SUMMARY
OF ENERGY POLICY
IN THE SECTORS OF
RENEWABLE ENERGY SOURCES (RES) & ENERGY EFFICIENCY

MINISTRY OF DEVELOPMENT

Directive 2001/77/EC

as spur for RES development.

The RES indicative 20,1% stake in the country's overall electricity output in the year 2010

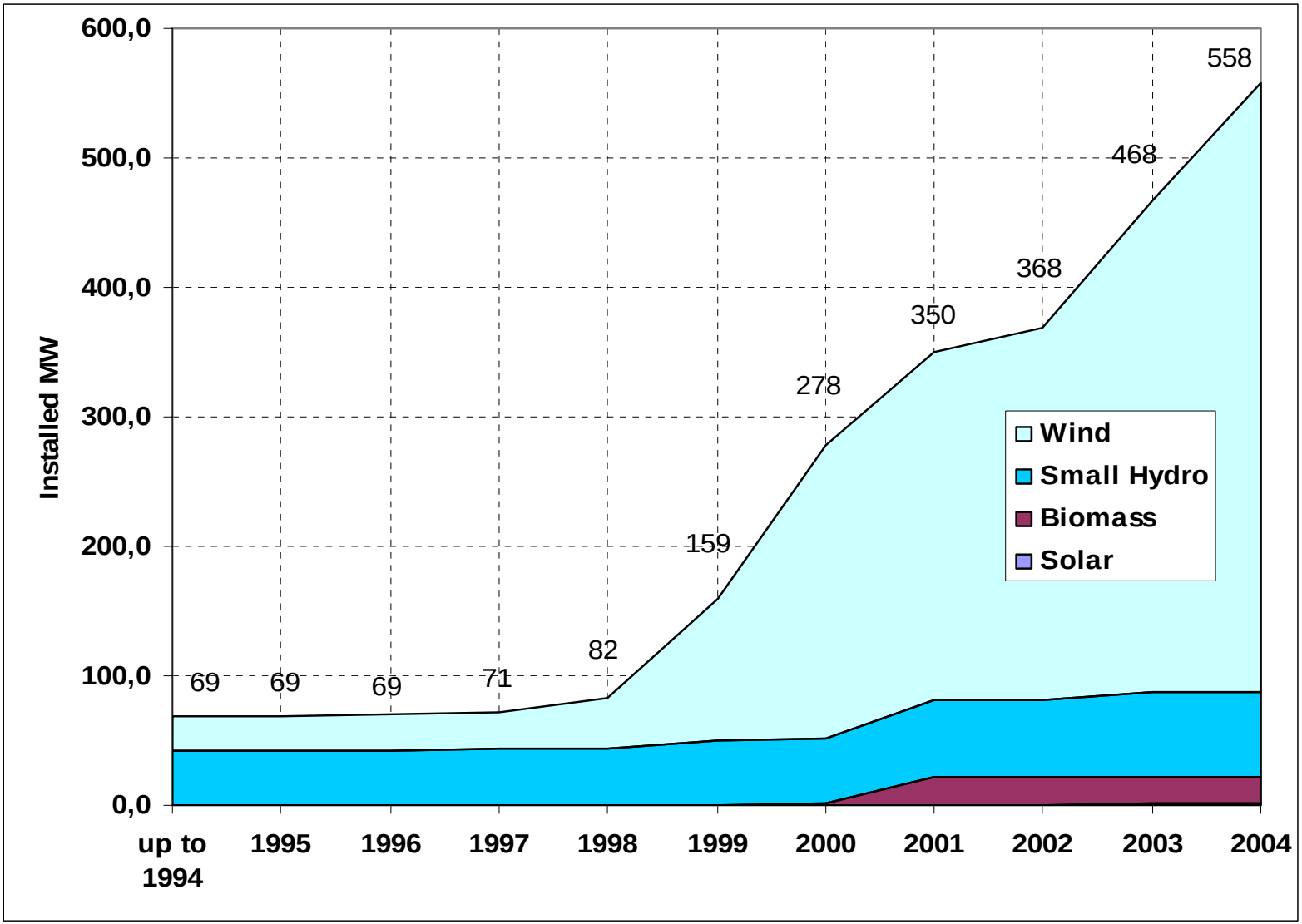
Basics of Greece's Electricity System in 2003

- PPC generation 52,2 TWh
- customers 6,7 million
- Capacity 12 TW PPC & 0,5 TW other generators

Energy mix (TWh)

- lignite 31,60
- oil 7,64
- Natural Gas 7,64
- Large-scale Hydros 5,21
- RES 1,20
- Net imports-exports 2,99

Progress of RES installed capacity each year



MINISTRY OF DEVELOPMENT

Overview of RES institutional context

- Law 2244/1994: beginning for the effective RES development: **fixed feed-in tariffs for Renewable Energy**
- Law 2773/1999: **emphasis on the priority access to the grids** – introduces a fee of 2% on the proceeds of renewable energy sales for the benefit of local government organizations
- Law 2941/2001: **a breakthrough in the licensing process**

Latest developments…

Law 3175/2003

- establishes for the first time a comprehensive set of rules for the rational use of **geothermal energy** – the probable potential of the whole country exceeds 500 MW
- enhances the liberalization of the electricity market
- introduces shortened and simplified procedures for the reinforcement and extension of power lines to serve RES deployment

Revision – update of the Regulatory Framework

System Operator

By virtue of P.D. 328/2000 the System Operator was establihed to operate, develop, and maintain the Greece's power transmission system and its interconnections with other systems for the purpose of supplying power to the country in an adequate, safe, effective and reliable way

PPC acts as Operator of the grids of the autonomous islands not connected to the mainland's interconnected system

Energy Efficiency

Three Ministries formulate energy policies in their respective sectors

Regarding Ministry of Development…

Buildings Sector

(A regulation for the rational energy use and energy conservation in buildings (KOXEE) is being prepared which will establish minimum energy standards, classification, energy audits, etc.)

CHP

District Heating

Public Support

Operational Programme for Competitiveness

(Receives financing from the 3rd Community Support Framework)

1,02 billion €, provides financing 30-50% of the eligible cost

RES & CHP 930 MW – electricity production 3,4 TWh

National Funding Law 2601/1998

grants public financing up to 30% of the eligible cost

RES & CHP 600 MW until 2010

Advantageous fixed feed-in tariffs

for electricity produced by RES and through CHP

The era after the end of capital subsidies...

- It is taken as granted that feed-in tariffs along with lack of competition among RES will sustain in the far future to offset any decline of the capital subsidies regime
- Wind Power: velocities > 8m/s support viable investments

Thank you very much

for your kind attention

****

Dimitris Tsalemis

RES Sector

Ministry of Development

Tel.: 210-6969449

Fax: 210-6969448

Email: TsalemisD@ypan.gr

Agence Nationale des Energies Renouvelables

Conférence MEDNET

Athènes, 31 mars 2004

LA MAÎTRISE DE L'ENERGIE EN TUNISIE

SITUATION & PERSPECTIVES

Troudi Valeria

PLAN DE L'EXPOSE

- CONTEXTE ET ENJEUX;
- PRINCIPALES ORIENTATIONS ;
- PRINCIPALES REALISATIONS ;
- EVALUATION DES ACTIONS ;
- PROGRAMME D'ACTION.

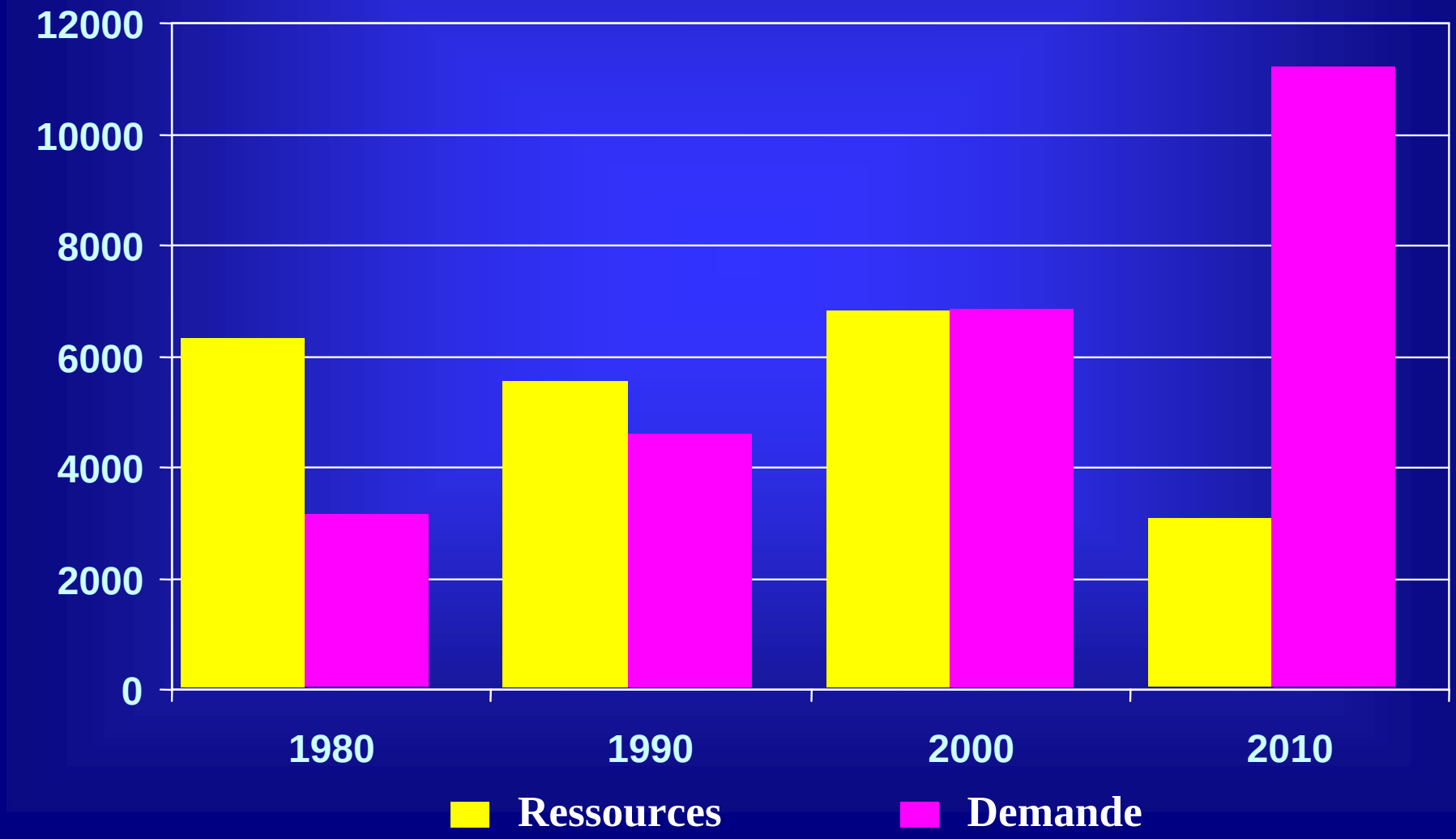
CONTEXTE ENERGETIQUE TUNISIEN

- Des ressources énergétiques limitées;
- Un accroissement continu de la demande d'énergie;
- Une politique de maîtrise de l'énergie depuis les années 80;
- Une volonté politique de promouvoir le secteur de la maîtrise de l'énergie;
  - *Les décisions Présidentielles du 3 mai 2001.*
- Un intérêt croissant pour la protection de l'environnement.

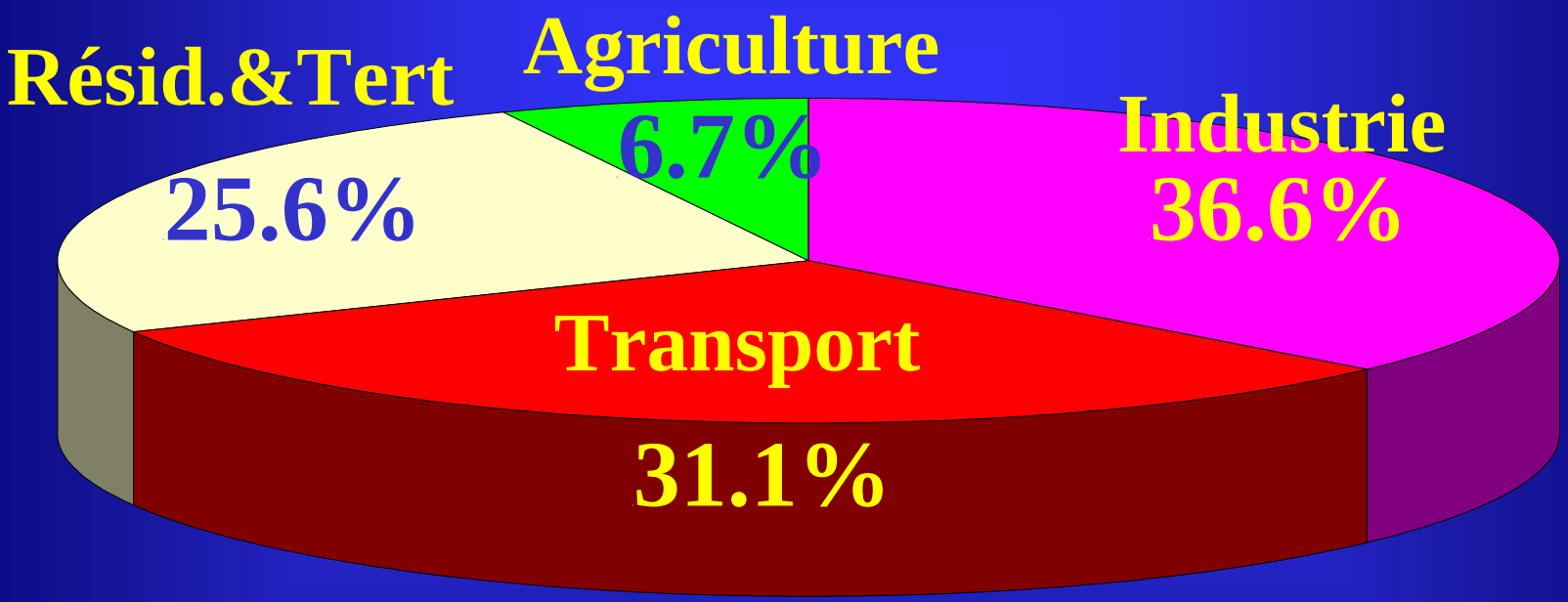
LES ENJEUX

- Améliorer le bilan énergétique et la balance des paiements;
- Satisfaire la demande énergétique au moindre coût;
- Permettre l'accès de l'énergie aux populations rurales des zones isolées;
- Réduire les émissions polluantes dues à la consommation de l'énergie.

EVOLUTION DE LA DEMANDE D'ENERGIE PRIMAIRE (ktep)



STRUCTURE DE LA CONSOMMATION PAR SECTEUR (2002)



PRINCIPALES ORIENTATIONS (1/2)

☞ **Promouvoir les Energies Renouvelables par :**

- ✓ *La diffusion à grande échelle des technologies matures vers les marchés accessibles;*
- ✓ *La création d'un marché favorable à la promotion des énergies renouvelables;*
- ✓ *L'appui à la Recherche-Développement pour les technologies au stade de l'expérimentation;*
- ✓ *L'encouragement du secteur privé à investir dans le domaine des énergies renouvelables.*

PRINCIPALES ORIENTATIONS (2/2)

☞ Développer l'Utilisation Rationnelle de l'Énergie Par :

✓*Le renforcement des audits énergétiques et des contrats programmes dans les secteurs énergivores;*

✓*Le développement de l'efficacité énergétique et de l'utilisation des technologies propres économes en énergie dans l'ensemble des secteurs consommateurs d'énergie.*

EVOLUTION DU CADRE REGLEMENTAIRE

- **Etape 1 1985-1990 :**
  - ✓ *Fondement et organisation de la maîtrise de l'énergie;*
- **Etape 2 1990-1994 :**
  - ✓ *Renforcement du cadre réglementaire de la ME;*
- **Etape 3 1994-1998 :**
  - ✓ *Uniformisation des avantages et des investissements;*
- **Etape 4 1998 à ce jour :**
  - ✓ *Repositionnement stratégique et institutionnel du secteur de la ME.*

PRINCIPALES REALISATIONS:E.R (1/8)

☞ **Énergie éolienne :** ***Réalisation, par la STEG, d'une centrale de 10 MW et son extension par environ 10 autres MW;***

✓ **Production de l'électricité**

✓ **Pompage de l'eau**

PRINCIPALES REALISATIONS:E.R (2/8)

☞ Electrification rurale par systèmes photovoltaïques :

✓ *Electrification de plus de*

11 000 foyers

✓ *Electrification de plus de*

200 écoles

PRINCIPALES REALISATIONS:E.R (3/8)

☞ Chauffage de l'eau sanitaire :100 000 m²

✓ Usage domestique

Plus de 20 000 foyers

✓ Usage collectif (hôtels, hôpitaux, salles de sport, foyers universitaires,…)

15 000 m²

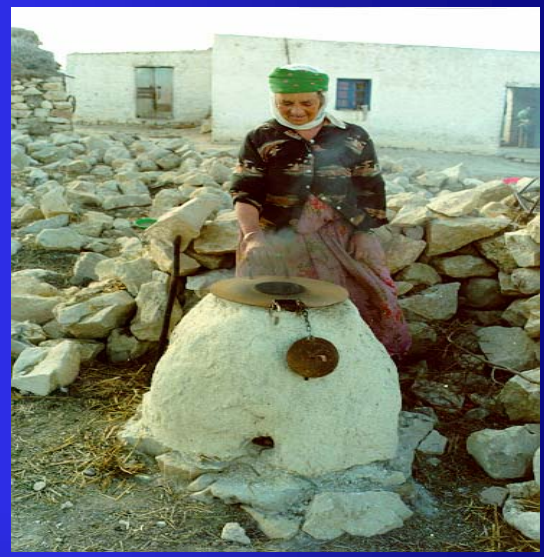
✓Douches publiques dans les zones rurales isolées: 56 unités

PRINCIPALES REALISATIONS:E.R (4/8)

☞ Biomasse:

✓*Expérimentation de 50 unités familiales de biogaz dans la région nord ouest*

✓*Expérimentation d'une unité industrielle de biogaz dans une ferme à Hammam-Sousse*



✓*Diffusion de plus de 11000 couvercles pour les fours traditionnels « Tabouna »*

PRINCIPALES REALISATIONS:E.R (5/8)

☞ Autres applications :

✓Equipement de 40 puits par des stations de pompage photovoltaïque

✓Utilisation des eaux géothermales pour la production des primeurs

PRINCIPALES REALISATIONS:E.R (6/8)

☞ Autres applications :

✓Electrification des dispensaires ruraux

✓Eclairage public

PRINCIPALES REALISATIONS:E.R (7/8)

☞ Autres applications :

✓Electrification des postes frontaliers

✓Téléphonie rurale

PRINCIPALES REALISATIONS:E.R (8/8)

☞ **Autres applications :** ***Dessalement de l'eau***

PRINCIPALES REALISATIONS:E.E (1/9)

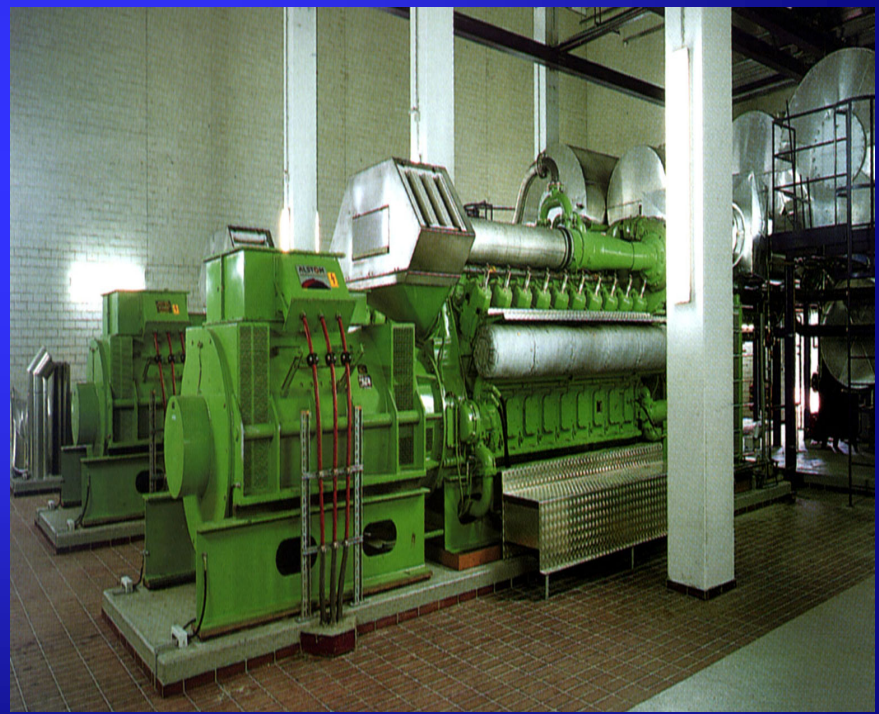
☞ **Audit énergétique dans les secteurs industriel, tertiaire et transport :**

Réalisation de plus de 300 audits énergétiques;

Conclusion de plus de 230 contrats programmes.

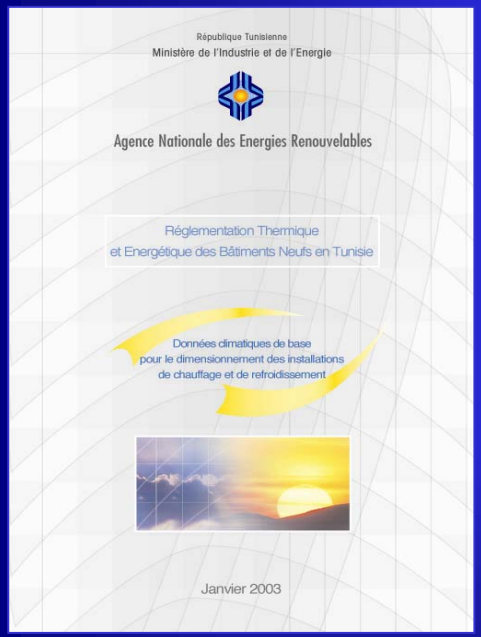
PRINCIPALES REALISATIONS:E.E (2/9)

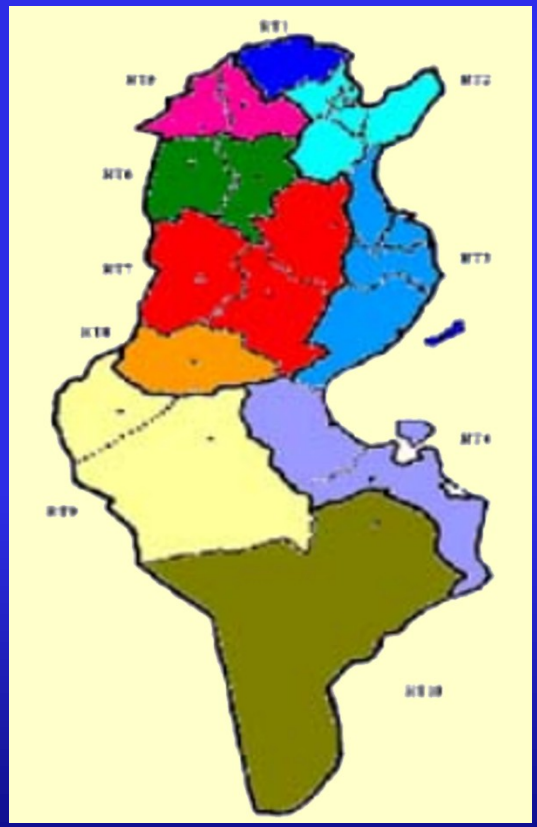
☞ Développement de la cogénération:

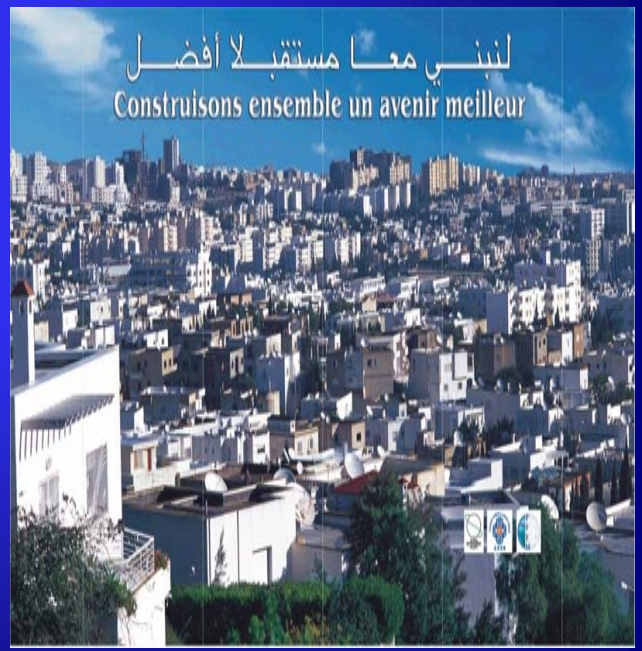


PRINCIPALES REALISATIONS:E.E (3/9)

- **Réglementation thermique des bâtiments;**

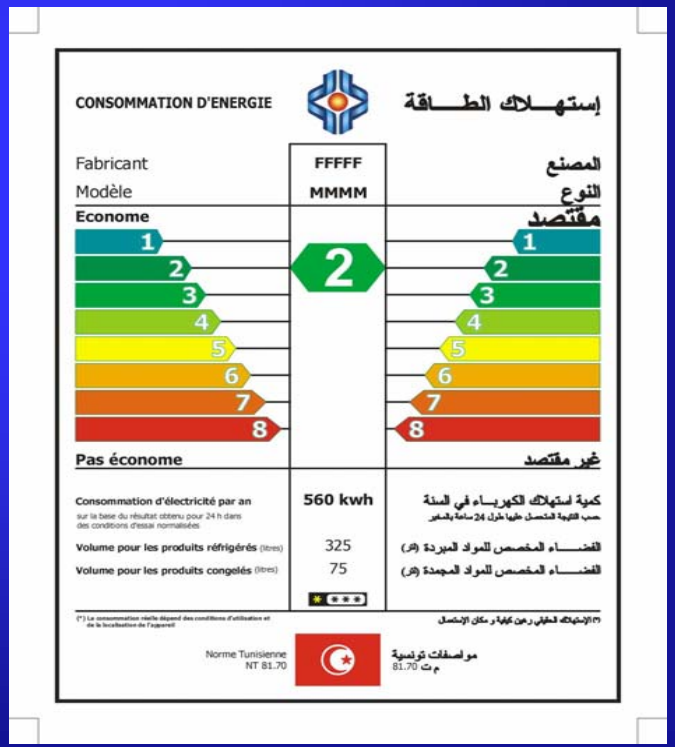






PRINCIPALES REALISATIONS:E.E (4/9)

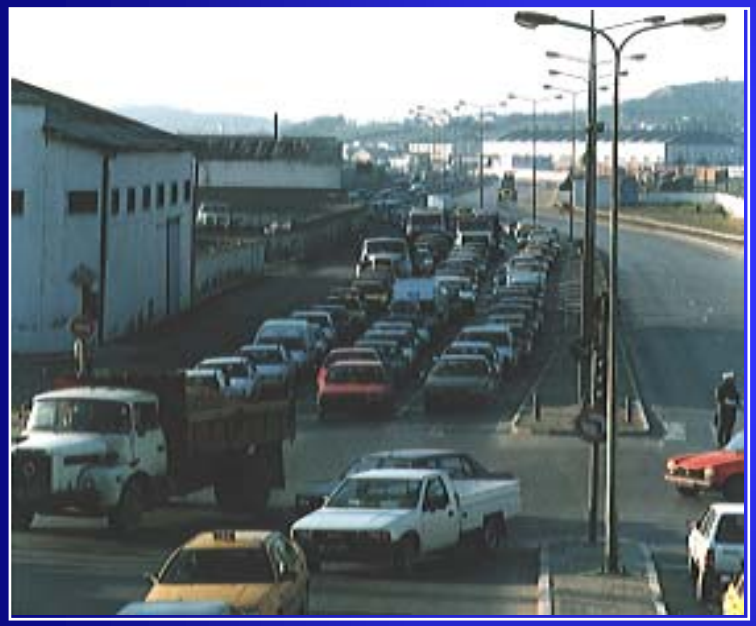
- Certification des équipements électroménagers;



PRINCIPALES REALISATIONS:E.E (5/9)

- Certification des équipements électroménagers;

PRINCIPALES REALISATIONS:E.E (6/9)

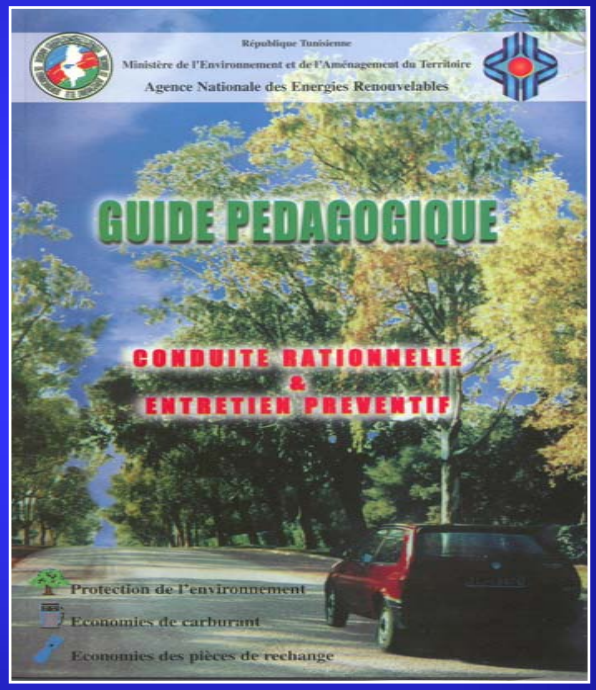


✓ *Plan directeur du transport pour la ville de Tunis*

✓ *Programme National de l'utilisation des carburants propres*

PRINCIPALES REALISATIONS:E.E (7/9)

✓ *Développement des bancs de diagnostic des moteurs de véhicules*



✓ *Introduction de la conduite rationnelle au niveau du permis de conduire.*

PRINCIPALES REALISATIONS:E.E (8/9)

☞ Assistance technique:

PRINCIPALES REALISATIONS:E.E (9/9)

- **Diffusion des lampes à basse consommation:**

EVALUATION DES ACTIONS (1/2)

Résultats encourageants mais:

☞**la contribution du programme de ME reste insuffisante malgré le potentiel important;**

☞**Principaux obstacles :**

✓*Les coûts encore très élevés de certaines filières de l'efficacité énergétique et des énergies renouvelables ;*

✓*Les bas prix actuels des énergies conventionnelles qui restent en deçà des prix internationaux ;*

✓*Les aides et les incitations octroyées jugées insuffisantes ;*

EVALUATION DES ACTIONS (2/2)

- ✓ *L'absence d'un cadre institutionnel et réglementaire adéquat permettant la diffusion à grande échelle de certaines technologies jugées techniquement matures ;*
- ✓ *Les marchés d'équipements très limités empêchant de bénéficier des effets d'échelle et le développement sur une base commerciale;*
- ✓ *L'absence de prise en compte des avantages de l'utilisation rationnelle de l'énergie et des énergies renouvelables en terme de protection de l'environnement et de création d'emploi ;*
- ✓ *L'insuffisance d'information, de sensibilisation et de promotion auprès des usagers potentiels tant publics que privés ;*

PROGRAMME D'ACTION

☞ Programme d'action à TCT : Décisions présidentielles.

- ✓ *Le renforcement de la sensibilisation et de l'information dans le domaine de la maîtrise de l'énergie;*
- ✓ *La mise en place de cadres réglementaires spécifiques pour l'encouragement du secteur privé à investir dans ce domaine;*
- ✓ *L'implication du secteur public dans l'exploitation du potentiel de maîtrise d'énergie;*
- ✓ *La mobilisation des ressources financières nécessaires au développement du secteur de maîtrise de l'énergie ;*
- ✓ *Le renforcement des capacités locales et le soutien des programmes de recherche & développement.*

PROGRAMME D'ACTION E.E (1/2)

Programme d'action à MT (horizon 2010):

- ✓ *Renforcement des audits énergétiques et des contrats programmes;*
- ✓ *Mise en place de la réglementation thermique des bâtiments et son application;*
- ✓ *Elargissement du programme de certification des appareils électroménagers;*
- ✓ *Développement de la cogénération dans les secteurs de l'industrie et du tertiaire.*
- ✓ *Lancement d'un programme d'efficacité énergétique au niveau des municipalités;*

PROGRAMME D'ACTION E.E (2/2)

Programme d'action à MT (horizon 2010).

- ✓ *Développement du transport en commun dans les grandes villes;*
- ✓ *Généralisation des bancs de diagnostic moteurs au niveau des voitures particulières et des parcs de véhicules de l'administration et des établissements publics;*
- ✓ *Développement de l'utilisation des carburants propres notamment le gaz naturel dans le transport en commun;*
- ✓ *Implantation des centrales de frêt pour réduire le retour à vide du transport des marchandises.*

PROGRAMME D'ACTION E.R

Programme d'action à MT (horizon 2010).

- ✓ *Electrification de 6000 foyers et développement de nouvelles applications solaires PV;*
- ✓ *Implantation de 230 mille m^2 de capteurs solaires de façon à augmenter la part de l'énergie solaire dans la consommation du chauffage de l'eau sanitaire de 3% à 8%;*
- ✓ *Implantation de parcs éoliens d'une capacité de 300 MW de façon à augmenter la part de l'éolien dans la capacité de production électrique de 0,1% à 5%.*

RESULTATS ESCOMPTES A L'HORIZON 2010

- ***Réduction du taux de croissance de la demande annuelle d'énergie primaire de l'ordre de1%;***
- ***Economie annuelle d'énergie d'un million de Tep à partir de 2010 représentant 10% de la consommation finale;***
- ***Réduction des émissions de GES de l'ordre de 3 millions de tonnes d'Equivalent CO2 par an;***

IMPACT DU PROGRAMME DE ME

ICTAF Obligations

3 case studies:

1. Solar heated water by industrial collector system at a camp site

2. 500MW Solar Thermal Power Station

3. iomass in municipal garbage dumps

Database update

Information for Newsletter

National Energy Policy

Israel – Basic Data

Population (2003): 6.5 million

Area: 21,946 km^2 (430 km long and 60-100 km wide)
Capital: Jerusalem
Official languages: Hebrew, Arabic
Religions: Jewish, Moslem, Christian, Druze and other minorities

Economy

Market economy
GDP - $30.3 Billion
Employment - 2,324,000

Substantial government participation

Leading exports: high technology equipment, diamonds, and agricultural products.

Increasing privatization and liberalization.

Energy Economy

Based on imported fossil fuels
Annual supply of primary energy ± 22.5 million TOE (tons of oil equivalent).

Fossil fuels comprised 97% of the total (66% oil and 44% coal).

Domestic solar water heaters provide ± 3% of the primary energy supply.

Energy Economy (cont.)

Since 1990 the average annual growth rates have been:

Energy consumption - 6.3%
GDP - 4.8%
Energy intensity - 1.5%
Reserve electric capacity - ± 10% above the expected peak demand
Electricity demand projections: annual increase of 1.2% till 2010 and 0.7% after 2010.

National Energy Policy Strategy and Priorities
Ministry of National Infrastructures

The main objective : To ensure the quantity and the availability of energy supply in the short and in the long term.

Supply should be implemented:

- **With care for reasonable costs,**
- **Optimal environmental and social impacts,**
- **Complying with international commitments .**

National Energy Policy (cont.)

The main priorities are:

- **Diversification of the energy supply sources**
- **Variation of the fuels used for generation**
- **Introduction of natural gas**
- **Increasing privatization**
- **Consideration for the environment**
- **Managing the demands for energy**
- **Increasing the effectiveness and efficiency of the energy market**

Providing energy supply for water desalination

National Energy Policy (cont.)

Use of natural gas - starting in 2004, would increase to 50% of fuels for electricity production in the long-term.

National Energy Policy (cont.)

Monopoly of the Israel Electric Company (IEC).

The development plan for electricity-generation from 1999 to 2005 includes 1,133 MW from Independent power producers (IPP) At present, IPPs, with an total capacity of 280 MW have already signed Power Purchase Agreements with the IEC.

There are as yet, no IPPs in operation. The first one is to be established in 2005.

.

Installed Capacity, MW, end of the period

Year	MW	Peak Demand
1999	8,579	7,150
2000	9,179	7,650
2001	9,744	8,061
2002	10,484	8,367
2003	10,484	8,741
2004	11,340	9,142
2005	11,710	9,497

Renewable Energy

Type	Capacity MW	Future
Hydro	5	No increase
Wind	6	Growth
Solar		100 - 500

Oil & Fuels Sector

The Fuel Authority, a division of the Ministry of National Infrastructures is in charge of the country's fuel market and oil sector.

- **Till now, total dependence on imports**
- **In 2002, 9.5 million tons of crude oil were imported**
- **Offshore natural gas was recently discovered reserves estimated at 12 billion cubic feet, consumption planned to be equal to 700 million cubic feet per year**
-

- **Proven oil reserves are estimated at just over 4 million barrels with production of ~1000 bpd.**

- **The Ministry of National Infrastructures encourages private sector exploration, mostly by small and medium sized independent operators.**

- **The Eilat-Ashkelon pipeline system, jointly owned by Government and Private sector, has a throughput capacity of 55 million tons of crude oil per year.**

- **Oil Refineries Ltd, jointly owned by the Government (74%) and private investors (26%) operates two refineries and is the only company, which refines oil, and supplies oil products to the market.**

Two refineries exist - Haifa and Ashdod with total refining capacity of 13 million tons of crude oil per year.

The Natural Gas Authority in the Ministry National Infrastructure was established to further facilitate the introduction of natural gas into the energy sector.

The potential consumers of natural gas include existing and future power plants, industrial energy users, and petrochemical industries, industrial cogeneration plants and the commercial sector.
The share of natural gas will be ~ 8% of the total energy basket in 2005 and 25% of the total energy basket in 2025.
(Ashdod st. is operating on NG since February 2004)

Coal is at present the main source for electricity generation in Israel.
In 2002, Israel imported ~13 million tons which is equivalent to 35% of the primary energy consumption in Israel.
The main sources for coal import are South Africa , Columbia and South – East Asia
.

Renewable Energy Sources (RES)

Israel is very advanced in development and utilization of solar energy, which accounts for 3% of the country's gross energy consumption (GEC).
(According to law contractors are obliged to install solar energy for water heating in new buildings under 9 floors since 1990.)

Two wind energy farms produce another ~1% of GEC.

Government, the IEC and the public sector, finance energy production plants exploiting RES.

Energy conservation

Promotion of RUE and conservation is a basic objective of Israel policy. This includes special legislation.

Energy Efficiency

The Energy Resource Management Division of the Ministry of National Infrastructures is the main authority responsible for energy conservation measures: information , training, consulting, energy audits, legislation and regulations and demonstration projects.

THE OPET Network

- Organisations for the Promotion of Energy Technologies -OPET Network-
- initiative of the European Commission that aims to promote public awareness of current energy research through a new and challenging series of activities integrating
  - EU energy policy priorities
  - New technological research
  - Market sustainability

Web site: www.opet-network.net

THE OPET Network

- Thematic areas of work
  - Buildings
  - Renewable Energy Sources
  - Co-generation and District Heating
  - Clean-Fossil Fuels
  - EMINENT (Emerging Energy Technologies at an Early Research Stage)
  - Transport
- Geographical Coverage: EU, Associated Countries, Latin America, Russia, China & India
  - MEDNET (Mediterranean Basin Countries)
  - ASEA (Asean region – Malaysia & Thailand)
  - Co-generation Heat & Water for Mediterranean islands

THE MEDENER Network

- Mediterranean Association of the National Agencies for Energy Conservation
  - Created in 1997 and includes 12 Mediterranean Energy Agencies
  - Aims to the development of regional partnerships
  - Exchange of experience
  - Creation of common programs or projects
  - Participating National Agencies from the countries:

    Algeria, Egypt, France, Greece, Italy, Jordan, Lebanon, Morocco, Palestine, Portugal, Spain & Tunisia

MEDNET – Dissemination of Energy Technologies Information in the Mediterranean through Networking

- **Objectives:**
  1. To create a forum for the exchange of information between the OPET Network and Non EU Mediterranean (MEDENER) countries
  2. To disseminate information on RES & RUE technologies
  3. To explore the areas of common interest, including future investment projects
  4. To facilitate technology transfer between the EU and the south basin Mediterranean countries

Promoting the Mediterranean cooperation for new energy technologies

- Project partners:

  CRES (Greece)– coordinator, IDEA (Spain), ENEA (Italy), ADENE (Portugal) & ICTAF (Israel)

- Duration:

  April 2003 to May 2004

- Main activity: information exchange with the SB Mediterranean countries:

  Egypt, PNA, Lebanon, Morocco, Algeria, Tunisia & Jordan

Promoting the Mediterranean cooperation for new energy technologies

- Project tasks:
  - Establishment of a Mediterranean Web site & Discussion Area
  - Operation of a Mediterranean Energy Information Database on the Internet
  - Electronic publications and informational documents
  - Organization of information dissemination event

Establishment of a Mediterranean Web-site and Discussion Area

A Comprehensive Web – site that includes:

- A Discussion Forum
- News – announcement area
- The Mediterranean Energy Information Database
- Country profiles with energy statistical data, national policy documents & case studies
- Publications – electronic bulletin area
- Related Links
- Web-site: www.cres.gr/mednet

Operation of a Mediterranean Energy Information Database on the Internet & preparation of electronic material

- The Database contains information for:

  Country energy profiles, Energy investment projects, Key organizations, Programs and National Measures

- Electronic material
  - National energy policy documents
  - Information document for financial aspects of energy technology realization
  - Case studies
  - 3 e-bulletins (8 page) in English and French with news and events for the Non-EU Mediterranean countries
- Organization of information dissemination event

OPET Network — Puts You In Touch With Innovative Energy Technologies

European Commission

CO-OPET
Support initiative for the Organisations for Promotion of Energy and Transport Technologies

Work package no. 7:
Water and Power co-generation in the Mediterranean islands and coastal areas

Seawater desalination exploiting waste heat from local diesel power plants

Alex Sorokin

FAST – 20121 Milano P.le Morandi, 2
Tel +39 02 76015672 – www.fast.mi.it

FAST – Federazione delle Associazioni Scientifiche e Tecniche, Milano

WP 7 - Objectives

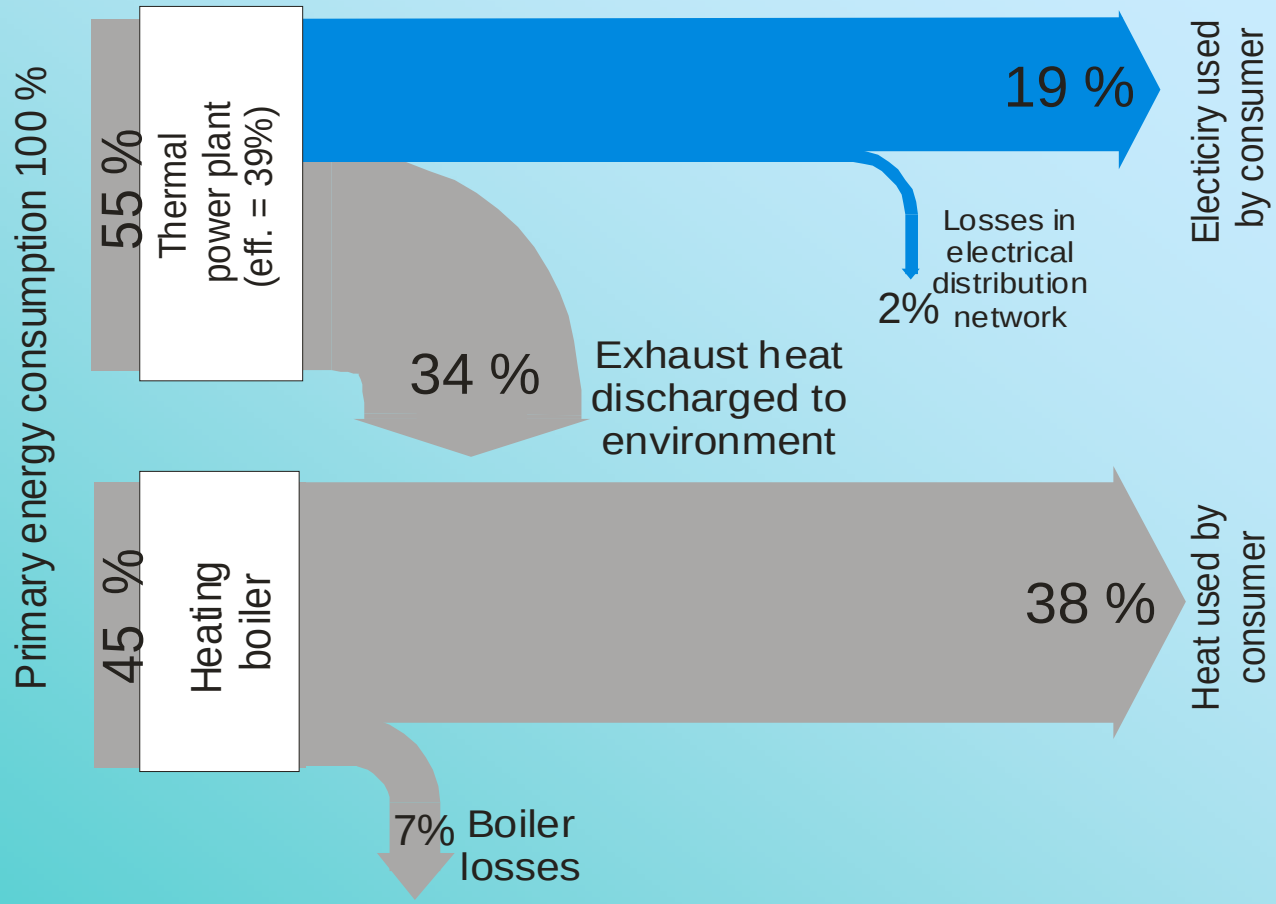
- Human communities living in hot and arid areas, or on islands in the sea, usually are in bad need for both water and power.
- Combined Heat and Power generation (CHP) is usually not easily feasible in hot climates since there is no sufficient heat demand.
- So why not produce instead water and power by exploiting the otherwise wasted exhaust heat (or waste heat) from thermal power plants to drive thermal seawater desalination (distillation) systems?
- In large-scale applications in Saudi Arabia and in the Arab Gulf Emirates, this is a common and well proven practice.
- The aim of the Work Package is to promote the use of such technologies in small-scale stationary applications on islands not connected with the main electricity network of the country.

Separate Power and Heat production

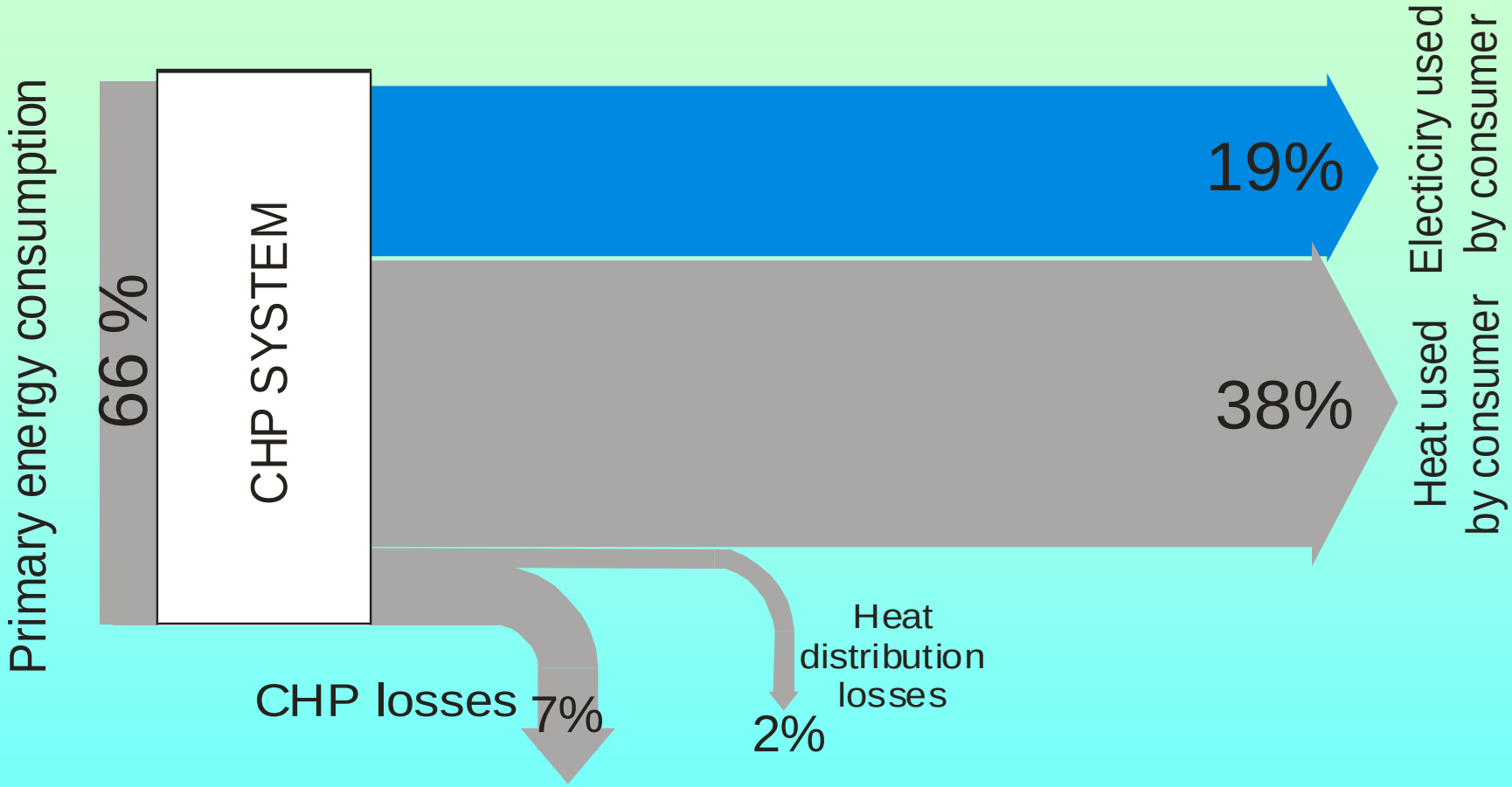
What we usually do:

Produce electricity in large power plants

Produce Heat in our domestic boilers



Combined Heat and Power (CHP) generation



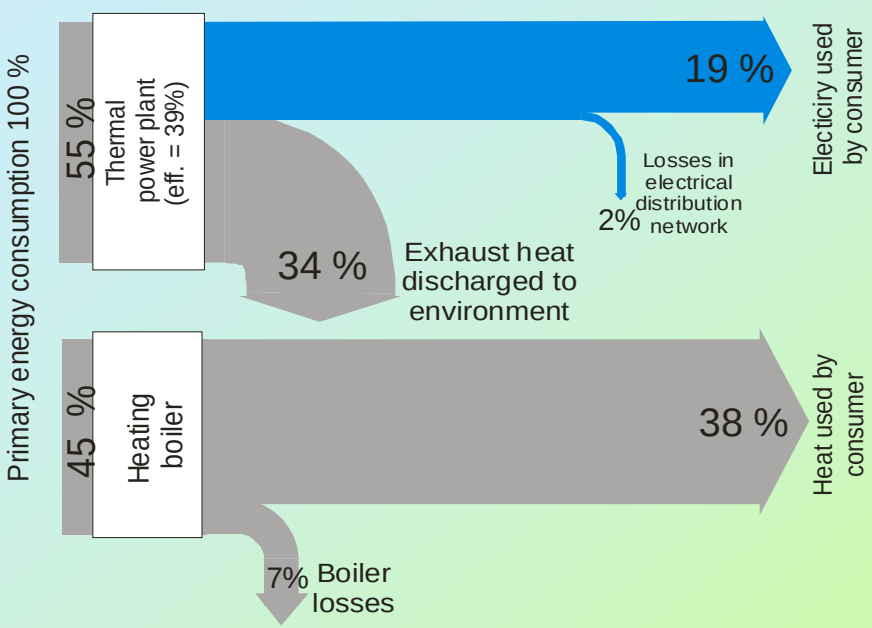
Primary energy source saving: 30-35%

(in comparison to separate generation, maintaining same final energy uses)

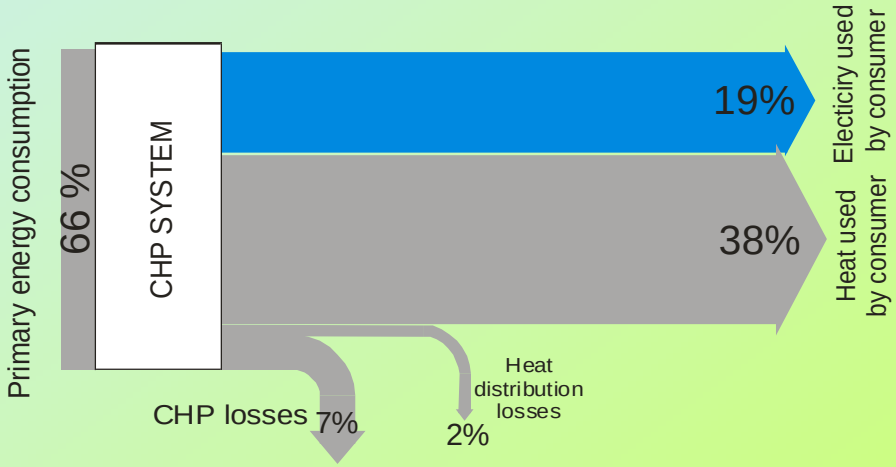
FAST – Federazione delle Associazioni Scientifiche e Tecniche, Milano

Comparison:

separate Power and Heat



CHP

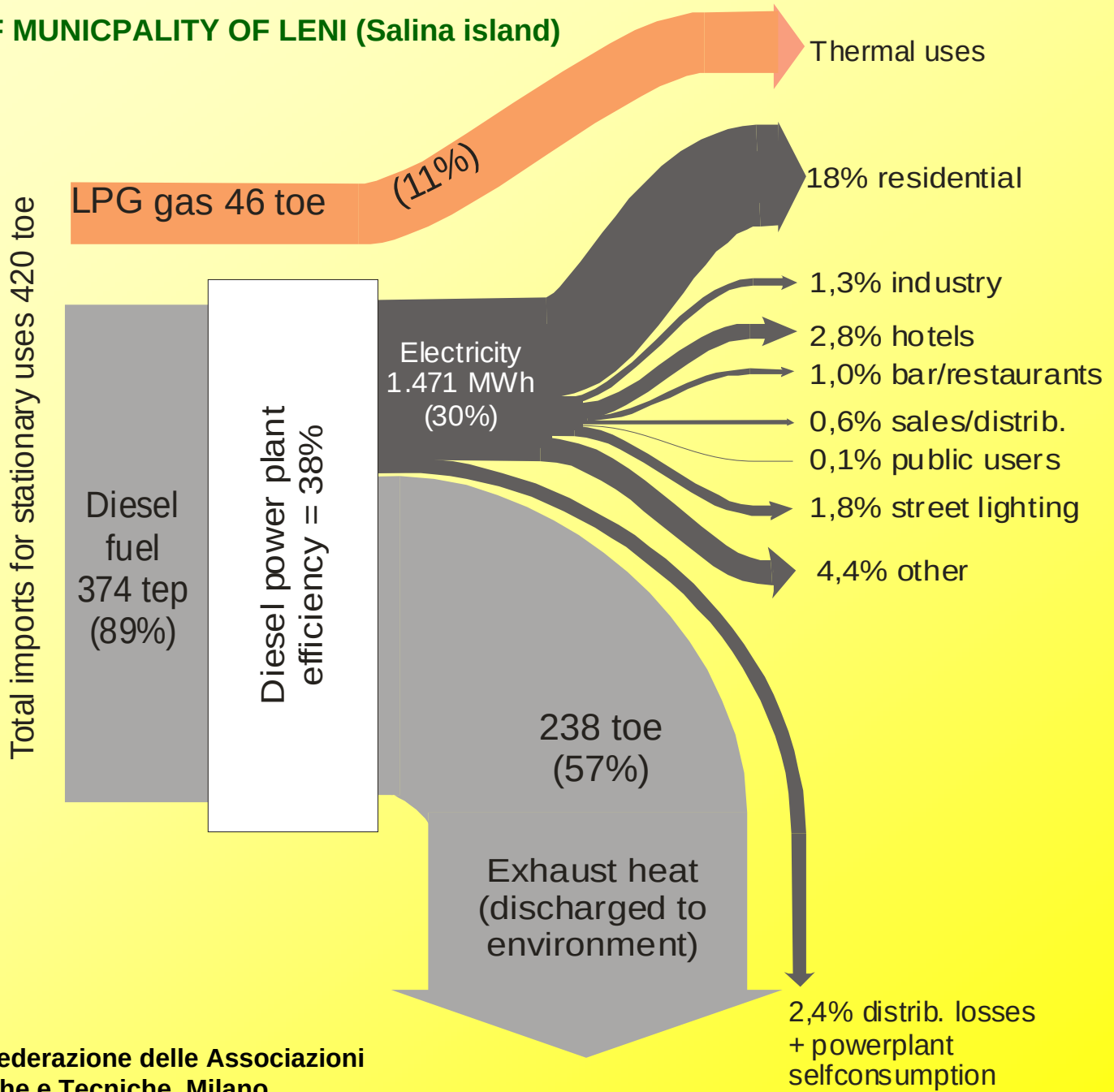


Primary energy source saving: 30-35%

(maintaining same final energy uses)

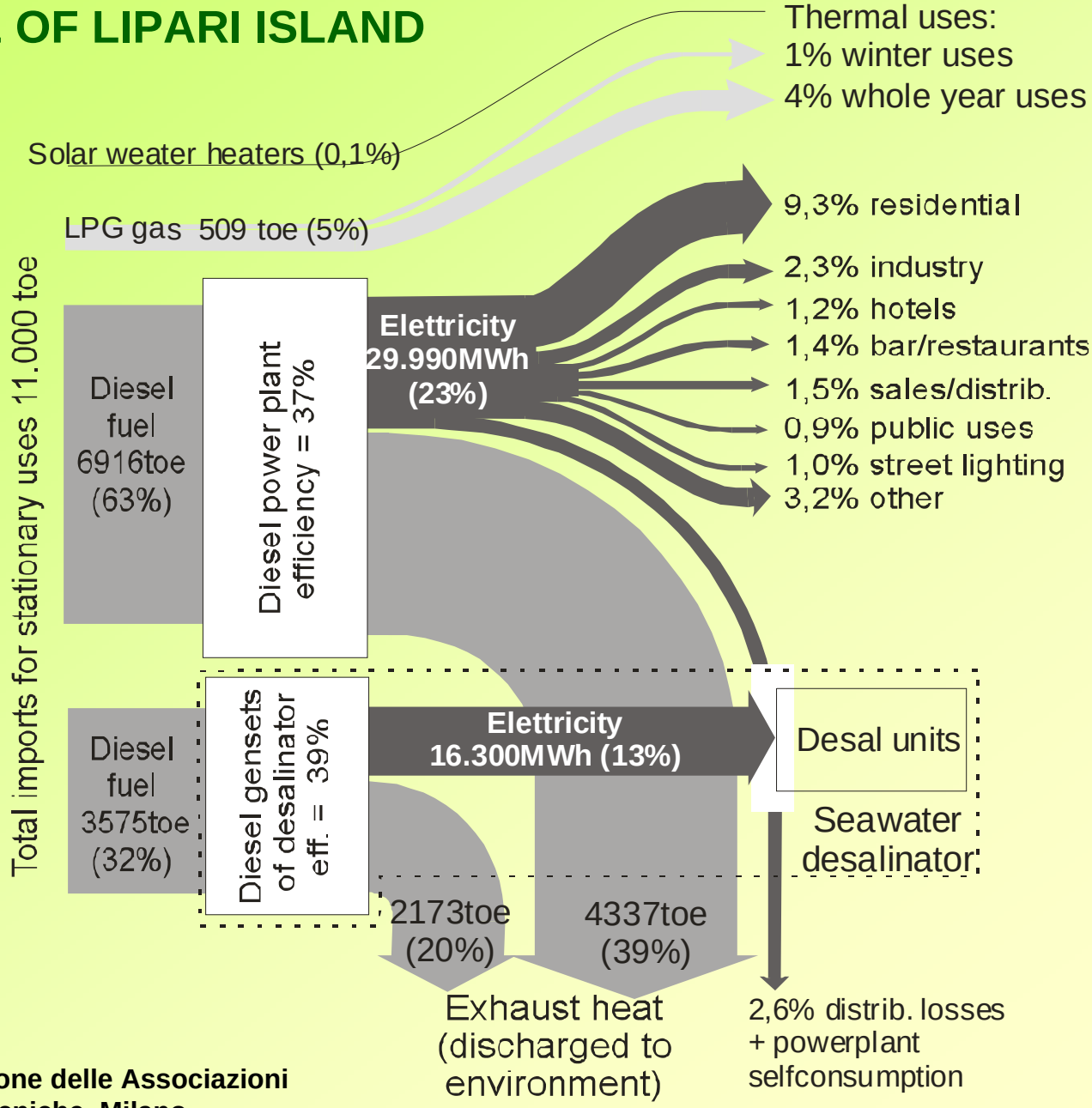
ENERGY BALANCE OF MUNICPALITY OF LENI (Salina island)
(650 inhabitants)

(excluding transports)
(percentages related to imports of primary energy source)



ENERGY BALANCE OF LIPARI ISLAND (Sicily) Year 2000 (9.000 inhabitants)

(excluding transports) (percentages related to imports of primary energy source)

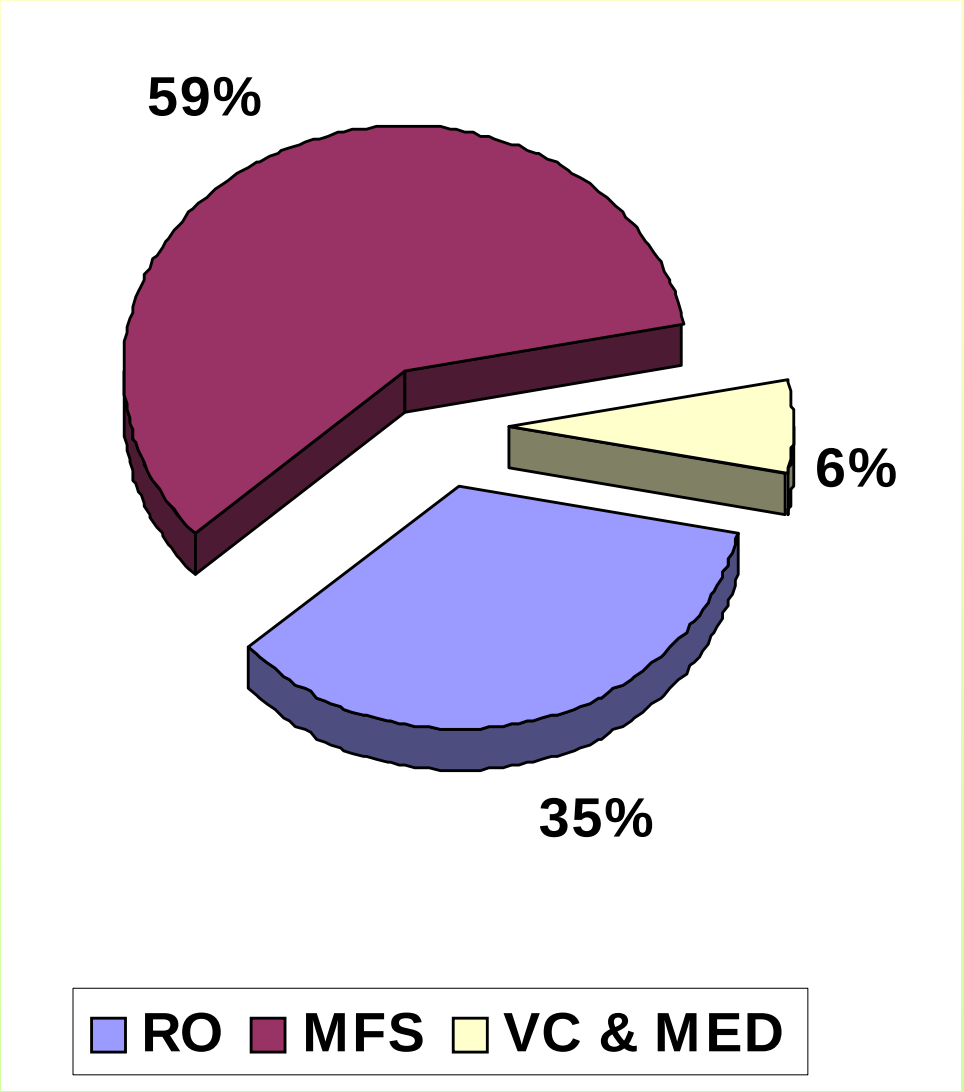


FAST – Federazione delle Associazioni Scientifiche e Tecniche, Milano

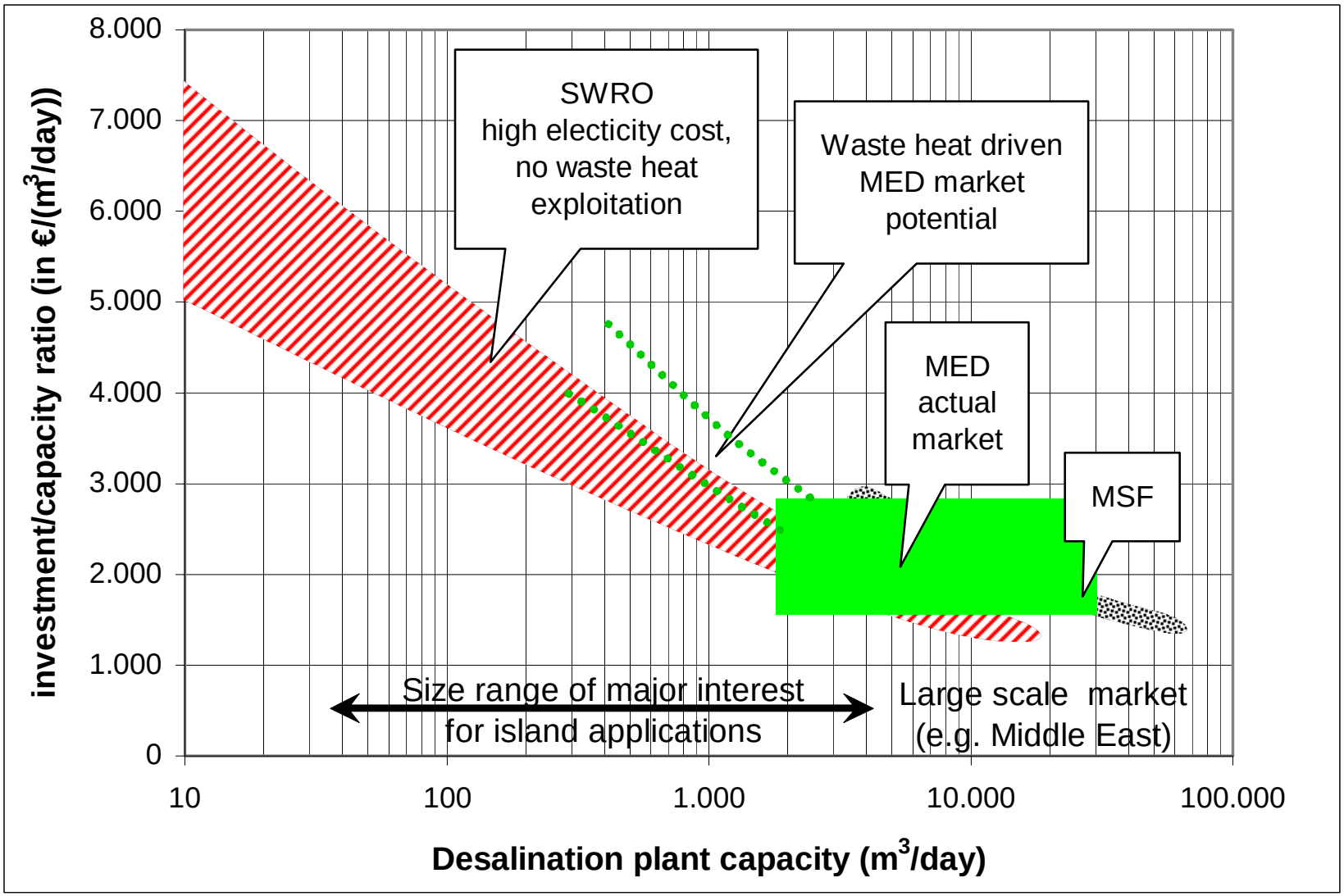
Investigated desalination technologies

Process			Sea-water	Maintenance requirements	Size range per production unit (m^3/day)	
					min	max
Membrane processes	Electrodialysis Reversal	EDR	**NO**	↗	0	30.000
	Brackish Water Reverse Osmosis	BWRO	**NO**	↗	0	10.000
	Seawater Reverse Osmosis	SWRO	yes	↗	0	10.000
Thermal processes	Multiple Effect Distillation	MED	yes	↘	2.000	20.000
	Multiple Effect Distillation with thermo-compression	MED-TC	yes	↘	2.000	20.000
	Multiple Stage Flash - Brine recirculation	MSF-BR	yes	↘	4.000	75.000
	Mechanical Vapour Compression (all electric)	MVC	yes	↘	100	3.000

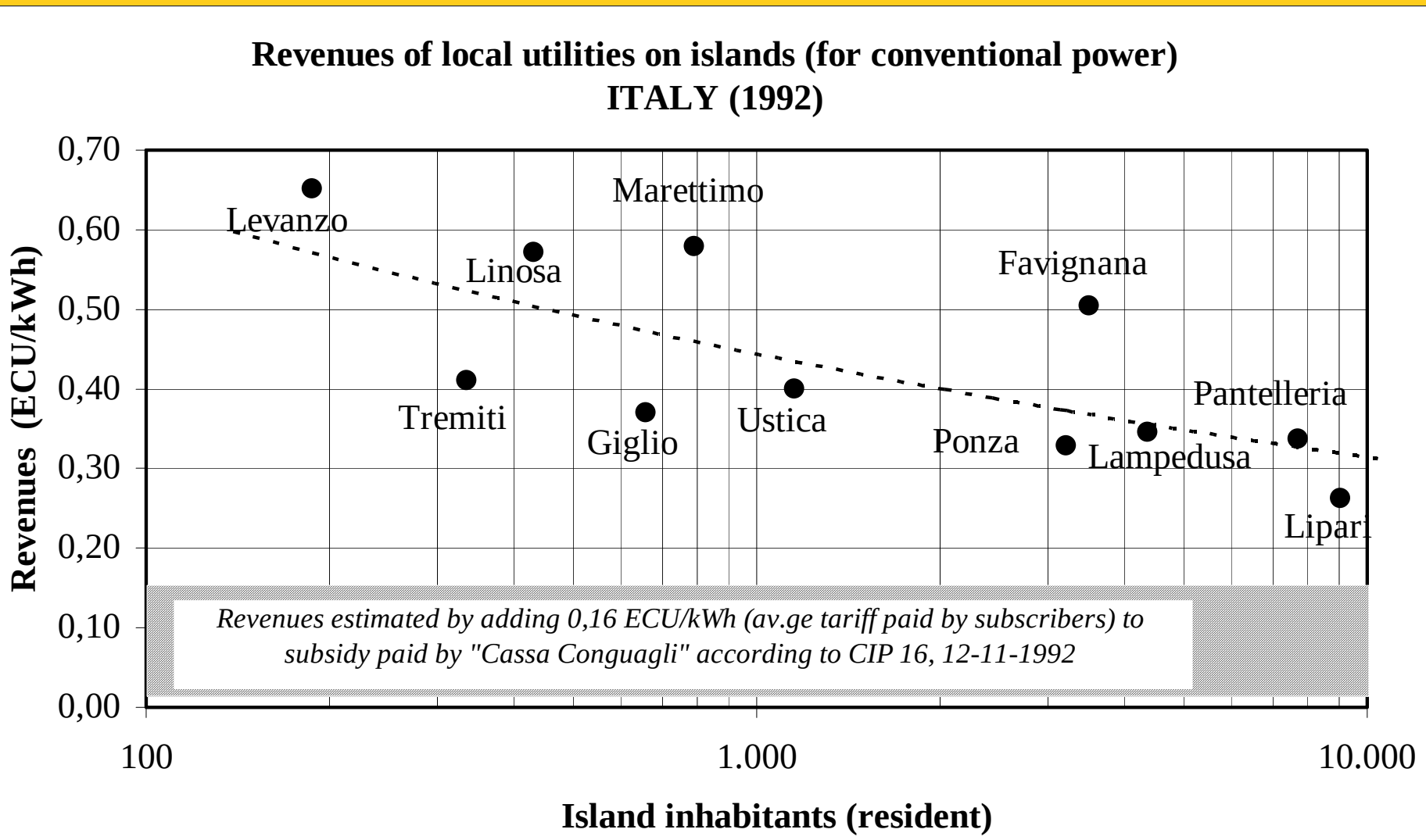
World market shares of desalination technologies



Typical specific investment costs of desalination technologies

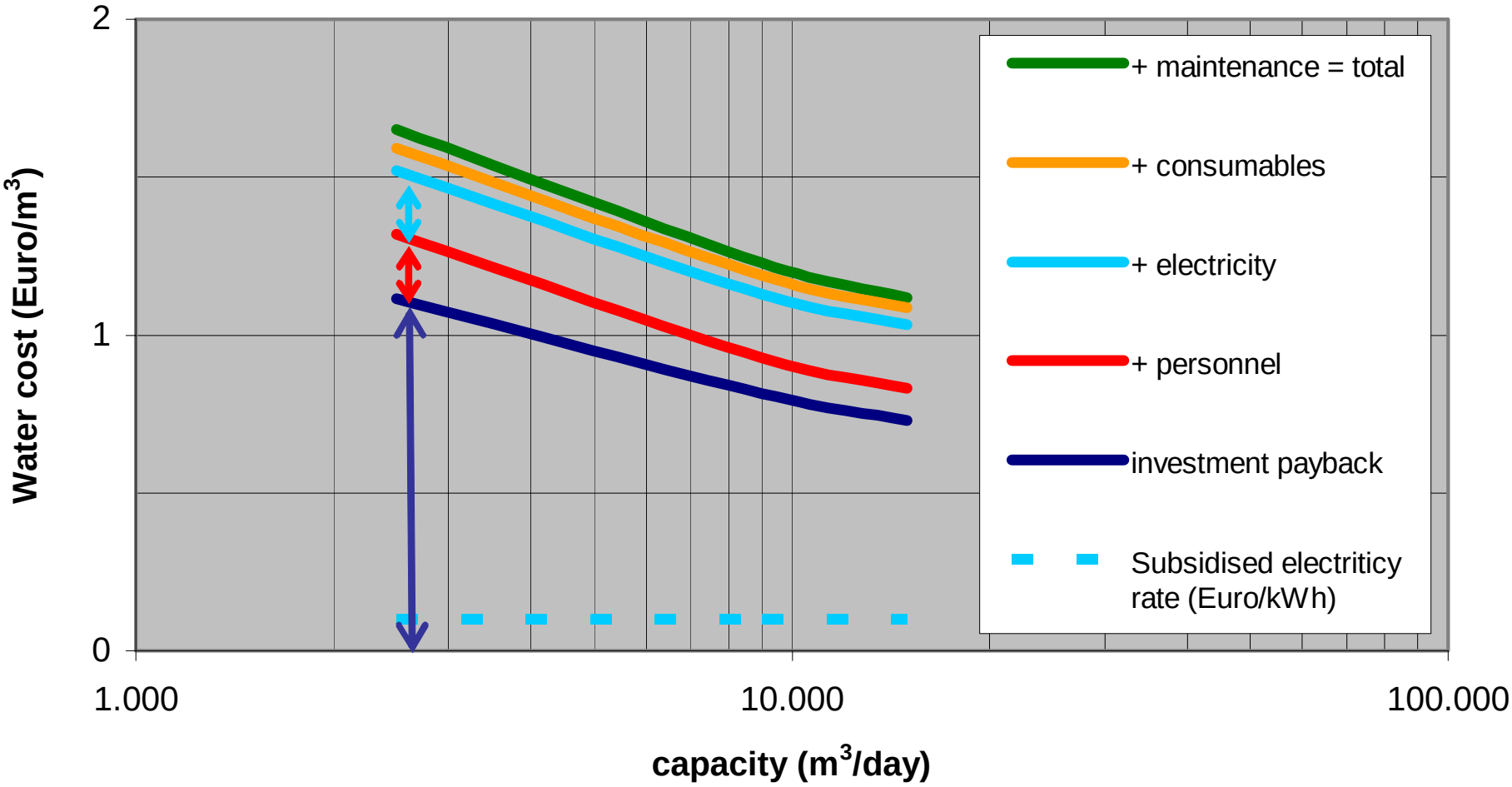


Note: each 1 m^3/day satisfies the potable water needs of 3-5 inhabitants (Europe)



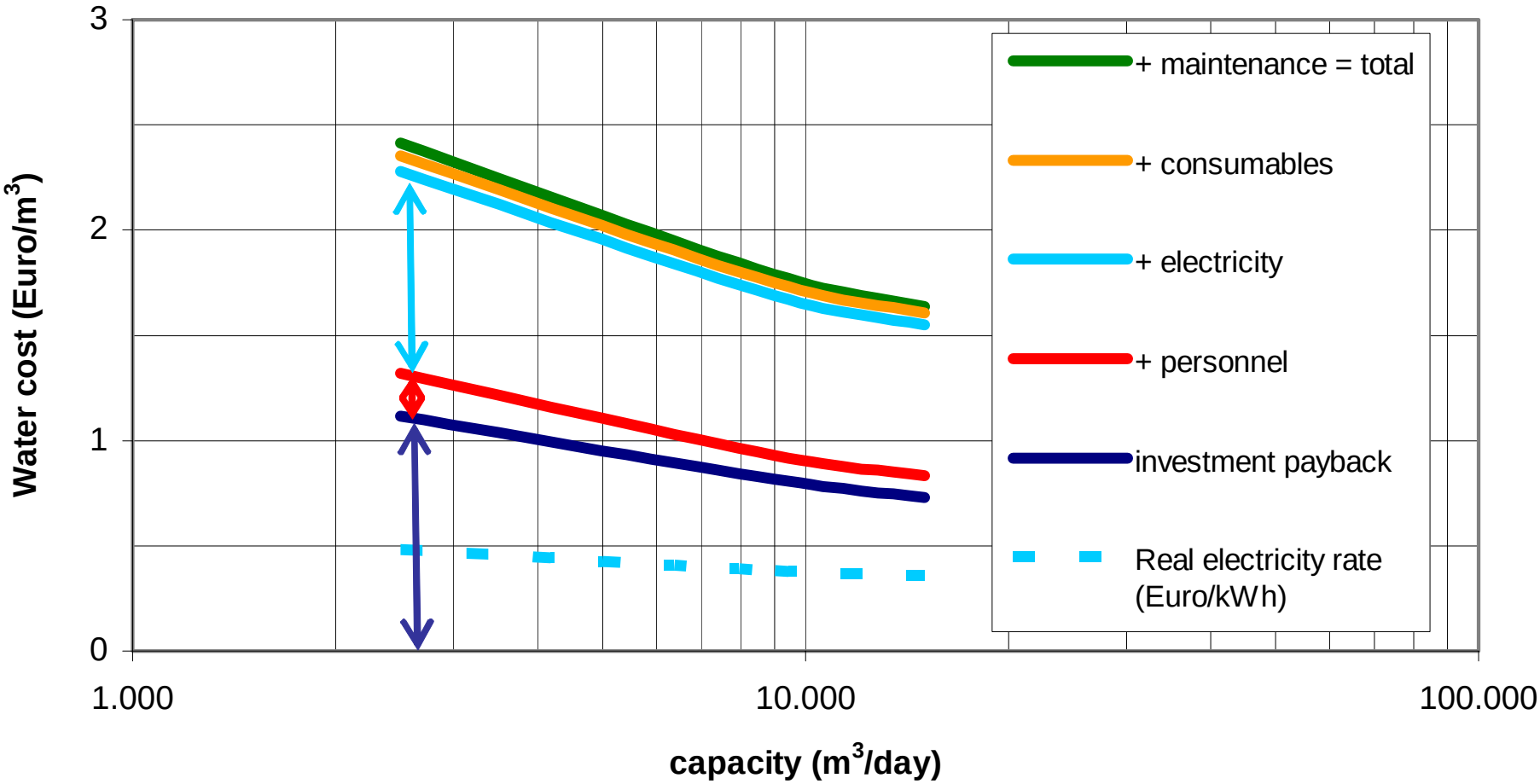
Source: Final report "Renewable Energies on Mediterranean Islands", EC DG XII - APAS - RENA CT94-004 (1996)

MED + COGEN – Waste heat driven MED - Typical cost structure of produced water considering a subsidised electricity tariff of 0,10Euro/kWh



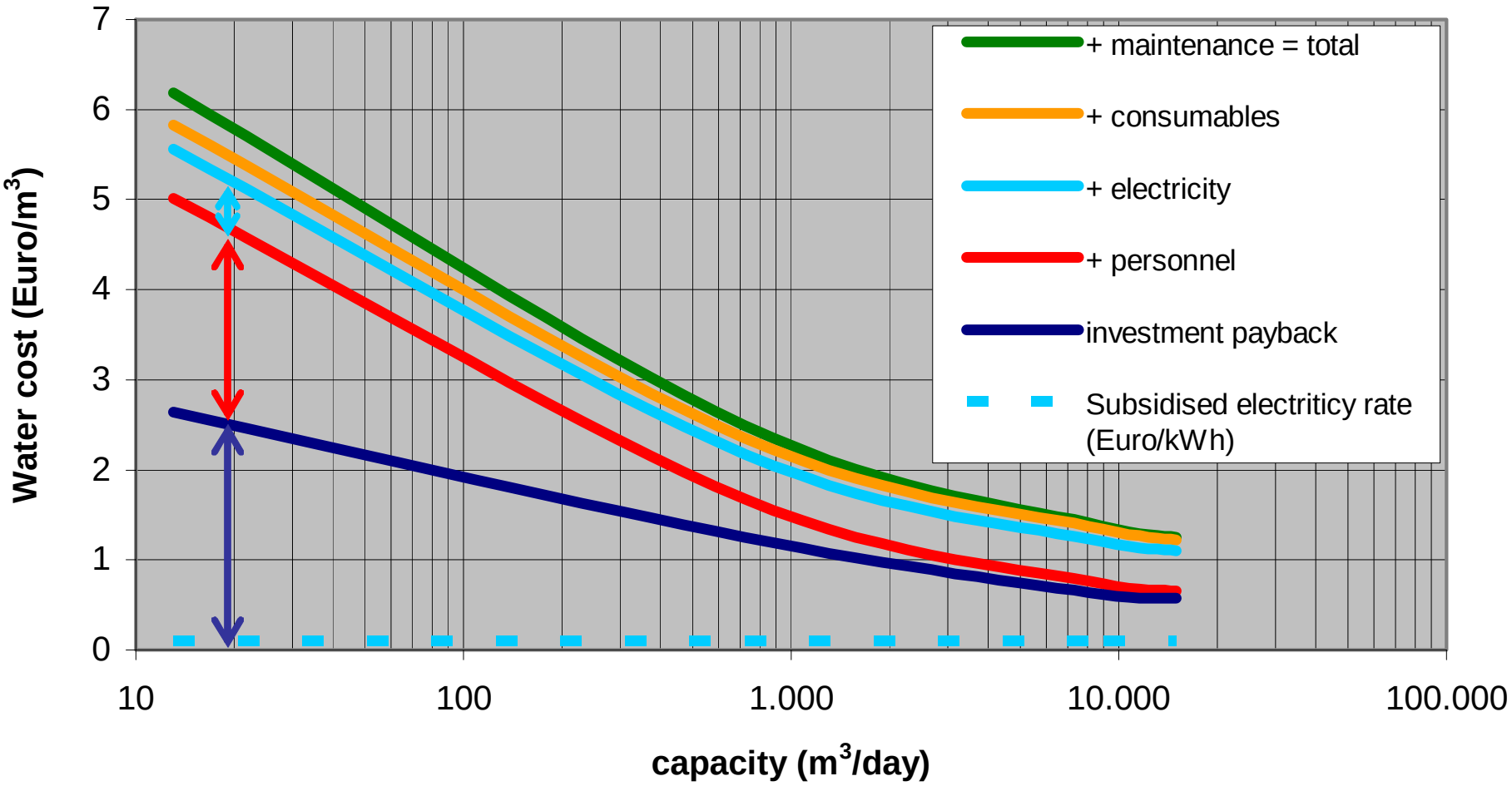
Note: each 1m3/day satisfies the water needs of 3-5 inhabitants (Europe)

MED + COGEN – Waste heat driven MED - Typical cost structure of produced water considering the real cost of electricity on small islands



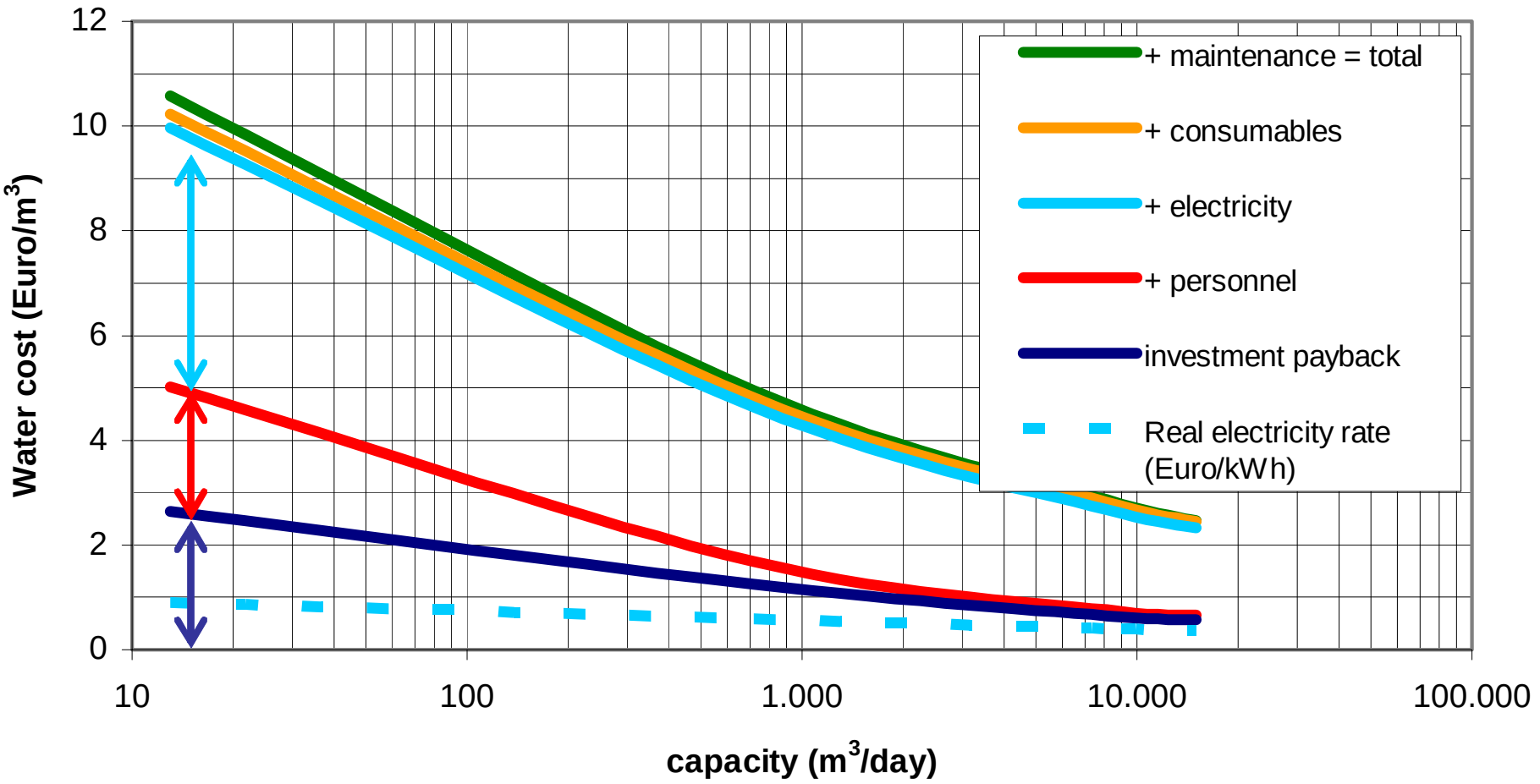
Note: each 1m3/day satisfies the water needs of 3-5 inhabitants (Europe)

SWRO – Typical cost structure of produced water considering a subsidised electricity tariff of 0,10Euro/kWh



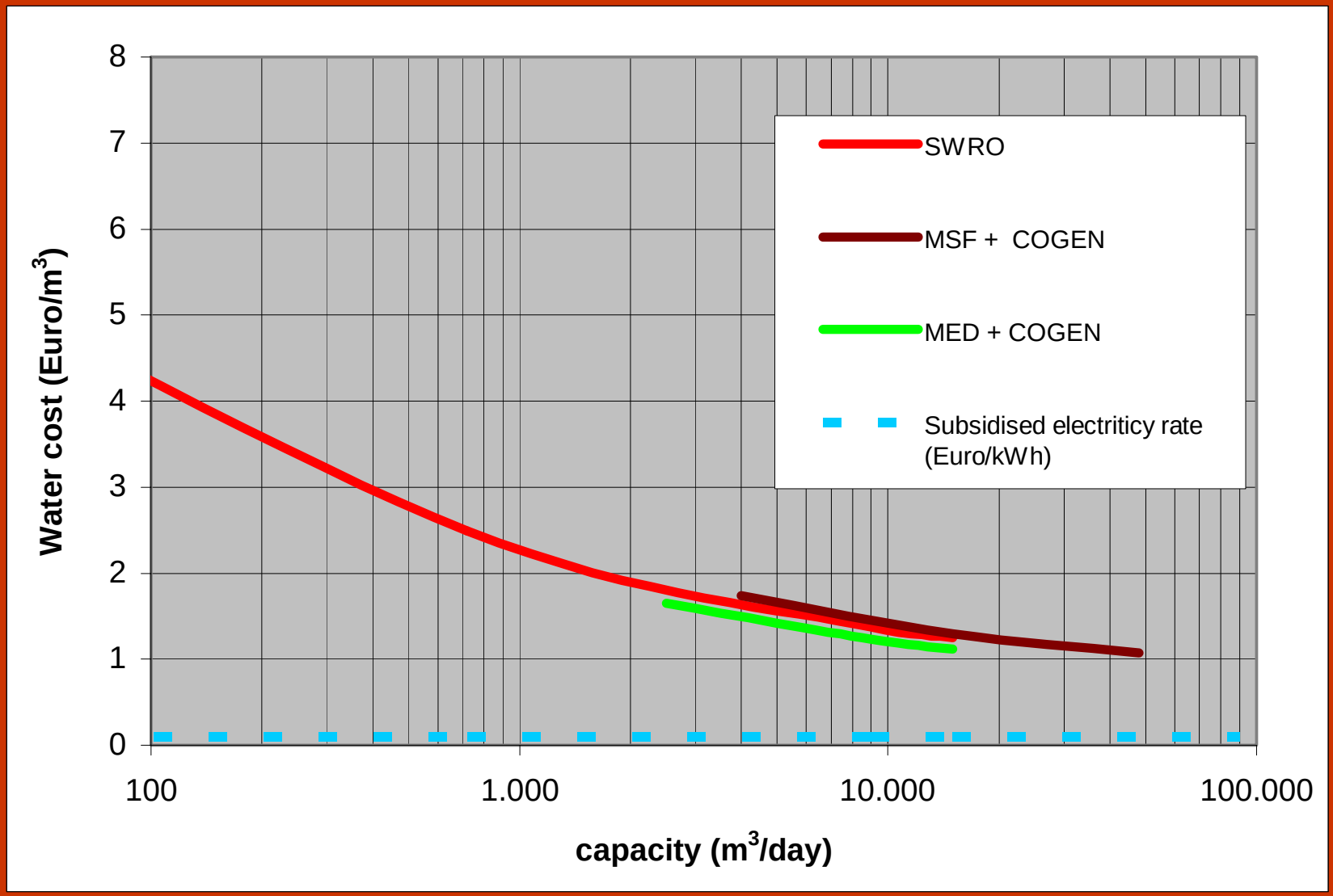
Note: each 1m3/day satisfies the water needs of 3-5 inhabitants (Europe)

SWRO – Typical cost structure of produced water considering the real cost of electricity on small islands



Note: each 1m3/day satisfies the water needs of 3-5 inhabitants (Europe)

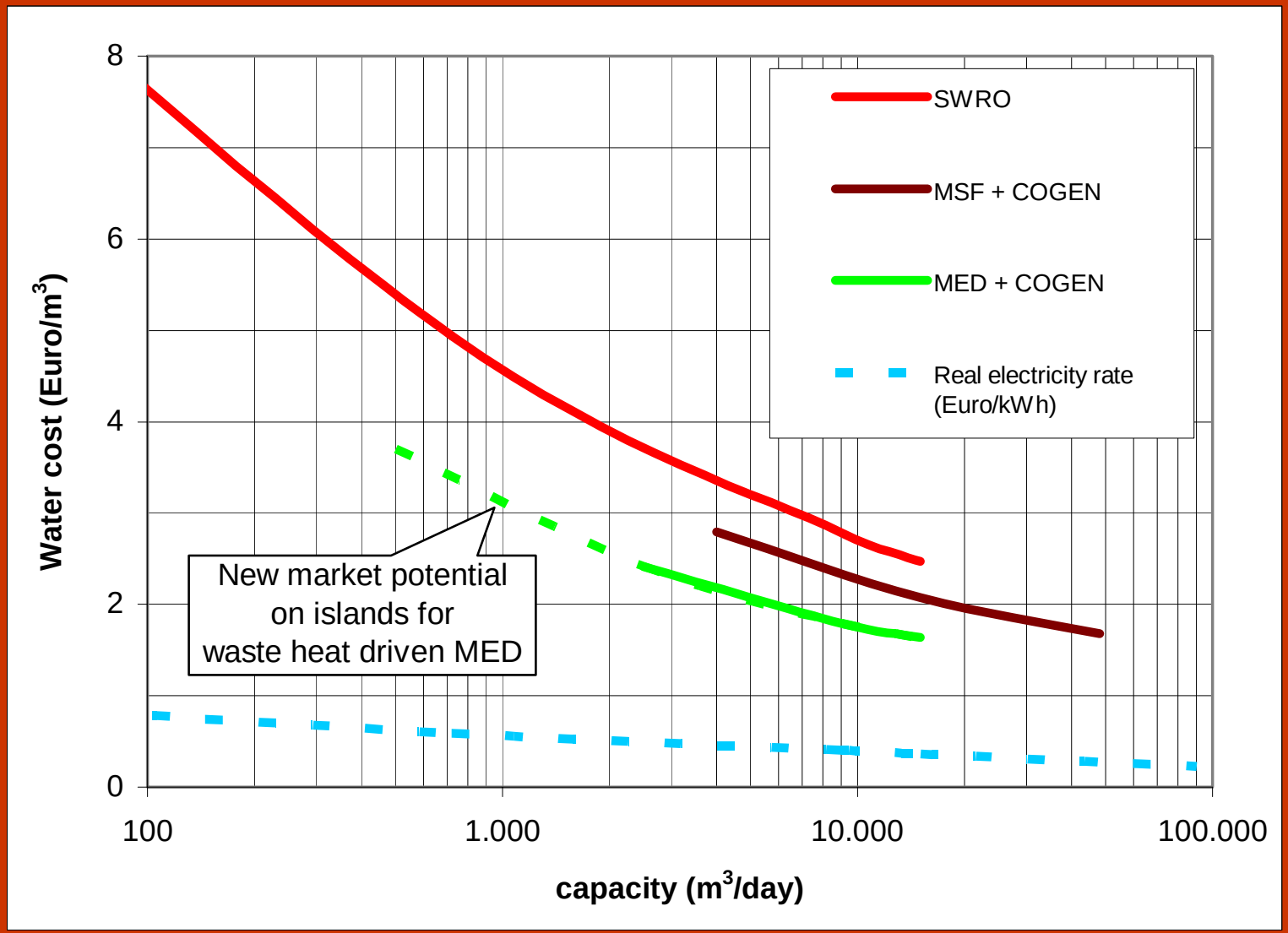
Comparison between overall costs of produced water considering a subsidised electricity tariff of 0,10Euro/kWh



Note: each 1m3/day satisfies the water needs of 3-5 inhabitants (Europe)

FAST – Federazione delle Associazioni Scientifiche e Tecniche, Milano

Comparison between overall costs of produced water considering the real cost of electricity on small islands



Note: each 1m3/day satisfies the water needs of 3-5 inhabitants (Europe)

FAST – Federazione delle Associazioni Scientifiche e Tecniche, Milano

Conclusions

- Thermal desalinations systems exploiting waste heat from a power plant are common for large scale applications in the middle east
- On italian islands there are some few inefficient MVC desalination systems using electricity, or else, like in Greece, only SWRO systems
- On islands there are no thermal desalination system using waste heat

Why are there no plants on islands ?

- Exploiting waste heat for seawater desalination produces marked advantages in terms of:
  - Energy efficiency and overall saved energy
  - Overall economics (at macro scale)
- So why is this mature and commercial technology not applied on islands?
- The answers lies in the difference between macro-economy and micro-economy

Subsidised consumer tariffs for electricity and water end-up to become an **Environmentally Harmful Subsidy**

Definition of subsidy:

"any measure that keeps prices for consumers below market levels, or for producers above market levels"

Consequence: Inefficient allocation of public spending (money of taxpayers / consumers)

The issue is NOT to eliminate subsidised consumer tariffs on islands. The question is how to open subsidy mechanisms to allow for

innovation and fair competition

MedNet – CO OPET
New jobs in the energy efficiency and renewable energy sector

31 March 2004, Hotel Holiday Inn - Athens

New jobs in the energy sector: the role of training

Francesco CIAMPA

ENEA – Unità Agenzia Prog. Città Sostenibile

Technology, training and employment

- ✓ *Innovation produces lost of jobs in the industrial phase while al the beginning of industrialization and in post industrial phase it is a driver for the creation of new jobs*
- ✓*Italian cases : boilers' efficiency verification solar thermal plants construction*
- ✓*Problem : a market exists but operators are lacking*
- ✓*Solution may be training and promote employment of new professionals*

BARRIERS TO PENETRATION OF TECHNOLOGY INTO MARKET

- ✓ *expensive or not demonstrated technology (H2 cells – PV)*
- ✓ *legislative problems*
- ✓ *heavy authorization process (mini-hydro)*
- ✓ *economic and financial problems (building envelopes)*
- ✓ *socio-economic and cultural problem (solar thermal)*

1 BIOMASS: fuel STRUCTURAL SOLUTION

2 SOLAR THERMAL: scarce technical ability and competition with gas promotion campaign

Solution – Training campaign for solar plant installation

THE ITALIAN CASE OF BOILERS INSPECTORS

OBSTACLES AND PROBLEMS

- ✓ *LACK OF LEGISLATION (L 10/91- Energy efficiency decrees)*
- ✓ *COMPETITION WITH GAS DISTRIBUTION CAMPAIGN*
- ✓ *CULTURAL AND SOCIOECONOMIC PROBLEMS*

BOILERS ENERGY EFFICIENCY: boilers' inspectors

EFFICIENT ENERGY USE: energy manager

THERMAL PLANT DESIGN: high cost of control

ENERGY EFFICIENCY MEASURES: energy broker

Solution: New profession, training, promotion

3 TOOLS FOR JOB CREATION

1. *PUBLICATION ON NEW PROFESSIONS IN EUROPE*

   "DESCRIPTION OF NEW JOBS IN THE FIELD OF RENEWABLE ENERGY AND RATIONAL USE OF ENERGY " – 23 new professions in GREECE FRANCE, ITALY AND GERMANY

2. *A COLLECTION OF TRAINING COURSES IN EUROPE*

   "COURSES AND TRAININGS IN EUROPE in the field of Sustainable Energy" - 130 opportunity in 15 countries

3. *JOB BURSARY - http://ressources.cler.org/jobs*

- ✓ *CLER – http://www.cler.org/predac*
- ✓ *IDEC – http://www.IDEC.GR*
- ✓ *FIRE – http://www.fire-italia.it*

Conclusions

STRATEGY FOR NEW JOB CREATION

1. **IDENTIFY NEW PROFESSION**
2. **IDENTIFY HOST STRUCURES**
3. **PREPARE TRAINING COURSES**
4. **CONTRACT WITH HOST STRUCTURES**
5. **TRAINING and EMPLOYMENT**

This could be a hint for new proposals

THANKS FOR YOUR ATTENTION

Mednet Conference:

"*Possibilities for Co-operation in the Field of Innovative Energy Technologies in the Mediterranean Basin*"

Financial Instruments for project financing

Manuel Sáinz Andrés

Athens, March 31st 2004

MINISTERIO DE ECONOMÍA
IDAE Instituto para la Diversificación y Ahorro de la Energía

Introduction

- Many financial institutions
- Many programmes for project financing
- Financial costs very affordable
- But still many difficulties
- Two very interesting financing systems:
  - TPF
  - CDM

Two excellent instruments:

- Third Party Financing (TPF)
- Clean Development Mechanism (CDM)

THIRD PARTY FINANCING (TPF)

Contents

(1) Problems addressed
(2) Origin and development
(3) Description
(4) Process
(5) Advantages
(6) Similar Instruments

Third Party Financing

Problems addressed

- High initial capital outlay requirements
- Lack of understanding of energy issues by financial intermediaries
- Lack of familiarity of investors with energy technologies
- Need of a reliable company to trust in

Third Party Financing

Origin and development

- Born in the *US* in the eighties
- Adopted in Spain by *IDAE since 1987*
- Awarded with the *Grand Prize* in the Campaign for Take off in January 2004

MINISTERIO DE ECONOMÍA

IDAE Instituto para la Diversificación y Ahorro de la Energía

Third Party Financing

Description (1/3)

Main idea: Investment undertaken by a third person (IDAE) with is not the user

Business : sell of services

Payment: power generated or savings achieved

Management: Joint implementation by IDAE and the user until the investment is recouped

Third Party Financing

Description (2/3)

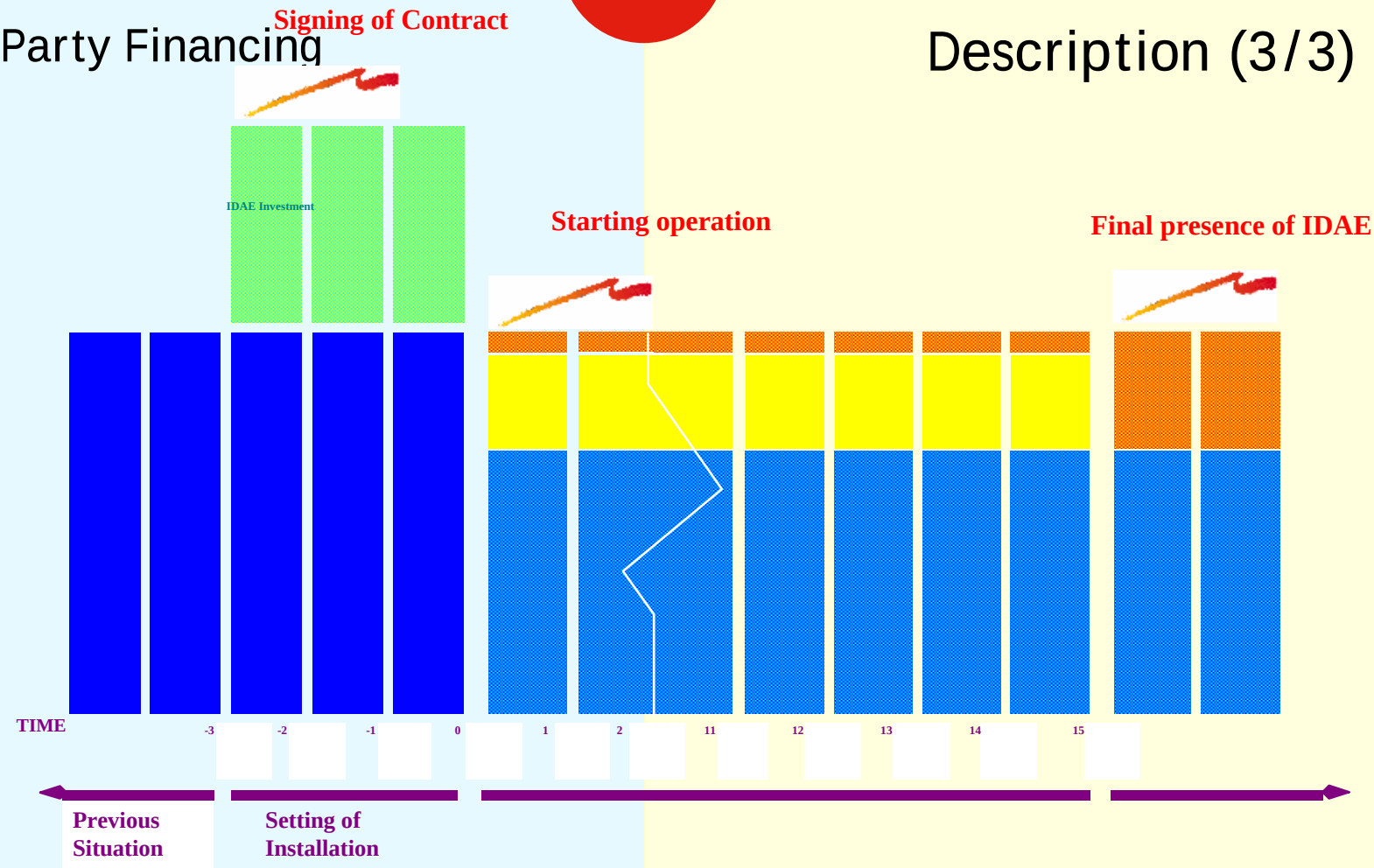
- IDAE participates in the definition of the project and afterwards, purchases, supplies and installs the equipment as agreed with the final user

- The investments, including its profits, are recovered by the savings produced or the generated energy, in a conditioned way and proportional to the same ones

- After the agreed period of permanency, IDAE retrieves from the investment and the industrialist becomes owner of the equipment

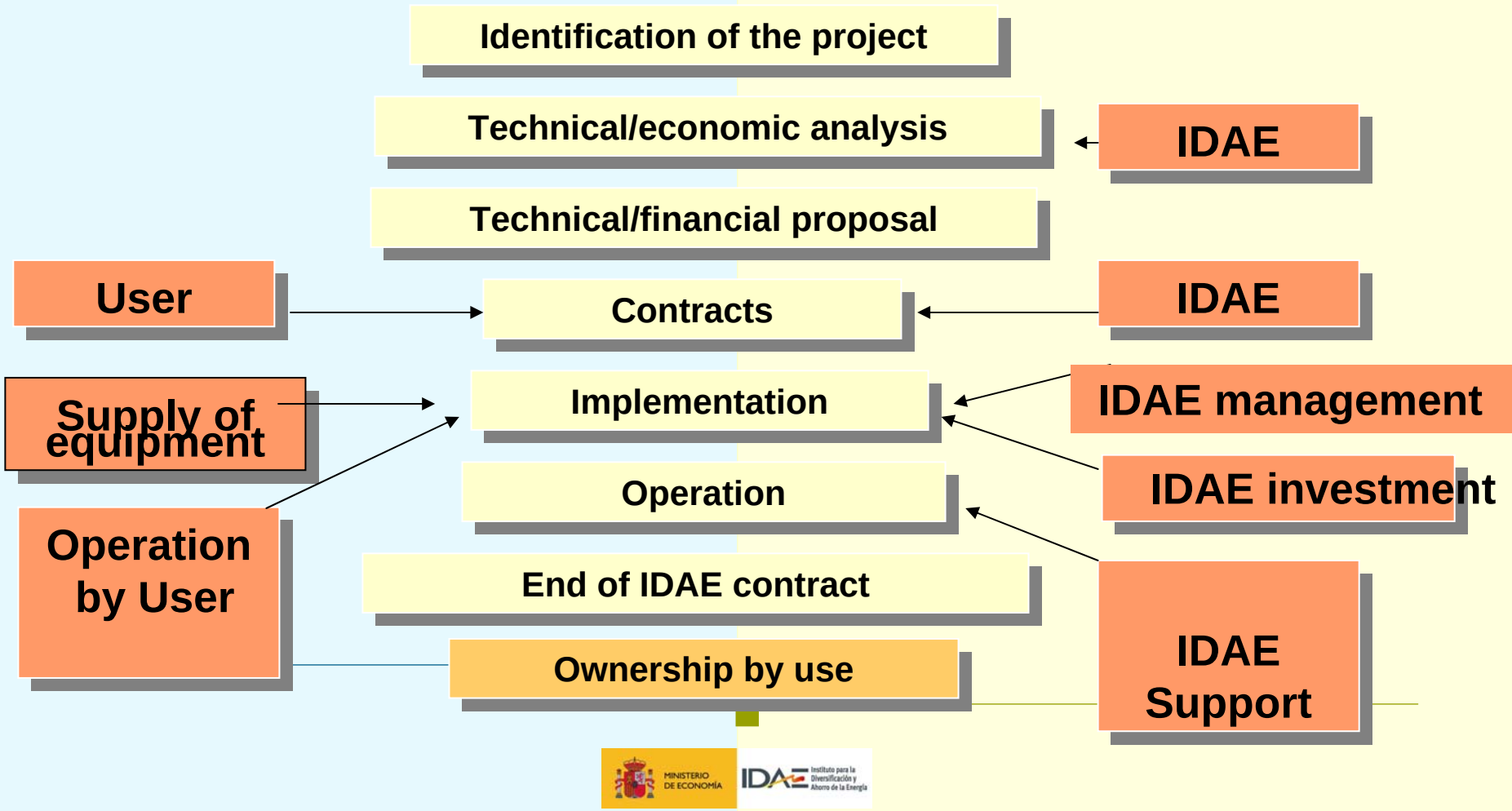
Third Party Financing

Description (3/3)



Third Party Financing

Process



Third Party Financing

Advantages

- Suitable for projects with high levels of investment and long amortisation times
- Associated with technical consultancy from IDAE
- Access to new technologies without increasing risks

Technological and financial risks born by IDAE

Third Party Financing

Similar instruments

- Temporary Company Union
- Shareholdings
- Economic Interest Group
- Participation accounts

Risks are shared

MINISTERIO DE ECONOMÍA

IDAE Instituto para la Diversificación y Ahorro de la Energía

CLEAN DEVELOPMENT MECHANISM (CDM)

Contents:

(1) The Kyoto Protocol

(2) Benefits

(3) Potential of a CDM market

(4) Conclusions

The Kyoto Protocol (1/3)
Main contents

- Approved in 1997 in the framework of the United Nations, the protocol aims to reduce the global level of greenhouse gases emissions.
- The protocol implies control obligations of gas emissions only in the most industrialised countries.
- The European Union has shown its compromise with the protocol with a global reduction of the emissions of 8% in relation to the level of 1990. However some countries are allowed to increase its emissions(i.e Spain increase up to 15%)

The Kyoto Protocol (2/3) Consequences

Ways of reducing of emissions in an industrialised country:

- Reducing the industrial activity
- Implementing energy efficiency measures
- Replacing the conventional energies by renewable energies
- Increasing the forests and other areas of vegetation

All these measures have a very high cost.

For this reason, the **flexibility mechanisms** have been created.

The Kyoto Protocol (3/3)
Flexibility mechanisms

- *Exchange of the emissions* rights between the countries with obligations
- Development of *common projects* between the countries with obligations
- Enforcement of the *clean development mechanism*

Clean Development Mechanism

Benefits (1/2)

- Definition: The CDM is a mechanism according to which one a country with the obligation to reduce emissions can finance an energy project in a developing country and *count the reduction of emissions of greenhouse gases as if it had been realised in its own territory.*

MINISTERIO DE ECONOMÍA

IDAE Instituto para la Diversificación y Ahorro de la Energía

Benefits (2/2)

Advantages of the CDM:

- **For the country with obligations:** some energy projects (RUE or RE) are less expensive in other places than in its own country.
- **For the beneficiary country**: source of financial funds as well as economical and technological co-operation

Clean Development Mechanism

Potential (1/5)
Size of the market

- CDM is a mechanism still hypothetical which is being developed only in a *theoretical way*; there are only few pilot projects.
- The potential of a market related to the CDM is substantial for the countries that have a very high level of emissions and difficulties to reduce it.
- The publication “Point carbon” estimates that in 2005 the size of the market can reach 3,35 million tons of CO2 equivalent

Potential (2/5) Institutions

Institutions that, at present, are financing energy projects related to the CDM:

- **The Prototype Carbon Fund**, of the World Bank, created in 1999
- **The Agency SENTER** of the Dutch government

Operating mode: the institutions *buy the certificates of emissions* reductions related to energy projects of CDM at a fixed price that has been negotiated individually on the basis of the quality of the project

Clean Development Mechanism

Potential (3/5)
Sectors

Negotiated price: 3 - 5 dollars/ ton of CO_2 reduced

Types of project financed by the PCF and by SENTER:

Particularly the projects of renewable energy sources, but the agencies are willing to diversify it in the future. In 2002, the PCF dedicated 107 million dollars to the CDM projects:

- 18% for wind energy
- 25% for waste management
- 17% for biomass
- 17% for mini hydraulic
- 17% for energy efficiency.

MINISTERIO DE ECONOMÍA

IDAE Instituto para la Diversificación y Ahorro de la Energía

Potential (4/5)
Countries

Geographic repartition of the financed CDM projects:

Specially Latin America and Asia

Only one project in the Mediterranean basin, in Morocco

Conclusion:

Since the Kyoto Protocol has not been yet ratified, and so the CDM is only an hypothetical possibility, only few funds are dedicated to the financing of energy projects, however its potential is important

Potential (5/5) Spain's opportunities

- Installation and operation of **wind farms**
- In the buildings sector, **solar panels** for heating and hot sanitary water production
- Some projects for the **substitution of the traditional furnaces** by highly efficient furnaces working with natural gas or biomass.
- Projects of **cogeneration** or trigeneration

Conclusions (1/2)

- The CDM is a **mechanism with a very high potential**, but there is still **uncertainty** because of the pending ratification of the Kyoto protocol and the existence of some methodology problems
- At present, **the financial funds** dedicated to this instrument are still limited, but there is a positive trend
- The **Mediterranean countries** should adopt a more active attitude towards these mechanisms since they represent an opportunity with few risks and the possibility of important benefits

Conclusions (2/2)

- **Most of the CDM projects** are financed by co-operation organisms related to renewable energy sources. However, in the future, the energy efficiency will occupy a most relevant position
- If the Kyoto protocol is ratified, **Spain will have to use the CDM** to reduce the emissions level. Due to their geographical and cultural proximity, the **Mediterranean countries are the most probable partners**. The most probable fields for co-operation are: wind energy, installation of solar panels and cogeneration.

Web Links

- www.idae.es
- http://unfccc.int/
- http://prototypecarbonfund.org/splash.html
- http://www.senter.nl/asp/page.asp?alias=erupt

Greek Solar Thermal Market

Market Development and Tools Awareness, International Trade

ECONOMOU APOSTOLOS
Executive Secretary GSIA

Greek Solar Industry Association

Dimosthenous Str. 267, 17674 Athens, Greece.

Tel. +30210 9416057 Fax 9409119

www.ebhe.gr

Email: info@ebhe.gr

GSIA Members

Est.1979

Calpak

SAMMLER

THERMOHELLAS

FYROGENIS

Calosyra

STEHellas

ΗΛΙΑΚΑ ΣΥΣΤΗΜΑΤΑ ΔΗΜΑΣ

HOWAT

FOCO

ΗΛΙΟΘΕΡΜΟ

MD MELPO

NOBEL XYLINAKIS

MALTEZOS

ΣΗΕ

Intersolar

ROMINA

SIELINE

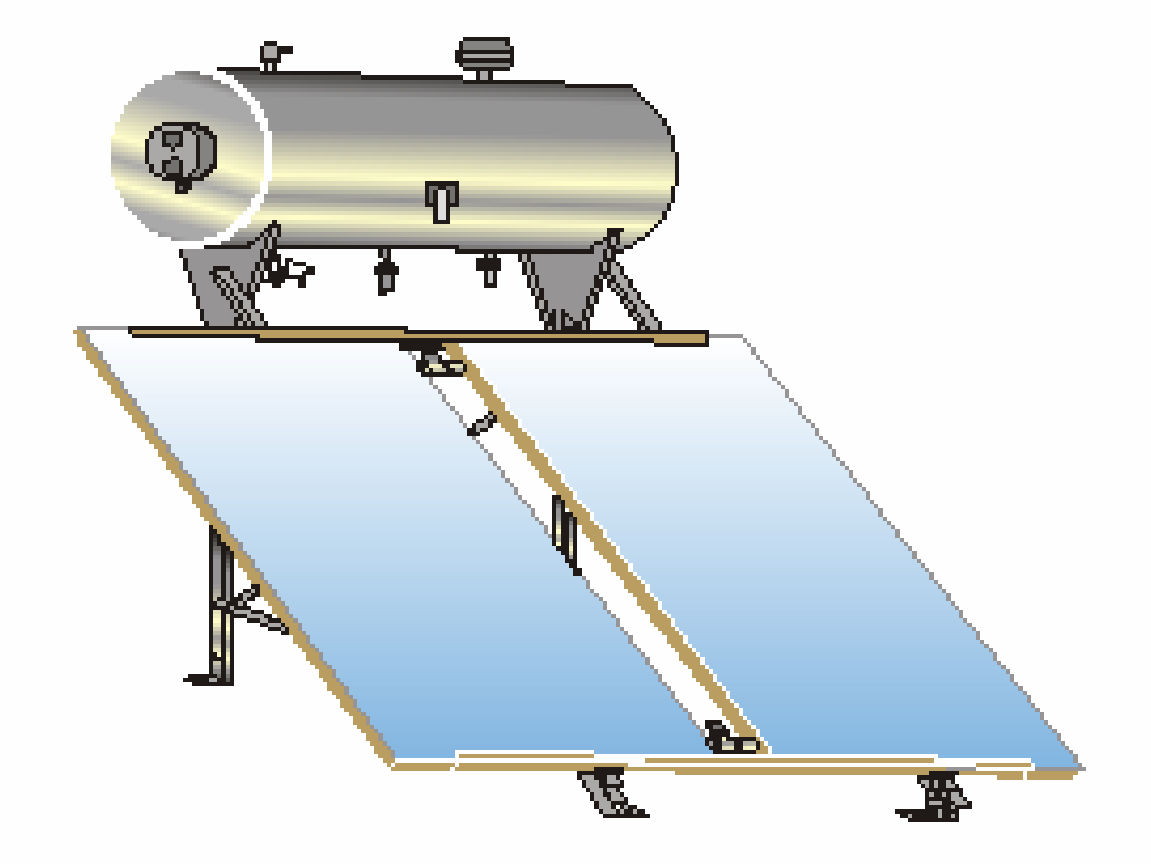
HELIOAKMI

Products in Greece

- Solar water heater Thermosiphonic 95%
  - Private customers
- Central pump systems
  - Mainly professional customers
  - Hot water for hotels (95%), hospitals, etc
  - Process hot water
  - Solar cooling

Domestic Pump System

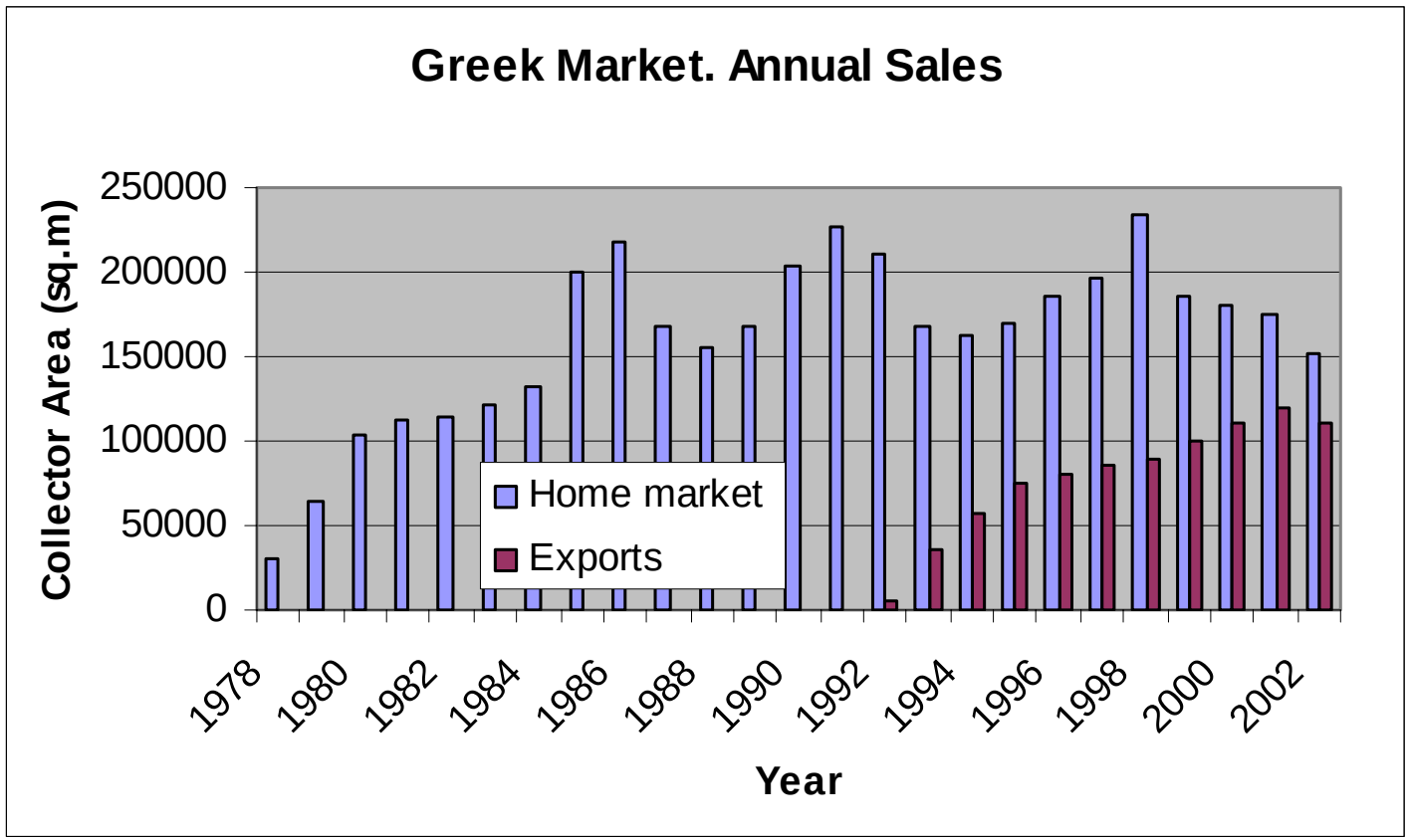
Thermosiphonic Water Heater



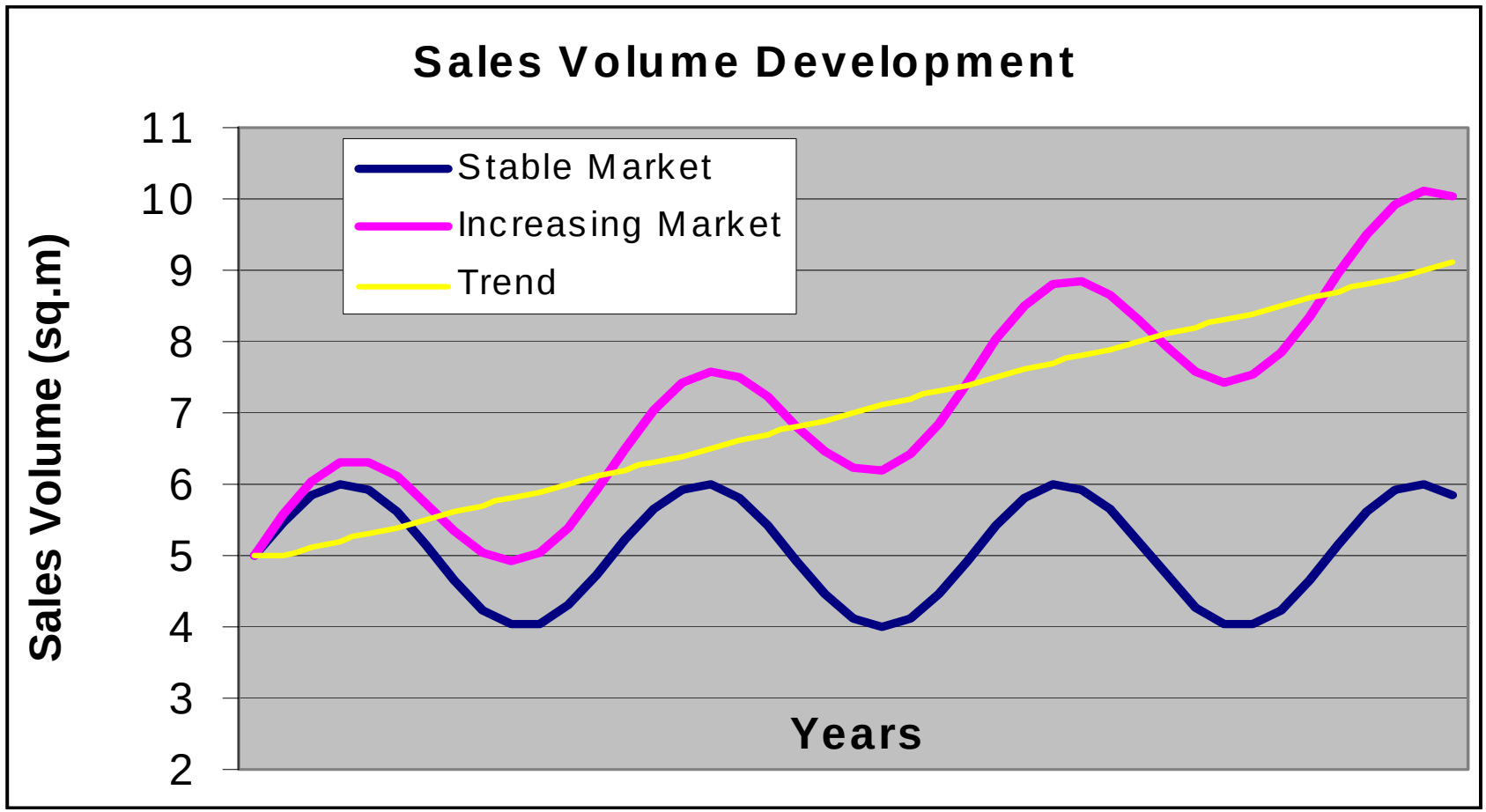
Thermosiphonic Water Heater

- Requires flat roof or integration on roof or acceptance by customer
- Inexpensive installation
- Simple installation
  - No mistakes by installers
  - No negative influence on customers by installers

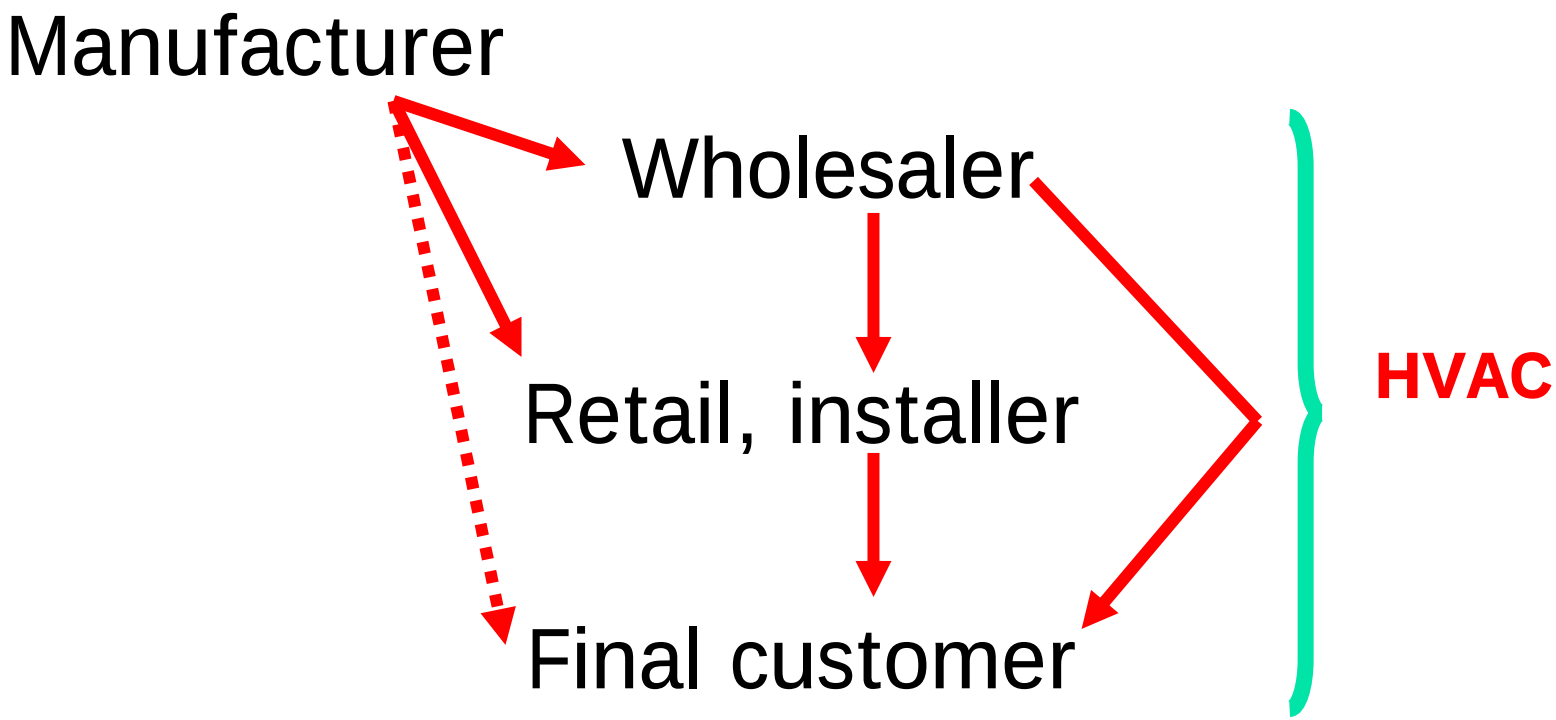
Sales


Greek Market. Annual Sales
Collector Area (sq.m)
250000
200000
150000
100000
50000
0
Home market
Exports
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
Year

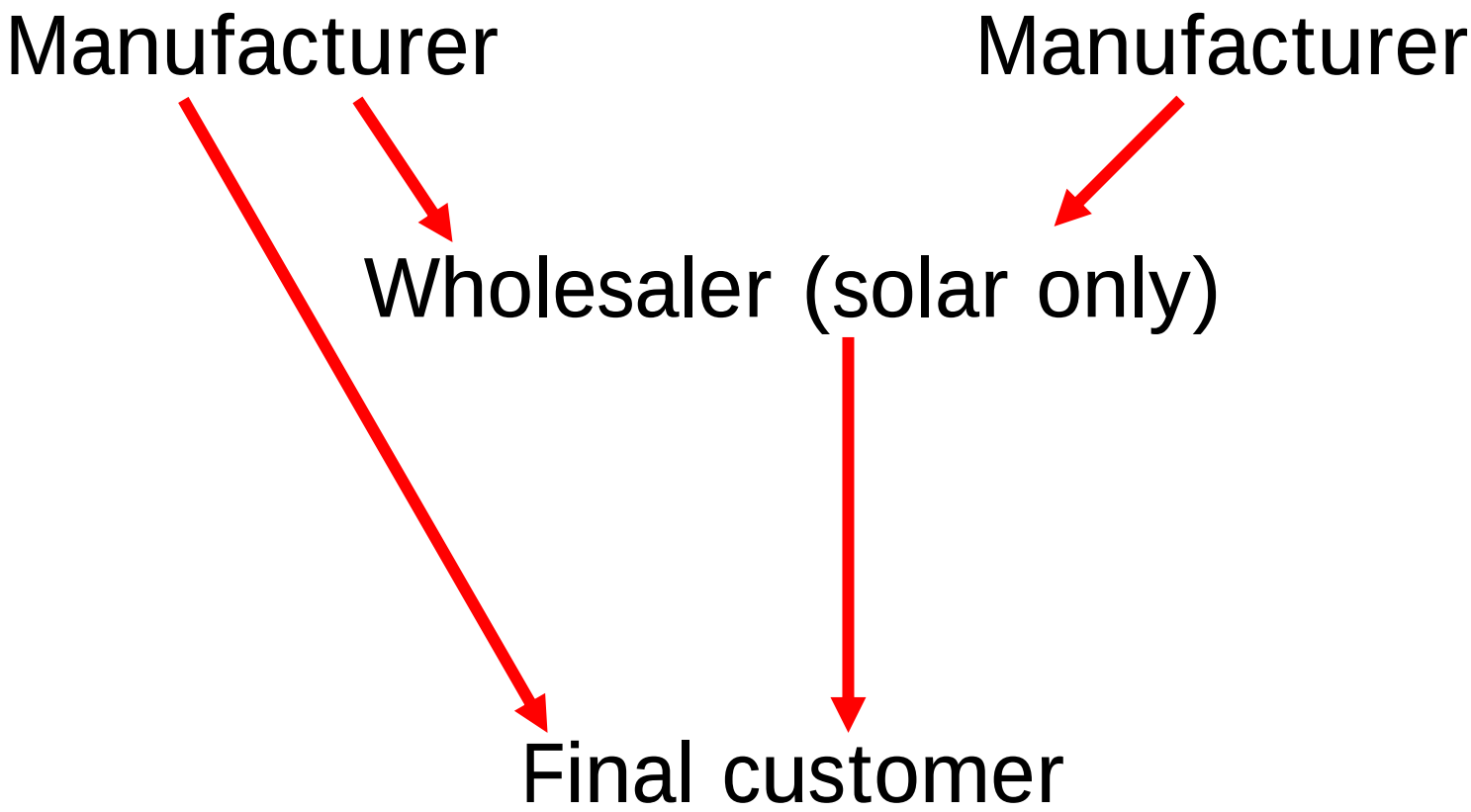
Medium Term Trend



Market Structure Now



Initial Market Structure



Advertising/Awareness Campaigns

- 1979-1981 Industry, State
  (benefits of solar energy)
- 1984-1985 Industry, State
  (economy)
- 1995 Public Power Corporation

Awareness for Solar

- Hot water : Complete
- Process heat : not satisfactory
- Space heating : only ‘futuristic’
- Solar cooling : ‘startup phase’
- Other in project level (drying, etc.)

International Trade

Positive

- European safety requirements CE mark
- European standards
- Solar Keymark 

Negative

- National & regional requirements

Exported Products

- Solar water heaters (Mediterranean, 37 countries all over)
- Solar collectors (Europe, mainly central)
- Small solar tanks - suitable for thermosiphonic systems- (Mediterranean)
- Absorbers, etc.- (Eastern Europe)

Key to Enlarge Solar Market

Simple and long term rules for subsidies

THE “PHILOSOL” 2000 PROJECT

The purposes of the project:

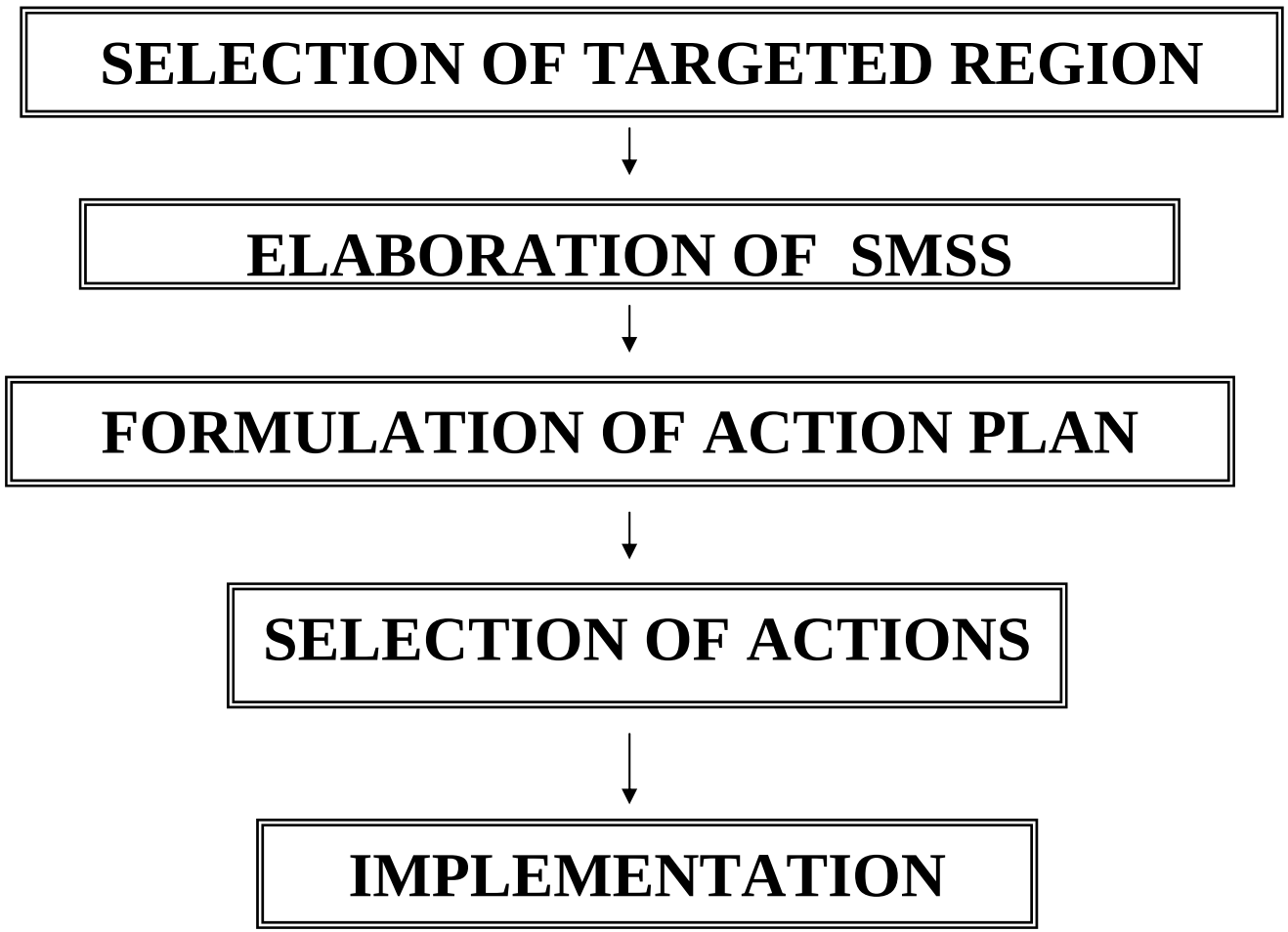
1. propose the implementation of an Action Plan (AP) based on Technology Assessment Studies (TAS) and Solar Market Strategy Studies (SMSS)
2. promote to local solar thermal markets
3. reinforce of the existing business infrastructure
4. organise partenariat business trips (STIM=Solar Thermal Industrial Missions)accompanied by technology exhibitions

A large number of EU manufacturers of solar thermal equipment as well as numerous local manufacturers (SMEs) and business operators pursued the events

BUDGET: 250000€ + 430 000 €

FINANCING : ***ESTIF, CRES, APISOLAR, ASSOLTHERM, ASENSA, STA, MOTIVA***

METHODOLOGY OF THE PHILOSOL



Objectives of the Solar Thermal Industrial Missions (STIM)

The objectives of the STIM were to:

- **stimulate the awareness of the local authorities** relevant to the use and application of Renewable Energy Sources (RES) and especially of the Solar Energy taking into account their positive environmental impact

- **promote the use of solar energy technology** that has already known technological development in some areas of Southern Europe (i.e. Greece) and promote its penetration to new, less developed markets (such as Southern Italy and Southern Portugal or Portuguese islands)

- **Involve local actors in partenariat meetings**, the local actors being:

- manufacturing and installation SMEs
- authorities and municipalities
- professional associations

Places and timings of the missions of the PHILOSOL PROJECT

January	1999	Loule, Algarve	Portugal
January	1999	Napoli, Campania	Italy
February	1999	Funchal, Madeira	Portugal
March	1999	Palermo, Sicily	Italy
March	2000	Murcia, Murcia	Spain
April	2000	Palma, Mallorca	Spain
July	2000	Brighton, Sassex	U.K.
November	2000	Helsinki	Finland

PHASES OF ELABORATON of the PHILOSOL PROJECT

PHASE 1:Preparation phase by ESIF, CRES, APISOLAR, ASSOLTHERM, ASENSA, STA, MOTIVA

- Elaborate Market Assessment Studies (Distribution Agreement, Under license manufacturing,…)
- Elaborate Product Assessment Studies (which application or product for which region,…)
- Detailed outlining of the action plan
- Preparation of the partenariat events
- Brochure elaboration and edition

PHASE 2: Action phase by ESIF members-SMEs

- A business trip
- An exhibition of technological samples
- An one day workshop
- Partenariat meetings

PHASE 3 :Evaluation of the promotion actions by ESIF, CRES

- Reporting of project activities
- Evaluation of results

During the Palermo event, basic parameters of a SWOT analysis of the ST Market in Europe have been monitored, with scope to assess means for future market expansion

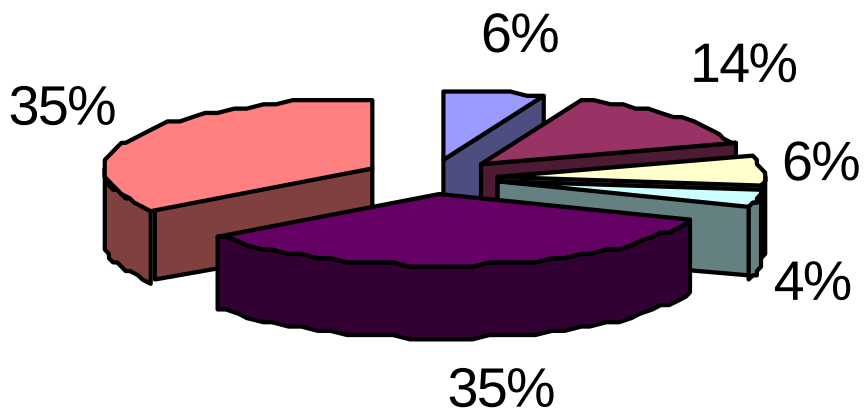
Quantitatively, 42 visitant EU manufacturing companies were involved in 63 business partenariat missions to 6 EU regions (Murcia, Majorca, Algarve, Madeira, Napoli and Sicily)

During the 6 events the visitant manufacturing companies met with 226 local professionals while more than 380 people from the general public visited the exhibition of the samples

The amount of local professionals, allocated per area of interest, during the PHILOSOL events (throughout 1999-2000) is shown in next graph

Furthermore, 16 press actors (TV, radio, newspapers and magazines) have been involved in local promotion.

PARTICIPATION RESULTS OF 226 COMPANIES TO THE PHILOSOL EVENT



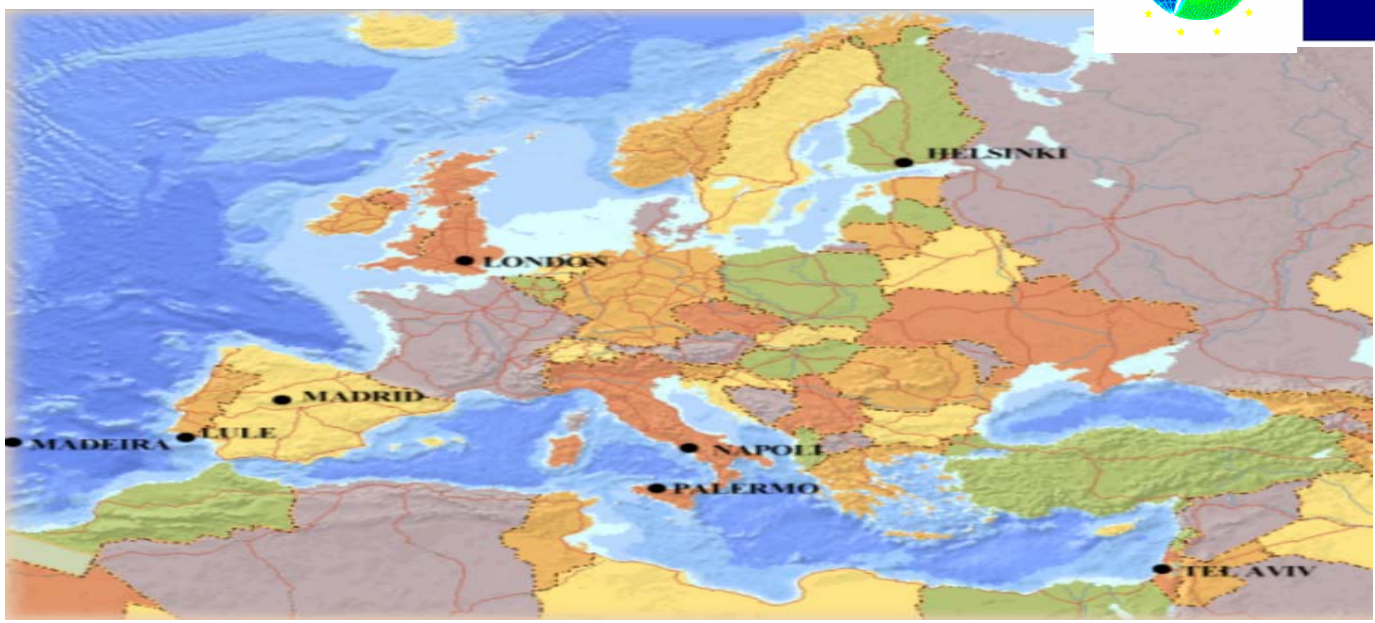
TUNISOL 1995- A BILATERAL Greco- Tunisian PROJECT on Solar Thermal

- Date: 14 July 1995
- Place: Tunis, HILTON HOTEL
- Budget : 10 k€
- Participation: 13 Tunisian companies from the HVAC sector and
- 6 Greek manufacturers from the Solar Thermal Manufacturing Sector

- Auspices of: AME, Ambassade de Grece
- Financing: CRES (management, PR), EBHE (6 missions)
- Perspectives: Program GEF
- **Sponsors API (event), Hilton Hotel Tunis (conference room)**

RESULTS SO FAR: 2 Distribution agreements

PHILOSOL: The Solar Thermal Industrial Partnerships



DIRECTORATE GENERAL FOR ENERGY (DG XVII) ***:THERMIE & ALTENER ACTIONS undertaken by:***

Project Leader
ESIF, Kempten, Germany
EUROPEAN SOLAR (THERMAL)
INDUSTRY FEDERATION

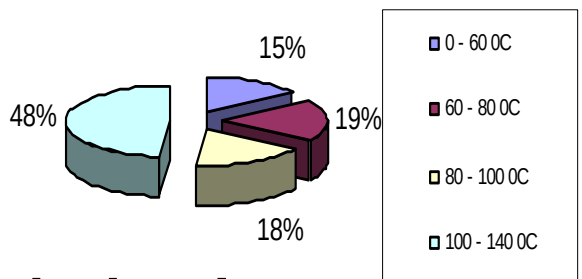
Project Manager
CRES, Athens, Greece.
CENTRE FOR RENEWABLE
ENERGY SOURCES

PROCESOL I&II – Solar Thermal Process Heating in Industrial Applications Coupled with Heat Recovery Technologies

Wine industries

Dyeing-finishing

Dairies



kWh/kWh in dairies in oC areas