ENERGY SUBSIDIES AND ELECTRICITY PRICES in IRAN

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Mah Taab Group

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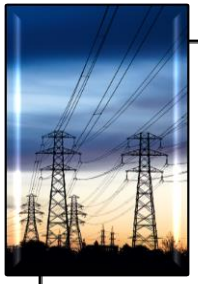
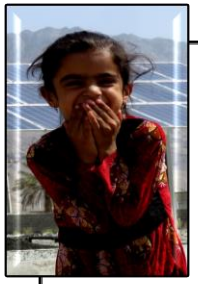


Electricity Cost in Iran



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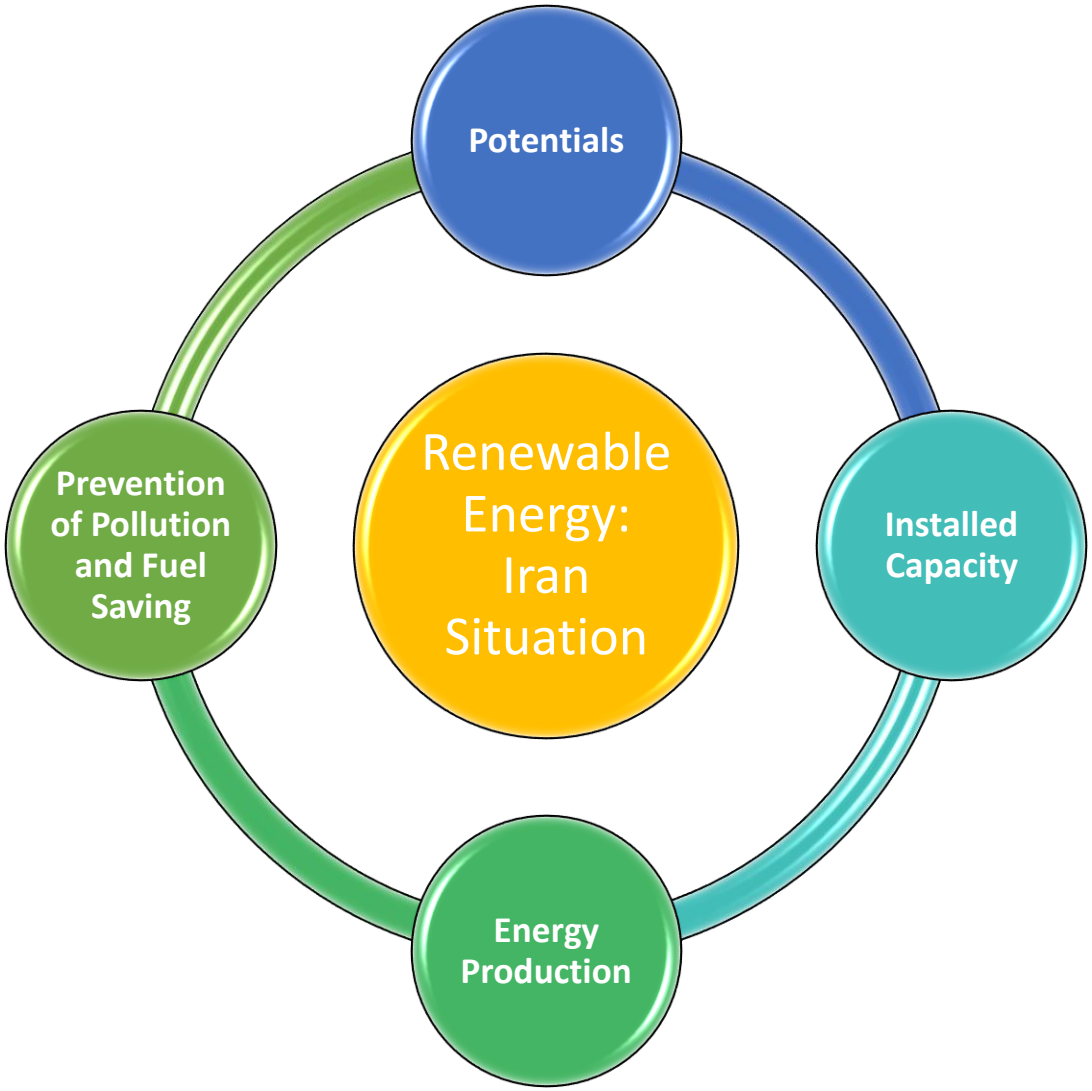


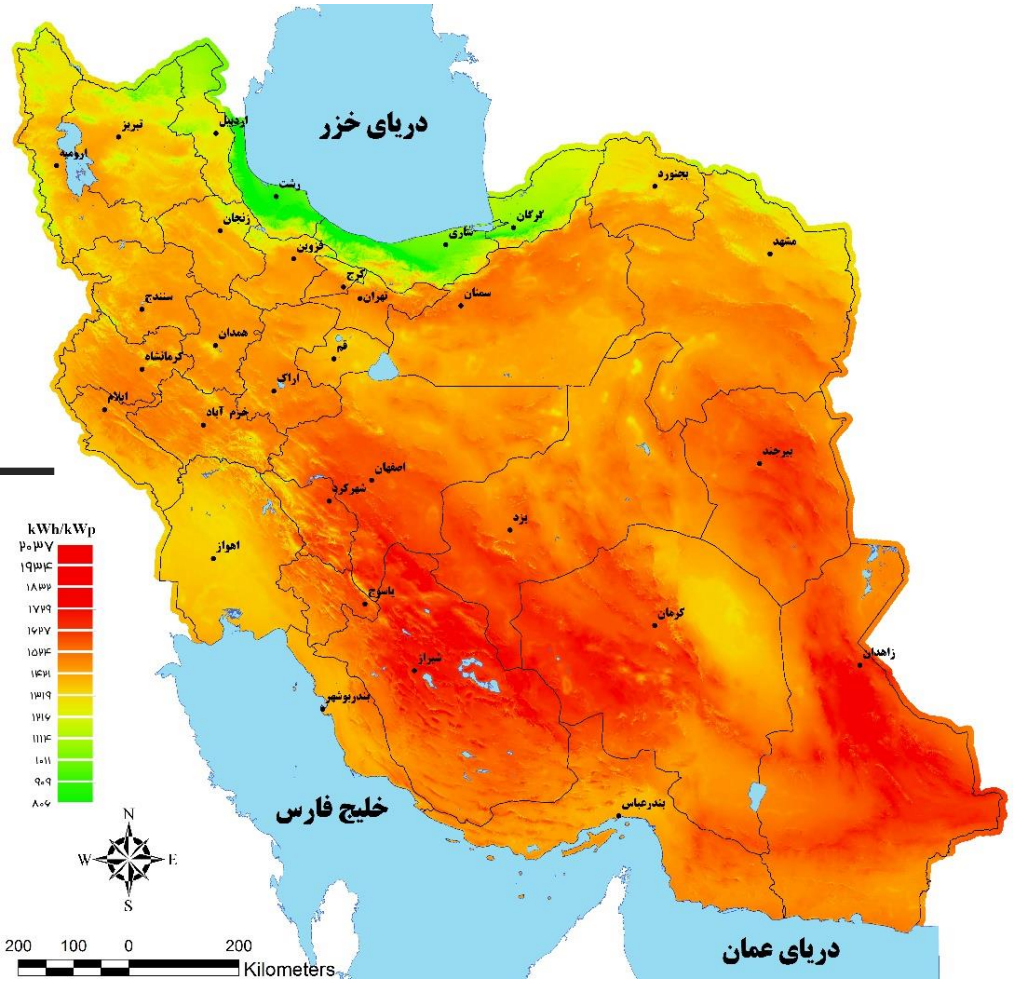
Siahpoush Wind Farm

Photovoltaic Solar Energy Potential in Iran

The Average Annual Radiation

average **2000 kWh** **solar radiation** per square meter

300 **clear sunny day** in a year



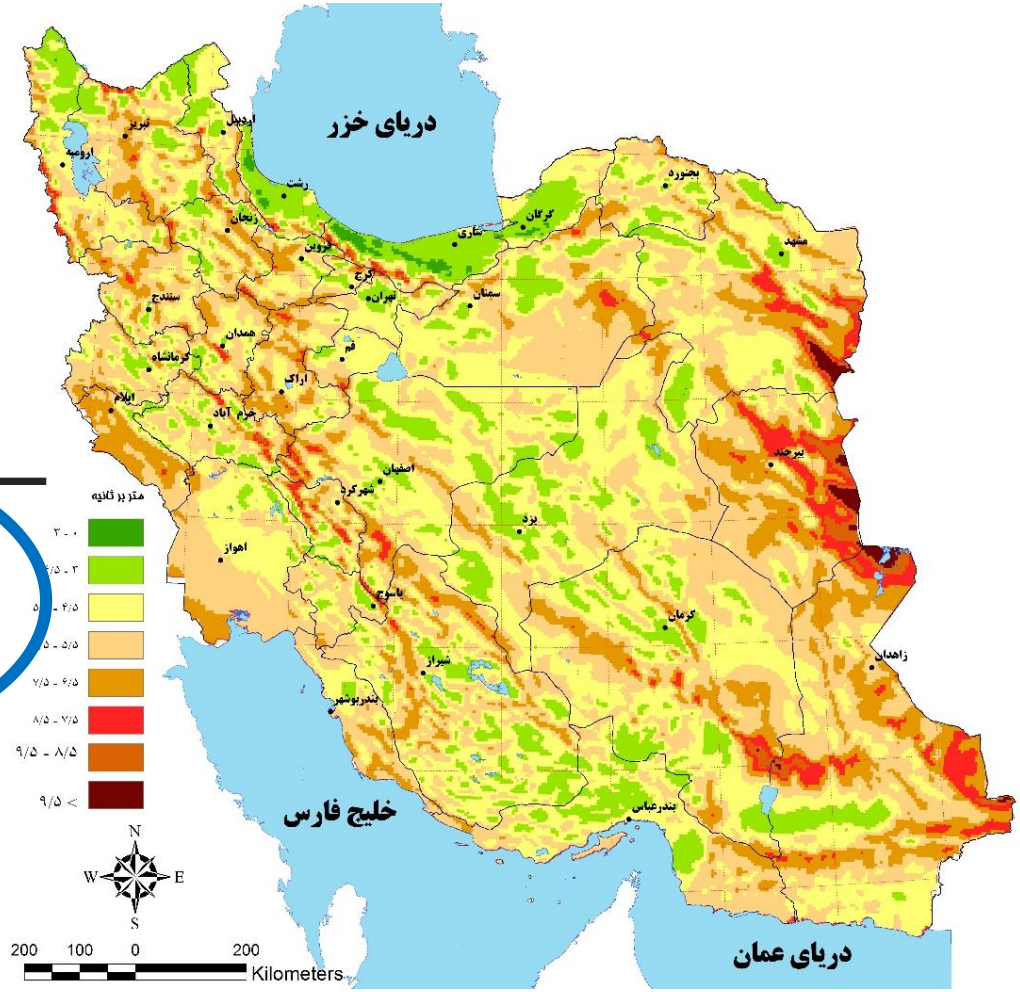
Source: SATBA.com

Wind Energy Potential in Iran

The Average Annual Wind Speed at 100 meters

According to the advantages of wind power,

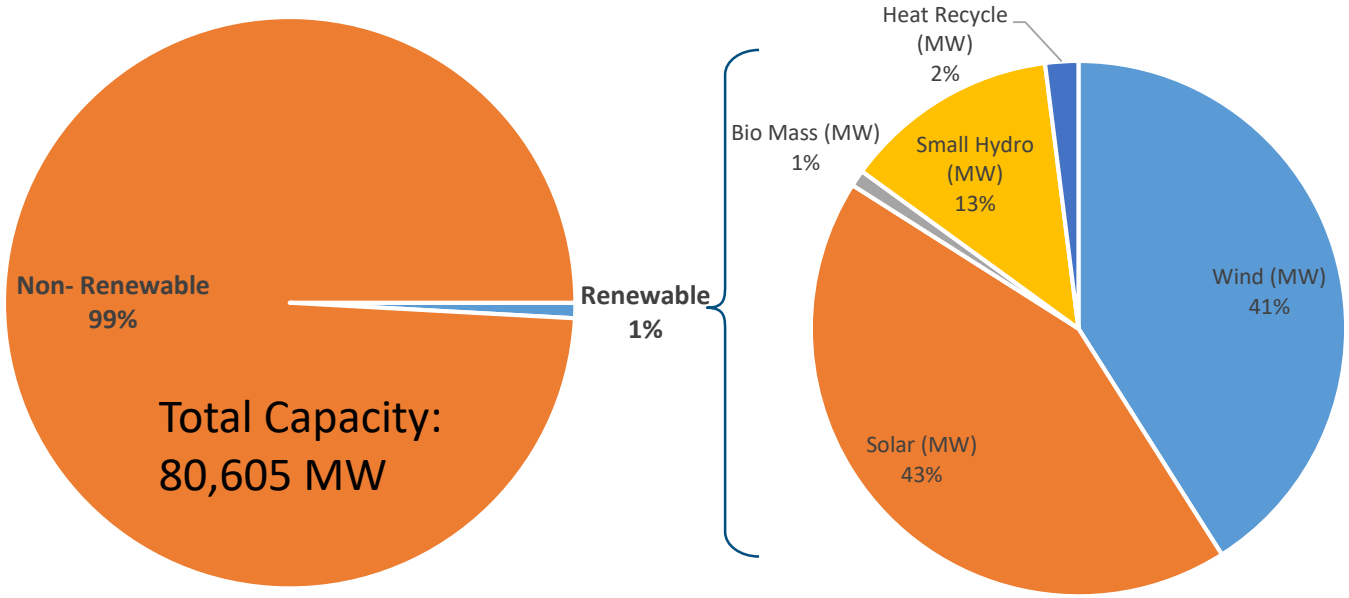
Iran's potential for wind power generation is **20,000 MW**



Source: SATBA.com

Iran Power Plant's Capacity

Installed until end of 1397

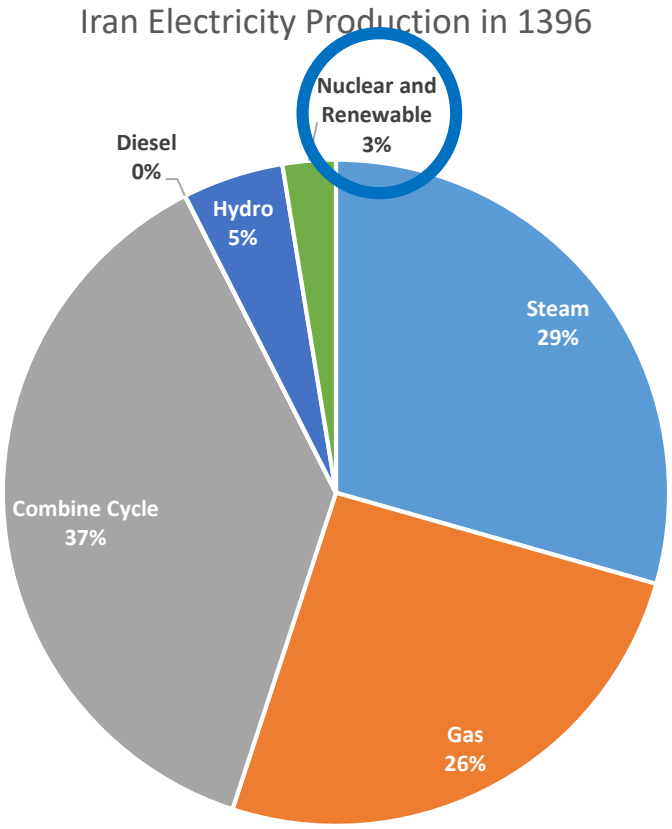


Total Renewable Capacity (MW)	**700**
Wind (MW)	**287**
Solar (MW)	**301**
Bio Mass (MW)	**7**
Small Hydro (MW)	**91**
Heat Recycle (MW)	**14**

Source: Tavanir Report 1398, SATBA

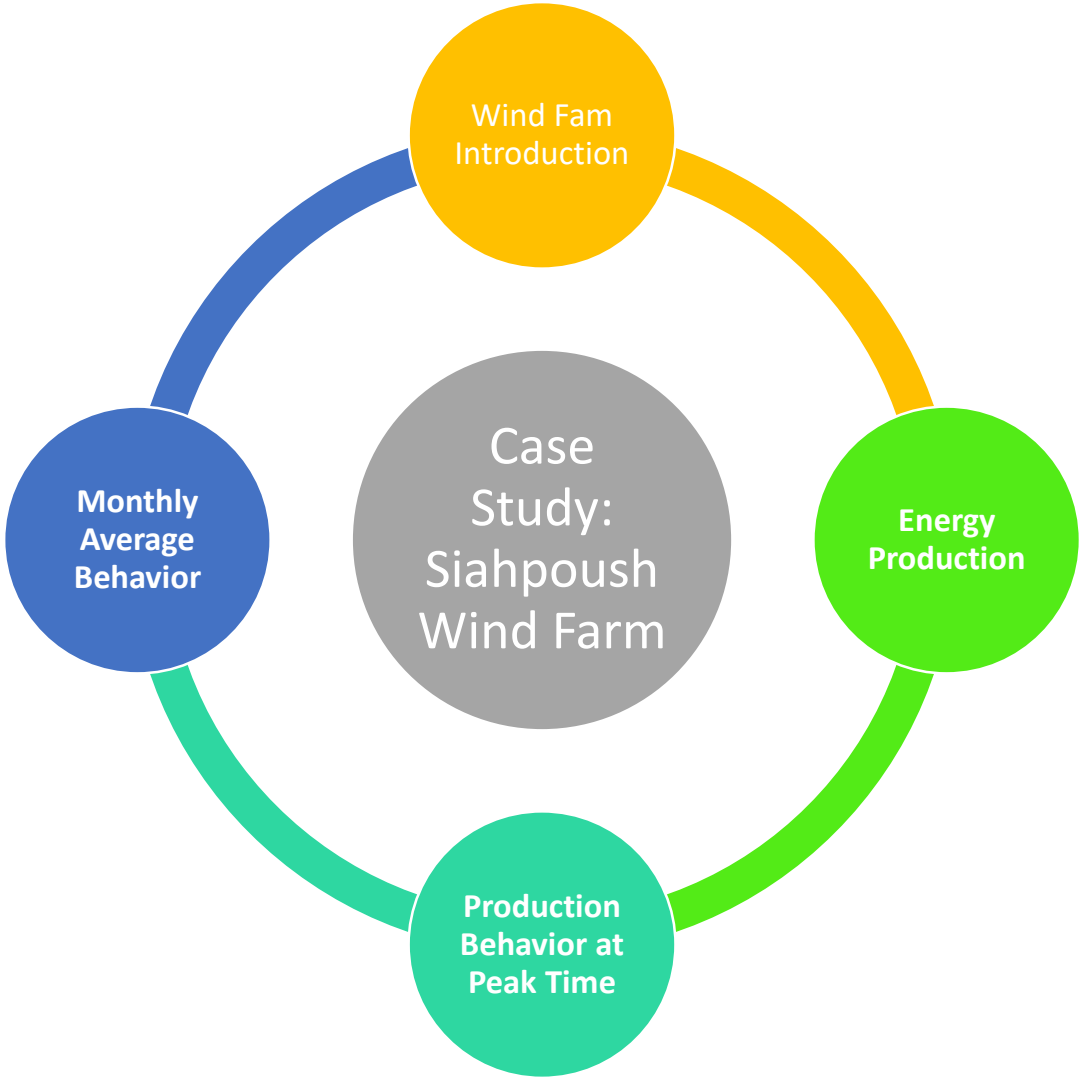
Electricity Production in Iran

1396



Iran Electricity Production in 1396 (TWh)	
Total	307
Steam Power Plant	90
Gas Power Plant	79
Combine Cycle Power Plant	115
Diesel Power Plant	0.06
Hydro Power Plant	15
Nuclear and Renewable Power Plant	8

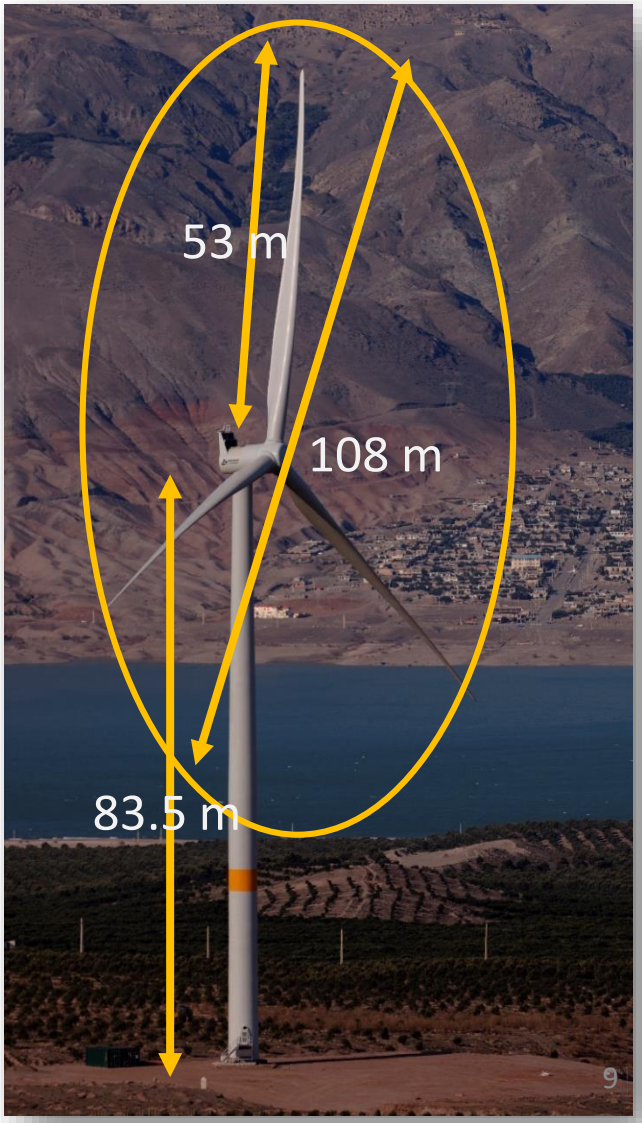
Source: Tavanir Report 1397


Wind Fam Introduction
Energy Production
Production Behavior at Peak Time
Monthly Average Behavior
Case Study: Siahpoush Wind Farm

Tarom (Siahpoush) **Wind Farm Introduction**

Turbine Introduction

- ✓**Turbine: SWT 3.4-108**
- ✓ **Turbine Capacity: 3.4 MW**
- ✓**Technology: Permanent Magnet Direct Drive**
- ✓ **Rotor Diameter: 108 m**
- ✓ **Blade Diameter: 53 m**
- ✓**Hub Height: 83.5 m**
- ✓**Turbine Class: IEC-IA**



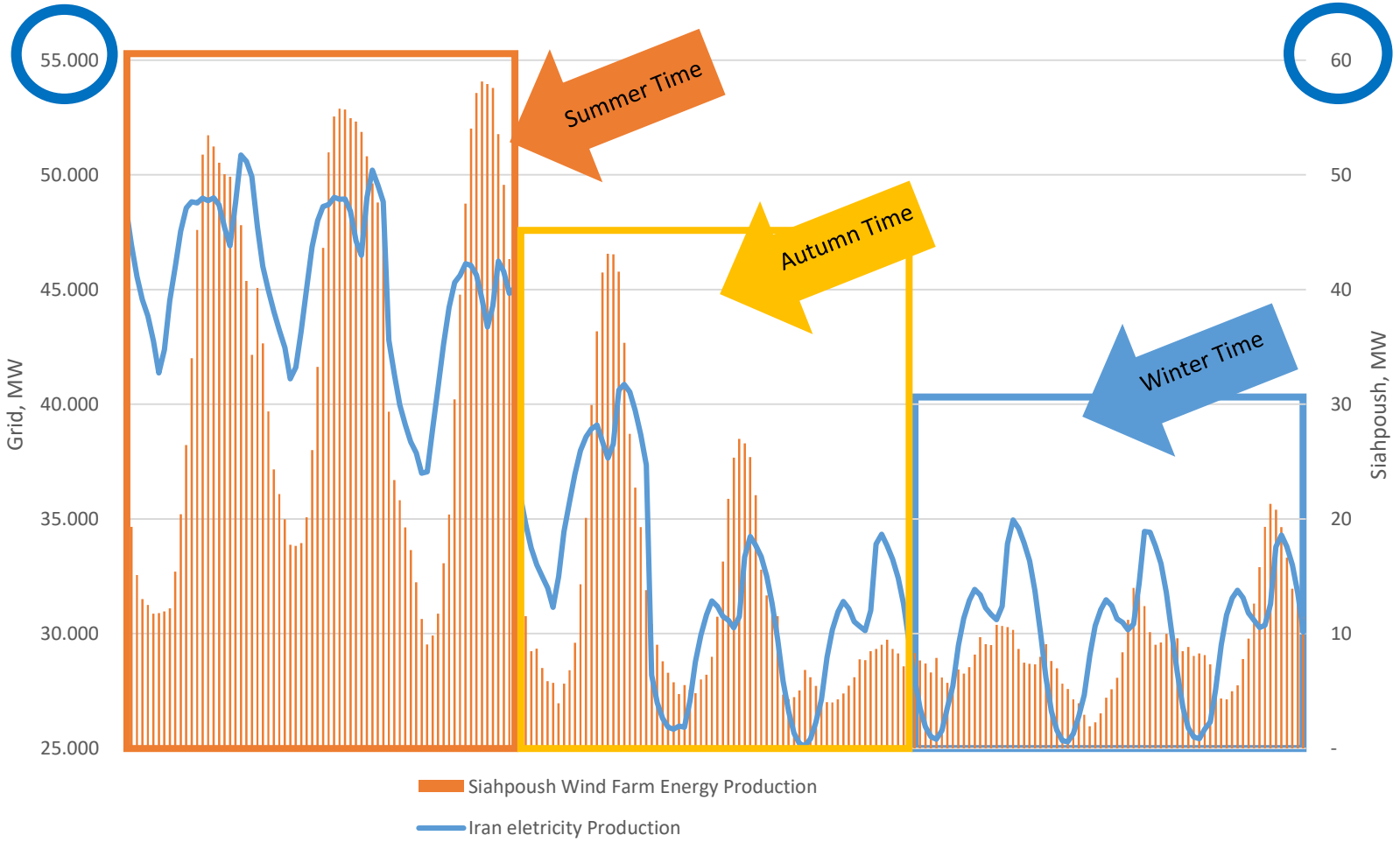
Tarom (Siahpoush) **Wind Farm Introduction**

61.2 MW **187 GWha**

110 k-Tonne

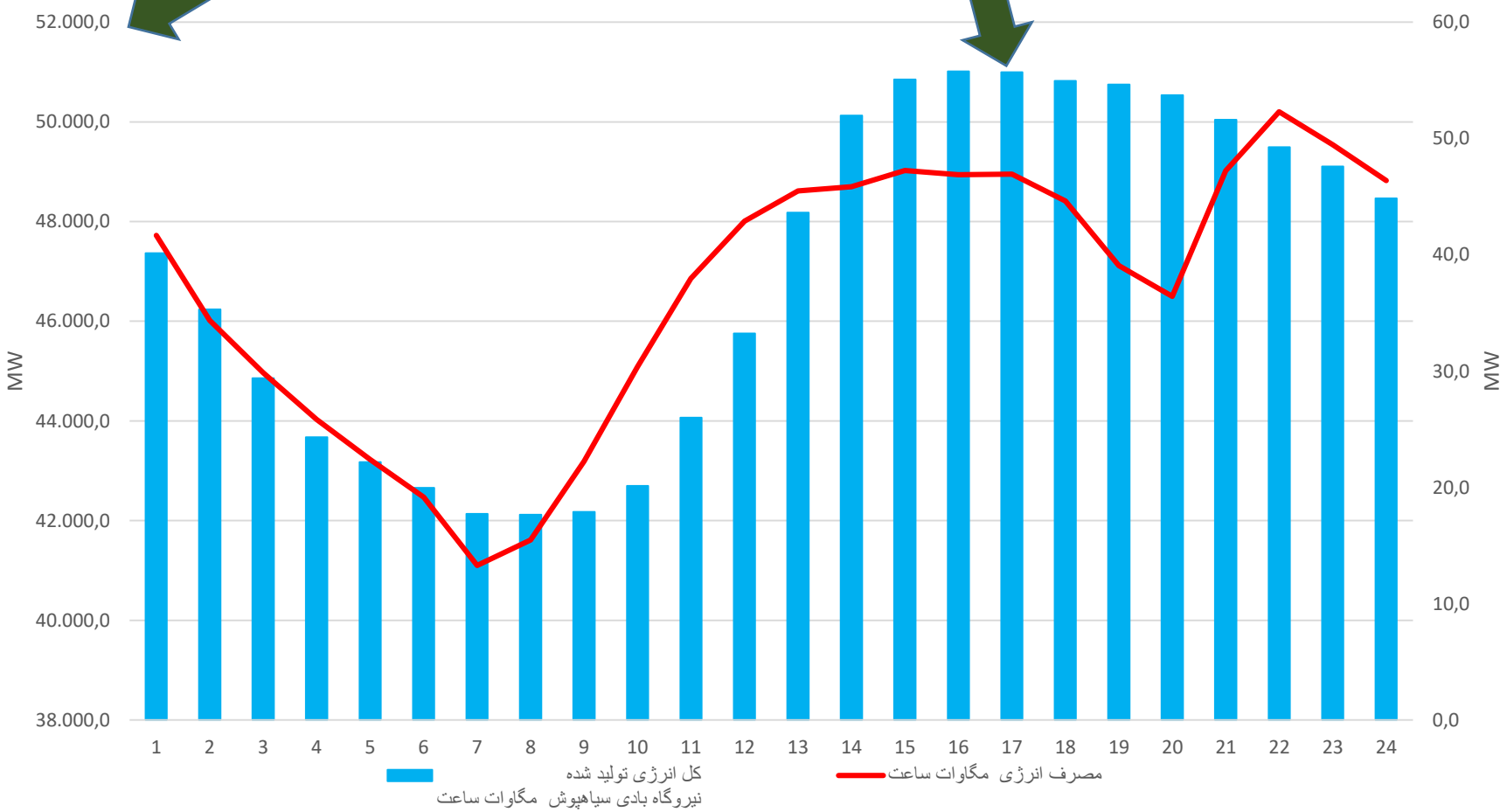
45 million Natural Gas m^3

Iran Electricity and Tarom (Siahpoush) Wind Farm Production in 1397 (Tir to Esfand- Hourly Average)

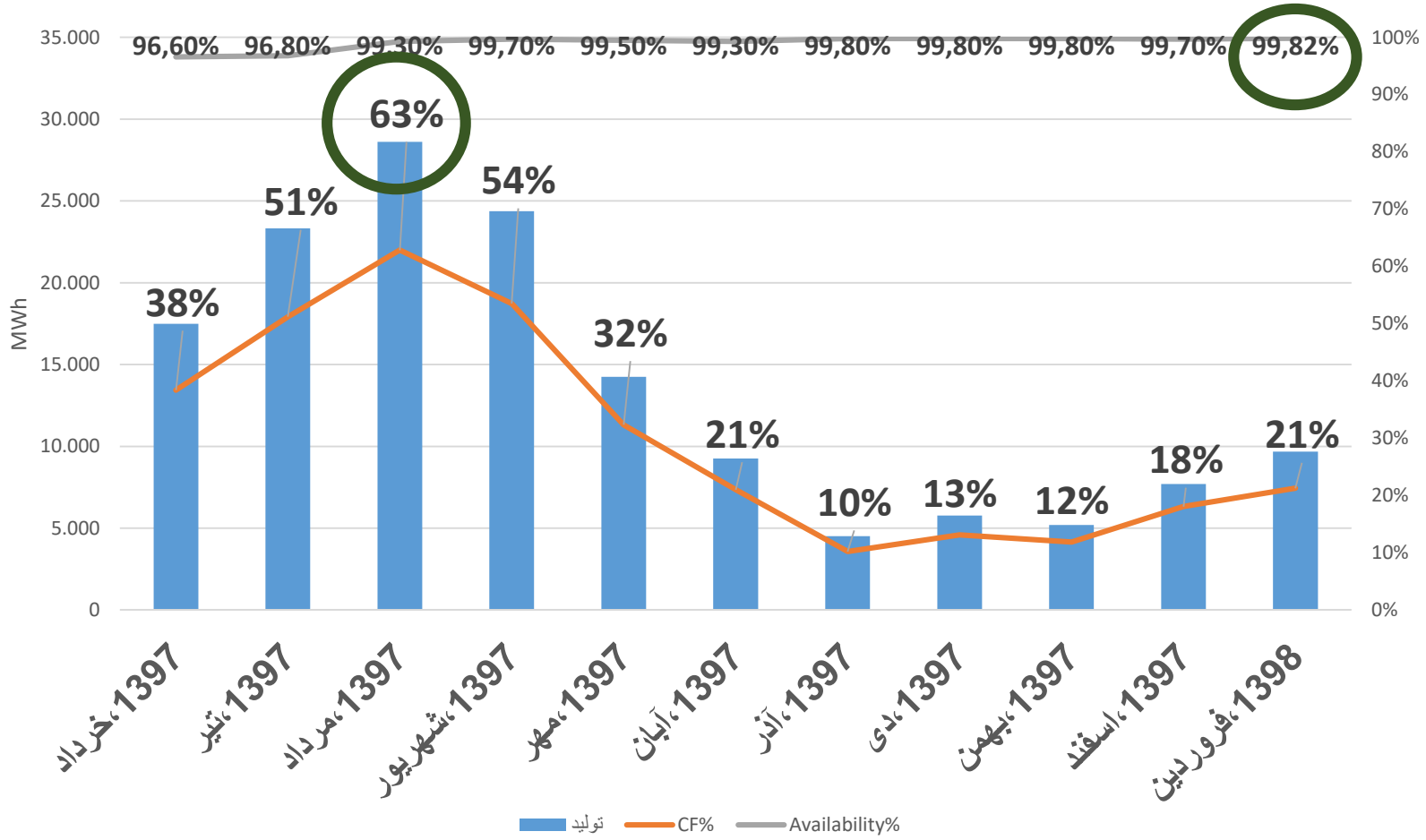


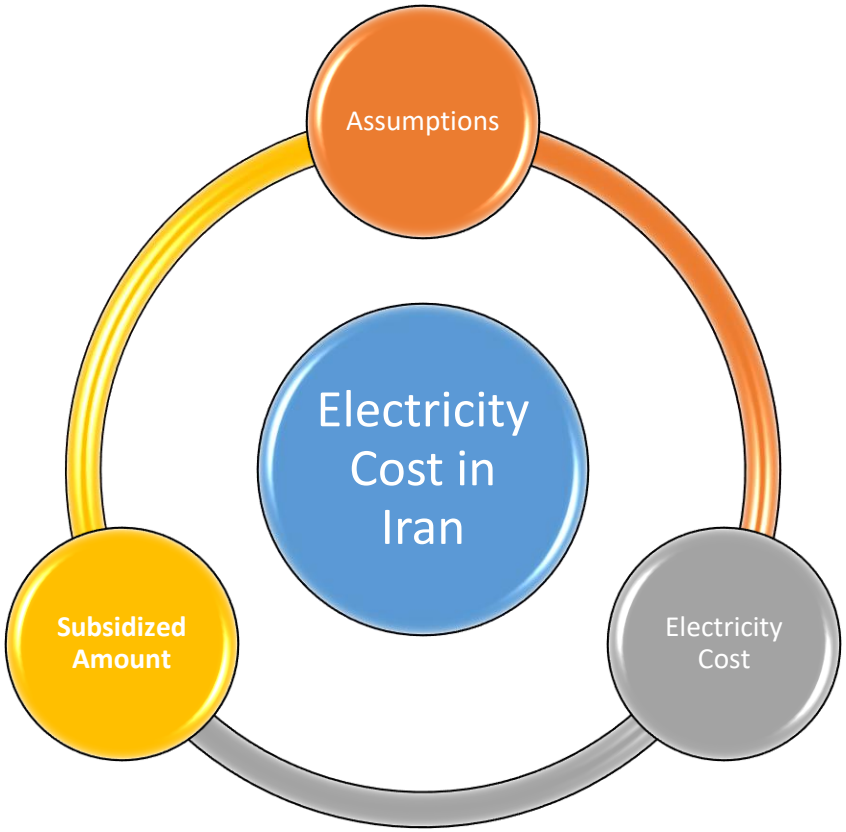
52 GW/80 GW = 65%
Grid Installed Capacity

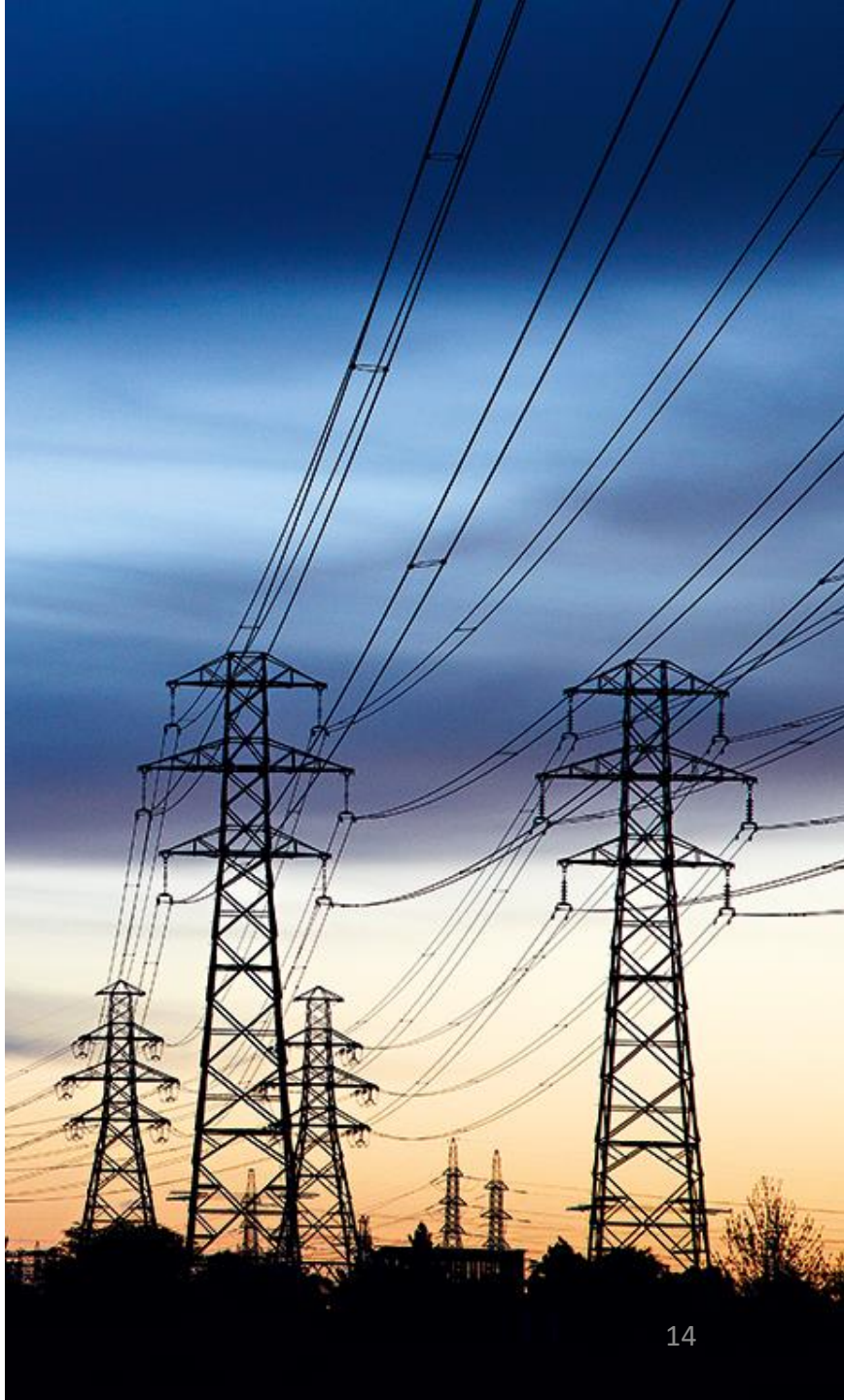
56 MW/61 MW = 91%
Wind Installed Capacity



Iran Electricity and Tarom (Siahpoush) Wind Farm Production in Since COD




Assumptions
Electricity Cost in Iran
Subsidized Amount
Electricity Cost



Real Electricity Production Cost

Assumptions

USD: Toman	**9,479**	(NIMA)
Natural Gas Price	**0.13** USD/m3	Petrochemical Feed

Real Electricity Production Cost of Fossil Fuel Power Plants in Iran

Fuel	**465** Toman/kWh
Water	**0.3** Toman/kWh
Environmental	**185** Toman/kWh
Energy Conversion	**223** Toman/kWh
Transmission	**131** Toman/kWh
Energy Loss	**157** Toman/kWh

874
Toman/kWh

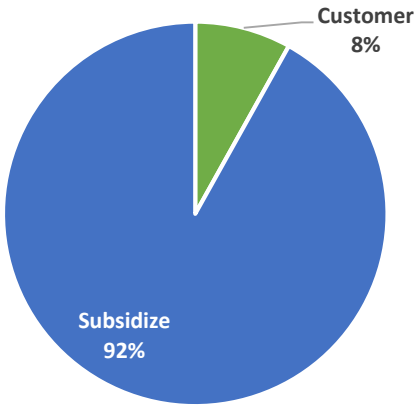
1,161
Toman/kWh

Subsidized Cost of Electricity in Iran

Fuel Power Plant Production Cost	Real Cost	Subsidized Cost	Difference	Unit
	1,161	94	1,067	IRR/kWh
	320,875	25,962	294,913	B toman/year

31 Bilion USD

Electricity Price for Household Customer



Electricity Price for Household Customer	Customer Share	94	8%
	Subsidize Share	1,067	92%

Actual Consumer Cost of Electricity in Iran

نرخ ارز دلار										بهای تمام شده **واقعی** برق تولیدی، تحویل مصرف کننده (ریال هر کیلووات ساعت)		قیمت گاز (دلار بر مترمکعب)
180,000	170,000	160,000	150,000	140,000	130,000	120,000	110,000	100,000	94,790			
17,170	16,518	15,866	15,214	14,562					11,615	$	0.13	
17,771	17,086	16,401	15,715	15,030					17,771	$	0.14	
18,372	17,653	16,935	16,216	15,497	14,779	14,060	13,341	12,623	18,372	$	0.15	
18,973	18,221	17,469	16,717	15,965	15,213	14,461	13,709	12,957	18,973	$	0.16	
19,574	18,789	18,00				14,862	14,076	13,291	19,574	$	0.17	
20,175	19,356	18,53				15,262	14,443	13,625	20,175	$	0.18	
20,776	19,924	19,07				15,663	14,811	13,958	20,776	$	0.19	
21,377	20,492	19,606	18,720	17,835	16,949	16,064	15,178	14,292	21,377	$	0.20	
21,978	21,059	20,140	19,221	18,302	17,383	16,464	15,545	14,626	21,978	$	0.21	
22,579	21,627	20,675	19,722	18,770	17,817	16,865	15,913	14,960	22,579	$	0.22	

11,615

18,770

Conclusion

- Energy Economy is the most important thing that should be adjusted
- Production Should be Feasible based on Actual and Comparable Energy Prices
- Renewable Energy Share in Electricity Production should be at least 20% and to be increased gradually in new Power Plant Establishment
- Replacing old Power Plants by Renewables
- Saving Fuel to be rewarded to the Renewable Plants


Thank you
نیروگاه بادی ۶۱ مگاواتی
طارم (سیاهپوش)
Tarom (Siahpoush) 61MW Wind Farm
MAH BAAD
شرکت تولیدی آرین مه باد
Arian Mah Baad Co.
Beyond Power Generation

Renewable Social Responsibilities

520 Solar Systems Roof Type

Kahnooj Charity Project

5 kW Solar Systems for Charity Project (20 Years Power Purchase Agreement)

Loan / 5 years / 4% interest **32 Million** Toman

Free from Committee Emdad **10 Million** Toman

} **42 Million** Toman

First 5 years

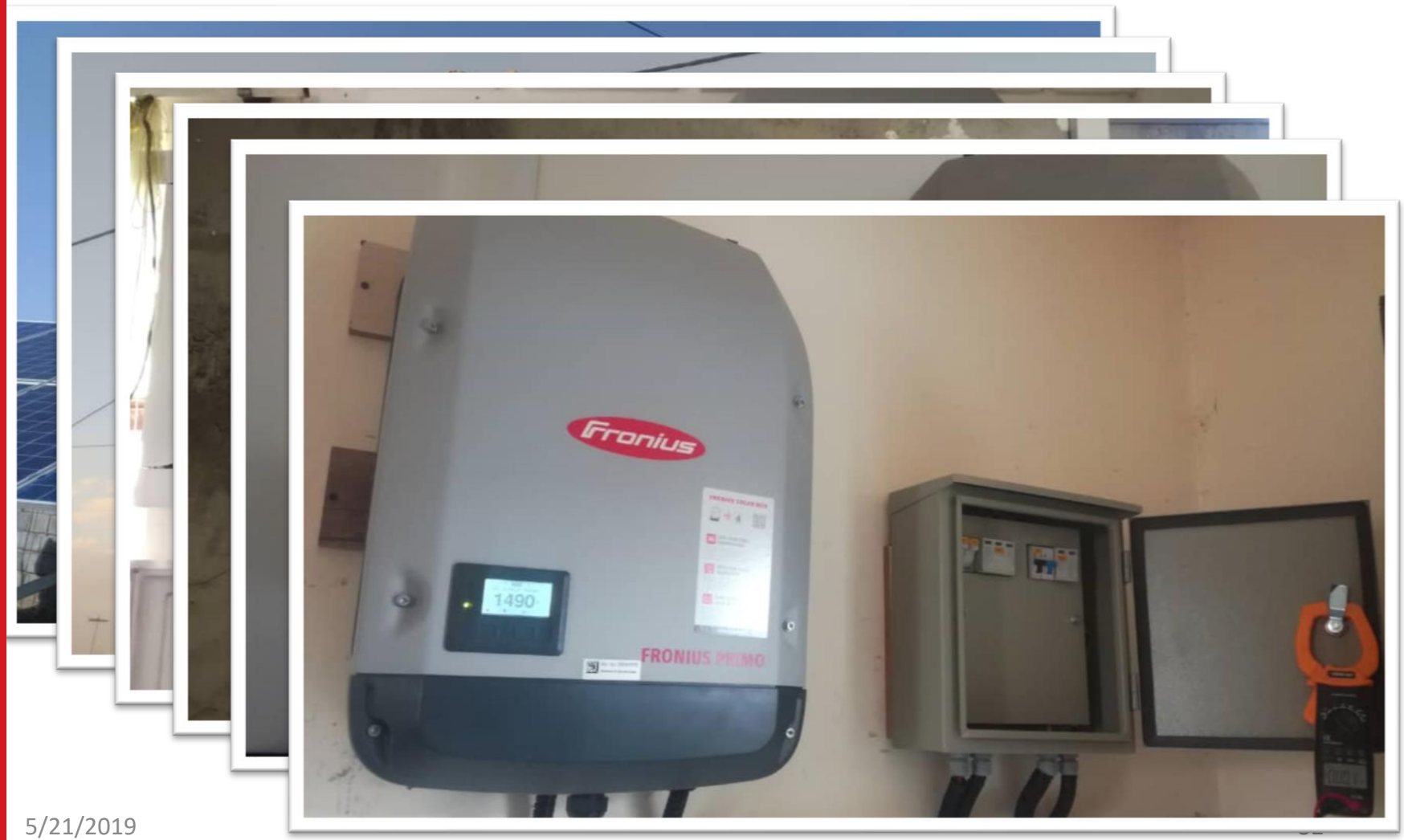
- **80% Loan Reimbursement**
- **20% for the Owner**

5 to 20 years

- **100% for the Owner**

Project Locations

Project Progress (Inverter Installation)



Project Progress (Connection to Grid)

MAH TAAB

Beyond Power Generation