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**Development of the Renewable  
Energy Sector**

**TASK 1**

Assessment of Current Situation, Barriers and Road Map

SubTask1A

Assessment of Current Situation

PROJECT FINANCING PRACTICES (04)

Activity 13

Deliverable D2 – Final Report

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**TASK 1 – SUBTASK 1A**  
**DELIVERABLE D2 – FINAL REPORT**  
**ACTIVITY 13**

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## TABLE OF ACRONYMS

<b>Acronym</b>	<b>Definition</b>
<b>BOT</b>	Build Operate and Transfer
<b>DFI</b>	Development Financial Institutions
<b>EIA</b>	Environmental Impact Assessment
<b>EMRA</b>	Energy Market Regulatory Authority
<b>EPIAS</b>	Energy Market Operations Company
<b>EUAS</b>	Electricity Generation Company
<b>EUR</b>	Euro Currency
<b>FX</b>	Foreign Exchange
<b>FIT</b>	Feed In Tariff
<b>GDRE</b>	General Directorate for Renewable Energy
<b>GDP</b>	Gross Domestic Product
<b>GW</b>	Gigawatt
<b>IFI</b>	International Financial Institutions
<b>IMF</b>	International Monetary Fund
<b>IEA</b>	International Energy Agency
<b>IPP</b>	Independent Power Producer
<b>KFG</b>	Credit Guarantee Fund
<b>MENR</b>	Ministry of Energy and Natural Resources
<b>MIS</b>	Management Information Systems
<b>MW</b>	Megawatt
<b>PPA</b>	Power Purchase Agreement
<b>REIT</b>	Real Estate Investment Trusts
<b>TOR</b>	Transfer of Operating Rights
<b>TSO</b>	Transmission System Operator

<b>TSKB</b>	Industrial Bank of Turkey
<b>TWh</b>	Terawatt hours
<b>USD</b>	United States Dollar
<b>YoY</b>	Year on Year

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## 1. PROJECT FINANCING PRACTICES (TASK 1A – ACTIVITY 13)

This section summarizes the main conclusions of research and stakeholder interviews to provide a high-level overview of financing practices for small and medium scale renewable energy projects in Turkey. The time frame considered is largely 2014-2015. At the time of submission of this Report we tried to enclose some year-end 2016 figures on projects financed through targeted IFI Renewable Energy Lending facilities.

A positive environment for funding small scale Renewable Energy and financing practices in Turkey were on a clear trajectory throughout 2015 and mid 2016 when this report was commissioned. But, it would not be prudent to extrapolate these trends and investment environment without considering the political events which began during the second half of 2016. The impact on Renewable Energy investments, especially foreign investment, is at this point highly speculative.

An additional challenge and further barrier in preparing this report is the lack of transparency in the financial sector and availability of third party data on financing RE projects. This consultant obtained the number of projects which were commissioned during the year. But financing data is not systematically collected nor reported to the central bank, statistical office, or relevant ministries. Even some of the banks are not able to extract and report loans for RE projects. Thus, there is no aggregate data, except for IFI credit facilities, on how many projects are financed and the structure of financing. It's possible to derive some estimates, which generally fall in line with international market practices, but these should be considered as an illustrative sample prone to a high degree of variance.

This report will first summarize the main conclusions and findings. Afterwards, the report will expand on these findings in the following chapters that will follow with explanations and supporting data obtained from the field interviews.

### 1.1. SUMMARY OF MAIN FINDINGS

- Currently only corporate loans, backed up by mortgages and other guarantees, are used for financing small and medium size RE projects and the leasing mechanism is becoming a financing alternative for the investors.<sup>1</sup>
- Industrial Development Banks (IDB) finance only large companies which are joint stock companies, this leaves out the financing of SMEs (which are typically not registered as joint stock companies), despite that IDB's are the only ones with technical skills in-house to be able to appraise RE projects.
- Commercial banks prefer large clients with strong credit histories, as they do not have the know-how to evaluate RE technology risks and cash flows.
- From bank perspective, the main financing barriers are:
  - regulatory risk,
  - credibility of the customers,

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<sup>1</sup> We took into consideration in our review the projects which received third party financing such as from banks. It should be noted that there is a portion of projects which were self-financed.



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- repayment behavior of the client, and
  - payment structure after the power plant starts operation.
  - Bank financing are using mainly facilities from IFIs - not their own funds - due to price, currency, and maturity advantages offered by IFI facilities.<sup>2</sup>

## 1.2.OVERVIEW OF FINANCING OF SMALL AND MEDIUM RE PROJECTS IN TURKEY

Financing of small and medium RE in Turkey is delivered through commercial bank corporate or SME lending. At least 13 of the large commercial banks are financing RE. Leasing is now a growing trend, but it's still a small portion of the market. Commercial banks very often participate in facilities promoted and funded by IFIs. Turkish Industrial Development banks have the longest history in providing RE project finance but these have and continue to serve the large projects. For example, from 2004 The Industrial Bank of Turkey (TSKB) has financed well over 100 large energy related projects. In May 2016, TSKB issued the first Green Bonds - 300 million USD and 5-year tenor REGS/S only transaction. The deal is the first ever public benchmark Green / Sustainable Bond out of Turkey and CEEMEA region. TSKB attracted 13 times demand over the issue size and received the largest ever order book for a transaction in Turkey. But again, these funds will be used primarily to finance larger projects.

Turkey has a bank-based financial system, banks play the dominant role in mobilizing and allocating capital, monitoring firms and facilitating risk management systems. Capital markets, with financing instruments such as Yieldco's or Real Estate Investment Trusts (REIT's), are not used.<sup>3</sup>

Lending to small and medium scale RE projects falls under SME lending and lending to SMEs in Turkey has benefit from the solid economic growth experienced by the country in the last years. The financing of SME's demonstrated much higher growth rates than other portfolios. For some of the top SME focused banks, where the SME segment comprised 70% of their total loan book, SME loan portfolios grew at a rate of over 30% YoY. Moreover, the annual growth rates for the banking sector SME portfolios since 2011 have also averaged around 30% per year. This indicates significant growth in SME lending and bank lending capacity.

The bulk of the commercial bank loans for RE projects, large and small, are processed and underwritten, with similar collateral requirements, as conventional SME loans. Only large hydropower or wind projects, utilize a project finance (non-recourse lending) approach. Otherwise small scale and medium size RE investments follow the SME underwriting track.

To better serve small and medium scale companies, the enterprises which are the driving force of growth and employment, the Industrial Development banks have introduced APEX lending (wholesale banking) as an additional product and it has been in operation since 2008. Presently, APEX lending plays a small role in the market and it is still not clear whether it will scale. The idea behind the APEX banking is, loans are provided through on lending intermediate financial institutions with extensive branch networks and this mechanism is used to better meet financing needs of SMEs. The model was discussed with IDB's during the interviews but there was no

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<sup>2</sup> Due to FIT being paid in USD, clients prefer to take out loans in USD in order to avoid taking on currency risk.

<sup>3</sup> Turkey is considered a REIT leader since Real Estate Investment Trusts in Turkey go back to 1995. There are about 35 REITs traded on the exchange but as in other countries, the REIT instrument cannot hold RE assets.

strong indication that APEX lending is expected to grow significantly or particularly be targeted at RE.

Most of the RE loans are in USD as the tariffs are also fixed in USD. As already mentioned, data on RE loans is not systematically captured and not reported, therefore there are no aggregate data on average terms or conditions (information considered confidential by banks) of the RE loans although it was mentioned during the research interviews that RE loans were offered often with more attractive rates, one-year grace periods, and longer maturities than standard investment loans since they were primarily funded through IFI on-lending facilities. But these comments are not corroborated by any actual reports or data.

The consultant team estimates that the overall bank loan book for just PV and Wind RE was around \$3.1 Billion at the end of 2016 (Capacity in MW added times average cost per MW and 80% financed and assuming all projects financed with bank debt).<sup>4</sup>

**Table 1: RE Loan Book Estimate.**

Technology	MW Installed During 2015	MW Installed During 2016	Average Project Capital Cost per MW in 2015 Euro	Average Project Capital Cost per MW in 2016 Euro	% Financed Estimate	Estimated Loan Book Euro Added in 2015	Estimated Loan Book Euro Added in 2016
PV	209	583 <sup>5</sup>	1,02M	1,02M	80%	213M	595M
Wind	873	1248 <sup>6</sup>	1,1 M	1,1M	80%	960M	1,373
<b>Total Wind and PV RE Added</b>	1082	1832	--	--	--	1,173M	1,968M
<b>Total PV and Wind Loan Book</b>							3,141M

**Source: Own elaboration.**

<sup>4</sup> We do not have data on how many projects were self-financed so the estimate is possibly on the high side

<sup>5</sup> Per the MENR website - As of the end of 2016, it has been given the pre-license 34 solar power plant whose installed capacity is 402 MW and the license 2 solar power plant whose installed capacity is 12,9MW. Also, at the end of 2016 with the establishment of unlicensed power generation plants the number of solar power plants is 1043 and the total installed power of these plants is 819,6 MW. Total installed power of solar energy-based power generation plants is 832,5 MW

<sup>6</sup> As the end of 2016, the installed capacity of the wind energy plants in operation is 5.751,3 MW

**Table 2: BSRA - Banking Sector Loan Portfolio.**

SME Loans (million \$), Period:2016/12, Last update:1/20/2017											
		Loans TRY	Loans FX	Total Loans	Non-Performing Loans TRY	Non-Performing Loans FX	Total Non-Performing Loans	Non-Cash Loans TRY	Non-Cash Loans FX	Total Non-Cash Loans	Number of Customer (Net)
Banking Sector											
1	Total SME Loans (2+3+4)	97.363	22.456	119.819	6.135	27	6.162	27.936	7.222	35.157	0
2	Loans Extended to Micro Enterprises	28.577	2.662	31.239	2.049	0	2.049	6.080	745	6.824	0
3	Loans Extended to Small Enterprises	33.488	6.446	39.934	1.974	7	1.981	9.826	2.243	12.069	0
4	Loans Extended to Medium Enterprises	35.298	13.348	48.645	2.113	20	2.133	12.030	4.234	16.264	0
5	Total Number of Customers (6+7+8)	822.205	5.953	828.158	88.701	25	88.727	483.977	5.239	489.216	3.834.915
6	Total Number of Customers-Micro Enterprises	641.453	1.338	642.791	69.788	1	69.789	332.871	765	333.636	2.969.340
7	Total Number of Customers-Small Enterprises	138.300	1.942	140.242	14.737	9	14.746	113.532	2.019	115.551	656.525
8	Total Number of Customers-Medium Enterprises	42.453	2.673	45.125	4.176	15	4.191	37.574	2.455	40.030	209.050

Once data would be available on small scale RE projects, it would be useful to compare and follow the small scale RE portfolio against the SME loan book.

The total SME loan book at the end of 2016 was \$119 Billion (see BSRA Table 2 above). \$22.5 Billion was in FX loans. If we adjust for cash loans and portion of investment loans (approx. 30%) we estimate that the SME FX Investment Loan book was roughly about \$4.6 Billion. If \$808 Million (Table 1) was added in PV over the last two years – the majority being unlicensed – this would indicate that almost 20% of the banking sector SME FX Investment Loan Book was for PV – which does not seem plausible. If it is the case, risk management prudence would place limits on the portfolio concentration. The conclusion is that it would be very useful to tag, track, and report the RE loans so that a better overview of the financing of RE could be provided and used to guide policy. Without these insights, it's challenging to determine if or what type of financing barriers exist or to predict where financing issues might arise.

Turkish banks distinguish Corporate vs SME loans based on the size and annual turnover of the business entity – 40 million Lira (approx. \$10.0 Million USD)<sup>7</sup>. In the commercial banks, almost all cases the small RE project loans are processed as either Corporate or SME loans, not as project finance deals. The banks do have small project/structured finance departments for larger projects such as Wind Park investments. None of the institutions interviewed, except for the Industrial Development Banks, had a RE specialists on their team or a specialized RE department.

The commercial bank or leasing company will do its own due diligence or examination of the project before committing money to the project. This analysis typically includes a review of:

- The business plan including a Technical Feasibility (for example the reports provided as Technical Assistance by TurSEFF consultants)
- Projected cash flows, margins, IRR, NPV;
- Debt Service coverage ratio of the loan versus project cash flows;
- Reliability of technology involved;

<sup>7</sup> The SME definition in Turkey is not aligned with the EU definition nor with how some IFI's define SME's or small scale project loan size limits under their facilities.

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- Creditworthiness of all parties involved;
  - Likelihood of changes in regulatory and policy environment;
  - Permits and environmental approval—required for project to begin construction and operation.
  - Non-Performance Risk, Default risk, and repayment default risk assessment
  - Valuation of collateral

Based on the TurSEFF database, for PV projects the Debt/Equity was around 80% which is in line with international averages. For wind the Debt/Equity ratio was 40%<sup>8</sup>. We were not able to obtain more comprehensive overviews such as collateral requirements or more detailed information on project financing practices or syndications to be able to assess the quality, sophistication, or compare to practices in developed markets.

There are no data on the aggregate lending or leasing for RE. Other than general facility data provided by IFI's, neither the local banks, BRSA (Bank Regulation and Supervision Agency), TURKSTAT (Turkish Statistical Institute) nor the Bankers or Leasing Association track loans at the 'purpose' level. Bank loans used to finance RE projects may be classified as working capital, real estate, or in a few cases project finance loans. For regulatory reporting, they'll be categorized by sector according to the sector of the borrowing entity (ex. Agriculture, Manufacturing, Service, etc.) and by maturity.

Nor are data available on who is being financed or investing; Sponsors can generally be categorized into four groups: industrial sponsors, public sponsors, contractor/sponsor, and purely financial investors. Most RE projects are developed and owned by newly registered SPV's (Special Purpose Vehicles). Clustering is taking place where several unlicensed PV projects are developed together as separate legal entities but held in common ownership or by related parties. This mechanism allows for a higher FiT (it was also used in Spain.) There were several mentions during the interviews of examples where 20 or more projects were clustered by a single large investor. The RE loan(s) would be underwritten as (a) large corporate client loan(s). Without data on the actual sponsors/investors, and making the adjustment for the clustering, it's not possible to make discerning observations, segment, or profile the client market.

Most of the banks and one leasing company interviewed did not have Management Information Systems (MIS) configured which would enable tracking or data mining loans issued for financing RE. One bank noted that they are waiting for internal approval (expected by summer 2015) of a RE loan product which would in the future allow the Bank to extract RE loans from their MIS. However, this would not solve the gap in mining for aggregate statistical RE lending data. Such information could help provide useful information on trends, concentrations, relative growth rates, etc. of the RE specific loan or leasing books. Only the Industrial Development Banks report RE loans in their annual and investor reports. For example, TSKB reported that as of end-2015, the Bank has financed 133 renewable energy projects.

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<sup>8</sup> From TurSEFF this was mainly due to high cost of projects and limit of loan amount of TurSEFF credit facility. There were only a few projects supported under TurSEFF so this Consultant assume this is not indicative of the industry leverage.

Access to Credit, especially through the IFI RE facilities (see table below) is there, but without tracking and reporting of applications received, it's not possible to assess if demand for financing is disproportionate to the supply or if the banks are turning away clients who want to invest in RE. It would be optimal to analyze the reasons for application rejections as this would facilitate deeper insights and solution ideation. During one interview, a bank shared an observation that the rejection rate for RE loans was about 70%, a high number. Interestingly, the reason provided was that due to the awareness building campaigns for RE, an expectation has been created among smaller investors that projects do not require a contribution of own capital, and that projects could be wholly financed through donor supported loan facilities or grant programs. The bank was receiving numerous applications which included unrealistic financing assumptions. For this reason, the approval rate for RE loans was low due in part to a large number of unqualifiable applications. Based on the quick uptake of the TurSEFF facility and utilization of other RE related facilities by Turkish banks, there's support for the assertion that Banks are lending to viable projects.

**Table 3: Current IFI On-Lending and Direct Lending Facilities for RE in Turkey (2016).<sup>9</sup>**

Donor	Facility	Currency	Size (Million)	Number of RE Projects Financed	Capacity MW
<b>EBRD</b>					
	MidSEFF	Euro	1,500	47	800
<b>EIB</b>	Pending*		pending	pending	pending
<b>IFC</b>	pending	USD	255	pending	pending
<b>World Bank</b>	Private Sector Renewable Energy and Energy Efficiency Project	USD	650	pending	pending
			500	pending	pending
	CTF - Clean				
<b>KfW</b>	pending		122	pending	pending
<b>AFD</b>	pending		100	pending	pending
<b>IDB</b>	pending		pending	pending	pending
<b>ADB</b>	pending		pending	pending	pending
<b>Green for Growth Fund</b>	pending		pending	pending	pending
<b>Dutch FMD &amp; Korea DB</b>	pending		115	pending	pending

<sup>9</sup> Since there is no tracking of all facilities and projects funded at one source, a letter has been sent to each donor requesting an update on facility size and utilization. We will make this information available as soon as the responses are received.

TKSB	pending		300	pending	pending
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(\*pending: an official request by the MENR will be send to the beneficiaries and once the data will be collected the above table will be updated accordingly).

Based on the MENR12/CS04 EE Report and own elaboration:

The committed funds to the Turkish market through various credit lines are \$1,370 million plus €1,486 million. There are no available data of which portion of these amounts is disbursed and furthermore which amounts are directed to EE projects vs RE projects.

One final point is that without financing data on projects, we are unable to ascertain what proportion of projects are self-financed (do not take on debt.). For example, out of the 570 unlicensed projects in 2016, only 47 or 8% were financed through the TurSEFF facility, one of the larger debt capital providers on the market. We don't know the level of the remaining portion which was financed through other IFI RE facility loans or not. It's unlikely that banks funded the projects on their own since they don't have access to long term foreign currency funding outside of the IFI sources. This data would be helpful in designing other financing mechanisms which could be used to free up, leverage, and recycle the locked-up developer/investor capital in the projects.

### 1.3. MARKET DRIVERS IN FINANCING RES<sup>10</sup>

Based on interviews with stakeholders, the current market drivers for RE in Turkey are project returns pursued by investors (some speculative). The investments provided a very good return opportunity with ex-ante estimated IRRs averaging between 7.8 and 12.3% for PV and Wind respectively. Over the span of the last several years, investors were becoming more aware of the profitable RE opportunities at first from other countries, vendors, EPC's, and then from domestic projects. As more successful projects were taken into operation, information within the community spread about the high returns, which in turn attracted more investors and developers.

To analyze the factors in more detail, there are three primary and intersected reasons which have driven the demand for RE financing in Turkey:

- Non-licensed generation projects which are (as frequently assumed by investors) easy and fast to develop and finance
- Decreasing investor investment costs/Declining Cost of Technology/ Increasing financial internal rate of return (FIRR)
- Predictable Feed in Tariffs paid in foreign Currency – USD

Let's begin with the first reason which spurred a boom in installations based on renewable resources, especially PV. In 2012 Turkey decided to simplify the process in the legislative and regulatory landscape in the electricity market for developing solar power projects of up to 500 kilowatts. Then 2013 amendments further paved the way for the rally focused on this non-

<sup>10</sup> This section focuses on PV due to no publicly available data on the other sectors which is easy to dig up. Due to resource constraints, the other sectors were not investigated.

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license power generation. Systems up to 1 MW can be installed on the ground with the sole purpose of selling the generated electricity to the grid<sup>11</sup>.

Solar and wind developers currently face a choice between the relatively burdensome process of bidding for a license in one of the regulatory authority's infrequent licensing rounds, or relying on the rule that allows projects of up to 1 MW to be built without a license and possibly clustering several such projects together or holding them in common or related party ownership. For investors who do not want to deal with the licensing process and the additional losses in revenues due to competitive bidding, investing in 1 MW capacity plants with the purpose of selling to the grid looks appealing. Many have chosen the latter route. Thus, Non-license generation together with the attractiveness of the feed-in tariff prices (due partly to devaluation of the local currency and partly to the low levels of wholesale prices) are deemed responsible for the rally in PV investments. Both domestic and international investors became highly interested in and became involved in non-license power generation. At the end of 2015, there were 362 unlicensed solar power plant with an installed capacity of 248.8 MW. (MENR)

It should be noted that because of this boom and clustering, a recently amendment to the legislation suggests that a legal entity/real person and any companies in which the legal entity/real person holds shares may not be allocated an installed capacity over 1 MW tied to a given transformer center.<sup>12</sup> This has prompted some concerns but it is too early to tell if or how these proposed amendments will curtail the practice or impact demand.

Furthermore, there is some uncertainty with the unlicensed generators as to what will happen to the installations after the 10-year period ends. Unlike the licensed generators, the unlicensed generators are not allowed to sell their electricity in the market. Additional regulations will need to be made before the 10-year period ends. As the market is still at the early stage of the lifecycle, these issues have not yet impeded the appetite of investors seeking financial returns made possible through unlicensed projects.

The second market driver has been pushed by the photovoltaic system prices which have been steadily declining in the recent years. Simply, photovoltaic generation has become more competitive. Overall solar system costs have declined at approximately 15% CAGR over the past 8 years and continued cost reductions of around 40% over the next 4-5 years are expected as a solar module costs continue to decline, panel efficiencies gradually improve, balance of system costs decline due to scale and competition, global financing costs decline due to development of new business and financing models, and customer acquisition costs decline as a result of increasing customer awareness and more seamless technology adoption enabled by storage solutions.

The capital costs associated with the PV systems are mainly attributed to the system costs (hard costs) and the bureaucratic costs (soft costs). The system costs include the costs of the panel and the various other components required for generation such as the inverters, wiring and the mounting system. These costs have been rapidly falling in the last decade on a global scale. The global spot market price for solar panels fell 2.4 percent to an average of 36 cents a watt on Dec. 28, 2016 according to PV insights from around 4 dollars in 2007, and it is estimated that the

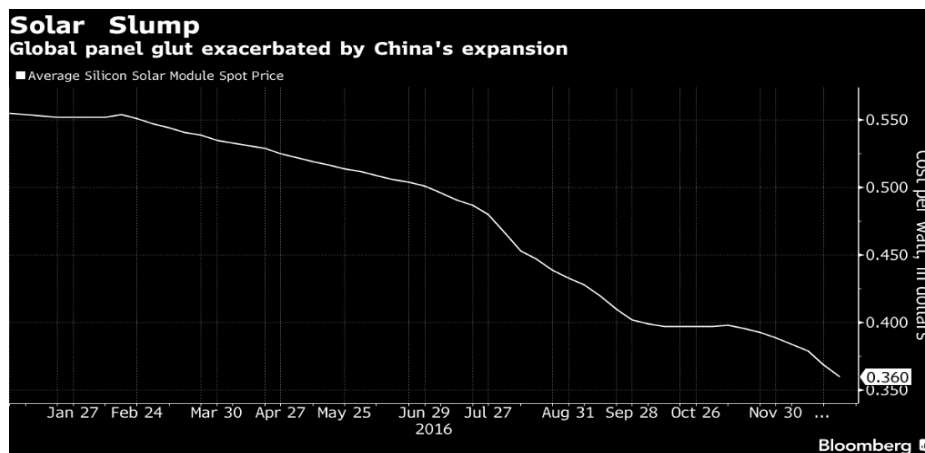
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<sup>11</sup>Self consumption had to be demonstrated but at such a low level that in practice all generated electricity was sold to grid.

<sup>12</sup> The total grid allocation to be made to unlicensed energy plants owned by one entity cannot exceed 1 MW per substation.

downward trend in costs will persist in the near future. For example, the commercial rooftop sector in the U.S. has enjoyed price falls for hardware (15%), and a modest 6% decrease in soft costs in 2015. By Q4, a typical commercial installation cost \$2 per watt, of which 50% was comprised of soft costs. Soft costs, the ongoing operation and maintenance costs associated with photovoltaic systems, are predictable and relatively low in Turkey due to lower labor costs, if compared with the EU average. The financing of projects made using IFI sourced debt, has allowed for financing costs to be sensible. The bureaucratic costs consist mainly of the costs of the various procedures, grid connections, and approvals required to begin the operation. These falling hard costs and reasonable soft cost enabled an environment which provided high potential financial internal rates of return and attracted investors.

**Figure 1: Global PV Panel Glut.**



**Source: Bloomberg.**

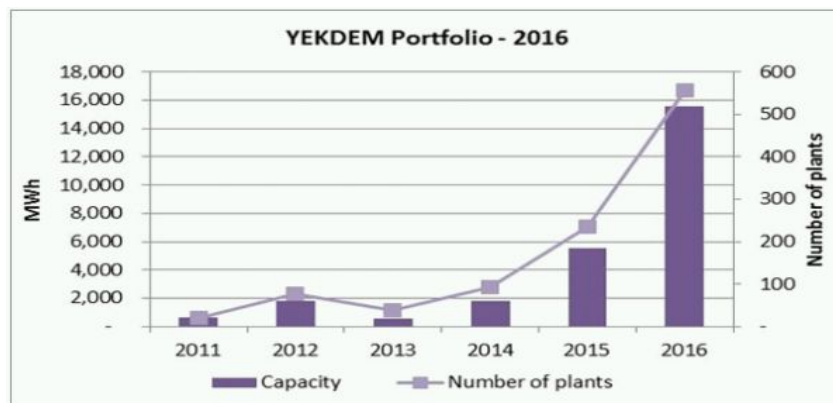
The third reason which has facilitated the scale up of RE is the simple feed-in tariff mechanism paid in foreign currency. The feed-in tariff scheme is currently the principal type of subsidy that is being utilized for promoting photovoltaic power generation. The government provides a \$13.3 cent per PV kWh (\$ 7.3 cent per kWh for hydro and wind) feed-in tariff for a period of 10 years. The FIT is paid in USD. And the amount of the tariff can be increased up to \$ 20 cents per kWh for a period of five years by using domestically manufactured components in the panel installation, which is then a tariff far above current international prices for this technology.<sup>13</sup>

A depreciation of the Turkish Lira has made the feed-in tariff more appealing compared to self-consumption of the generated electricity because the feed-in tariff is calculated on the USD basis while the electricity rates are based on TL. On the contrary, an over appreciation of TL against US would make self-consumption relatively more profitable.

<sup>13</sup>The new Electricity Market Law 6446 has become effective as of 30 March 2013. Under this law, an 85 percent discount is applied to the lease, easement and utilization right of energy transfer lines for 10 years in both investment and operating periods to the power plants that are in operation or to be in operation until 31 December 2020.



Figure 2: YEKDEM Portfolio – 2016<sup>14</sup>



The current feed-in tariff amount of \$ 13.3 provides high returns, but the duration of 10 years falls a little short compared to many of the European countries which generally employ a 20-year tariff period. Currently, the unlicensed generators are not allowed to sell their generation in the market. This limitation creates significant uncertainty for the unlicensed generators.

However, due to this steep increase in capacity, the peak load is expected to be around 45.000 MW in 2016 and 15.000 MW renewable portfolio without balancing responsibility and with substantially higher guaranteed prices, concerns on the burden that such a volume is ultimately ushering can turn out to be a hot topic in the Turkish power market.<sup>15</sup>

Other reasons which have also contributed to the development of the market are:

- The Institutionalizing of clean energy policies. RE policies and their implementation were formalized through laws or national programs approved by the government.
- Public agencies such as EMRA, MENR, etc. responsible for RE are there to support and to implement national policies. For instance, the implemented support scheme has been assessed as satisfactory looking at the FIT level (for more details on Turkish support scheme assessment, please see D5 Report, section 3).
- Increasing investor confidence and decreasing investor risk.
- Decreasing transaction costs as developers and lender gain experience and deals become more standardized.
- Demand for electricity continues to grow. Between the years 2000 and 2013, the electricity demand of the country almost doubled. Turkey's energy demand has one of the fastest growth rates in the OECD in recent year provide a stable funding base that will be used to grow the RE portfolio.
- After a few years of lending to RE projects, mostly promoted by IFI, local banks have developed some comfort level for RE loans.

<sup>14</sup>

<http://www.mondaq.com/turkey/x/500908/Renewables/Revolutionary+Changes+In+The+Renewable+Support+Mechanism+New+YEKDEM+For+Turkey>

<sup>15</sup> We deliberately avoid a lengthy debate of the strengths and weaknesses of the FIT in this report as the focus is on current financing mechanisms. Higher and longer FIT obviously will result in more projects while lower FIT will result in a decrease in interest by investors.

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## 1.4. IDENTIFIED BARRIERS

From a banking perspective, renewable energy projects in Turkey had historically a rather poor reputation within the financing community as they were viewed as higher risk investments, resulting in stiffer requirements for investors and developers alike. These factors usually result in the risk of a proposed RE project being overrated and the required collateral or viability hurdle rate becoming untenable. The technical assistance provided by numerous Development Financial Institutions (DFIs) has helped to relax this perception of risk.

Affordable, especially local currency, and long maturity financing was one of the critical factors inhibiting the wider realization of RE projects<sup>16</sup>. Although banking spread margins are still probably too high compared with Western Europe banks, banks are beginning to evolve from defensive to proactive banking strategies by understanding the business case and the competitive advantages offered by RE finance as drivers for developing new products and services, generating additional revenue and increasing market share<sup>17</sup>.

There were two main barriers to RE finance which has been cited during the interviews with the banks: Risk based Capital pricing and Regulatory Risks.

The **Risk Based Capital** is related to BASEL III requirements. Risk-Based Capital (RBC) is a method of measuring the minimum amount of capital appropriate for a reporting entity to support its overall business operations in consideration of its size and risk profile. RBC limits the amount of risk a bank can take. It requires a bank with a higher amount of risk to hold a higher amount of capital. Capital provides a cushion to a bank against insolvency. Since RE projects are considered risky due to the long tenors and new technologies, they require more capital to be set aside. The implementation of Basel III could add between around 60 bps and 110 bps to a bank's funding costs and reduce the attractiveness of long term project finance. The combination of higher capital reserves and focus on addressing asset mismatches is undermining interest in large, longer-term project finance loans. This is a much broader problem which is not only specific to Turkey but is part of an ongoing debate in the international banking sector. The Turkish banks are aware of this problem and it was also highlighted in an Energy Policy publication<sup>18</sup> back in 2013 which noted "Without foreign capital, with merely the support of international financial institutions, the market will not be able to prosper because this is primarily a risk-based capital system that Turkey is trying to master." As Basel III is to be phased in from 1 January 2013, with full implementation by January 2019, it is difficult to predict accurately the effect which the new regime will have on project or RE finance<sup>19</sup>.

The second risk which was noted by all the banks interviewed was regulatory risk. It's the risk that regulations and more importantly support mechanisms will abruptly change, putting at risk the level of future cash flows to be used to repay the loan. Regulatory risks experienced by

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<sup>16</sup> Under the assumption that income would be in local currency and not as in current case where FIT are paid in USD and there is no self-consumption.

<sup>17</sup> This comment is based on anecdotal information during the stakeholders' meetings. Turkish banks are very reluctant to share this data.

<sup>18</sup> <https://www.journals.elsevier.com/energy-policy> - Energy Policy  
Volume 60, September 2013, Pages 106–115

<sup>19</sup> This is a Basel III issue which applies to all banks not only in Turkey. There is an ongoing and complex debate around this topic.

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investors can appear in many forms. They can be changes in tax laws, accelerated depreciation rules, custom duties, licensing fees, etc. In general terms, key risks include:

- Weak and ever-changing regulatory frameworks;
- Right of government to override regulatory decisions;
- Lack of clarity about power of regulator;
- Regulator without necessary minimum skills, capacity and competence;
- Unilateral regulatory decisions undermining project and investment returns;
- Playing field tilted in favor of dominant industry player (most often a state owned enterprise).

It's worth mentioning that even in more developed markets there are fresh examples of regulatory risks and abrupt changes in legislation. Investors in Spain, Czech Republic and most recently Poland have become more risk adverse after the bad experiences. In Poland, proposals submitted to parliament by the new administration might tighten new wind generation regulations to the point of killing off the industry. The bill would make it illegal to build wind turbines within 2km of other buildings or forests and quadruple the tax rate payable on existing turbines. If enacted the RES act could lead to bankruptcy of many existing installations, and Poland's failure to meet its RES target, causing enormous financial losses for the country. So, the concerns banks have been legitimate. The recent regulatory changes in Spain have potentially caused, according to a Wall Street Journal article<sup>20</sup>, thousands of small developers to go bankrupt, and even the flagship of Spanish solar companies Abengoa, has filed for bankruptcy. It is therefore normal that financial institutions in European neighbouring countries, as Turkey demand more margin to cover potential regulatory risks.

The practical lesson from the above examples (maybe more of an extreme nature) is that abrupt or unexpected regulatory changes, even if they occur in other countries, rattle investors. Investors and lenders are constantly scanning global market events and risks and juxtapose positioning (and trying to price in) those risks against their own projects. Since the RE market is nascent and many investors new to the sector, the government needs to monitor global sector events and proactively communicate to assure local and international investors, even if events occur in third countries, how similar risks are not applicable. The Ministries also must be aware how any surprise changes to regulations or policies can leave a lasting imprint on the market and the perception of potential risks.

There is a third problem which was not mentioned in the interviews but which became clear during our study. In our view, one of the most significant barriers to continued development of the RE financing market is the lack of cohesive and consistent data on RE projects and their performance (especially ex-post). During our research, we discovered various pieces of RE project information from the technical side (capacity, technology, CO2 reduction estimates, ex-ante IRR's, etc.) spread among EMRA, TEAS, TUBITAK, Ministry of Energy and Natural Resources, and TURKSTAT. But there is no complementary data on investors/sponsors and financing. And there is also no current ex-post performance data on at minimum a sample of typical projects. All this information could be available from banks, tax office, etc. and could be aggregated and anonymized to respect investor/sponsor confidentiality principles. The issue of confidentiality

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<sup>20</sup> GREEN INVESTORS FACE BANKRUPTCY AS SPAIN CUTS SUBSIDIES. Date: 07/06/13 Ilan Brat and Christopher Bjork, The Wall Street Journal.

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does not have to be undermined and it is not necessary to disclose contract details which are related to renewable energy projects and confidentiality provisions such as; turnkey contract clauses or performance guarantees which the party would not wish disclosed for a range of commercial reasons. Data are essential to effective policymaking at every level.

In a liberalized market, the investors are very sensitive to signals which allow them to assess and price risk. Therefore, the regulator should protect the markets credibility and strive for the market to be as transparent as possible to serve the development of the market. Transparency should be instrumental to building investor trust. In a private market, which we have now in Turkey, the issue is not so critical, but if Turkey is to rely more on public market finance, data and transparency will be critical. The trust of the investors to the open market mechanism is thus very important. The earlier historical data is collected the more useful and valuable it becomes. In a world of big data, more comprehensive data collection is imperative. As the interest over the last three years indicates that investors already find the market very promising and act enthusiastically for participation, they would do so more readily if they could better assess risk through better historical performance and financing data

### 1.5. CURRENT PROJECT FINANCING PRODUCTS

As mentioned in the top section of this report, the current products available on the market to finance RE are overwhelmingly loans and to a small degree leases. The banks do not have loan products specifically for RE projects except for one bank which is planning to introduce a RE loan product. Public market instruments, with the expectation of Green Bonds, or other local RE funds are not available as financing mechanisms for small and medium investors. There are no RE loan guarantee programs.

There is an SME loan guarantee fund offered in Turkey, KGF (Credit Guarantee Fund) but until 2016 it was underutilized and viewed as expensive by the banks<sup>21</sup>. Amendments to the fund were made in 2015/2016 and the volume of guaranteed SME loans increased significantly. In theory, SME's seeking loans for RE projects, but collateral constrained, could take advantage of the facility. There are no data to confirm if this indeed has started take place.

The main donor incentives rely on the lending facilities which provide longer term, lower cost financing to RE developers and technical assistance. No grant component for example is offered by TurSEFF as in some other SEFF facilities which provide a 10-15% grant based on the loan amount. Turkey does not provide tax credits, treasury grants, or loan guarantees for renewable energy generation. Nor does it have set-aside programs or solar renewable energy certificates (SRECs). However, renewable energy generators enjoy other incentives in addition to the feed-in tariff, including reduced licensing fees and permitting costs, and priority in grid connection. Tax incentives exist for projects. There are grants from regional development authorities. Various tax credits and exemptions, as well as support on interest payments, are available for eligible manufacturers of turbines, blades and generators used in hydro, wind, biomass and geothermal power projects. But similar incentives are not applicable for solar panels.

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<sup>21</sup> KGF confirmed that RE projects could be covered by the SME Guarantee Fund. The KGF did not place any restrictions for RE projects.

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## 1.6. SUMMARY OF MAIN FINDINGS FROM SELECTED STAKEHOLDER INTERVIEWS

The key drivers of the market are the foreign currency feed in tariff, falling equipment prices, and access to debt financing provided through IFI facility loans delivered through commercial banks. The FIT is an effective and simple policy tool, however the quick growth of the unlicensed PV segment, and possibly crowding in of some speculative money for non-self-consumption, might not have been intended or expected. More targeted support and interventions such as through an entity like a National Energy Fund, could help channel incentives to long term strategic, self-consumption, investors/developers and throughout the value chain (including suppliers and EPCs). The Fund could also be a key vehicle in attracting institutional capital such as pension funds.

The primary financing mechanism in Turkey for small scale projects are bank term loans and the equity being provided by the SME owner/project sponsor. Loans are accessed through corporate and SME lending departments of the commercial banks (primarily utilizing IFI credit facilities). Standard SME lending requirements, application, and appraisal processes are applied and there are no special loan products for RE projects. Project finance is not, as in other markets, a viable approach for smaller transactions due to high transaction costs. But as the sector continues to grow and develop, the banks will dedicate more focused resources (such as RE sales and appraisal units) and adjust their policies to serve the segment more efficiently. Based on a limited sample size and medium size projects, the Debt/Equity ratios for PV projects are in line with the industry while the Wind projects indicated a lower leverage ratio (possibly due to IFI facility max loan size limitations). The revamped SME loan guarantee program might be an instrument which could facilitate wider access to credit for SME's with viable RE projects but with limited collateral.

Although gaining experience and traction, banks still perceive RE lending as relatively new. Higher National Bank and Basel III reserve requirements for project type, long term tenor, including RE loans (due to higher estimated risks) are an issue which drive up required margins (i.e. higher interest rates for clients) and reduce the appetite of banks to lend to the sector (due to higher cost of funding). The banks are also pricing in the risk of regulatory changes, which can have an immediate impact on project returns. Some of banks have been trying to lobby to have the reserve requirement reduced for RE projects. As the RE technology and projects prove themselves over time to be less risky, this might be a policy area worth attention.

Leasing companies are starting to finance RE but this channel is just at an early stage of development and there are no specialized RE leasing firms. New IFI credit facilities with TA components have also just recently been provided to leasing companies to promote the mechanism, increase capacity, and develop the market. Leasing certainly has carved out a strong presence in developed markets, especially with specialize players like Solar City and Sunrun in the U.S. The most successful leasing companies can offer clients financing, system design, installation, monitoring and maintenance all under one roof. With the right facilitating policies, funding sources, and supplier/installer arrangements, the leasing mechanism should become a significant option for small RE project investors, including residential customers.

There is a plethora of incentives (interest rate buy downs, guarantees, grants, tax rebates, etc.) which can be created by policy makers to boost market development, each with a set of their own advantages or disadvantages but each with a fiscal cost. But to attract larger volumes of

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investment at a lower cost of capital, policy makers need to better understand, the factors that can have an impact on the risk-and-return profile of RE projects to attract different sources of capital channelling through the various financing mechanisms.

To be able to effectively assess and monitor the direction and development of projects and RE finance and to identify any financing barriers, trends, or interventions, it's necessary to first be able track the RE portfolio and a level which facilitates data driven analytics. As an example, most banks are currently not tracking RE loans in their MIS and are unable to generate reports on their RE portfolios or track loan applications from RE clients. Without this information, it's not possible to better report on the performance of RE loans. It's also not possible to compare RE lending relative to bank sector SME investment loan book. This makes policy unperceptive to what is happening on the market (which is rapidly evolving) at a more meaningful level and on an on-going basis.

Therefore, as identified in the barriers section, the consulting team has one major recommendation in response related to market data to help improve policy interventions and the project financing of small and medium scale renewable energy projects. By far, the biggest weakness and challenge to investors (especially small and medium size investors) is information. Investors estimate, manage, and reduce their risks through analysis of all pertinent information about the project and market. As experienced by the team in preparing this report, there is a big gap in the availability and accessibility of data on RE projects in general and how they are being financed.

Thus, the first important change which should be implemented is that Banks should be required to identify and track in their MIS and report to BRSA or TURKSTAT the RE loans as part of their statutory reporting requirements. The aggregate data should be regularly published.

It would not take a significant effort to put together a much clearer picture of the RE and financing market which could be used to introduce, drive, and monitor any new additional policy tool, best practice, or support mechanism. The field of RE finance might have been considered the exclusive domain of bankers, populated by inscrutable models and projections. But there is no reason that it should. The problem revolves around the volume and availability of, and access to, information. Most if the information is simple, not burdensome or expensive to deliver, and would be aggregated to avoid disclosing any specific investor or lender data.

The consultant team has developed tables included in the MS Excel file "Small Scale RE Projects Data Collection Table" annexed to this Report, with the recommended data which could be tracked and regularly published to help improve the transparency of the RE financing market.