

“Waste Management” on Occasion of Smart Engineering Tokyo 2016



Current Status of Waste Management in Iran and Business Opportunities

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Date: October 2016

Municipality waste management in Iran

- **Iran:**
 - Area: 1, 648, 195 km²
 - Population: 80 million



- The 18th largest and most populated country in the world
- The second largest and most populated in the Middle East .



- Iran has:**
- ✓ 31 province
 - ✓ 1,100 city
 - ✓ 2,500 Village

- **Iran:**
 - GDP: \$1336 Billion PPP
 - The 19th largest economy in the world



The need for waste management in Iran

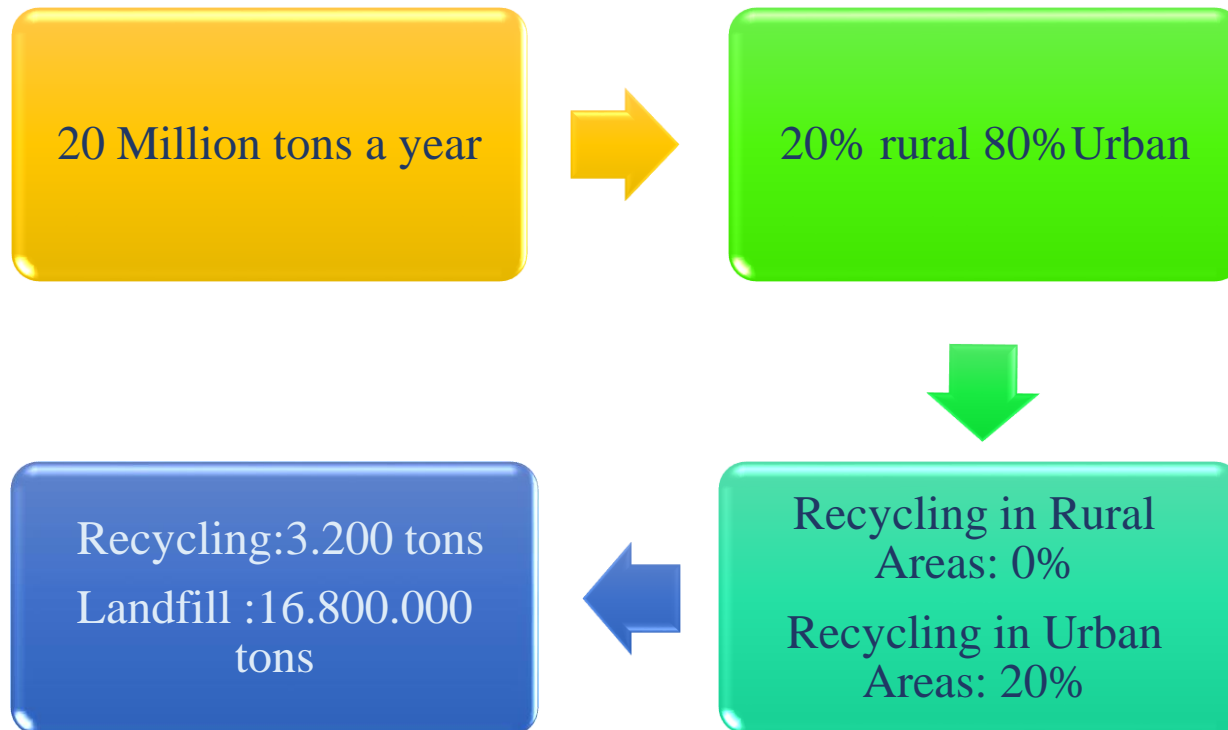


- Waste generation per capita in urban areas:
658 gr/day
- Iranian waste generation per capita in rural areas:
220-340 gr/day
- Average Iranian waste generation per capita (urban and rural area):
650 gr/day
- Average Iranian waste generation per capita:
240 kg/year

In Tehran (Capital):

- waste generation per capita: 750-800 gr/day
- waste generation per capita: 270-450 kg/year

Total waste production in Iran (municipal plus other)



60 Million tons/year of Construction Waste
 50,000 tons/year of Greenhouse Gases
 10,000,000m³ of Leachate from landfills

Global conditions



Germany
(82 million people)



90,000 tons of waste/day
32 million tons of waste/year



Recycling: 48%

Germany produces 1.5 times more waste than Iran

Switzerland
(8 million people)



15,500 tons of waste/day
5,5 million tons of waste/year



Recycling: 52%

Switzerland produces 3 times more waste than Iran

Row	Country	Annual waste (million tons)
1	USA	254
2	Russia	207
3	Japan	52.36
4	Germany	48.84
5	England	34.84
6	Mexico	32.17
7	France	32
8	Italy	29.74
9	Spain	26.34
10	Turkey	25.99



Row	Country	Recycling (%)
1	Switzerland	52
2	Austria	49.7
3	Germany	48
4	Netherlands	46
5	Norway	40
6	Sweden	34
7	USA	31.5
8	Denmark	30.4
9	Belgium	30.1
10	Finland	30

Waste in Iran

Waste Generation per capita/day

- Municipal waste: 658 gr
- Hospital waste :17gr
- Industrial waste : 26 gr
- **50% less than developed countries**

Waste disposal

- 7% Source separation
- 13% Recycling
- 2.5% Formal Landfill
- 77.5% Informal Landfill, Burning and burying in filed (trenches)

Informal Landfill



important points in waste management in Iran

Informal Landfills are located in the countryside or deserts near cities

Recycling in Iran has a 60 year history, the first composting plant for organic waste was built in Isfahan in 1955 (The third biggest city in Iran with 2 Mil people)

Mechanized Waste Collection accounts for 87% of waste collection in Iran

5000 tons of plastic are dumped in landfills every day

About 60% to 70% of waste in Iran is Organic waste

Municipal waste moisture is more than 40%

The North of Iran The Caspian sea



5% of the total waste in Iran is produced in northern coastal cities ,
the daily waste generation per capita is 800 gr



In coastal cities, formal waste disposal accounts for only 3% of all
waste disposal



In coastal areas there is a lack of suitable locations for landfills and
urban areas are jammed between the coastline and mountains;
The level of underground aquifers are very high.



In this area there are 42 Informal landfills (3,000,000 m²) located in forest
lands;
More than 6,000 tons of waste are dumped in these landfills every day.

Waste Analysis in Iran



Components	Percent
Organic	61.6
Paper	10.8
Plastic	10.2
Metal	3.2
Glass	4.2
Textile	4.7
Wood	5.3



Municipal Waste composition

Organic is more than 60%

Nylon, Paper and ... is more than 30%

- In Iran most of the waste generation is through commercial activities rather than household consumption.
- Provincial Government & Municipalities are responsible for the management and disposal of waste.
- Waste Management began about 100 years ago.
- With the growth of urban population (70% of total population), particularly in big cities like Tehran, municipalities have started mechanical collection of waste which is then transported outside the city for disposal.
- Since 35 years ago, municipalities of big cities established Waste Management Organization (The public organization under supervision of municipalities) to carry out waste recycling.

Outline of the waste
management system
in Iran

- **Source reduction**
- **Storage and Processing**
- **Waste Collection**
- **Transfer & Transport**
- **Recycling**
- **Waste disposal**
- **Management after disposal**
- **Support**

Source reduction

Design, manufacture, supply and use of products (packaging, marketing, etc.)

Reduction of the quantity and quality of waste produced

There are no noteworthy precedents in Iran

Out of 1,500 tons of vegetables brought to Tehran daily, only 46% are used, 54% are disposed as municipal waste

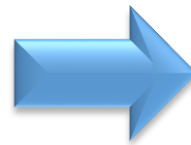
About 800 tons of vegetable waste is produced on a daily basis in Tehran alone

The cost for transportation and disposal of this waste is \$130,000 per year

Storage and processing

- In recent years, some municipalities, in big cities, have worked on designing garbage containers suitable for mechanical collection.
- There not many experiences in waste processing except the separation of the organic fraction and other recyclable fractions in few cities such as Isfahan.
- Various awareness programs have been implemented to sensitize citizens about waste collection and recycling.







Storage and processing

Problems :

- Low level of cooperation by the public.
- Uneven collection by municipality, quality of the service, timing, etc.



Waste Collection



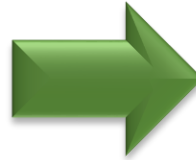
Municipal waste collecting in Iran is generally good. Municipalities have invested heavily on standardized trash-bins and mechanized collection.

In Iran, more than 90% of municipal waste is collected by municipal waste management systems.

Waste Collection

Collection Time

- 37% at night
- 56% in the morning
- 33% in the afternoon



The total percentage is higher than 100% because in some cities, waste is collected **two or three times** a day.

Lack of citizen cooperation is one of the reasons that obliges municipalities to collect waste more than once a day.

Garbage bin misuse is the other reason that obliges municipalities to collect waste more than once a day.



Waste Collection

The frequency of waste collection in cities

- 57%: six days a week (21% more than once a day)
- 33%: Every other day
- 3%: Bi-weekly
- 7%: Every day (5% more than once a day)



Waste Collection

87% of cities use mechanized and semi-mechanized waste collection

13% of cities use traditional methods.

About 57% of Hospital waste is collected with municipal waste

HOSPITAL
WASTE
sources:

- Medical research centers
- Clinics
- Doctors offices
- Nursing Homes
- Drug stores

Waste Collection

The average cost of waste collection is 28-43 US\$/Ton

0.5-5 employees are needed for collecting per ton of waste
(regarding the level of mechanization)

The private sector is the most important subcontractors in waste collection however, there are some challenges due to the reasons listed below :

- There is no transparent contracting process, cost assessment, contract format, quality and performance monitoring.
- Municipalities pay, on an average, 60% of invoices by cash and the rest payed non-cash (apartment or ...) specially in recent years.
- As for the above, funding is a question mark and private companies can't provide investment on waste management particularly in processing plants, waste disposal and ... specially in recent years.

Transport

Waste is collected within the city on collection track and is then loaded to other tracks for transfer to landfills



Logistic for transportation in big cities is essential.



The logistic and transportation system has been upgraded in the last 15 years





Recycling




Recycling of waste in the country is mainly done by municipal workers and unofficial groups.

In some cities such as Shiraz and Isfahan recycling started 10 years ago, however in other cities waste is separated by unofficial groups and workers.



Waste Disposal



Formal and Informal landfills are the most common waste disposal methods in Iran.

Burning and On-Land Dumping are other waste disposal solutions used in Iran.



Informal landfills are used for the disposal of 62% of the total waste in Iran. 12% of waste is simply buried, and burned, on illegal landfills 4% of waste is disposed of by burning..



Formal Landfill account for only 2% of all waste.

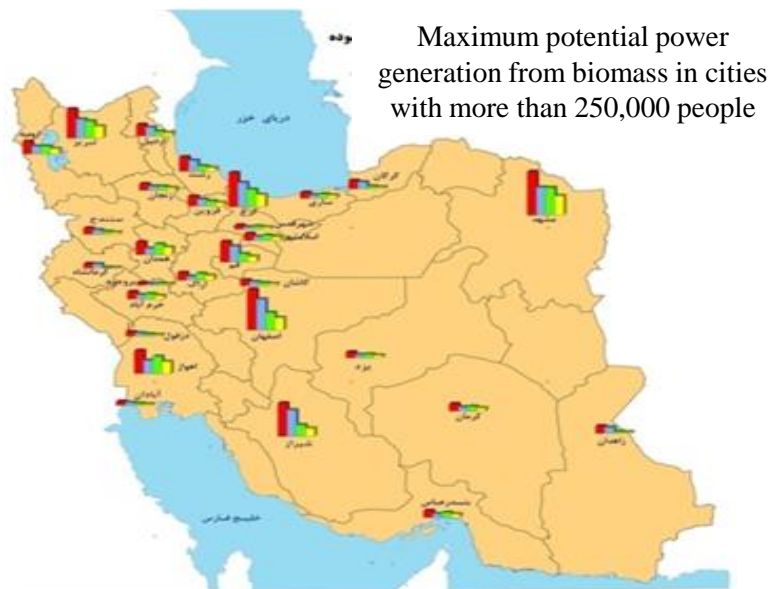


In recent years various new projects such as Incinerators and Digesters have commenced operation.

Governmentally Support to generate electricity from waste

Technology	Minimum Guaranteed price for 10 years Per Kw/h
Incinerators	11 cent
Digester (Methane)	10 cent
Landfill (Methane)	8 cent

City	Pinc (MWH)	Ppg (MWH)	Pad (MWH)	Pslf (MWH)
Abadan	2.12	1.53	1.03	0.72
Arak	3.91	1.95	3.44	2.43
Ardebil	5.95	4.48	2.42	1.71
Urmia	6.50	4.03	4.06	2.86
Eslamshahr	3.64	2.08	2.74	1.93
Isfahan	21.16	16.02	9.06	6.29
Ahvaz	12.00	6.90	8.99	6.34
Borojerd	1.23	0.68	0.94	0.66
Bandarabas	3.62	2.02	2.68	1.89
Tabriz	15.11	9.85	8.82	6.22
Tehran	110.80	80.27	51.04	35.99
Khoramabad	3.89	2.31	2.73	1.93
Dezfool	2.20	1.59	1.07	0.75
Rasht	7.42	5.70	2.79	1.97
Zahedan	3.81	3.15	1.00	0.71
Zanjan	3.41	2.19	2.12	1.49
Sari	3.05	1.72	2.46	1.59
Sanandaj	3.20	2.33	1.49	1.05
Shahr Ghods	2.09	1.19	1.57	1.11
Shiraz	17.29	13.72	5.98	4.22
Qazvin	5.11	3.58	2.63	1.85
Qom	10.64	8.22	4.21	2.97
Kashan	2.92	2.05	1.52	1.07
Karaj	17.78	12.58	9.07	6.40
Kerman	3.85	2.14	2.46	1.73
Kermanshah	2.25	2.09	0.30	0.21
Gorgan	4.22	3.45	1.26	0.89
Mashhad	22.60	14.43	14.26	10.05
Hamedan	6.56	3.21	5.47	3.86
Yazd	2.98	1.66	1.90	1.34
Total	311.28	217.15	159.31	112.34



- Pinc** :Maximum capacity from Incinerators (MWH)
- Ppg**: Maximum capacity from Pyrolysis - Gasification (MWH)
- Pad**: Maximum capacity from Digester (MWH)
- Pslf** :Maximum capacity from Landfill (MWH)

Waste Disposal



Hospital waste disposal:

18% On-Land Dumping

22% Burning

60% Landfill (Usually alongside other municipal waste).



Industrial waste is disposed with other municipal waste in municipal landfills.

Management after waste disposal

Waste Disposal causes long-term effects on the environment and public health.

In Iran there is no management after waste disposal in landfills, which are covered and abandoned.



- **Tehran (capital):**

- 730 km² Area
- 12 Mil Population (25th most populated city in the world)

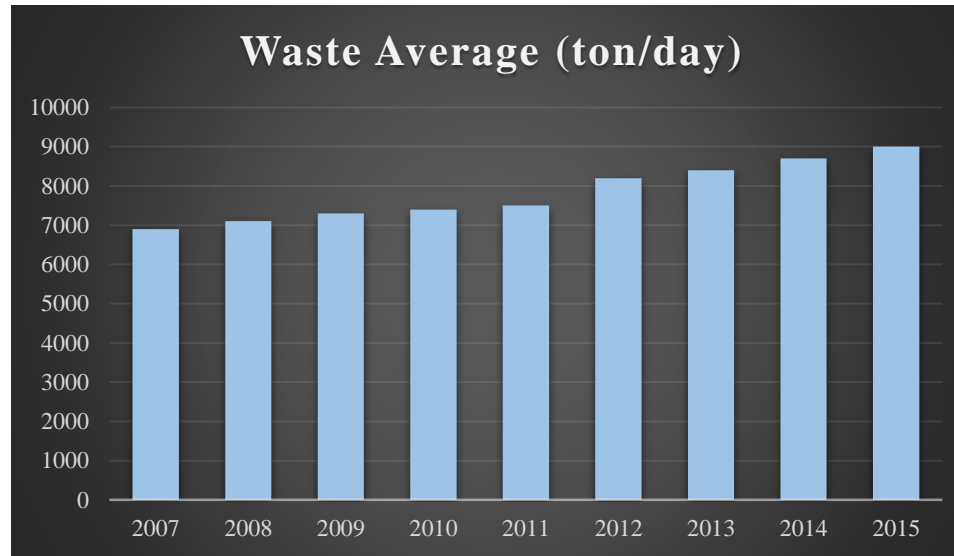
- waste generation per capita: 750-800 gr/day
- waste generation per capita: 270-450 kg/year

✓ Waste: 9,000 tons/day

- ✓ 38% recyclable (cardboard, plastic, glass, metals, bread and ...)
- ✓ 62% Organic waste

✓ **Frequency of waste collection :2-4 times/day**





cost of collection and transport in Tehran

about \$45 per/ton

Collection and transportation (daily)

Over \$405,000

Tehran Waste Analysis

Compounds	Amount (%)
Organic	73.6
Paper, cardboard	8.3
Plastic	4.8
Rubber and leather	0.4
Glass	2.7
Metal	1.3
textiles	2.7
Wood	0.9
Other	5.3

The high percentage of food waste is due to the lack of vegetable, fruit and meat preparation before final consumption.

Percentage of Organic Waste in Tehran is higher than Tokyo

Percentage of paper and wood waste in Tehran is lower than Tokyo

- There are more than 60,000 garbage containers in Tehran.
- The garbage containers misuseage in Tehran is the main reason
- that has led to the need for repeated waste collection in a day.

Hospital waste



400 tons/day in Tehran

In Iran, hospitals are responsible for collecting and separating infectious and noninfectious waste, however they do not oblige.

The Tehran Municipality, collects and buries only half of the total hospital waste

The Tehran Municipality uses landfills for the disposal of hospital waste.



Challenges

1

- Lack of public education in order to help reduce waste production, especially organic waste.

2

- Lack of influential education about waste separation.

3

- Increase in the use of the plastic (More than 500 tons per day and 177,000 tons per year).

4

- Frequency of waste collection in a day.

5

- Unsafe management of medical waste.

6

- Informal Landfill for most of urban and almost total of rural waste.

7

- Lack of information regarding modern disposal solutions such as digesters, incinerators, biogas and combined methods in municipalities.

8

- Lack of finance for new projects in waste management especially modern disposal methods.

Plans and objectives for waste management in Iran in next 5 years:

- 1 • Reduce non-organic waste from 60% to 45%.
- 2 • Increase source separation from 7% to 30%.
- 3 • Increase recycling from 13% to 30%.
- 4 • Increase Formal Landfills from 2% to 20%
- 5 • Promote new technologies for waste disposal such as incinerators, digester, biogas, recycling, and etc
- 6 • Optimize waste collection, increase awareness of people

Opportunities

1

- Cooperating with Iranian consulting companies for technical training and awareness in waste management.

2

- Cooperating with Iranian consulting companies and municipalities to find the best solution for various cities in modern methods of waste disposal.

3

- On site assessment and negotiation with municipalities

4

- Cooperating with Iranian companies in supplying waste management equipment such as machinery, tanks and to Japanese companies for waste management projects being executed in Iran and neighboring countries.

5

- Use Iran as a hub for the export of services to neighboring countries such as Afghanistan, Pakistan, Iraq, Turkmenistan, Azerbaijan, etc.

6

- Investment on waste management services such as incinerators, digesters, formal landfill and etc.

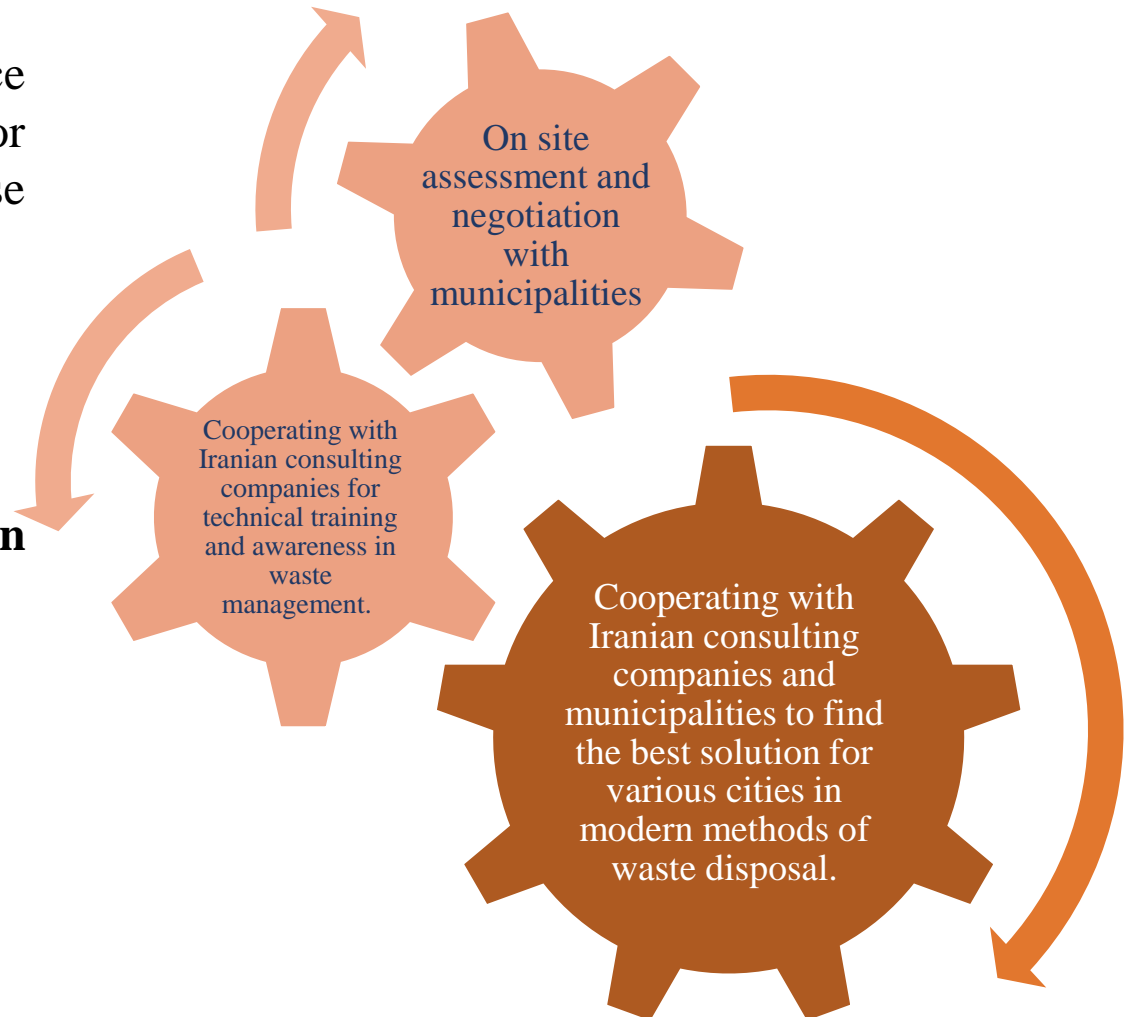
Introduce some Iranian Partner in opportunities

ESPX provide you by introduce Iranian consultant Co. are ready for joint with Japanese Co. in these opportunities.

More than 10 consultant Co. in Unido MIS

Suggested validated Co. :

- San Pouyan
- ICC
- Foolad Technique
-



San Pouyan

- Safa Nicu Sepahan Company (SNC) was established and registered in 1992
- SNC was recognized as the most superior exporter of engineering services and technical know-how in power industries by Iranian government in 2002 and 2003.
- To expand the range of services and clients, SNC has actively attended local, regional and international markets as in Persian Gulf region, Afghanistan, Iraq, CIS countries, and Africa.
- SNC is also active in financing the mentioned projects, on BOT and BOO basis.

SNC executed more than 150 big projects in Iran, and executed more than 14 substations in Afghanistan and, Meanwhile , we operate as supplier of main equipment and spare parts for clients and other contractors.

Introduce some Iranian Partner in opportunities

ESPX provide you by introduce Iranian subcontractors are ready for supplying Japanese Co.

More than 100 machinery validated Co. in Unido MIS

Suggested validated Co. :

- Safa Foolad
- Tamkar
- Azarbajejani
- Machine Ajza
-



Safa Foolad

- The main field of activities of SNC primarily included steel and industrial projects comprising design, engineering, procurement, installation and operation (EPC-basis projects).
- At present, Safa Foolad is one of the most reputable private companies in Iran. Trusting the past experiences and performances, the company now has turned to act as a general contractor (GC) for execution of Steel, Oil, Gas, Petrochemical, Utility of other industries and
- Safa Foolad executed more than 1 billion \$ projects in Iran and we operate as supplier of main equipment and spare parts for clients and other contractors.

Introduce some Iranian Partner in opportunities

ESPX provide you by introduce Iranian expert Co. in waste management services and are ready for joint with Japanese Co. in this opportunity.

More than 20 waste management services validated Co.

Suggested validated Co. :

- Rahyaban Farda
- Kar va Ebtekar
- Sabz Zivar
-



Introduce some Iranian Partner in opportunities

ESPX provide you by introduce Iranian huge companies are ready for joint with Japanese Co. in this opportunity.

More than 100 machinery validated Co. in Unido MIS

Suggested validated Co. :

- Safa Nicu
- TTS
-



Safa Nicu

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Thank you