

RFP No 7000000610

Formulation of Industrial Energy Efficiency Policy and Related Instruments in Iran

United Nations Industrial Development Organization (UNIDO)



First Progress Report – Part 1

WP2-2 and WP2-3 Review International Best Practice in Industrial Energy Efficiency and Comparison to Policy Instruments Employed in Iran



Prepared by:

Energy Changes Projektentwicklung GmbH (www.energy-changes.com)

Obere Donaustrasse 12/28

1020 Vienna, Austria

FN 281804 v Handelsgericht Wien; St.Nr. 121/2835 BV21; UID-Nr.: ATU 62846399

V1

2014/12/31

Table of Content

1	<i>Introduction</i>	5
2	<i>Executive Summary</i>	6
3	<i>Methodology</i>	9
4	<i>Country Fact Sheets</i>	11
4.1	Denmark.....	11
4.2	Finland	13
4.3	Germany.....	15
4.4	India	17
4.5	Japan.....	19
4.6	Netherlands.....	21
4.7	Russia	23
4.8	Sweden.....	25
4.9	United Kingdom	27
4.10	USA	29
5	<i>Interviews</i>	32
5.1	Austria.....	33
5.2	Finland	34
5.3	Netherlands.....	36
5.4	Sweden.....	37
5.5	Interviews - Conclusion	39
6	<i>Analysis Results</i>	40
6.1	Step 1: Set the overall energy saving/ GHG mitigation goal to be achieved by industry	40
6.2	Step 2: Define the effort defining policy(ies)	42
6.3	Step 3: Define supporting and complementary policies	43
6.4	Step 4: Design a comprehensive implementation tool box	46
6.5	Step 5: Implement policy evaluation process	47
6.6	Step 6: Implement enforcement structure	48
6.7	Step 7: Create energy efficiency governance	50
7	<i>References</i>	54

List of Abbreviations

BACT	Best Available Control Technologies
EAP	Energy Audit Program
EC	European Commission
EU	European Union
EU ETS	EU Emissions Trading System
GDP	Gross Domestic Product
GHG	Greenhouse Gases
IIP	Institute for Industrial Productivity
ISO	International Organization for Standardization
NMEEE	National Mission for Enhanced Energy Efficiency
NAPCC	National Action Plan on Climate Change
PAT	Perform, Achieve and Trade

1 INTRODUCTION

According to the Contract No. 3000022568 article 2.09 a) the contractor shall submit a First Progress Report summarizing the activities undertaken with relation to sub paragraphs 2.1.1 (conduct kick off meeting), 2.1.2 and 2.1.3 (review international best practice and compare to policy instruments employed in Iran) of the Terms of Reference.

The First Progress Report should include

1. a progress report summarizing the activities and outputs completed during the reporting period
2. updated work plan and a
3. summary of planned activities for the next period

This document contains the part of the progress report as referred to under nr 1 of the above mentioned list. Part 2 and 3 of the first progress report will be submitted in a separate document.

2 EXECUTIVE SUMMARY

The **objective of this report** is to describe international best practices in relation to industrial energy efficiency policies and to compare them with policy instruments applied in Iran. Since **Iran has already implemented a national law on energy efficiency** the report does not refer to an explanation/comparison of voluntary agreements but focuses on general approaches for industrial energy efficiency policies.

Section 3 defines the applied **work approach** which is based on the policy analysis methodology developed by “The Institute for Industrial Productivity (IIP)” www.iipnetwork.org.

Section 4 describes the **(best) practices of 10 different countries** (selected by their popularity for effective policies or their economic importance) using the 7 steps for designing effective energy efficiency and GHG mitigation policy packages:

1. Set the overall energy saving and/or GHG mitigation goal to be achieved by industry
2. Define the effort defining policy(ies)
3. Define supporting and complementary policies
4. Design a comprehensive implementation tool box
5. Implement policy evaluation process
6. Implement enforcement structure
7. Create governing structure

Section 5 summarizes the results of the first round of **interviews** with 4 experts, each from a different country. The objective of the interviews is to identify the most important success factors for an effective policy with special focus on situations with low energy prices and a difficult situation for enforcement. All experts emphasized that commitment of company management should be engaged by positive country wide publicity, recognition by governmental leaders and benchmarking/networking between companies.

Section 6 analyzes Iran’s policy instrument using the methodological framework of section 3 and the inputs from section 5 and prepares some preliminary recommendations for the further improvement of Iran’s policies for industrial energy efficiency. The most important findings at this stage of the project are:

In general policy development in Iran in relation to industrial energy efficiency seems to be good.

Based on the existing information at the time of preparing this report the project team would make the following suggestions for Iranian energy efficiency policy.

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

The goal/target setting process could potentially be improved:

- **by coordinating energy efficiency with GHG mitigation targets;** if GHG mitigation is prime aim, focus of target setting should be broader than looking only on energy efficiency and also consider application of renewable energy or process emissions from industry;
- as pointed out in the expert interviews policy making for energy efficiency depends very much on the **specific situation in each country** (e.g. energy prices, structure of the economy, development objectives etc..), which should be taken into account to set realistic targets;
- **technically** by applying Marginal Abatement Cost curves, economic modelling and stakeholder involvement

Define the effort defining policy(ies)

The process to prepare the effort defining policy (The Act of modification of energy consumption pattern, number 1770, approved on February 23, 2011) could potentially be improved:

- by describing the rights and obligations/consequences and timelines **more precisely**.

Define supporting and complementary policies

The existing supporting and complementary policies could potentially be improved:

- by focusing on **quick wins** with no or only low investment costs (e.g. behavioral changes turning off lights etc. or control systems)
- by increasing the commitment of higher level management of industrial companies; this could be achieved through
 - increase of **company profit** through energy efficiency,
 - **benchmarking** and networking with other companies
 - positive country wide **publicity**
 - or **recognition** by governmental leaders
- by asking for more support from political leaders
- by extend financial/technical support schemes, **more financial resources** especially for energy audits and the implementation of energy management systems (taking into account that most energy savings will result in subsidy savings of the Iranian Government)
- by considering the implementation **energy efficiency certificate trading**; which as well could raise the interest of high level management in companies because the financial benefits of energy efficiency measures would have a clear market prices; (an energy efficiency obligation trading will be easier to put into practice than an emissions trading system because its focus is narrower and there is already experience in available technologies etc.).

Design a comprehensive implementation tool box

No specific findings;

Implement policy evaluation process

- Periodic evaluation of effectiveness, efficiency, social equity effects, timing of implementation would be important

Implement enforcement structure

The current enforcement structure could potentially be improved by:

- Asking for higher commitment from political leaders in order to be able to enforce policies more strictly

Create governing structure

- While there is already a very diversified governing structure in place it may make sense to involve highest leadership in the governance of energy efficiency, in order to strengthen enforcement

3 METHODOLOGY

The analysis of Iran’s existing industrial energy efficiency policies is based on the following methodology:

The project team uses and extends the policy analysis methodology (also called policy pyramid) developed by “The Institute for Industrial Productivity (IIP)” www.iipnetwork.org. The underlying assumption is that an effective energy efficiency policy requires a policy package which includes sufficiently ambitious, effort defining policies to outline industrial energy efficiency. The analysis approach of the project team defines 7 steps for designing effective energy efficiency and GHG mitigation policy packages.

1. Set the overall energy saving and/or GHG mitigation goal to be achieved by industry
2. Define the effort defining policy(ies)
3. Define supporting and complementary policies
4. Design a comprehensive implementation tool box
5. Implement policy evaluation process
6. Implement enforcement structure
7. Create governing structure

While **section 4 describes the various approaches of 10 countries** (selected (i) for their “popularity” in energy efficiency policy making [e.g. Denmark, Germany, Netherlands] and/or (ii) their economic importance [e.g. US, India, Germany etc.]), section 5 provides additional insights from a first round of interviews with experts from 4 different countries (Austria, Finland, Netherlands, Sweden).

The analysis matrix in section 6

- describes the aim of each of the 7 steps (header: “Aim”),
- provides theoretical best practices (header “Best Practices”) and
- concrete country examples (mainly from section 4) (header “Country Examples”) and
- evaluates the Iranian policy package against the best practice (header “Evaluation Iran”)

Countries are facing different development situations and have various characteristics in relation to energy efficiency. Therefore it is not feasible to prepare a solid quantitative comparison between Iran and other countries; instead the evaluation is done qualitatively:

The project team applies the following evaluation parameter

No corresponding policy is implemented	Policy development is low
At least one corresponding policy is implemented	Policy development is medium

One or more comparable best practices are implemented	Policy development is good
More than 50% of corresponding best practices are implemented	Policy development is high

In this analysis the project team refers to energy efficiency policy in general not necessarily only to Voluntary Agreements or Emissions Trading since Iran has already detailed energy efficiency legislation in place (e.g. it would not make sense to compare a VA with the threat of setting legislation since legislation already exists in Iran).

4 COUNTRY FACT SHEETS

4.1 DENMARK¹

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry²

The overall goal for industrial energy efficiency is embedded into the long term goal of the Danish energy policy to cover **the entire energy supply by renewable energy by 2050**. In 2012 an energy agreement was issued which contains medium term targets until 2020:

- More than 35% renewable in final energy consumption
- About 50% of electricity consumption to be supplied by wind power
- 7.6% reduction in gross energy consumption in relation to 2010
- 34% reduction in greenhouse gas emissions in relation to 1990

Define the effort defining policy(ies)

In 1993 a CO₂ tax was introduced in the energy tax system as start of the of the Danish voluntary agreement program, known as **Denmark's Agreement on Industrial Energy Efficiency**. The objective of this tax was to cut the country CO₂ emission by 20% of the 1988 level before 2005. From 1996 to 2013, the Danish Energy Agency entered into energy efficiency agreements with large, energy-intensive businesses in Denmark. Companies agreed to implement energy management systems and improve energy efficiency in their production in exchange for a rebate on their energy-saving tax. Currently Danish stakeholders are working on a successor agreement which may be in the form of a new scheme providing subsidies to businesses towards paying a so called public service obligation tariff.

Define supporting and complementary policies

- Green taxes on energy use in industry;
- Subsidies to promote (i) energy audits and (ii) investment in energy efficient use of renewable energy/ combined heat and power plants in the production processes of enterprises;

Design a comprehensive implementation tool box

¹See: Danish Energy Agency(1) and (2, 2012), IIP Institute for Industrial Productivity, (2011, 2012, a/b)

² Please note that countries which are EU member states also have to follow regulation (including monitoring requirements) issued by the EC especially the 20/20/20 targets: 20% reduction in EU greenhouse gas emissions from 1990 levels, raising the share of EU energy consumption produced from renewable resources to 20%, 20% improvement in the EU's energy efficiency;

- **Trainings:** The Danish Energy Agency provides training courses, access to external energy engineers and consultants to assist companies in implementing energy management systems.
- **Information and resources:** The Danish Energy Agency provides case studies, practical guidelines and operative tools, which enable companies to implement energy management system.
- **Workshops and seminars:** Regular networking activities and workshops hosted by the Danish Energy Agency allow the dissemination of best practices, and the sharing of experiences and knowledge between companies and experts.

Implement policy evaluation process

The entire program was evaluated several times, usually on a three to five year basis by independent contracted consultants. At the beginning the evaluation was dominated by quantitative analysis of data. Today in-depth interviews with program participants are the core element of the evaluation process.

Implement enforcement structure

Companies are required to implement a certified energy management as described in the international standard ISO 50001 and comply with additional **requirements on energy management defined by the Danish Energy Agency**. These requirements should ensure that the companies have a well-defined energy policy, survey the development in the energy consumption, carry out preventive and corrective actions related to inefficient use of energy, **carry out internal and external audits, evaluate the energy efficiency performance**, etc.

Create governing structure

The **Danish Energy Agency**, as agency under the Ministry of Climate, Energy and Building is responsible for the implementation of the energy efficiency measures in all sectors except transport sector.

4.2 FINLAND³

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

Finland described its overall energy efficiency policies (until 2020) in the national “Long-Term Climate and Energy Strategy” in 2008 which were further detailed by a Government resolution on energy efficiency in 2010. The targets are:

- energy savings of 37 TWh for energy end-use by 2020 and
- another 33% of the 2020 level by 2050;

The **energy and climate roadmap 2050**, issued in October 2014, set as long-term objective a greenhouse gas emission reduction by a minimum of 80% by 2050 compared to the level of 1990.

Define the effort defining policy(ies)

The voluntary agreement “**Energy Audit Program**” (EAP) under the Ministry of Employment and Economy plays a significant role to promote and reach the energy efficiency target by the industry sector.

Define supporting and complementary policies

- 40% subsidy for audits by carried out by qualified third party auditors;

Design a comprehensive implementation tool box

- Sector-specific Action Plans
- Energy auditor training, handbook and software tools
- Software: calculation and reporting software for auditors, freeware to auditors attending training
- Energy Auditors handbook: Available for auditors that passed the training.
- Best practice examples
- Guidance documents on Best Available Techniques (BAT).

Implement policy evaluation process

The **Energy Department of the Ministry of Employment and Economy** is the government body responsible for energy policy and evaluates its policies as according to EU requirements

Implement enforcement structure

³ See: Ministry of Employment and the Economy (2014 a/b), IIP Institute for Industrial Productivity, (2011, 2012, a/b), Motiva Oy (2012)

Companies under the EAP have to submit an audit report each year to a web-based monitoring system. Motiva (the state owned company in charge of operating the program) monitors the quality of the audits undertaken by certified auditors through representative sampling.

Create governing structure

The Energy Department of the Ministry of Employment and Economy is the administrator of the EAP program. A network of consultants coordinated by Motiva conducts the audits. As mentioned above the state owned company Motiva is in charge of the implementation and operation of the EAP.

4.3 GERMANY⁴

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

In July 2011 the Government of Germany agreed on an accelerated transformation of the German energy system, called the “**Energiewende**” (**energy transition**) which also includes the overall goals for the German industry. The targets are

- Reduction of primary energy consumption by 20% until 2020 and by 50% until 2050
- Reduction of electricity demand by 10 % until 2020 and by 25 % until 2050
- Reduction of GHG emissions by 40 % until 2020 and by minimum 80% until 2050

All targets are quantified against the year 2008 as baseline year.

Define the effort defining policy(ies)

Germany has used **voluntary agreements** to improve energy efficiency in industry since 1996. The first voluntary agreement was conducted between 19 German industrial associations, covering two thirds of industrial energy consumption and the federal government with most targets due in 2012 and one in 2015.

In 2000 the German Government signed an agreement with industrial associations covering about 4,400 companies and approximately 99% of public power generation. The agreement is titled “**Joint Declaration of the German Industry on Climate Protection**”. It also includes the chemical and the non-ferrous metal industries which agreed on targets for **specific energy consumption per unit of production**. In return German Government agreed to abstain from administrative regulations, such as the introduction of mandatory energy audits and ensured that participants would not be put at a competitive disadvantage internationally.

Define supporting and complementary policies

- Support of energy-efficient and climate-friendly production processes.
- Support of energy management systems
- Financial support for investments in cross sectional technology
- Energy efficiency fund
- Stimulus program for mini combined heat and power plants
- Heat from renewable energies
- Tax cap

Design a comprehensive implementation tool box

⁴ See: IIP Institute for Industrial Productivity, (2011, 2012, a/b)

- Providing and sharing know-how by sending updated information on climate change and energy efficiency
- Free-of-charge energy audits supported by a toolbox with services and information.
- Free-of-charge information events on energy efficiency and climate protection
- Low-cost training courses for energy managers.

Implement policy evaluation process

Various types of energy efficiency indicators were created to evaluate the effectiveness of policies, such as

- diffusion indicators to monitor the market penetration of energy-efficient technologies or
- sectorial energy efficiency indices.

Implement enforcement structure

The voluntary agreement includes an evaluation and monitoring/verification process carried out by an independent research entity. The individual companies report to their respective associations, which in turn provide the aggregated data to the verifier. The research entity verifies the plausibility of the data provided by the associations using official statistics.

Create governing structure

The federal **Agency for Energy Efficiency** and the German energy agency are responsible to achieve energy saving targets.

4.4 INDIA⁵

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

At the United Nations Framework Convention on Climate Change Conference of the Parties in Copenhagen 2009, India's environment minister reconfirmed its target to cut GHG emissions 20-25% per unit of GDP until 2020 compared to 2005 as baseline year.

The **energy savings** and GHG goals are addressed by the following government initiatives:

- The Integrated Energy Policy
- Five-Year Plans
- National Action Plan on Climate Change (NAPCC)
 - the Perform, Achieve, and Trade (PAT) Scheme

The NAPCC, which was launched in 2008, highlights eight pillars (called missions) for mitigating and adapting to climate change while simultaneously advancing development. One mission under the NAPCC is the enhanced implementation of energy efficiency (NMEEE). The **National Mission for Enhanced Energy Efficiency (NMEEE)** shall achieve about 23 million tons oil-equivalent of fuel savings in coal, gas, and petroleum products by 2014-15, due to avoided power capacity addition of over 19 GW.

Under the NMEEE, the **PAT Scheme**, sets specific energy consumption targets (and allows trading of energy efficiency certificates) for the energy intensive industry.

Define the effort defining policy(ies)

As mentioned above the PAT Scheme is a market based mechanism under the NMEEE. Within each sector, a number of individual industrial units (plants or factories) called "Designated Consumers" must meet energy consumption targets based on a facility baseline. The facility baseline was determined by its historic 2007-2010 specific energy consumption. Facilities, which reduce more emissions than their target, receive tradable energy saving certificates.

Define supporting and complementary policies

- Best practices examples
- The **Venture Capital Fund** for energy efficiency is one key element under the NMEEE, which provides risk capital to ESCOs and other companies investing in the supply of energy efficient goods and services for the industry.

⁵ See: Bureau of Energy Efficiency (BEE) 2011, Government of India (2014); IEA International Energy Agency (2012, b), IIP Institute for Industrial Productivity, (2011, 2012, a/b), Planning Commission Government of India 2012

- The **Partial Risk Guarantee Fund** for energy efficiency under the NMEEE is a risk-sharing mechanism that provides commercial banks with partial coverage of risk exposure against loans issued for energy efficiency projects.
- The national Energy Conservation Award program promotes energy efficiency and the adoption of clean and innovative technologies in the industry sector.

Design a comprehensive implementation tool box

- Financing guidelines
- Monitoring and verification protocols
- Free of cost energy audits by accredited energy auditors, due to government subsidies

Implement policy evaluation process

The PAT scheme will be evaluated by the “**Bureau of Energy Efficiency**” after the first commitment period, i.e. in 2015.

Implement enforcement structure

The Designated Energy Consumers have to carry out energy audits by an accredited energy auditor and report the results as well as the completed monitoring and verification protocols to the Bureau of Energy Efficiency. Each Designated Energy Consumer must appoint an energy manager.

Create governing structure

The Bureau of Energy Efficiency (BEE), under the Ministry of Power is authorized to

- assign specific sectors as designated consumers,
- develop energy consumption norms and standards for designated consumers and
- to prepare procedures for energy audits.

Other tasks include the development of energy performance evaluation mechanisms and the institutionalization of energy efficiency services.

4.5 JAPAN⁶

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

The Japanese Government has usually relied on voluntary approaches to stimulate industrial energy efficiency. The **Keidanren Voluntary Action Plan** on the Environment adopted in 2008 was a unilateral, voluntary and non-binding commitment devised by Japan's business federation (the Nippon Keidanren). It was an important component of Japan's strategy to meet its Kyoto targets and included a non-binding target to reduce CO2 emissions in industry and the energy sector.

In **2010, Japan announced a mandatory energy efficiency obligation**, as an amendment to the energy conservation law, defined in benchmarking terms (top-of-the-world efficiency level). This policy requires energy efficiency targets in the form of benchmarks and introduced a 1% annual energy efficiency improvement obligation.

Define the effort defining policy(ies)

The law defines targets for designated sectors (steel, electricity, cement, paper & pulp, oil refinery, chemical) **at the energy efficiency level of the best performing companies** (top 10% - 20%). Companies that have taken early actions and have achieved the benchmark target level can ask for an exemption from the annual 1% target by helping small and medium-size companies achieve higher energy efficiency levels

Define supporting and complementary policies

- Mandatory energy management
- Fiscal incentives for energy efficiency (e.g. tax credit or a flexible depreciation for eligible equipment)
- Subsidy scheme to promote energy efficiency (grants for large-scale investment projects introducing energy conservation equipment or technologies into existing factories and business facilities)

Design a comprehensive implementation tool box

- Guidelines & protocols for energy management & energy audits
- Guidelines for benchmarking methodologies
- National certificate for energy managers as part of the mandatory energy management
- List of eligible measures and technologies (for tax credits)

Implement policy evaluation process

⁶ Energy Conservation Center Japan <http://www.asiaeec-col.eccj.or.jp/index.html> , IEA International Energy Agency 2008, IIP Institute for Industrial Productivity, (2011, 2012, a/b)

NA

Implement enforcement structure

Facilities **must provide yearly reports** and develop mid- and long-term plans for energy efficiency and conservation. Obligated companies must nominate energy managers, qualified with a national certificate, proving experience in both heat and electricity matters, to oversee their energy management. Energy managers must be certified under a third party scheme.

Create governing structure

The New Energy and Industrial Technology Development Organization manages the operational part of the law.

4.6 NETHERLANDS⁷

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

In 2007, the Dutch government introduced the “New Energy for Climate Policy: The Clean and Efficient Program” setting **the overarching goals** for reductions of GHG emissions and use of energy:

- 30% greenhouse gas emission reductions from 1990 baseline
- 20% share of renewables in the energy mix
- 2% annual increase in the energy saving rate until 2020

Define the effort defining policy(ies)

Since 1990, Netherlands’ policy has focused on **voluntary agreements with industry**. Currently two kind of long-term agreements are active until 2020:

- One agreement covers companies which are part of the EU ETS
Participating companies are obliged to design an energy efficiency plan and to implement all profitable measures (with payback periods of five years or less). The plan includes a target of 2% increase of energy efficiency per annum. In return the government will not implement any laws.
- Another agreement covers non EU ETS companies and small and medium enterprises.

Define supporting and complementary policies

- Energy Investment Allowance (EIA)
allows companies to deduct 41.5 % of the investment costs for energy-saving technologies from the taxable profit on top of the usual depreciation;
- Incentive Scheme for Sustainable Energy Production
is a subsidy scheme for companies, which deliver renewable or CHP based electricity to the grid;

Design a comprehensive implementation tool box

⁷ ECN Energy Research Center of The Netherlands (2012), IIP Institute for Industrial Productivity, (2011, 2012, a/b), Netherlands Enterprise Agency: <http://english.rvo.nl/home/about-rvonl/what-is-rvonl>.

- Monitoring Protocols
- Benchmarking manuals
- Guidelines for energy efficiency plans
- List of eligible technologies (to support implementation of the Energy Investment Allowance)

Implement policy evaluation process

A **steering committee** formed by all Parties, including the government, and chaired by an independent chairman monitors and guarantees the results of the agreement. The next full evaluation is planned for 2016.

Implement enforcement structure

Under the existing agreements, companies must prepare an energy efficiency plan every four years and have to implement the cost-effective measures identified in the energy efficiency plan. **Each company must report annually** the status of implementation to the Netherlands Enterprise Agency.

Create governing structure

The **Netherlands Enterprise Agency** manages the energy efficiency schemes and provides a list of subsidies, loans. An accreditation panel supervises the certifying bodies for the certification and accreditation of energy advisors. The above mentioned steering committee provides the strategic guidance.

4.7 RUSSIA⁸

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

The “Energy Strategy of Russia for the Period up to 2030”, was launched by the Ministry of Energy in 2010 defining a 56 percent energy intensity reduction target for 2030 compared with 2005.

In 2010, Government of Russia approved the state program on “Energy Saving and Energy Efficiency Improvement until 2020” (Decree #2446-r). The program emphasizes the reduction of primary energy of not less than 195 million tons coal equivalent and cut off energy intensity per GDP by 40 % until 2020 compared with 2007. **Mandatory targets for the industrial sector** equal to total savings of primary energy of 110 million tons of oil equivalent during Phase I (2011 - 2015) and 333 million tons over the life of the Program (2011 - 2020).

Define the effort defining policy(ies)

Under the “Energy Saving and Energy Efficiency Improvement until 2020”, large energy consumers (with energy expenditure over 10 million rubles/year) **are obliged** to perform energy audits and energy passports for specified equipment and materials.

Define supporting and complementary policies

- Tax rules

In 2011, the Russia government introduced new tax rules to promote the application of energy efficiency equipment and to invest in research and development energy efficiency (EE) related activities for companies. The **new tax rules** allow for energy efficiency equipment and R&D activities and include:

 - Property tax exemptions
 - Income tax credits
 - Accelerated depreciation
- Co-financing selected regional energy efficiency programs by federal and regional budgets
- Guaranteeing loans for EE projects

Design a comprehensive implementation tool box

- Formula set to calculate the maximum size of the tax breaks
- Special guidelines to report R&D and efficiency activities to tax authorities
- Monitoring system for energy efficiency supported by the government
- Supported Training for personnel by the government

⁸ IEA International Energy Agency (2011 b), IIP Institute for Industrial Productivity, (2011, 2012, a/b), IREX (2012), Ministry of Energy of the Russian Federation 2013, Russian Energy Agency (REA): <http://rosenergo.gov.ru/>

Implement policy evaluation process

The energy consumption and achieved energy savings by energy intensive industrial companies have to be based on a certified ISO 50001 energy management system. The energy management systems are required to be evaluated by certified energy managers. Inspections of industrial companies can be made by accredited companies to obtain any relevant data on energy consumption and energy efficiency potential.

Implement enforcement structure

An interministerial committee prepares annual reports on the progress of the action plan “Energy strategy of Russia for the period up to 2030”.

Create governing structure

The Russian Energy Agency, under the Ministry of Energy, with regional offices in 70 regions manages the state program “Energy saving and increasing energy efficiency until 2020”.

4.8 SWEDEN⁹

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

In 2006 the Swedish Parliament adopted an overall national indicative energy savings target of 9 % by 2016 compared with the average energy end-use for the period from 2001 to 2005. The percentage-based energy savings target corresponds to 33.2 TWh in absolute terms for 2016.

In 2009, the Swedish Parliament adopted a target of 20 % reduction of energy intensity between 2008 and 2020, i.e. **the input energy per unit of GDP in fixed prices** (energy intensity per GDP) shall be decreased by 20 %.

On December 2012, the Swedish Environmental Protection Agency in collaboration with the Swedish Energy Agency and other national authorities presented a proposal for a Climate Roadmap 2050 to the Swedish government how to achieve the 2050 vision of zero net GHG emissions in a cost-efficient way **on the basis of different emission trajectories in different sectors**.

Define the effort defining policy(ies)

In 2005 the Energy Efficiency Act as **voluntary program** for improving energy efficiency in **energy intensive industries** with focus on electricity consumption **was introduced**.

The tax for industrial process-related electricity was raised from 0 to 5 SEK per MWh in Sweden on 1st July 2004. **Energy-intensive companies in the manufacturing industry are granted exemption from this tax** if they will take action to improve their energy efficiency through participation in the voluntary program. Through the energy efficiency act, participants should (i) gain greater knowledge of their energy consumption and (ii) implement energy saving measures. Finally this should result in lower energy cost.

Define supporting and complementary policies

- **Environmental taxes on fuel**
Taxes levied on fuels based on content of carbon dioxide, sulphur and nitrogen oxide. Various exemptions apply to industrial companies.
- **Energy Audit financial support**

Design a comprehensive implementation tool box

- Case studies
- Manual for energy audit, analysis and review
- Manual for energy management systems

⁹ IIP Institute for Industrial Productivity, (2011, 2012, a/b), Stenqvist Christian, Nilsson J L, No date,

- Template for Life Cycle Costing calculations (including trainings)
- Guide for purchasing energy-intensive equipment and project planning (including trainings)
- Networking and workshops: Seminars for program participants and best practice dissemination

Implement policy evaluation process

NA

Implement enforcement structure

Companies that wished to participate in the PFE had to meet certain criteria:

- Electricity is used in the manufacturing process,
- Companies must be able to implement actions required by the program

The duration of a company's participation in the PFE is five years. In the first two years the company must obtain certification for the international standard for energy management systems ISO 50001, conduct an energy review, and introduce procedures for the purchasing of high-consumption electrical equipment. In the following three years, the company must implement measures to improve energy efficiency. A list of measures is generated by a mandatory energy review carried out by the company. After the initial two years, the company is required to submit a **report to the Swedish Energy Agency** on the energy management system, energy review and the list of measures. After five years another report is to be submitted, which should describe and summarize the actual result of the implemented measures.

Create governing structure

Since 1997 the **Swedish Energy Agency** (Statens Energimyndighet) under the Ministry of Enterprise, Energy and Communications is the central governmental agency responsible for implementing the energy policy set out by the government. There are also regional energy offices and municipal energy consultancy services funded by state support.

4.9 UNITED KINGDOM¹⁰

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

The goals for industrial energy efficiency are embedded in the **Climate Change Act** which entered into force in 2009.

Define the effort defining policy(ies)

Climate Change Agreements, a **voluntary scheme**, are agreed between the government and energy intensive industry associations to meet energy efficiency targets. In return the joining companies receive tax discounts up to 90 % discount of a climate change levy, and are also exempted from the Pollution Prevention and Control Act technology requirements.

Define supporting and complementary policies

- The **Climate Change levy** is a tax on energy consumption across all sectors, whereby participants in the Climate Change Agreements are granted an exemption of up to 90% of the levy.
- The **Enhanced Capital Allowance** Scheme should motivate companies to invest in low carbon, energy saving equipment by receiving an enhanced tax relief for their investments

Design a comprehensive implementation tool box

- Tools provided to help companies comply with Climate
- Energy saving, carbon management advice and financial support from the Carbon Trust
- Guidance documents on Best Available Techniques
- Guidance document to set targets, monitoring plans, and report saving results

Implement policy evaluation process

The Department of Energy and Climate Change is required to publish an annual report. This report provides a technical assessment of the outlook for the supply of electricity, gas and oil up to 2025 and an overview of the progress on energy efficiency. The Committee on Climate Change is an independent, statutory body established under the Climate Change Act 2008 and advises the Government on emissions targets and reports to the Parliament on progress made in reducing greenhouse gas emissions.

Implement enforcement structure

¹⁰ AEA (2012), DECC (2012, 2013, 2014), DEFRA (2009), Global Legislators Organisation (2011), IEA International Energy Agency (2011 b); IIP Institute for Industrial Productivity, (2011, 2012, a/b),

The companies with Climate Change Agreements have to monitor and report their energy consumption against agreed targets and report their result through registry, an online website.

Create governing structure

The **Carbon Trust funded by the Department of Energy and Climate Change** provides energy assessments to businesses, hosts a database for energy audits, manages the Climate Change Agreements and the Enhanced Capital Allowance scheme. Lead auditors for energy efficiency need to be accredited.

4.10 USA¹¹

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

In June 2013, the president Obama Administration announced the U.S. Climate Action plan which outlines 75 goals in three areas:

- Reduce GHG emissions
- Prepare the United States for the impacts of climate change,
- Lead international efforts to combat climate change

The **Climate Action Plan does not specify energy savings or GHG mitigation goals for the industry**. Industrial companies are obliged to implement "Best Available Control Technologies" (BACT) to control greenhouse gas emissions on a case to case evaluation.

Define the effort defining policy(ies)

The BACT, as mandatory element, limits GHG emissions based on the maximum degree of control that can be achieved by a particular source or facility. Additionally the following voluntary programs exist:

- Better Buildings, Better Plants Program (former "Save Energy Now Program")
This program focuses on a 25% energy-intensity improvement goal over 10 years in U.S. from 2007 through 2016 by industry. Companies, which sign up, have access to extensive free technical and financial support.
- Superior Energy Performance Program (SEP),
The SEP considers a facility's performance on a repetitive basis but does not compare the facility to other facilities within a company or throughout the industry. The participating companies can demonstrate their performance according to two energy pathways:
 - Savings of at least 5% over a three-year period
 - 15% savings over the last ten years based on "Best Practice Scorecards"

Participating companies receive incentives such as energy efficiency credits, public recognition by external certification of their savings and energy performance and obtain a systematic framework for continuous improvement (ISO 50001).

¹¹ IIP Institute for Industrial Productivity, (2011, 2012, a/b), Office of Energy Efficiency & Renewable Energy: Superior Energy Performance (2014), U.S. Government (2013), US Environmental Protection Agency (2012, 2013), WRI World Resource Institute (2010),

- ENERGY STAR is a joint program of the U.S. Environmental Protection Agency and the U.S. Department of Energy, which helps industrial companies to develop robust energy programs to create the necessary infrastructure for cost-effective GHG management.
- Executive Order 13624 sets as national goal to develop and deploy 40 gigawatts of “new, cost-effective industrial CHP” by 2020.

Define supporting and complementary policies

- Loan Guarantee Program for clean energy projects
- Modified Accelerated Cost-Recovery System (accelerated depreciation)
- Business Energy Investment Tax Credit

In the U.S a wide number of programs with targets to promote renewable energy and energy efficiency exist at the state level. Details are available at the database of state incentives for renewables and efficiency <http://www.dsireusa.org/>

Design a comprehensive implementation tool box

- Clean Energy Application Centers that offer technical assistance
- Catalogue of financial incentives
- CHP best practice guides and workshops and direct project assistance
- Software tools
- Case studies, top recommendations, industrial benchmarking tools
- Energy management trainings and guidelines and scorecards for best practice
- Industrial Assessment Centers provide no-cost energy assessment to small and medium enterprises

Implement policy evaluation process

The applicability thresholds of BACT will be **reviewed and potentially revised every 5 years**.

Implement enforcement structure

Companies under the better building, better plants program have to report energy intensity, energy use data, and achievements annually to the **U.S. Department of Energy’s Advanced Manufacturing Office**. All facilities under the Superior Energy Performance program must comply with ISO 50001 and demonstrate an improvement of their energy performance in agreed time intervals to the authority.

Create governing structure

The US **Environmental Protection Agency** is responsible for enforcing national standards and programs, in consultation with state, tribal, and local governments. The U.S. Environmental Protection Agency coordinates its work with three federal agencies (Departments of Energy, Commerce, and Agriculture, and the Environmental Protection Agency) and four councils/offices

(National Economic Council, the Domestic Policy Council, the Council on Environmental Quality, and the Office of Science and Technology Policy) to monitor the various energy efficiency programs in industry.

5 INTERVIEWS

The interviews which were structured with **open ended questions** shall support the identification of decisive factors for a successful energy efficiency policy in industry. In this first interview round the project team contacted experts from:

- Austria
- Finland
- Netherlands
- Sweden

The project team had sent out three questions 1-3 days before it carried out the interviews either via telephone (Finland, Netherland Sweden) or personally (Austria). The interviews took approximately 40 minutes. The project team asked 3 questions:

- In your view, what are generally success factors for effective and efficient industrial energy efficiency policy?
- Situation in your country: was your way effective and efficient in your view (with specific focus on Voluntary Agreements), why yes, why not?
- In a situation where energy prices are comparably low (due to national subsidies) and enforcement of policies is rather difficult, what suggestions would you make to incentivize investment in energy efficiency

The specific minutes of the interviews do not relate exactly to questions but summarize the replies of the interviewees (however using full sentences). In the final conclusion of the interviews the project team summarizes the most important lessons learnt and recommendations for Iran.

5.1 AUSTRIA

Name	Ms. Petra Lackner 12/12/2014
Entity and function	Austrian Energy Agency Researcher
Contact details	petra.lackner@energyagency.at
Comments	
<p>Recommendations for successful implementation of industrial energy efficiency policy:</p> <ul style="list-style-type: none"> • First focus on quick wins • Subsidy systems for energy management and audits • Training of auditors • Benchmarking • Best practice examples (financial and technical feasibility) 	

5.2 FINLAND

Name	Mr. Heikki Väisänen 09/12/2014
Entity and function	Senior Administrator Ministry of Employment and the Economy
Contact details	heikki.vaisanen@energiavirasto.fi

Comments
<p>In Finland energy efficiency in industry has already a rather long tradition (almost 20 years) because Finland has some energy intensive industry (e.g. paper) and costs for energy were always important part of production costs.</p> <p>For over 20 years a lot of work has been done by Finland’s industry and administration. Finish stakeholders understand the concept of industrial energy efficiency and companies know that they can increase their profits by saving energy. Companies have a good overview of technologies for energy efficiency and there is a vivid culture of cooperation between them.</p> <p>Voluntary agreements have also always played an important role in Finland’s strive to improve energy efficiency (because of the flexibility). The first energy audit program started in 1994. Energy efficiency targets are not fixed targets but need to be cost effective otherwise they could be set too high (unrealistic targets). If voluntary agreements do not perform as intended, then legislation will be put in place.</p> <p>Important accompanying measures for any law or voluntary agreement:</p> <ul style="list-style-type: none"> • Energy management • Energy audits • Subsidies for energy audits and resulting investments in energy saving measures up to 20-25% percent of investment cost. • Intensive training and • Monitoring of activities and results <p>Other important factors for success:</p> <p>Rules for subsidy applications need to be transparent, fair and simple, otherwise companies will not participate in the system;</p> <p>Specific recommendations for a situation where energy prices are comparably low (due to national subsidies) and enforcement of policies is comparably weak:</p> <ul style="list-style-type: none"> • Focus on quick wins where no investments are required

Comments
<ul style="list-style-type: none">• Generate a few success stories with first energy audits to market the benefits of energy efficiency (e.g. cost of audit in Finland has usually a payback within one year)• Create incentives to get the commitment of management (not necessarily profit for the company but maybe recognition by political leaders of the country)• Positive publicity• Benchmarking processes (internally and externally)

5.3 NETHERLANDS

Name	Mr. Stefan Walta 09/12/2014
Entity and function	Adviesbureau SAM BV Consultant
Contact details	stefan.walta@sambv.nl
Comments	
<p>Energy efficiency has long history in Netherlands, mainly through voluntary agreements (voluntary but not without obligations), first agreement focus on process efficiency (on site) from 1992-2000; second agreement 2001-2012 focus shifts to life cycle efficiency; third agreement 2009-2020 focus on long term how to remain competitive;</p> <p>Sector associations:</p> <ul style="list-style-type: none"> • Intermediate between enterprises and government • Report annually on sector progress • Initiate sector initiatives (projects and peer to peer working groups) • Communication to associations member on energy efficiency issues <p>Companies:</p> <ul style="list-style-type: none"> • Implement EnMS • Formulate an energy conservation plan • Implement energy conservation opportunities • Report annually progress in energy performance <p>Success factors on company level: Strong commitment of management Awareness within staff</p> <p>In Netherlands free consulting services and subsidies for implementation of energy saving measures are most important motivation for companies to participate in the scheme.</p> <p>Specific recommendations for a situation where energy prices are comparably low (due to national subsidies) and enforcement of policies is comparably weak:</p> <ul style="list-style-type: none"> • Invest in general awareness raising between stakeholders • Establish energy agencies • Benchmarking • Situation specific incentives for management 	

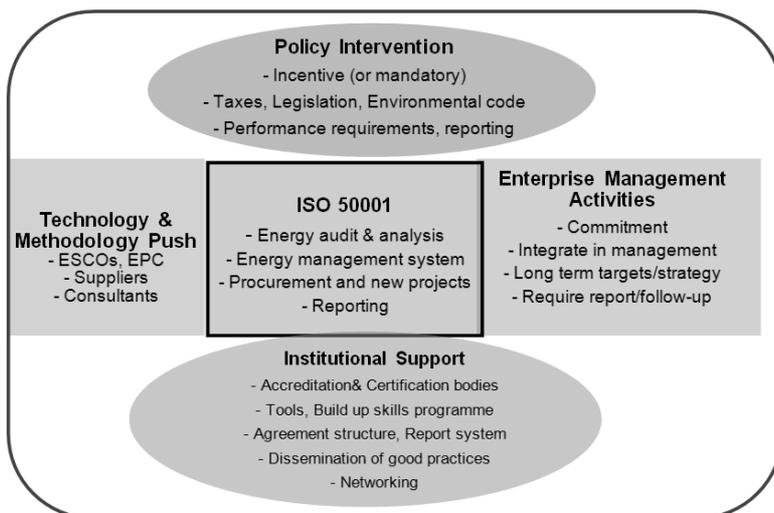
5.4 SWEDEN

Name	Mr. Thomas Björkman 16/12/2014
Entity and function	Swedish Energy Agency Programme manager
Contact details	thomas.bjorkman@energimyndigheten.se

Comments

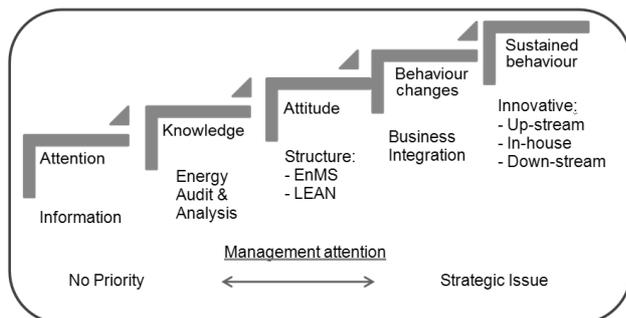
Energy management systems core of industrial energy efficiency policies; very country specific

Factors for favorable ISO 5001 environment:



Source: Dahlgren et al, 2014: *Models for Driving Energy Efficiency Nationally Using Energy Management* p. 3

A successful energy management program will address all five levels of the energy efficiency ladder as presented below



Comments

Specific recommendations for a situation where energy prices are comparably low (due to national subsidies) and enforcement of policies is comparably weak

- Leadership from government and corporate management
- Non-financial benefits for management (publicity, recognition by governmental leaders ett.)
- Networking between companies

In future not only energy efficiency but resource efficiency relevant, supply chains

5.5 INTERVIEWS - CONCLUSION

The following recommendations were emphasized by all the respondents:

- Policies for industrial energy efficiency are **country and situation specific**; not one single system fits it all
- Establishing awareness for energy efficiency **takes time**; countries of respondents have around 20 years of tradition in industrial energy efficiency
- Governmental commitment and **commitment of management in industrial companies is of utmost importance**;
- Benefits to increase commitment of management could be
 - increase of **company profit** through energy efficiency,
 - **benchmarking** and networking with other companies
 - positive country wide **publicity**
 - or **recognition** by governmental leaders
- In the first phase it is important to focus on **quick wins** where no or only very low investments for energy efficiency are required (e.g. behavioral changes turning off lights etc. or control systems)
- Programs to incentivize energy audits and energy management systems should be a central part of any policy for industrial energy efficiency

6 ANALYSIS RESULTS

6.1 STEP 1: SET THE OVERALL ENERGY SAVING/ GHG MITIGATION GOAL TO BE ACHIEVED BY INDUSTRY

Aim	Best Practices	Country Examples	Evaluation Iran
<p>Set an overarching (energy efficiency) goal which realistically can meet environmental goals (effectiveness principle) with least cost as possible (efficiency principle) considering distribution effects (social) and which can be achieved within a rather certain time frame (implementation time schedule)</p>	<p>Targets are defined based on research and alignment with other development goals of the country/region.</p> <ol style="list-style-type: none"> 1. Identify <u>technical options</u> 2. Identify <u>cost/ benefits¹²</u> of implementation 3. Build <u>Marginal Abatement Cost Curve¹³</u> and/ or international benchmarking 4. Prepare macro-economic <u>modelling¹⁴</u> 5. Undertake <u>consultative process</u> (to 	<p>United Kingdom UK has applied the tool of Marginal Abatement Cost Curves to identify the suitable country wide energy efficiency potential</p> <p>Belgium: Belgium has applied international benchmarking for its large energy intensive industry (energy consumption above 0.5 PJ)</p> <p>Denmark: In its voluntary agreement scheme with industry Denmark does not specific targets but participating corporates have to implement EMS,</p>	<p>The Act of modification of energy consumption pattern, number 1770, approved on February 23, 2011 outlines a very broad set of legislation covering all the “typical” energy efficiency sectors:</p> <ul style="list-style-type: none"> • EE in new and existing buildings • EE of equipment (including lighting) • EE of transportation sector • EE in energy generation and transmission • EE in industry • EE awareness raising

¹² Process of quantifying costs and benefits of a decision, program, or project (over a certain period), and those of its alternatives (within the same period), in order to have a single scale of comparison for unbiased evaluation. Unlike the present value (PV) method of investment appraisal, CBA estimates the net present value (NPV) of the decision by discounting the investment and returns. Though employed mainly in financial analysis, a CBA is not limited to monetary considerations only. It often includes those environmental and social costs and benefits that can be reasonably quantified <http://www.businessdictionary.com/definition/cost-benefit-analysis-CBA.html>

¹³ Marginal abatement cost is the expense associated with eliminating a unit of pollution. As the amount of pollution produced approaches zero, this cost tends to rise, because it becomes more and more expensive to prevent the pollution. This concept can also be applied to environmental cleanup, where it refers to the costs associated with cleaning up a unit of pollution, rather than preventing it in the first place. Economists and businesses can use this concept in optimization problems to balance the costs of pollution with the desire for environmental responsibility <http://www.wisegeek.com/what-is-marginal-abatement-cost.htm>

¹⁴ A macroeconomic model is an analytical tool designed to describe the operation of the economy of a country or a region. http://en.wikipedia.org/wiki/Macroeconomic_model

Aim	Best Practices	Country Examples	Evaluation Iran
	<p>increase ownership, alignment with broader development goals)</p> <p>6. <u>Define sectors</u> covered by the policy</p> <p>7. Define realistic goals in relation to:</p> <ul style="list-style-type: none"> • Environmental benefits • Techno/economic feasibility • Timeframe for Implementation 	<p>include guidelines on procurement of energy efficient equipment and all profitable energy saving projects have to be carried out</p> <p>European Commission The European Commission usually involves <u>all interested stakeholders</u> to participate in a public consultation process; e.g. via website which contains: consultation period, policy field(s), target group(s), objectives of the consultation, how to submit contributions and contact details</p>	<p>No reference to trading of energy efficiency certificates has been found</p> <p>Article 11 defines that energy efficiency standards resp. goals shall be set for industrial processes; apparently such goals have already been approved but were not available yet to the project team. Currently it is also not clear if detailed economic/social studies had been carried out beforehand;</p> <p>Based on the existing information the project team has the opinion that policy development in Iran is</p> <p>“medium” to step 1 <i>Set the overall energy saving and/or GHG mitigation goal to be achieved by industry</i></p>

6.2 STEP 2: DEFINE THE EFFORT DEFINING POLICY(IES)

Aim	Best Practices	Country Examples	Evaluation Iran
<p>Establish the main policy driver to achieve the energy savings/GHG reduction goal determined in the 1st step.</p> <p>Such policy driver(s) could be</p> <ul style="list-style-type: none"> • Voluntary agreements with industrial sectors • Process standards • Country wide energy efficiency law including trading with energy efficiency offsets • Emissions trading etc.. 	<p>Take into account <u>national context</u> (e.g. country specific marginal abatement cost curve, international competition of industry, awareness of market driven decisions etc..)</p> <p>Provide <u>long term reliable signals</u> to investors but avoid lock in of ineffective plants</p>	<p>United States Even though USA is a market oriented country congress did not pass proposed legislation on country wide GHG emissions trading (still strong opposition to climate change policy in general); therefore only subnational trading zones have been implemented, <u>the main policy driver</u> is by executive power of the US President and its administration (Environmental Protection Agency EPA)</p> <p>Germany Germany originally used Voluntary Agreements to improve energy efficiency in industry; however on the other hand it is dependent on exports of its energy intensive industry and exempts specific industrial sectors from energy price rises caused through the renewable energy law;</p>	<p>The Act of modification of energy consumption pattern, number 1770, approved on February 23, 2011 outlines a very broad and comprehensive set of legislation covers all economic sectors of Iran.</p> <p>Another important piece of legislation which in theory is advanced compared to other countries (if enforced/implemented properly) is the “Subsidy Reform Act” approved on January 5th 2010 (aiming to reduce subsidies on fossil fuels); which could provide the necessary funds to carry out energy saving measures in industry</p> <p>Therefore the project team concludes that policy development in Iran in regard to <i>step 2: Define the effort defining policy(ies)</i> is “high”;</p>

6.3 STEP 3: DEFINE SUPPORTING AND COMPLEMENTARY POLICIES

Aim	Best Practices	Country Examples	Evaluation Iran
<p>Consider the case for supplementary policies and assess interactions</p>	<p>Analyze the barriers and drivers of the country and sector and then design supporting measures that can overcome identified barriers and achieve desired levels or higher (carrots and sticks) e.g:</p> <p>Establish <u>energy management programs</u>,</p> <p>Implement <u>educational (awareness raising, training)</u> programs for all groups of the society (schools, households, academic, corporate)</p> <p>Set up <u>financial incentives</u> programs for energy efficiency activities</p> <p><u>Remove subsidies</u> on fossil fuels</p> <p><u>Punitive actions</u> (tax increases, increase in fuel prices ect) for actors not complying with policies</p> <p>Establish system wide approaches that include a broad range of players in the market such as financial</p>	<p>Ireland Providing general and technical advice assessing energy savings</p> <p>Financial support for technical advice</p> <p>Slovenia Reduction of carbon tax</p> <p>Sweden General tax exemptions; Energy audits and energy management system</p> <p>Germany Voluntary Agreement Participating companies receive rebate from federal electricity tax</p> <p>Netherlands Sectoral list of measures, user groups and networks as well as software support tools</p> <p>United Kingdom Every two years, every target unit's performance against their targets is</p>	<p>According to the Act of modification of energy consumption pattern, number 1770, the users of energy with an annual consumption higher than 5,000,000 m3 of gas or liquid fossil fuels or electricity demand higher than 1MW are obliged to develop</p> <ul style="list-style-type: none"> • Energy management unit • Energy audits <p>Fine the industrial units implicated by the compulsory standards which have not fulfilled the criteria defined in those standards according to the article 6 (of this Act).</p> <p><u>Fined by the decision made by Ministries of Petroleum, Energy and Industries and Mines</u> in form of a percentage of the selling price of the forms of energy. The obtained funds would be deposited in the public earning account in the National Treasury <u>to be applied in implementation of optimization</u></p>

Aim	Best Practices	Country Examples	Evaluation Iran
	<p>institutions or Energy Service Companies (<u>ESCOs</u>)</p> <p>Assess the interaction between the chosen policies, estimate <u>system-wide effects</u> and adjust if necessary</p> <p>Ensure that the <u>energy performance and GHG emissions data collection</u> requirements evolve to meet long term requirements</p>	<p>checked to assess whether the facility should be recertified to continue to receive the tax discount for the following two years.</p> <p>If a facility misses its target, it can buy and retire carbon allowances in the market to make good the shortfall between performance and target. Conversely, if a company overachieves its Climate Change Agreement target, it can ‘ring-fence’ or set aside the allowances earned</p> <p>If a facility fails its target and has not bought allowances, then this facility will be decertified. Essentially, the agreement will remain in place, but the facility will not be allowed to claim the discount from Climate Change Levy for two years until the next reconciliation. If the facility reports at the next reconciliation and meets that target, then it will be recertified and be able to claim the discount again.</p> <p>China: Ten Key Projects or EE Financing</p>	<p><u>strategies in industrial divisions</u> included in this Act</p> <p>Special provisions for CHP power plants</p> <p>Ministries of Labor and Social Affairs and Education are bound to frame and perform <u>educational plans and technical and related practical courses, effective training</u> of optimization methods and energy application according to the attitudes of the Ministries of Petroleum and Energy</p> <p>Subsidy Reform Act” approved on January 5th 2010; which could provide the necessary funds to carry out energy saving measures in industry</p> <p>The existing EE legislation provides a very diverse frame for applying the “carrots and sticks” approaches and includes provisions for educational/awareness raising programs;</p> <p>For future activities, 100 billion \$ is considered for this year (Iranian calendar) to be invested in Energy</p>

Industrial Energy Efficiency Policy and Related Instruments in Iran

First Progress Report – Part 1

Aim	Best Practices	Country Examples	Evaluation Iran
			<p>Conservation Projects and it is becoming an Act in the parliament for all future Budget Acts</p> <p>Therefore the project team concludes that policy development in Iran in regard to <i>step 3: Define supporting and complementary policies</i> is “high”.</p>



6.4 STEP 4: DESIGN A COMPREHENSIVE IMPLEMENTATION TOOL BOX

Aim	Best Practices	Country Examples	Evaluation Iran
<p>Help companies achieve and implement policies</p>	<p>Develop guidelines, and provide resources, <u>training and tools</u> for companies</p>	<p>United States The ENERGY STAR for industry is supported by an extensive implementation toolbox. The main tools are: Industry-Specific Energy Management Tools & Resources, ENERGY STAR Industrial Benchmarking Tools, and Guidelines for Energy Management. See www.energystar.gov/index.cfm?c=industry.bus_in_dustry</p> <p>Austria Regional energy agency Graz has prepared a detailed guide to use ESCO models to increase the implementation of energy savings measures in all economic sectors</p> <p>European Bank for Reconstruction and Development (EBRD) Through its Sustainable Energy Financing Facilities (SEFFs) the EBRD creates LEME lists (list for eligible measures and equipments) which contains “pre-approved” small scale energy saving measures/equipments which receive immediate financial support (instead of going through a more complicated approval process for subsidy)</p>	<p>The Act of modification of energy consumption pattern, number 1770 provides for development and implementation of trainings and tools etc., however no specifics are mentioned;</p> <p>According to IFCO there are many tools available for companies</p> <p>Therefore the project team concludes that policy development in Iran in regard to <i>step 4: Design a comprehensive implementation tool box</i> is “good”.</p>

6.5 STEP 5: IMPLEMENT POLICY EVALUATION PROCESS

Aim	Best Practices	Country Examples	Evaluation Iran
<p>Evaluate effectiveness of policies and allow adjustment of the policy package</p>	<p>Identify from the start the <u>parameters and indicators</u> that will be monitored to allow ongoing and ex post evaluations</p> <p><u>Regularly review and evaluate the effectiveness</u> of the policy package and <u>allow for adjustments</u> to maintain coherence and the “reinforcing nature of the policies over time</p> <p><i>In general research has not much focused yet on this topic; not much guidance available yet</i></p>	<p>United Kingdom Every two years, every target unit’s performance against their targets is checked to assess whether the facility should be recertified to continue to receive the tax discounts for the following two years.</p>	<p>No specific procedure identified in Iran;</p> <p>Therefore the project team concludes that policy development in Iran in regard to <i>step 5: Implement policy evaluation process</i> is “low”.</p>

6.6 STEP 6: IMPLEMENT ENFORCEMENT STRUCTURE

Aim	Best Practices	Country Examples	Evaluation Iran
<p>Ensure that policy is implemented by covered sectors and companies</p>	<p>Credible and enforceable mechanisms to discourage non-compliance, including sanctions</p> <p><u>Political commitment</u> is important in order to enforce the policies properly.</p> <p><u>Monitoring, reporting</u> and verification of targets</p> <p>Penalties available</p> <p>Introduction of additional policy instruments such as taxation or regulation</p> <p><u>Authorities have right</u> to impose penalties</p>	<p>The Netherlands/Belgium Authorities have the right to tighten up environmental permits</p> <p>Sweden: The participating companies have to report their activities to the Swedish Energy Agency twice during the programme period: after two years and after five years of the programme.</p> <p>Ireland Program participants have to adopt the Irish Energy Management System IS393 within 12 months after joining the program (maximum 24 months). Once the EMS is certified by an accredited external certification body, it needs an annual surveillance audit to maintain its certified EMS status and re-certification after 3 years</p> <p>Denmark Each company under a VA must</p>	<p>While the The Act of modification of energy consumption pattern, number 1770 describes possibilities to monitor and enforce the law; such as in Article 25;</p> <p><i>The Ministries of Petroleum and Energy are in charge of receiving reports from the Institute of Standards and Industrial Research, and fine the industrial units implicated by the compulsory standards which have not fulfilled the criteria defined in those standards according to the article 6 (of this Act). If the Institute of Standards and Industrial Research postpones the framing and announcement of these standards, the Ministries of Petroleum and Energy can send their own inspectors for supervising the activities of energy units, perform consultations or give instructions to the industrial units included in Article 24 (of this Act). They can do this directly or their consulting contracts based on random sampling or other</i></p>

Aim	Best Practices	Country Examples	Evaluation Iran
		<p>submit reports on its compliance with the agreement to the Danish Energy Authority. This includes an annual progress report and reports on the special investigations</p> <p>All aspects of an agreement must be verified. There is an initial verification when the agreement is entered and at least one more during the three-year-period of the agreement.</p>	<p><i>methods included in the approved standards</i></p> <p>According to IFCO the Standard Organization has carried out more than 1000 inspections and has fined companies not complying with the law.</p> <p>Therefore the project team concludes that policy development in Iran in regard to step 6: Implement enforcement structure</p> <p>Is “good”</p>

6.7 STEP 7:CREATE ENERGY EFFICIENCY GOVERNANCE

Aim	Best Practices	Country Examples	Evaluation Iran
<p>Implementing energy efficiency policies is a complex undertaking. Therefore an effective institutional set up is important.</p>	<p><u>Clear assignment of authorities</u> their tasks and powers. A statutory basis is desirable, as it conveys status and permanency to an energy efficiency agency</p> <p><u>Sufficient personal and financial resources</u> (defined already by law)</p> <p>Clear <u>simple processes</u></p> <p><u>Stakeholder engagement</u> is a crucial component of an overall energy efficiency governance system. Stakeholder engagement helps build political consensus and ensures broad buy-in to policy implementation. That is not to say that stakeholder engagement is not without its risks, and it is a process which should be actively and carefully managed</p>	<p>Austria Energy efficiency agency was tendered competitively. Tasks and powers are defined in the Austrian energy efficiency law.</p> <p>European Commission The European Commission usually involves <u>all interested stakeholders</u> to participate in a public consultation process; e.g. via website which contains: consultation period, policy field(s), target group(s), objectives of the consultation, how to submit contributions and contact details</p>	<p>Energy efficiency laws and regulations in Iran involves a variety of entities with relatively well defined tasks:</p> <ul style="list-style-type: none"> • Supreme Council of Energy • Ministry of Energy • Ministry of Petroleum • Ministry of Housing and Urban Development • Ministry of Industries and Mines • Ministry of Culture and Islamic Guidance • Efficiency organizations (IFCO, SANA) <p>Etc..</p> <p>The project team has not analyzed personal/financial resources yet due to missing information;</p> <p>Based on existing information the project team concludes that policy development in Iran in relation to step 7: Create energy efficiency</p>

Industrial Energy Efficiency Policy and Related Instruments in Iran

First Progress Report – Part 1

Aim	Best Practices	Country Examples	Evaluation Iran
			governance is good

In general policy development in Iran in relation to industrial energy efficiency seems to be good. Based on the existing information at the time of preparing this report the project team would make the following suggestions for Iranian energy efficiency policy.

Set the overall energy saving and/or GHG mitigation goal to be achieved by industry

The goal/target setting process could potentially be improved:

- **by coordinating energy efficiency with GHG mitigation targets;** if GHG mitigation is prime aim, focus of target setting should be broader than looking only on energy efficiency and also consider application of renewable energy or process emissions from industry;
- as pointed out in the expert interviews policy making for energy efficiency depends very much on the **specific situation in each country** (e.g. energy prices, structure of the economy, development objectives etc..), which should be taken into account to set realistic targets;
- **technically** by applying Marginal Abatement Cost curves, economic modelling and stakeholder involvement

Define the effort defining policy(ies)

The process to prepare the effort defining policy (The Act of modification of energy consumption pattern, number 1770, approved on February 23, 2011) could potentially be improved:

- by describing the rights and obligations/consequences and timelines **more precisely.**

Define supporting and complementary policies

The existing supporting and complementary policies could potentially be improved:

- by focusing on **quick wins** with no or only low investment costs (e.g. behavioral changes turning off lights etc. or control systems)
- by increasing the commitment of higher level management of industrial companies; this could be achieved through
 - increase of **company profit** through energy efficiency,
 - **benchmarking** and networking with other companies
 - positive country wide **publicity**
 - or **recognition** by governmental leaders
- by asking for more support from political leaders
- by extend financial/technical support schemes, **more financial resources** especially for energy audits and the implementation of energy management systems (taking into account that most energy savings will result in subsidy savings of the Iranian Government)

- by considering the implementation **energy efficiency certificate trading**; which as well could raise the interest of high level management in companies because the financial benefits of energy efficiency measures would have a clear market prices; (an energy efficiency obligation trading will be easier to put into practice than an emissions trading system because its focus is narrower and there is already experience in available technologies etc.).

Design a comprehensive implementation tool box

No specific findings;

Implement policy evaluation process

- Periodic evaluation of effectiveness, efficiency, social equity effects, timing of implementation would be important

Implement enforcement structure

The current enforcement structure could potentially be improved by:

- Asking for higher commitment from political leaders in order to be able to enforce policies more strictly

Create governing structure

- While there is already a very diversified governing structure in place it may make sense to involve highest leadership in the governance of energy efficiency, in order to strengthen enforcement

7 REFERENCES

AEA Technology Plc (prepared by Misra Anne, Mould R., Haydock H.), 2012: *Energy Efficiency Policies and Measures in UK*

<http://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-united-kingdom.pdf>

accessed on 29/12/2014

Bureau of Energy Efficiency (BEE) 2011: *National Mission for Enhanced Energy Efficiency*

<http://beeindia.in/content.php?page=schemes/schemes.php?id=8> accessed on 28/12/2014

CERNA, Centre d'Économie Industrielle (prepared by Börkey P., Glachant M., Leveque F) 1998: *Voluntary Approaches for Environmental Policies in OECD Countries: An Assessment*, Paris

Danish Energy Authority, 2000: *Green Taxes in Trade and Industry, Danish Experiences*, Copenhagen

Danish Energy Agency (1): <http://www.ens.dk/en>

Danish Energy Agency (2) (prepared by Dal Peter, Rusbjerg J, Zarnaghi A. A.), 2012: *Energy Efficiency Policies and Measures in Denmark* (report in Odyssee-MURE project), Copenhagen

DECC Department of Energy and Climate Change (UK), 2012: *Updated energy and emissions projections report*, <https://www.gov.uk/government/publications/2012-energy-and-emissions-projections>

accessed on 27/12/2014

DECC DECC Department of Energy and Climate Change (UK) 2013: *Energy Efficiency Strategy: 2013 update*

<https://www.gov.uk/government/publications/energy-efficiency-strategy-2013-update>

accessed on 29/12/2014

DECC Department of Energy and Climate Change (UK), 2014: *UK National Energy Efficiency Action Plan*

https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/307993/uk_national_energy_efficiency_action_plan.pdf

accessed on 27/12/2014

EC, European Commission, JRC Joint Research Centre (prepared by Bertoldi P., Rezessy S.,) 2010: *Voluntary Agreements in the Field of Energy Efficiency and Emission Reduction: Review and Analysis of the Experience in Member States of the European Union*, Ispra

ECN Energy Research Center of The Netherlands 2012: *Energy Efficiency Policies and Measures in The Netherlands* <http://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-netherlands.pdf> accessed on 25/12/2014

Energy Conservation Center Japan: <http://www.asiaeec-col.eccj.or.jp/index.html>

Netherlands Enterprise Agency: <http://english.rvo.nl/home/about-rvonl/what-is-rvonl> accessed on 29/12/2014

European Parliament, DG for Internal Policies (prepared by Ludwig-Bölkow-Systemtechnik: Altmann M et al.), 2010: *Overview of Energy Efficiency Measures of European Industry*, Brussels

Global Legislators Organisation 2011: *Extract from the global climate legislation study - A Review of Climate Change Legislation in 66 Countries* <http://globelegislators.org/> accessed on 28/12/2014

Government of India; *National action plan on climate change* <http://www.moef.nic.in/downloads/home/Pg01-52.pdf> accessed on 27/12/2014

ICF International (prepared for Department for Business and Innovation Skills), 2012: *An International Comparison of Energy and Climate Change Policies Impacting Energy Intensive Industries in Selected Countries*, London

IEA International Energy Agency, 2008: *Energy Policies of IEA Countries – Japan 2008 Review*

IEA International Energy Agency, 2010: *Energy Efficiency Governance*, Paris

IEA International Energy Agency, 2011 a): *25 Energy Efficiency Policy Recommendations*, Paris

IEA International Energy Agency 2011 b): *Development of Energy Efficiency Indicators in Russia*, Paris

IEA International Energy Agency 2012: *Energy Policies of IEA Countries 2012 Review The United Kingdom*, Paris

IEA International Energy Agency 2012: *Understanding Energy Challenges in India Policies, Players and Issues*, Paris

IIP Institute for Industrial Productivity (prepared by Reinaud Julia, Goldberg A.) 2011: *Ten Key Messages for Effective Policy Packages*, www.iipnetwork.org accessed on 21/11/2014

IIP Institute for Industrial Productivity (prepared by Reinaud Julia, Goldberg A.) 2012 a): *Insights into Industrial Energy Efficiency Policy Packages Sharing best practices from six countries*, www.iipnetwork.org accessed on 21/11/2014

IIP Institute for Industrial Productivity and IEA, 2012 b): *Energy Management Programmes for Industry*, Paris

IPCC Intergovernmental Panel on Climate Change 2014: *Working Group III – Mitigation of Climate Change Chapter 10, Industry*, Berlin

IREX (prepared by Charlene A. Caprio) 2012: *Improving Energy Efficiency In Russia: Real Progress and Present Challenges*

http://www.irex.org/sites/default/files/Caprio%20EPS%20Research%20Brief_0.pdf accessed on 27/12/2014

Lawrence Berkeley National Laboratory (prepared by Price Lynn) 2005: *Voluntary Agreements for Energy Efficiency or GHG Emissions Reduction in Industry: An Assessment of Programs Around the World* in Proceedings of the 2005 ACEEE Summer Study on Energy Efficiency in Industry

Minister of Economic Affairs and the Minister of the Interior and Kingdom Relations (United Kingdom) 2014: *Third National Energy Efficiency Action Plan for the Netherlands*

http://ec.europa.eu/energy/efficiency/eed/doc/neeap/2014_neeap_en_netherlands.pdf accessed on 29/12/2014

Ministry of Employment and the Economy (Finland) 2014 a): *Energy and Climate Roadmap 2050*

https://www.tem.fi/files/41483/Energy_and_Climate_Roadmap_2050.pdf accessed on 29/12/2014

Ministry of Employment and Economy (Finland) 2014 b): *Finland's National Energy Efficiency Action Plan NEEAP-3*

http://ec.europa.eu/energy/efficiency/eed/doc/neeap/2014_neeap_en_finland.pdf accessed on 29/12/2014

Ministry of Energy of the Russian Federation 2013: *Energy strategy of Russia*

[http://www.energystrategy.ru/projects/docs/ES-2030_\(Eng\).pdf](http://www.energystrategy.ru/projects/docs/ES-2030_(Eng).pdf) accessed on 26/12/2014

Motiva Oy 2012: *Energy Efficiency Policies and Measures in Finland*

<http://www.odyssee-mure.eu/publications/national-reports/energy-efficiency-finland.pdf> accessed on 29/12/2014

Netherlands Enterprise agency 2012: *Covenants results brochure Long-Term Agreements on energy efficiency 2012*

http://www.rvo.nl/sites/default/files/2014/11/AGNL_RB2012_EN.pdf accessed on 29/12/2014

Open Journal of Energy Efficiency (prepared by R. Kumar, A. Agarwala) 2013: *A Sustainable Energy Efficiency Solution in Power Plant by Implementation of Perform Achieve and Trade (PAT) Mechanism*

<http://dx.doi.org/10.4236/ojee.2013.24020> accessed on 27/12/2014

Odyssee-Mure Project, no year: *Energy Efficiency Policies in the EU* <http://www.odyssee-mure.eu/>

accessed 21/11/2014

Office of Energy Efficiency & Renewable Energy: Superior Energy Performance
<http://www.energy.gov/eere/amo/superior-energy-performance> accessed on 22/12/2014

Planning Commission Government of India 2012: *Twelfth Five Year Plan (2012-17)*
<http://planningcommission.gov.in/plans/planrel/fiveyr/welcome.html> accessed on 27/12/2014

RAP The Regulatory Assistance Project, 2012: *Best Practices in Designing and Implementing Energy Efficiency Obligation Schemes*, Stockholm

Russian Energy Agency (REA): <http://rosenergo.gov.ru/> accessed on 26/12/2014

Stenqvist Christian, Nilsson J L, No date: *Energy efficiency in energy-intensive industries – an evaluation of the Swedish voluntary agreement PFE* The final publication is available online at:
<http://www.springerlink.com/content/5695k3k836040697/>

UNIDO, United Nations Industrial Development Organization (prepared by McKane A.; Price L., De la Rue du Can St., Lawrence Berkeley National Laboratory) 2008: *Policies for Promoting Industrial Energy Efficiency in Developing Countries and Transition Economies*, Vienna

UNIDO, United Nations Industrial Development Organization (prepared by University of Sussex: Mallett A., Sheridan N., Stornell St.) 2011a): *Policy Options to Overcome Barriers to Industrial Energy Efficiency in Developing Countries*, Vienna

UNIDO, United Nations Industrial Development Organization (prepared by University of Sussex, Sorell St, Sheridan Nye), 2011b): *Barriers to Industrial Energy Efficiency A Literature Review*, Vienna

UNIDO, United Nations Industrial Development Organization (prepared by Utrecht University, Worrell E.), 2011c): *Barriers to Energy Efficiency: International Case Studies on Successful Barrier Removal*, Vienna

U.S. Department of Energy Loan Programs Office <https://lpo.energy.gov/> accessed on 23/12/2014

U.S. EPA Environmental Protection Agency: *Clean Air Act*

U.S. EPA Environmental Protection Agency: *Energy Star Annual report 2012*
http://www.energystar.gov/sites/default/uploads/about/old/files/2012_AnnualReport_Final.pdf
accessed on 22/12/2014

U.S. EPA Environmental Protection Agency 2013: Background on Establishing New Source Performance Standards (NSPS) Under the Clean Air Act (US EPA)
<http://www2.epa.gov/sites/production/files/2013-09/documents/111background.pdf>
accessed on 22/12/2014

U.S. Government 2013: *The president's climate action plan*, Washington

U.S. Government 2012: *Executive Order 13624—Accelerating Investment in Industrial Energy Efficiency*

<http://www.gpo.gov/fdsys/pkg/FR-2012-09-05/pdf/2012-22030.pdf> accessed on 22/12/2014

WRI World Resource Institute: Bottom Line on Renewable Energy Tax Credits (by Goodward J., Gonzalez M.) 2010: <http://www.wri.org/publication/bottom-line-series-renewable-energy-tax-credits> accessed on 22/12/2014

Wuppertal Institute GmbH, Ecofys Germany GmbH (prepared by Schüle Ralf et al) 2013: *Good practice ways out of energy debt*, Brussels, Wuppertal, Cologne, Berlin, Linz