



**Ministry Of Energy of IR IRAN
Renewable Energy Organization of Iran- (SUNA)**

Renewable Energy In Islamic Republic of Iran:

**Policy
Potential
Energy Security
Private Sector
Application**

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Iran Renewable Energy Policy

Why Renewable Energy in Iran?

- Although Iran is a main oil producing country, due to the following reasons, RE is important:
- To be in line with the world efforts to curb the world environmental problems
- To improve energy accessibility for remote and isolated places in the country
- To pave the way, among other things, for controlling urban air pollution
- To Increase Security of Iran Energy Supply
- To Maintain The Present Level of Non Renewable Energy Export

Main Policies For Renewable Energy in Iran

- Supporting private sector for dissemination of RE applications that are approaching economical viability, such as wind, geothermal and biomass energy.
- Supporting manufacturers for transferring and localization of RE technologies which are expected to become competitive in medium terms, e.g. PV systems and solar thermal power plants.
- Supporting the research centers to expand their research programs for RE technologies that are becoming competitive in longer than 10 years period.
- Providing sustainable and accessible energy to the poor and isolated areas. It is worth mentioning that at present more than 96% of people in rural areas of the country have access to national electrical grid.

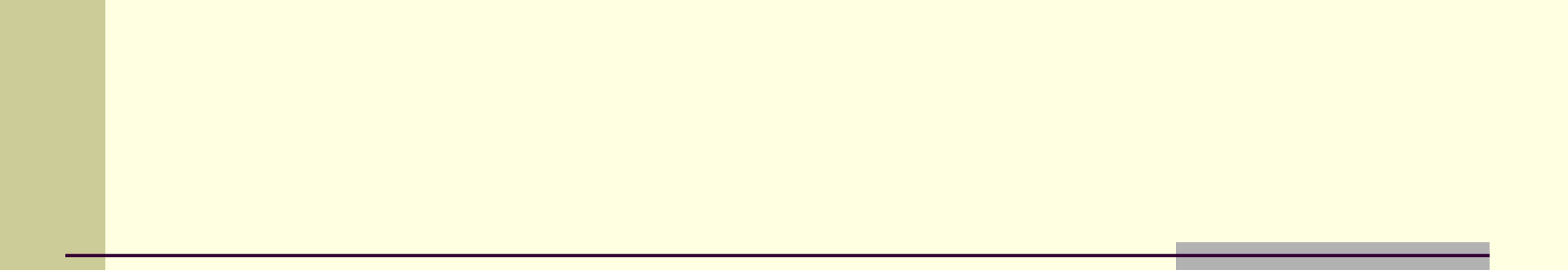
Policy Related Activities in Iran

- Building capacity;
training, supporting research centers, encouraging manufacturers to produce required RE equipments, organizing suitable institutional framework, ...
- Legislation for RE development;
the government is obliged to purchase electricity from private RE power plants with the price of three times higher than the amount paid by end users.
- Raising public awareness;
- Pilot projects by the government;
to clear the ground for the private sector to come forward.
- Potential assessment studies;
of RE resources with continuous upgrading of the results.

Goals in the period of 2010-2015

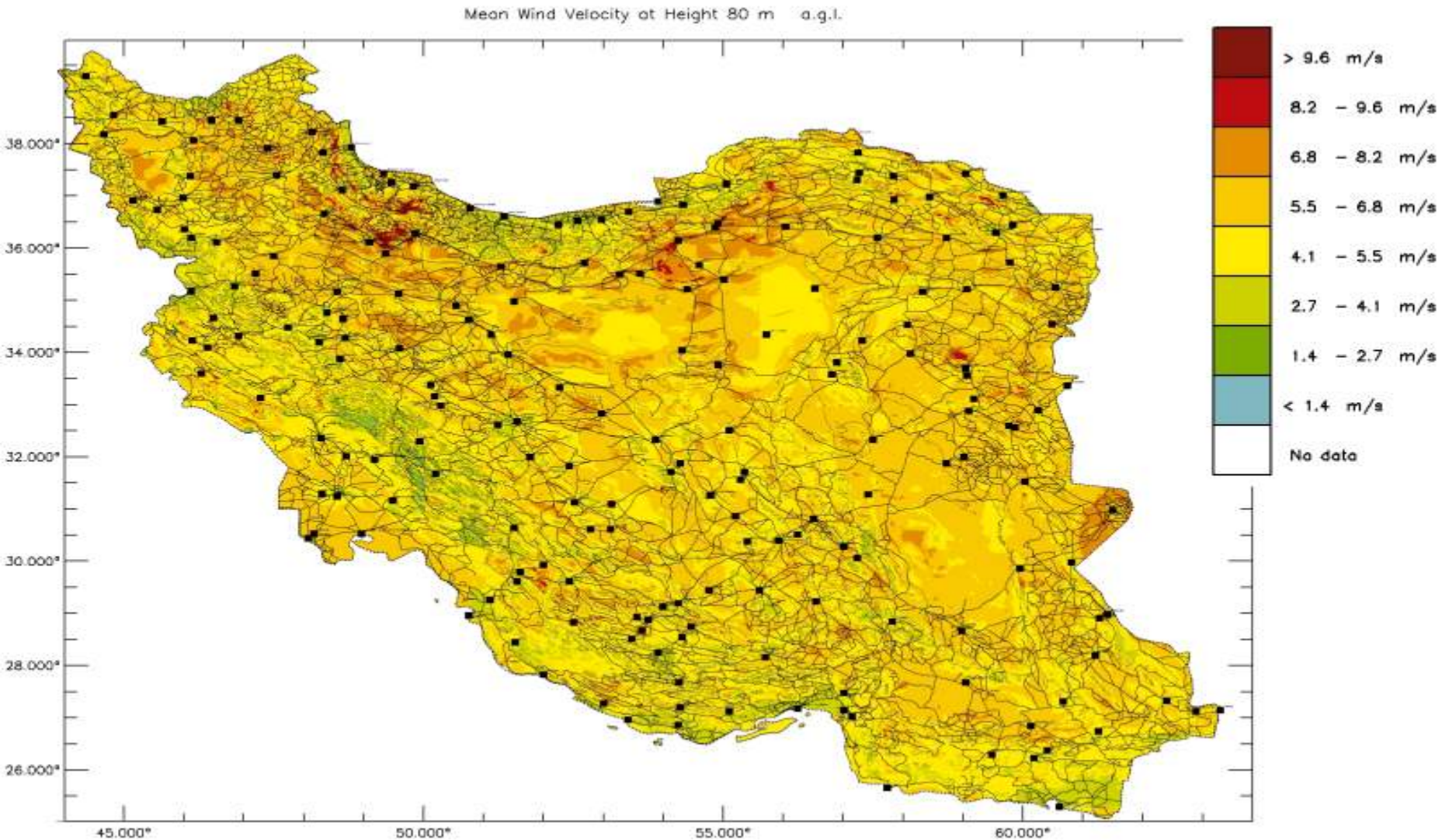
More than 810 MW of RE Power Plants would be installed in the country, which include:

Renewable Source	Accumulated Capacity	
Small Hydropower	150	MW
Wind Farm	2000	MW
Geothermal Power Plant	55	MW
Solar Thermal Power Plant	20	MW
Fuel Cell	1	MW
Photovoltaic	100	MW
Biomass Power Plant	100	MW
<i>Total</i>	2426	MW
Solar Water Heater (2,000,000 m ²)	100	MW _{th}
<i>Total (including Solar Water Heaters)</i>	2526	MW



Renewable Energy Potential of I.R. Iran

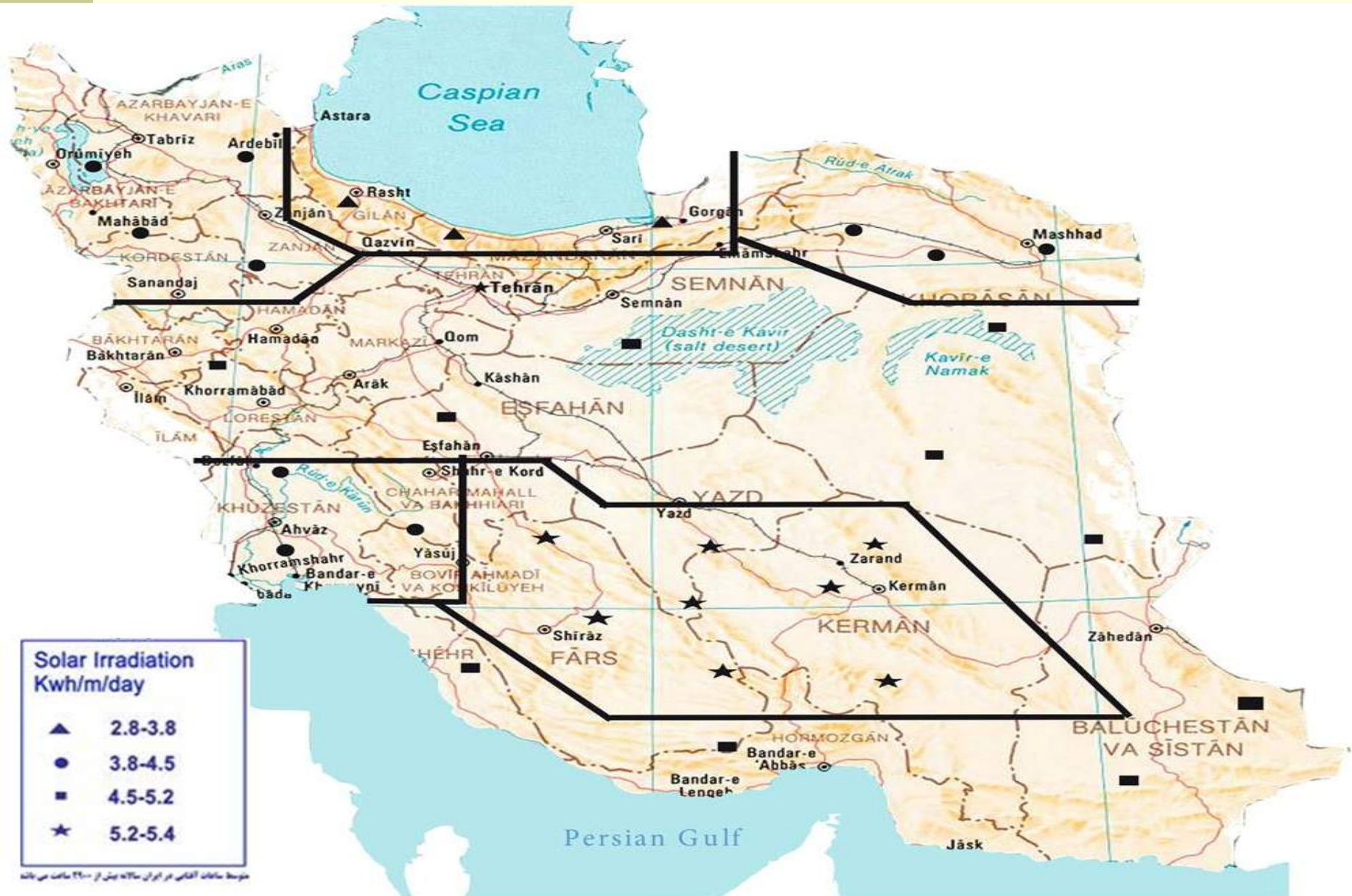
Iran Wind Energy Potential



Wind resource assessment is being done by Lameyer international company (Germany)

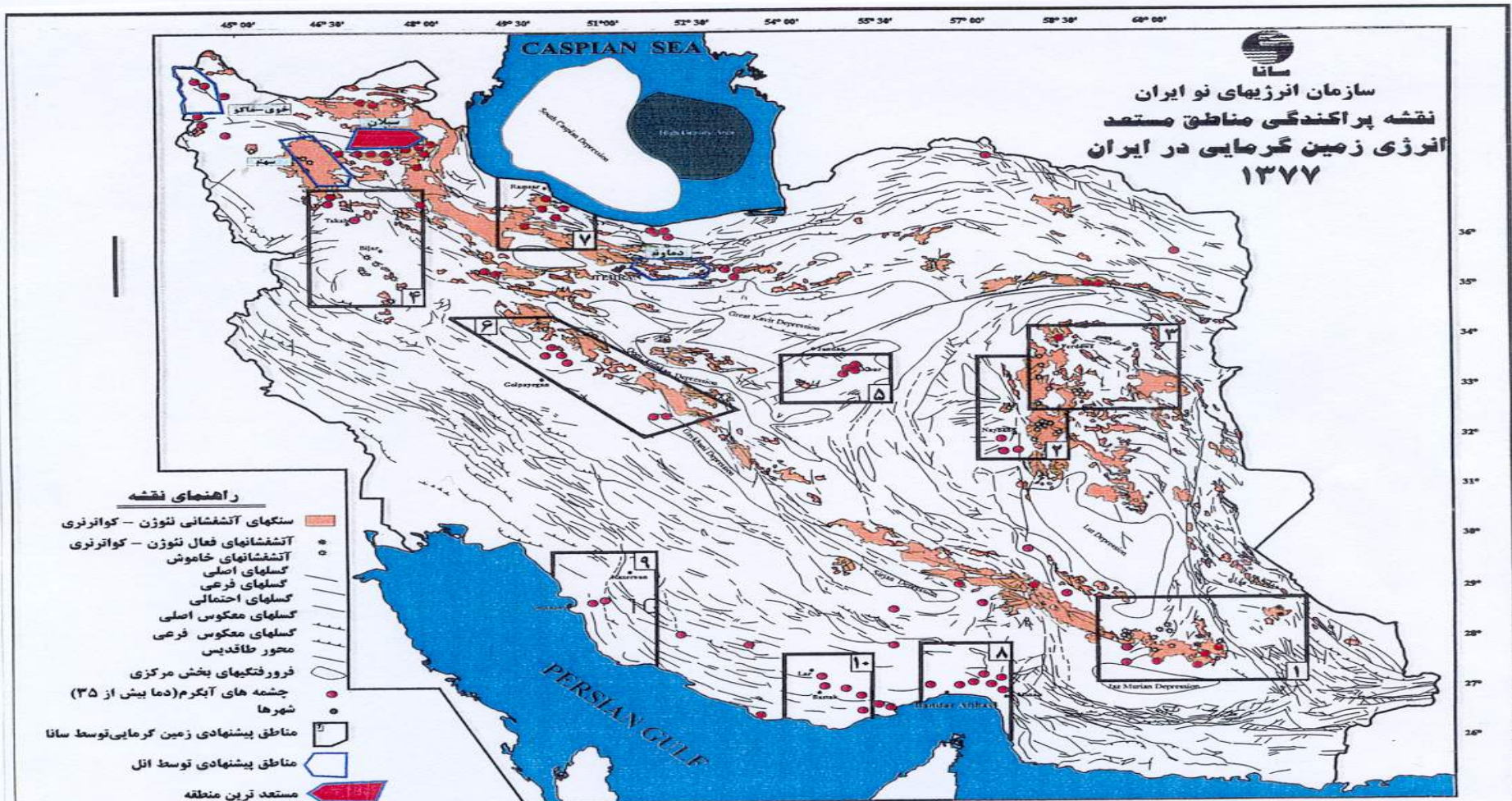
More than 40000Mw Potential

Iran Solar Energy Potential



مطابق با داده‌های سازمان انرژی‌های تجدیدپذیر و بهره‌ریزی انرژی‌های نو (ساوا) در سال ۱۳۹۰

Iran Geothermal Energy Potential



مناطق پیشنهادی ائل به ترتیب اولویت

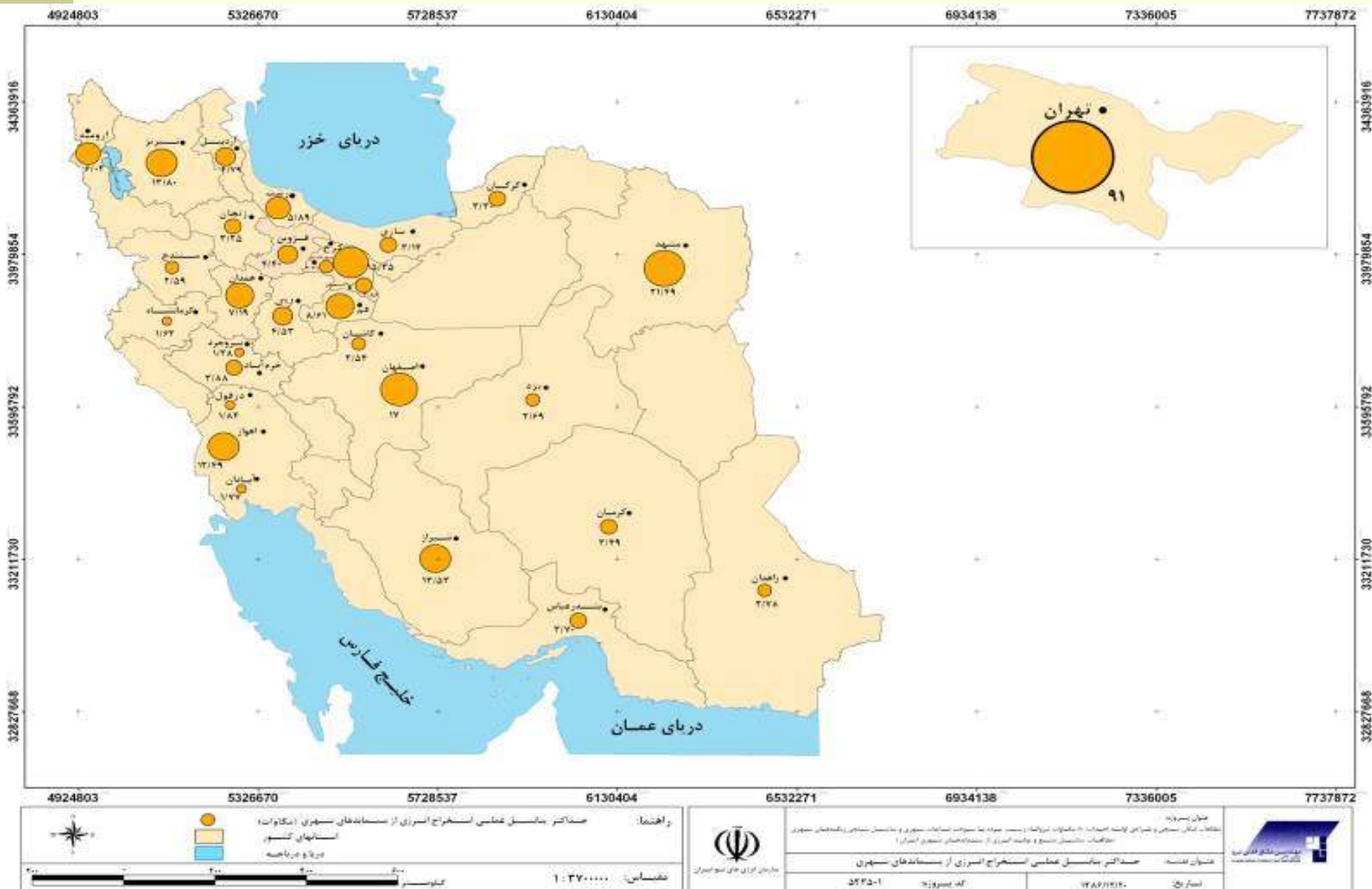
- ۱- سیلان
- ۲- خوی - ماکو
- ۳- دماوند
- ۴- سهند

مناطق پیشنهادی سانا به ترتیب اولویت

- ۱- تفتان - بزمان
- ۲- نایبندان
- ۳- فردوس - طبس
- ۴- تکاب
- ۵- خور - بیابانک
- ۶- اصفهان - محلات
- ۷- رامسر
- ۸- بندرعباس - میناب
- ۹- بوشهر - گازرون
- ۱۰- لار - بستک

شکل ۸۴. نقشه پراکندگی مناطق مستعد انرژی زمین گرمایی

Iran Biomass potential



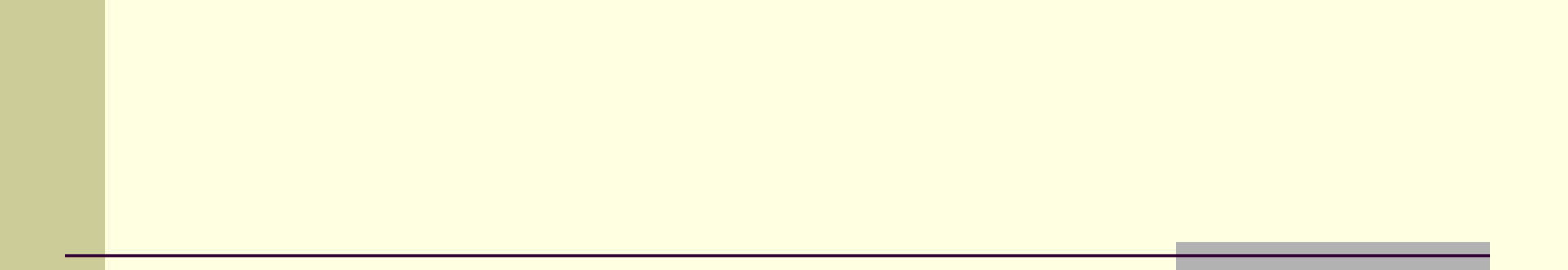
واحدتها: صدگنر براسنسل غعلس استخراخ السوزی از بسنادهای سهری انگوات
 استانهای کسور
 دریا و برابحه

مقیاسها: 1:2700000

سازمان سنجش و نقشهبرداری
 سازمان نقشهبرداری و نقشهنگاری
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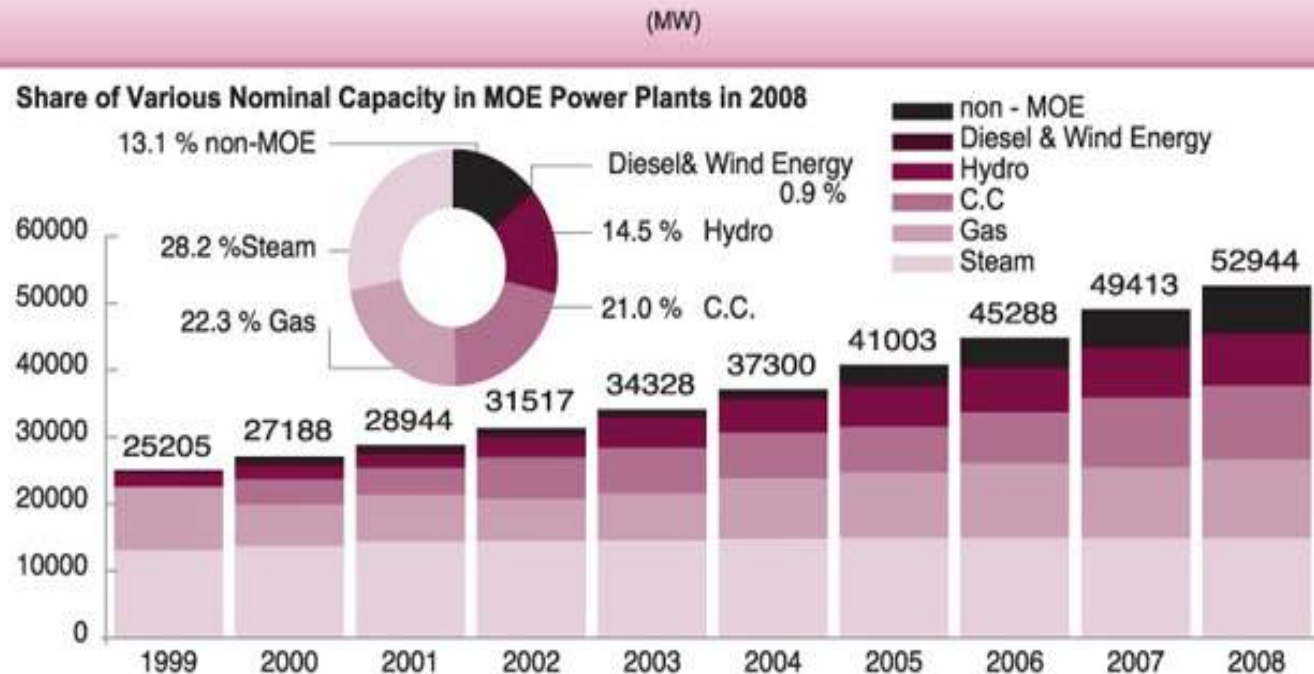


**Renewable energy
Increases
Iran Energy Security**

Current structure of electricity supply → Supply Mix

□ ending 2008, about 84.5% of Iran's electricity came from thermal power plants using natural gas and heavy fuel oil as main fuels

Diagram (1): Installed Nominal Capacity of the Power Plants at the end of the Years 1999 through 2008

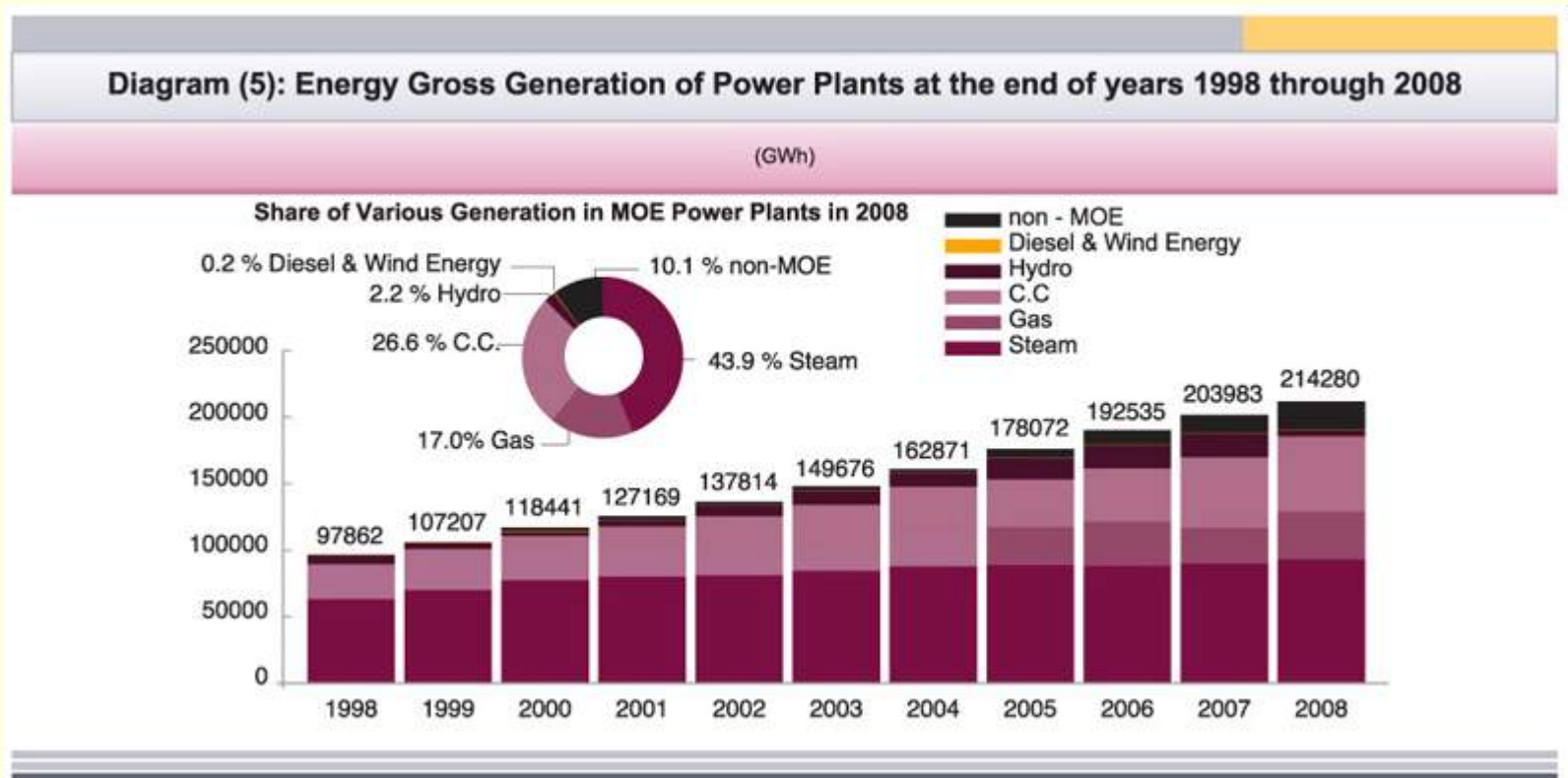


□ Share of Wind energy in 2010 is less than %1 of total Electricity Production

□ Non-MOE (Ministry of Energy) is private Sector

Current structure of electricity supply → Generation growth

- The total gross generation in Iran reached 214 TWh for the year ending 2008
- growing an average of 8% per annum during the preceding five years to 2008

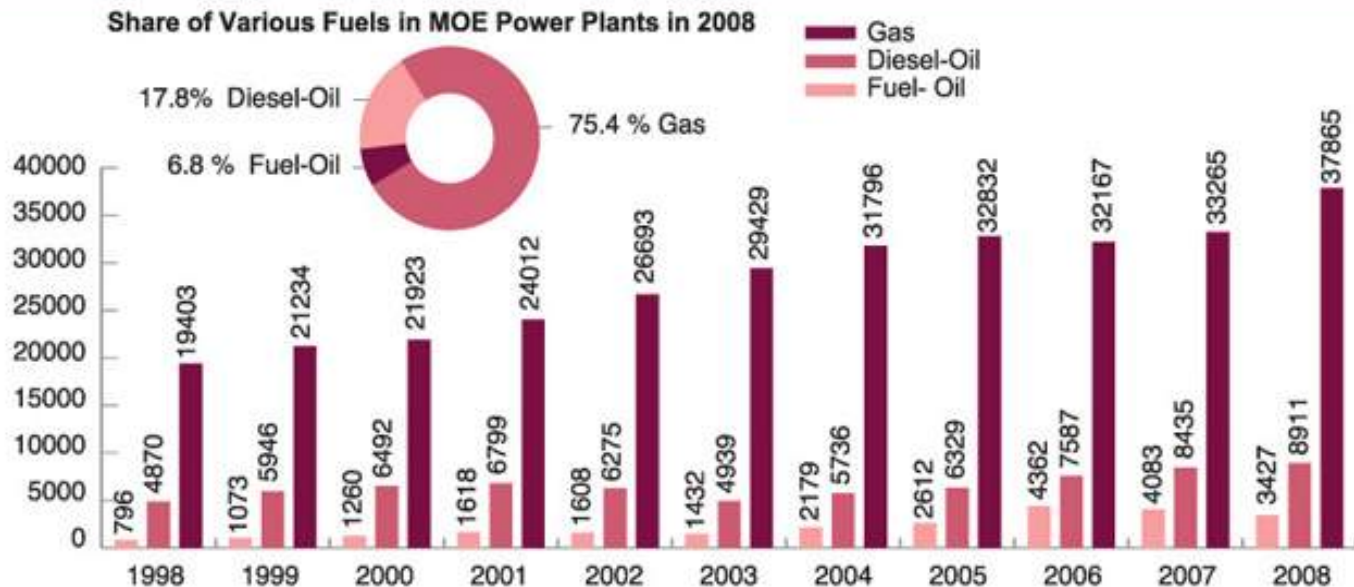


Current structure of electricity supply → Fuel

□ Natural gas as a main fuel in generation

Diagram (6): Fuel Consumption of the MOE Power Plants

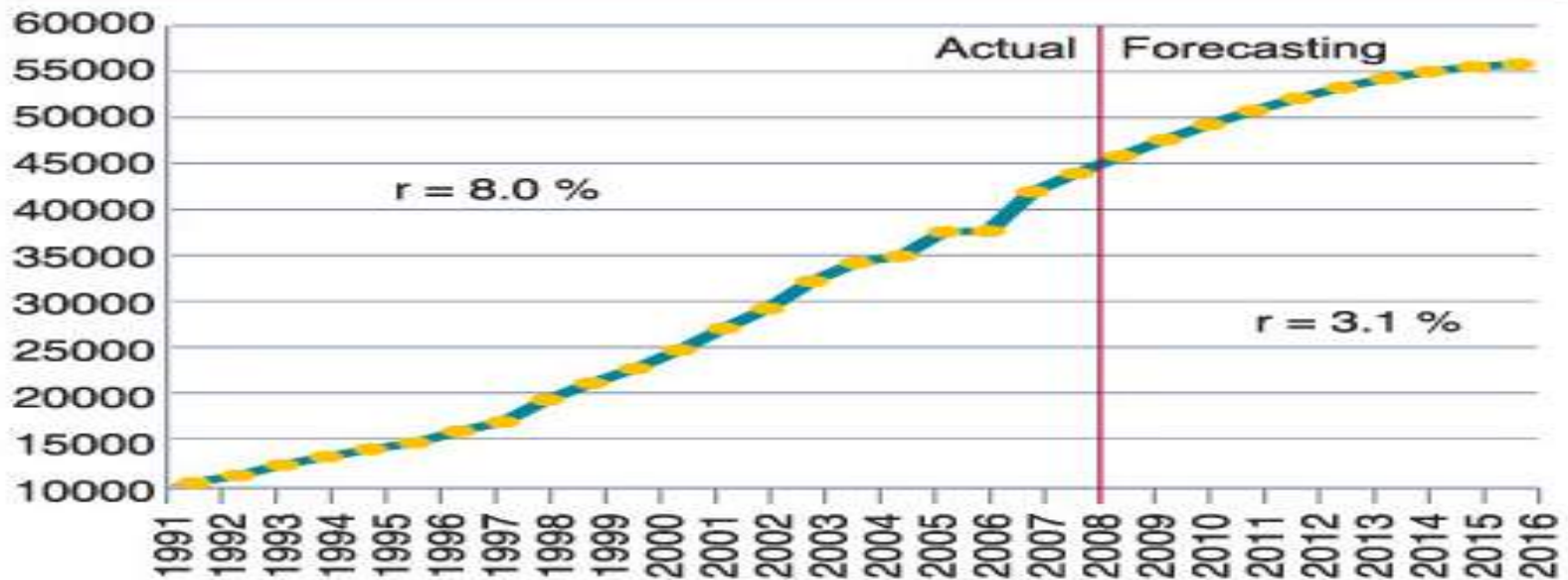
(10^6 m^3 or 10^6 Liter)



Current structure of electricity supply → Forecast

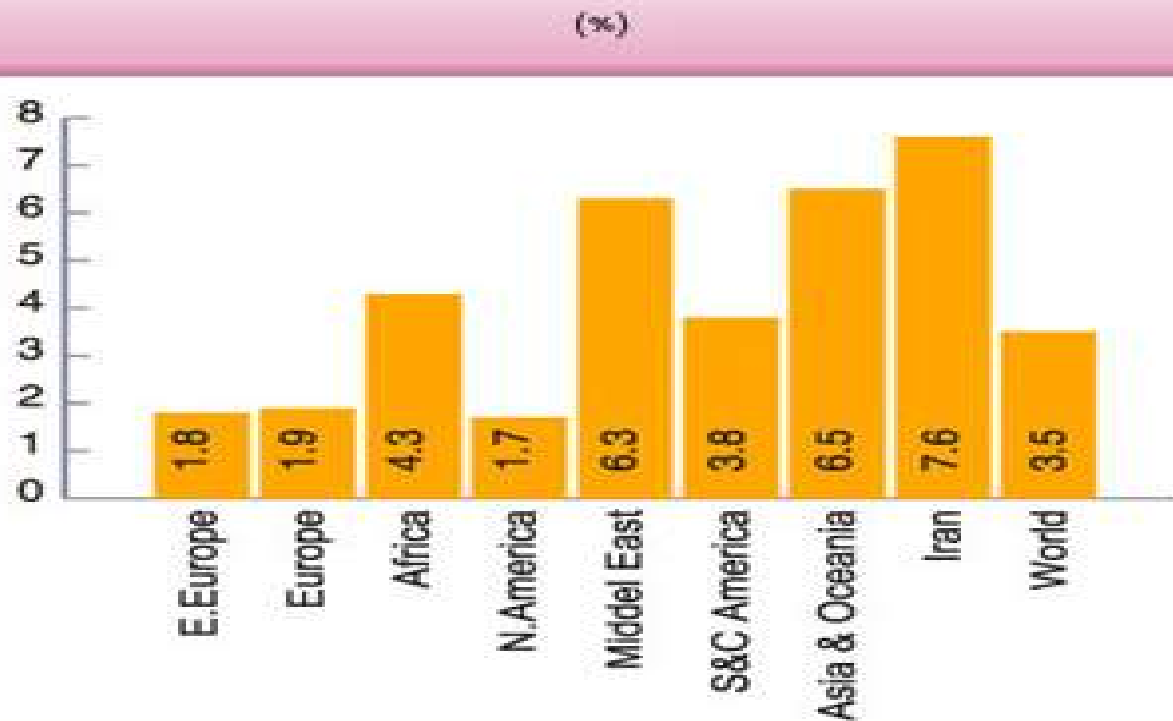
Diagram (14): Trend of Long Period Variation of the Annual Peak demand for the Power Network- 1991 to 2008 and Forecast up to 2016

(MW)



Current structure of electricity supply → population

Diagram (44): Average Per Cent Growth of Population During the Past Decade



Energy Security as National Issue

International Energy Agency (IEA):

1. Adequate
2. Affordable
3. Reliable

European Commission :

“Uninterrupted physical availability of energy products on the market, at a price which is affordable for all consumers (private and industrial)”

Considering the above definition and previous presented statistics slides, suggest that the Renewable Energy Can Increase Iran Energy Security

Risks in Energy Security Stability:

1-Energy Market Instabilities:

Caused by unforeseen changes in geopolitical or other external factors

2-Technical Failures :

Power outages caused by plant or grid malfunctions

Physical Security Threats sabotage, theft, or piracy and natural disasters.

Adequacy, Reliability and Prices are disturbed because of uncertainties.

Renewable energy can decrease risks in Iran energy security

How Renewable energy will increase Iran energy security: (Important notes)

- **Diverse geography and significant renewable energy resources can increase security in energy supplying section.**
- **Iran RE Can match fast growing energy demand in country**
- **The continued heavy use of fossil-fuels in Iran has major associated adverse environmental and health impacts. Iran RE can help to reduce those impacts.**

Continued: How Renewable energy will increase Iran energy security: (Important notes)

- **The substitution of fossil fuels with RE sources could reduce the amount of fossil fuels consumed domestically and increase the amount available for export**
- **Iran RE development provides business opportunities**
- **Iran RE Increase local employment (Iran is a young country and Therefore with more demands for jobs.)**



**Investment Opportunities
For Renewable Energy in
I.R. IRAN**

Legal framework for Iran private sector investment in RE

There is a legal framework for the program:

- Article 62 of The Law of Regulation a Part of the Governmental Financial Provisions
 - This is a law very similar to Feed-in-Tariff laws, used in European countries,
 - This concept allows the most feasible renewable energy source to develop at the first.

Executive Instruction of Article 62

- In the instruction MOE has been recognized as the responsible executive authority of the program

- With further approval by the Cabinet Council, in 2008, the price set at :
 - ❖ **1300 Rials (0.13\$) per kWh for peak & normal load hours,**

 - and**

 - ❖ **900 Rials(0.09\$) per kWh for off-peak hours (4 hours a day)**

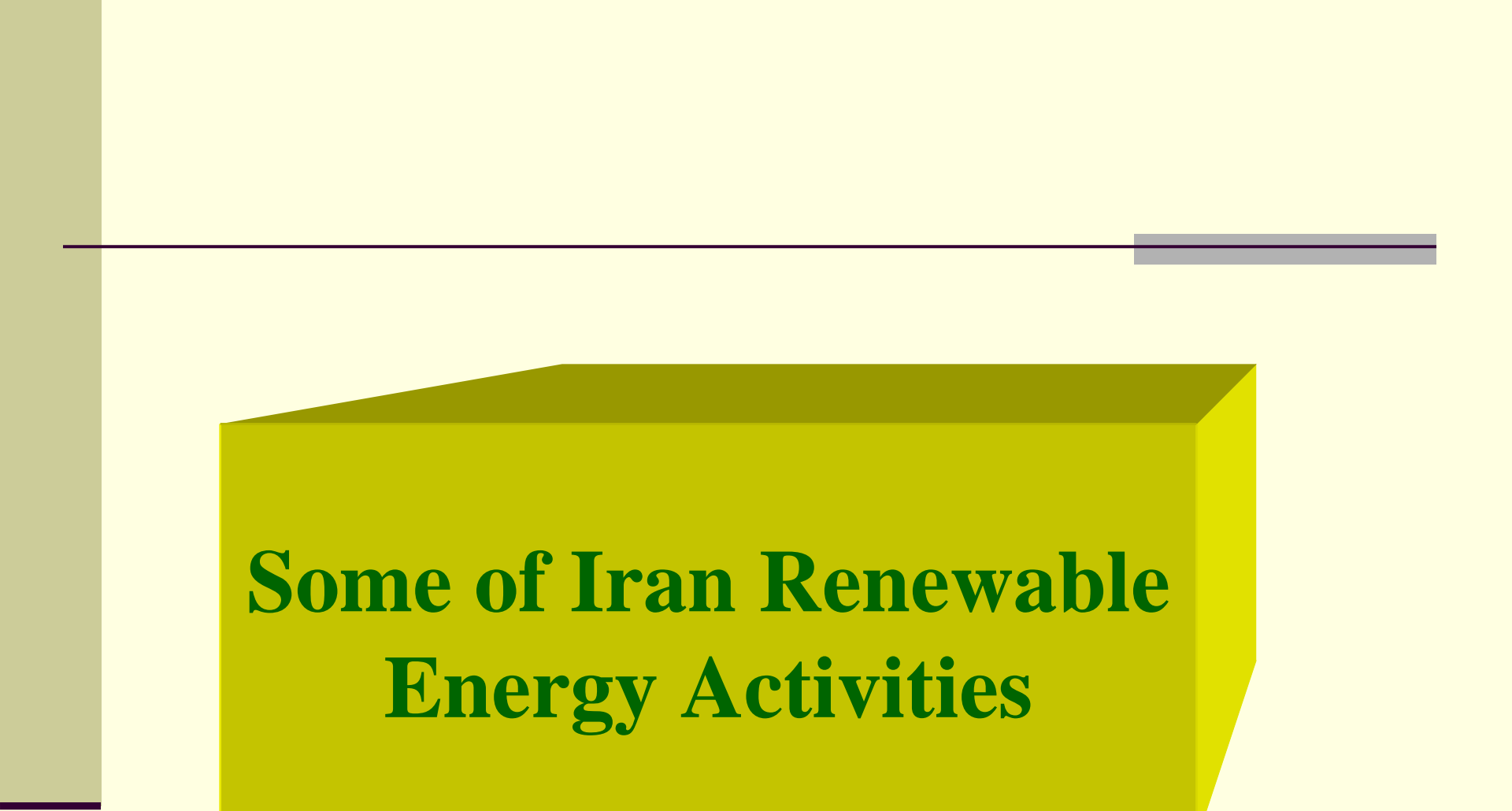
Private RE Sectors Status In Iran 2010

- More than 45 private companies has Justifications from MOE for Feasibility Study of generation of 4383 MW electricity using renewable sources
- 15 private company has yet been contracted under Article 62 to date for generation of 602 MW electricity using renewable sources.
- 3 Private Working Power Plants (28.3Mw wind+1.6Mw biomass) contracted under Article 62

Shiraz and Mashhad biogas power plants-Private Sector



**28.4 MW Wind power
plant- Binalood**
(43* 660 KW) installed
**First privatized Wind
Farm in Iran**



Some of Iran Renewable Energy Activities

100 MW Wind power plant- Manjil on going...

(55* 660 KW) (2* 500 KW) (18 * 550 KW) (27* 300KW) Installed



Shiraz Solar Parabolic power Plant

- Completion of the optimal design of parabolic collectors and collectors farm.
- Fundamental and Detailed design of steam and oil cycles for the first time for a solar thermal power plant in Iran.
- Site preparation.
- Production & installation of mirrors.
- Installation of mechanical equipments and electrical instruments.
- Construction of laser sun-tracking system to test parabolic glasses.
- Purchase of receiver pipes.

Shiraz Solar Parabolic Power Plant



Rural Electrification Introduction

In this project, 58 pilot PV systems have been installed for electrification of some rural areas and It will be expanded to 640 households in phase 2.

Major factors in selection of those areas were:

- Closeness to center of province
- Climatic and Regional Conditions
- Number of rainy days
- Windy locations
- For each consumer, Installed systems have 0.7 and 1.5 kW capacities because they can be widely used throughout the country based on experiences.

Rural electrification - Gilan



Rural electrification - Qazvin



30 kW grid connected in Taleghan



97 kW PV in Semnan



12 kW PV in Yazd



Solar water Heaters

Design, construction and installation of 7500 solar water heaters (3 types) in Boushehr, Tabas, Yazd, Bojnourd, Zahedan and Esfahan cities



Development of the field and construction of Sabalan geothermal power plant

- Installation of 5 Megawatt pilot power plant (phase 1)
- Installation of 50 Megawatt power plant (phase 2)
- Explorative and Productive excavation
- Preservation of environment through development of field.



Biomass atlas preparation, and introduction of suitable sites project

➤ Biomass atlas preparation, and introduction of suitable sites

The primary reviews show that the recoverable energy rate from biomass resources in Iran in 2008 was equivalent to 150 million barrels of petroleum (economical value: 30 million barrels of petroleum) which 50% is the share of agriculture and forest, 15% is the share of municipal wastes, 23% is the share of bestial refuses, and 2% is the share of municipal sewages and 10% alimental industry.

For recognition of suitable sites and utilization of recoverable energy from biomass resources, the biomass atlas preparation project has been defined and is on progress.

Taleghan Renewable Energy Park

Fresnel system



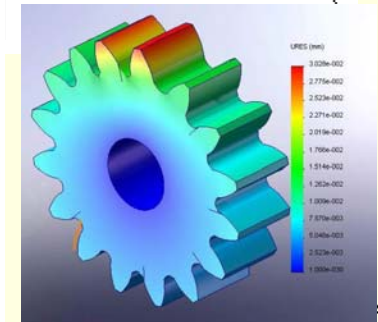
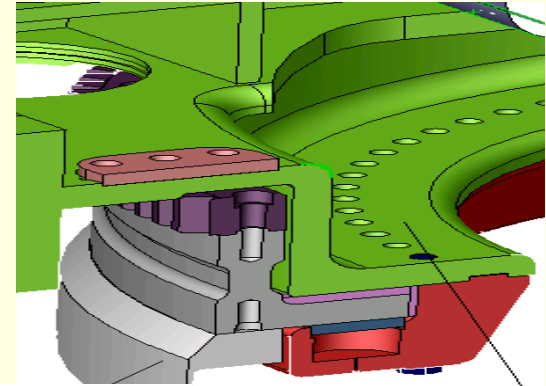
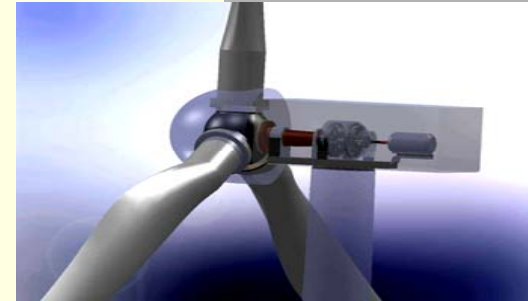
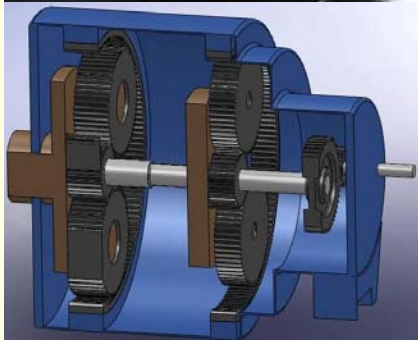
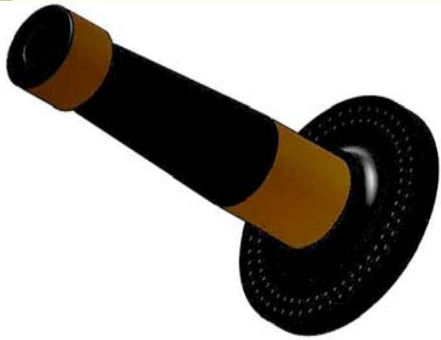
Heliostat system



Solar Parabolic pilot Plant



Design and fabrication of the first national MW wind turbine, Running project



Thanks for your attention

Harzevil Wind Farm in North of Iran

