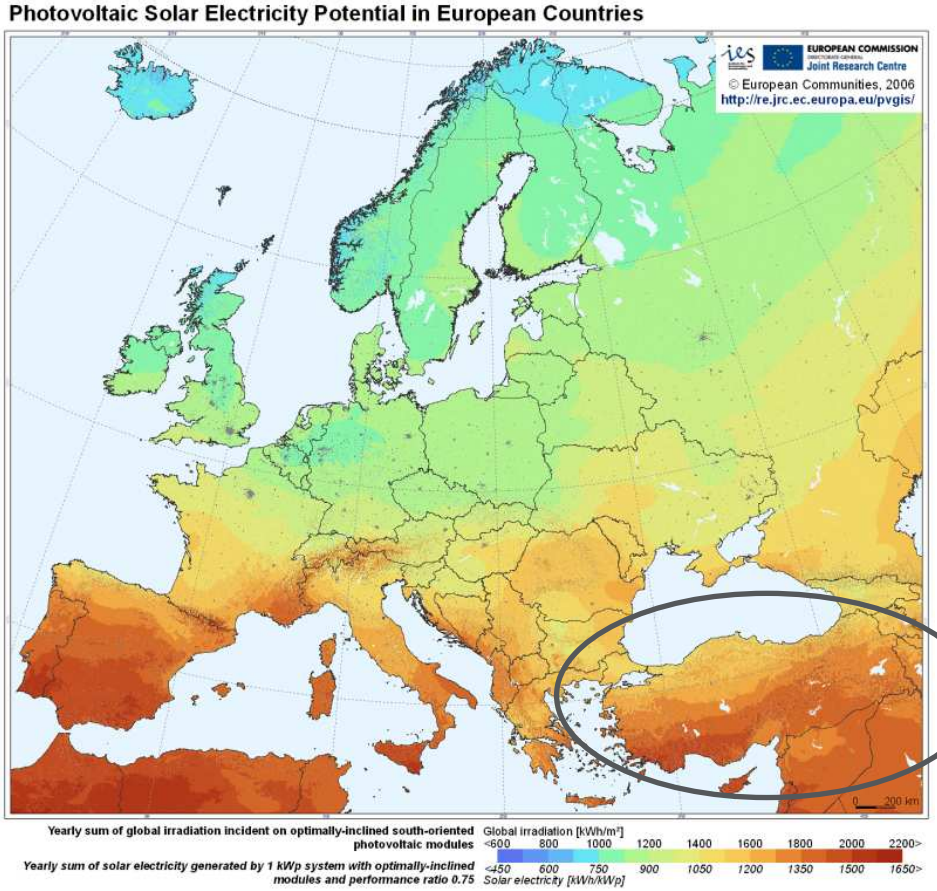
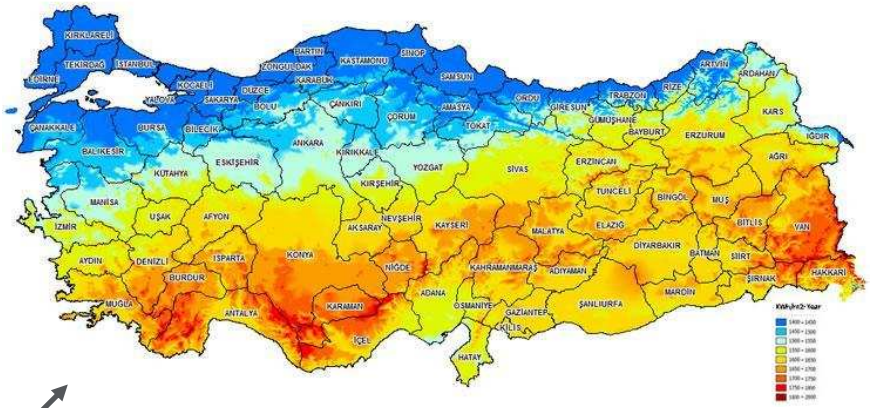
3.1 Turkey as a solar country

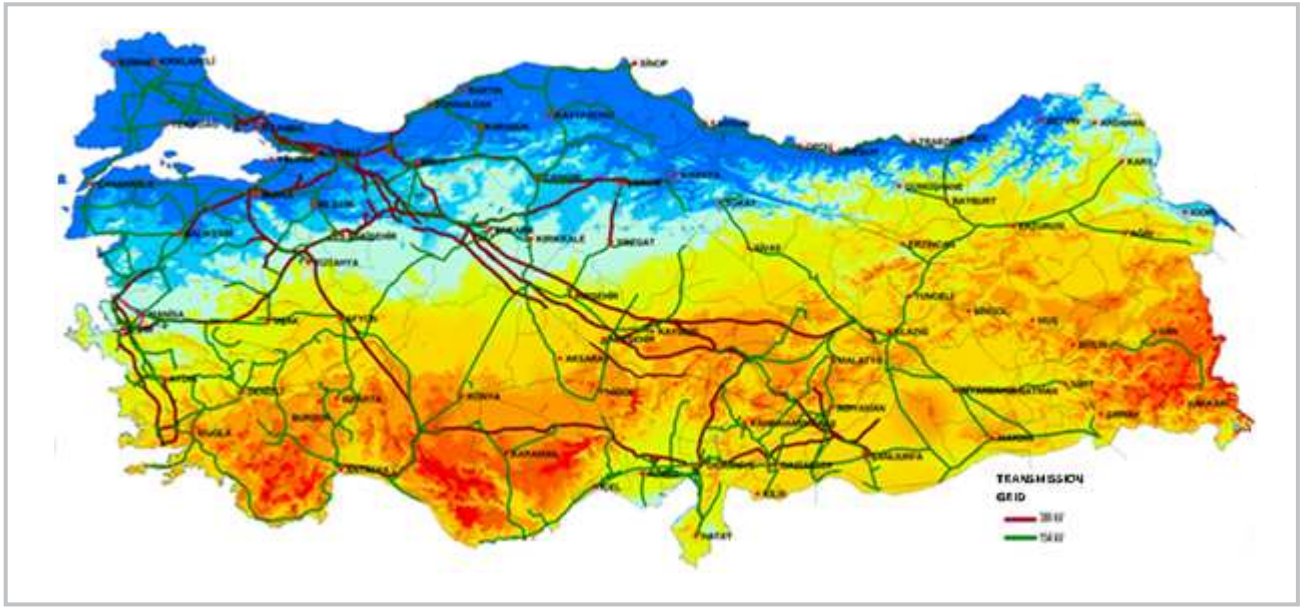


Solar energy potential atlas of Turkey



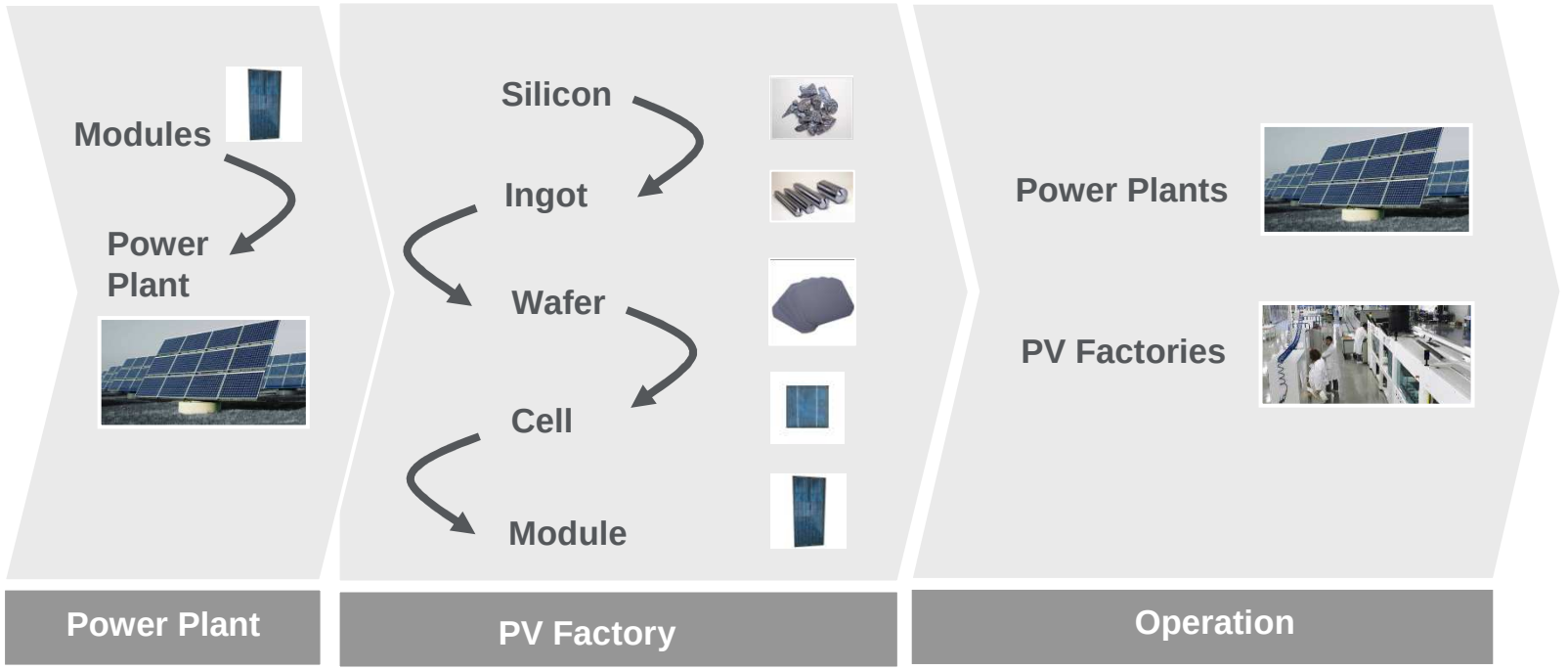
Turkey‘s overall solar energy production Potential is only comparable to Spain‘s. Only….

3.2 Solar power plants in Turkey



… the grid infrastructure in Turkey for remote regions is bigger and better located!

3.3 Market development in Turkey



3.7 Experience with Turkish companies

The vogt group and in specific the vogt solar and the ib vogt GmbH have local partnerships with three leading actors in the areas of construction, energy engineering and renewables

- ***Turkish companies are seen as „the German companies“ of the MENA region, this implies a feel of quality and reliance, and are, in our experience, amongst the most professional in the region***
- ***Turkish companies look up to German companies as delivering quality products and are principally very eager to work or to partner with them***
- ***In Turkey, business is made after meeting the people face to face. There is a strong emphasis in bulding a trust base before entering into a partnership***
- ***Specially in Istanbul business mentality is very european.***
- ***Turks are very proud of their nation and their culture. Europena countries should know that before hand and act accordingly***

3.7 Experience with Turkish companies

- ***Business has a very high priority in their lives***
- ***Family has also a very high priority. Do not be surprised if you get invited very soon to your business partner‘s home and meet the family.***
- ***Social events are very important for business. Inivitations to have lunch together or dinner are recommended to be done and accepted. Breakfast or brunches are not part of the business socializing***
- ***Expect to be picked up and driven to places. People are very hospitable and consider partners as their guests.***

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The potential of the solar industry development if the laws are approved can be seen in the following graphs:

2020 PV Installed Capacity in GWp

2020 PV Electricity production in TWh

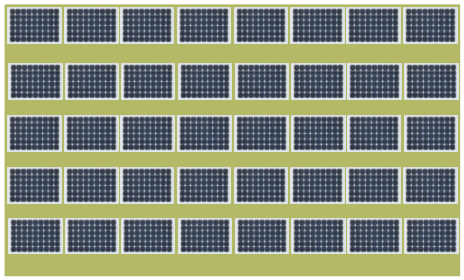
PV Penetration on total electricity consumption in 2020

Germany: 13%

Turkey: 5%

Source: EPIA

4. Conclusions

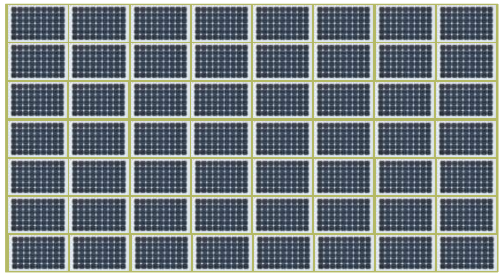


Berlin

400 – 450 KWp/ha

	Fixed system: inclination=35 deg., orientation=-1 deg. (optimum)			
Month	Ed	Em	Hd	Hm
Jan	0.94	29.0	1.04	32.1
Feb	1.82	50.9	2.06	57.5
Mar	2.44	75.5	2.81	87.2
Apr	3.42	103	4.14	124
May	4.15	129	5.18	161
Jun	3.70	111	4.71	141
Jul	3.92	121	5.01	155
Aug	3.67	114	4.68	145
Sep	2.82	84.7	3.47	104
Oct	2.05	63.4	2.41	74.8
Nov	1.13	34.0	1.28	38.5
Dec	0.67	20.8	0.74	23.1
Year	2.56	78.0	3.13	95.3
Total for year		936		1140

1140 KWh/m² average global irradiation for an average production of 936 KWh / kWp



Antalya

520 - 580 KWp/ha

	Fixed system: inclination=32 deg., orientation=-1 deg. (optimum)			
Month	Ed	Em	Hd	Hm
Jan	3.13	97.1	3.73	116
Feb	3.61	101	4.37	122
Mar	4.41	137	5.44	169
Apr	4.65	139	5.80	174
May	4.77	148	6.17	191
Jun	4.92	148	6.47	194
Jul	4.84	150	6.43	199
Aug	4.82	149	6.39	198
Sep	4.84	145	6.30	189
Oct	4.21	130	5.35	166
Nov	3.31	99.3	4.07	122
Dec	2.77	[illegible]	3.31	[illegible]
Year	4.19	127	5.32	162
Total for year		1530		1940

1940 KWh/m² average global irradiation for an average production of ***1530 KWh*** / kWp !

4. Conclusions

The new Feed-in Tariff for PV establishes the folowing guarantees:

First ten years solar farm:	28 €c/kWh
Following ten years solar farm:	22 €c/kWh

BIPV and roof top:

0 – 3000 kWh	45 €c/kWh
3001-6000 kWh	35 €c/kWh

- Although lower than the original German guarantees, due to the high output and the yearly decrease of the german feed-in tariff, it would be much more rentable to invest in solar energy in Turkey

- **However, the lack of apporval for regulation has been acting as a investment hurdle in this area since the announcement of the new renewable energy law two years ago**

4. Conclusions

Cost-Efficient	**Extensive network of partners**	**Project knowledge transfer**
Experienced, flexible & international	**Delivering Projects on Time & Budget at Competitive Prices**	**Proven construction management expertise**
Cash-to-cash optimization	**Optimized purchasing**	**Integrated quality management**

Contact

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