Energy Financing and Risk Management

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Energy projects

Financing mechanisms

Basic terms

Economic assessment of project

Criteria for investment decision making

- Net Present Value - NPV
- Internal Rate of Return – IRR
- Which margin is acceptable?

Cash flow of an investment

- Real/nominal values
- Project IRR/ Equity IRR

Energy projects

- **Conventional power plants**
  - lignite, natural gas combined cycle
- **Renewable Energy Sources**
  - Wind, solar, biomass, geothermy...
- **Energy efficiency**
  - Residential, tertiary, public sector, industry
- **Energy networks/facilities**
  - Electric interconnections , natural gas pipelines, LNG terminals, refineries ...
- **Industry**
  - efficiency, capacitors, BMS, harmonic filters...
- **Environmental**
  - Waste management...

Energy projects

Energy projects that are considered of high priority, as usually characterized as fast-track in national legislation.

Europe has established European Facility Mechanism to finance **Projects of Common Interest (PCI´s), towards creating an integrated energy market**

Projects are selected as PCIs on the basis of five criteria:

- have a significant impact on at least two EU countries
- enhance market integration and contribute to the integration of EU countries' networks
- increase competition on energy markets by offering alternatives to consumers
- Enhance security of supply
- contribute to the EU's energy and climate goals. They should facilitate the penetration of renewable energy sources.

Energy projects

The PCIs are essential for completing the European internal energy market and for meeting the EU's energy policy objectives of **affordable, secure and sustainable energy**

Such projects may benefit from:

- accelerated planning and permit granting,
- a single national authority for obtaining permits,
- improved regulatory conditions,
- lower administrative costs due to streamlined environmental assessment processes,
- increased public participation via consultations, and
- increased visibility to investors

Energy projects

Funding for Projects of Common Interest

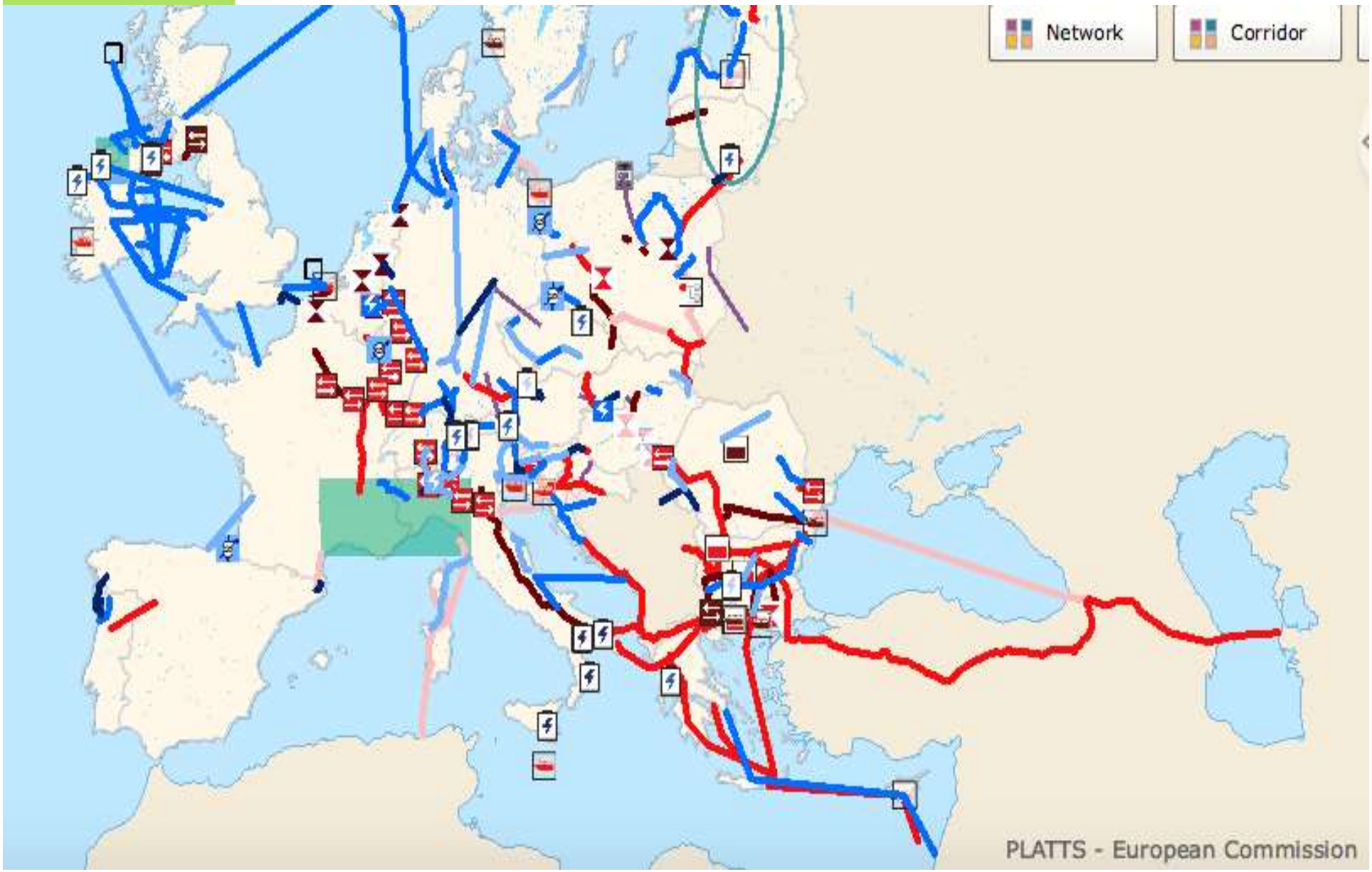
PCIs have access to a total of €5.35 billion in funding from the Connecting Europe Facility (CEF), the EU's €30 billion fund for boosting energy, transport, and digital infrastructure between 2014 and 2020. This funding is intended to speed up the projects and attract private investors.

A total budget of €5.35 billion is made available for energy projects for the 2014-2020 period

Current Projects of Common Interest

- The first list of PCIs was published in 2013 and the second in 2015. The list is updated every two years to integrate newly needed projects and remove obsolete ones, and the next update will take place in 2017

Projects of Common Interest for European Energy Security and Internal Energy Market




CZECH REP.
SLOVAKIA
AUSTRIA
SWITZERLAND
HUNGARY
MOLDOVA
ROMANIA
ITALY
CROATIA
BOSNIA HERZEGOVINA
SERBIA
MONTENEGRO
BULGARIA
CORSICA
SARDINIA
ALBANIA
GREECE
MALTA


NATURE
WORLD
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PLANET
GREEN
FLORA
LEAF
GROWTH
RECYCLING
VEGETATION
ALTERNATIVE
PROTECT

Energy projects

PROJECTS INVOLVING MORE THAN TWO EU COUNTRIES OR NON EU COUNTRIES OR OFFSHORE PROJECTS

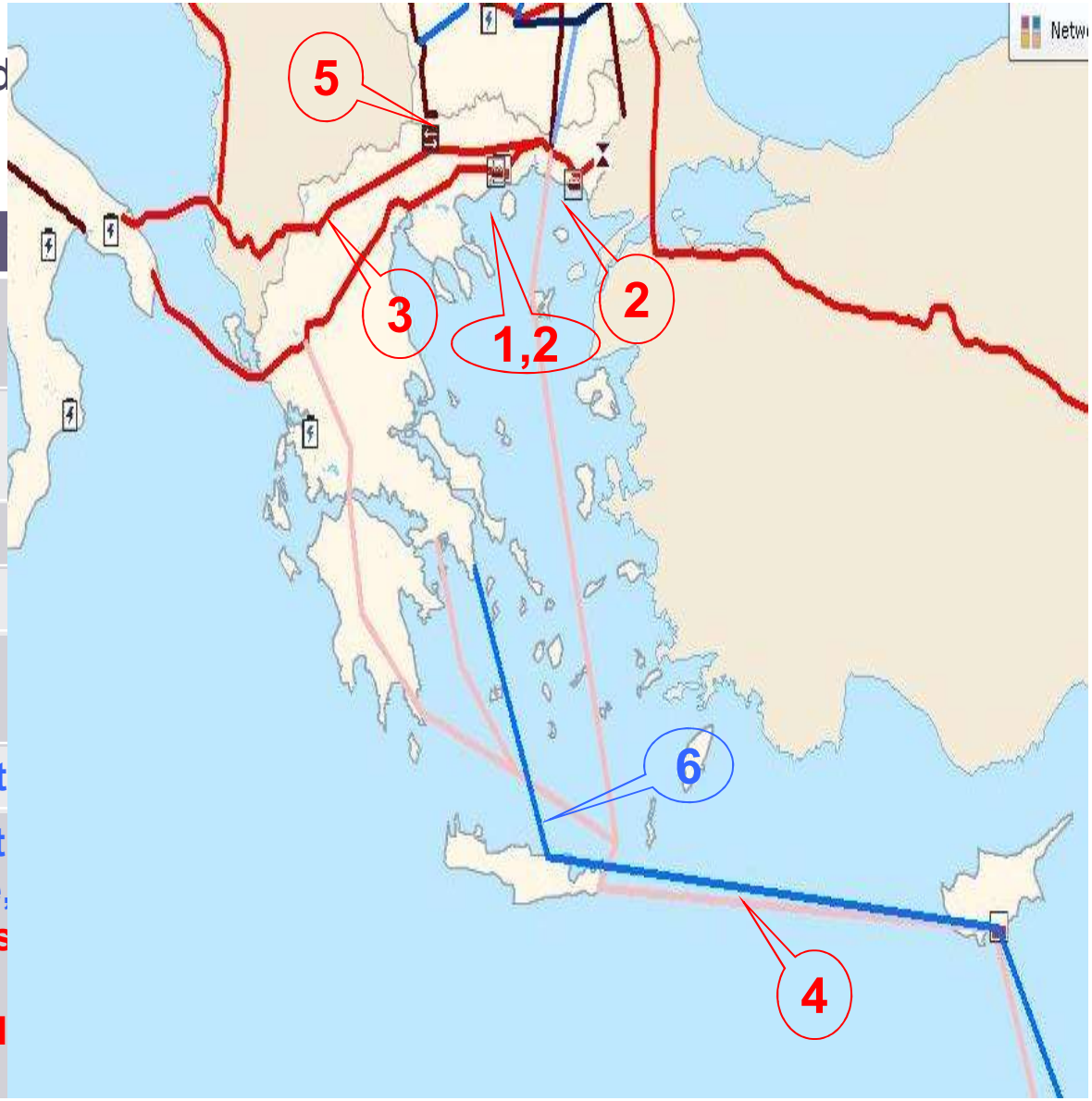
Project	TYNDP Code	PCI 2015 Code	Promoter	Status	Commissioning (TYNDP 2017)
Interconnection Bulgaria–Serbia	TRA-F-137	6.10	Ministry of Energy of Bulgaria	FID	2018*
TANAP – Trans Anatolian Natural Gas Pipeline Project	TRA-F-221	7.11	TANAP	FID	2018
Trans Adriatic Pipeline	TRA-F-051	7.1.3	Trans Adriatic Pipeline	FID	2019
Poseidon Pipeline	TRA-N-010	7.1.4	IGI Poseidon	Advanced Non-FID	2020
EastMed Pipeline	TRA-N-330	7.3.1	ΔΕΠΑ	Non-FID	2020
White Stream	TRA-N-053	–	W-Stream	Non-FID	2022
Interconnection Bulgaria–FYRoM	TRA-N-976	–	MER JSC Skopje	Non-FID	2021
Interconnection Greece–FYRoM (FYRoM part)	TRA-N-980	–	MER JSC Skopje	Non-FID	2021

* Since the submission of project data for the preparation of the TYNDP 2017, the commissioning date has been moved to 2020

Projects of Common Interest for European Energy Security and Internal Energy Market

12 Projects of Common Interest (PCIs) – have been characterized as fast-track in Greece towards their faster implementation

	Project of Common Interest
1	Underground storage facility in South Kavala
2	Floating LNG terminals either in Kavala and/or Alexandroupolis
3	Trans Adriatic Pipeline (TAP)
4	East-Med Pipeline
5	Interconnector Greece-Bulgaria (IGB)
6	Euro-Asia electricity interconnect
Rest	2nd Electricity interconnection wit Bulgaria, Hydro pumping storage, Reverse gas flow to Bulgaria, Gas Compressor Station in Evros, Interconnector Turkey-Greece-Ital (ITGI)



Energy projects

Electric energy

NSI East Electricity (electric interconnection North-South in Central-East and South-East Europe).

- **1.** Electric interconnection Israel- Cyprus- Greece between Hadera (Israel) and Attica region, known as Euro-Asia Interconnector.
- **2.** Electric interconnection between Maritsa East 1 (Bulgaria) and New Santa (Greece).
- **3.** Hydro-pumped storage power plant in Amfilochia, West Greece.

Energy projects

Natural gas

- **4.** IGB: Interconnector Greece Bulgaria between Komotini and Stara Zagora.
- **5.** Reverse-flow station in Bulgarian-Greek interconnection, between Sidirokastro and Kulata
  6. Floating Underground Storage and Re-gasification Unit (FSRU) in Alexandoupolis, North Greece- INGS LNG Greece.
- **7.** Floating Underground Storage and Re-gasification Unit (FSRU) in Kavala, North Greece- Aegean LNG import terminal.

Energy projects

Natural Gas

- **8.** Underground storage in Kavala, North Greece.
- **9.** Trans-Adriatic Pipeline (TAP).
- **10.** Interconnector Turkey Greece Italy (ITGI).
- **11.** East-Mediterranean pipeline (interconnection Israel-Cyprus-Greece).
- **12.** Compressor natural gas station in Kipoi, North Greece, in the borders with Turkey.

Energy projects

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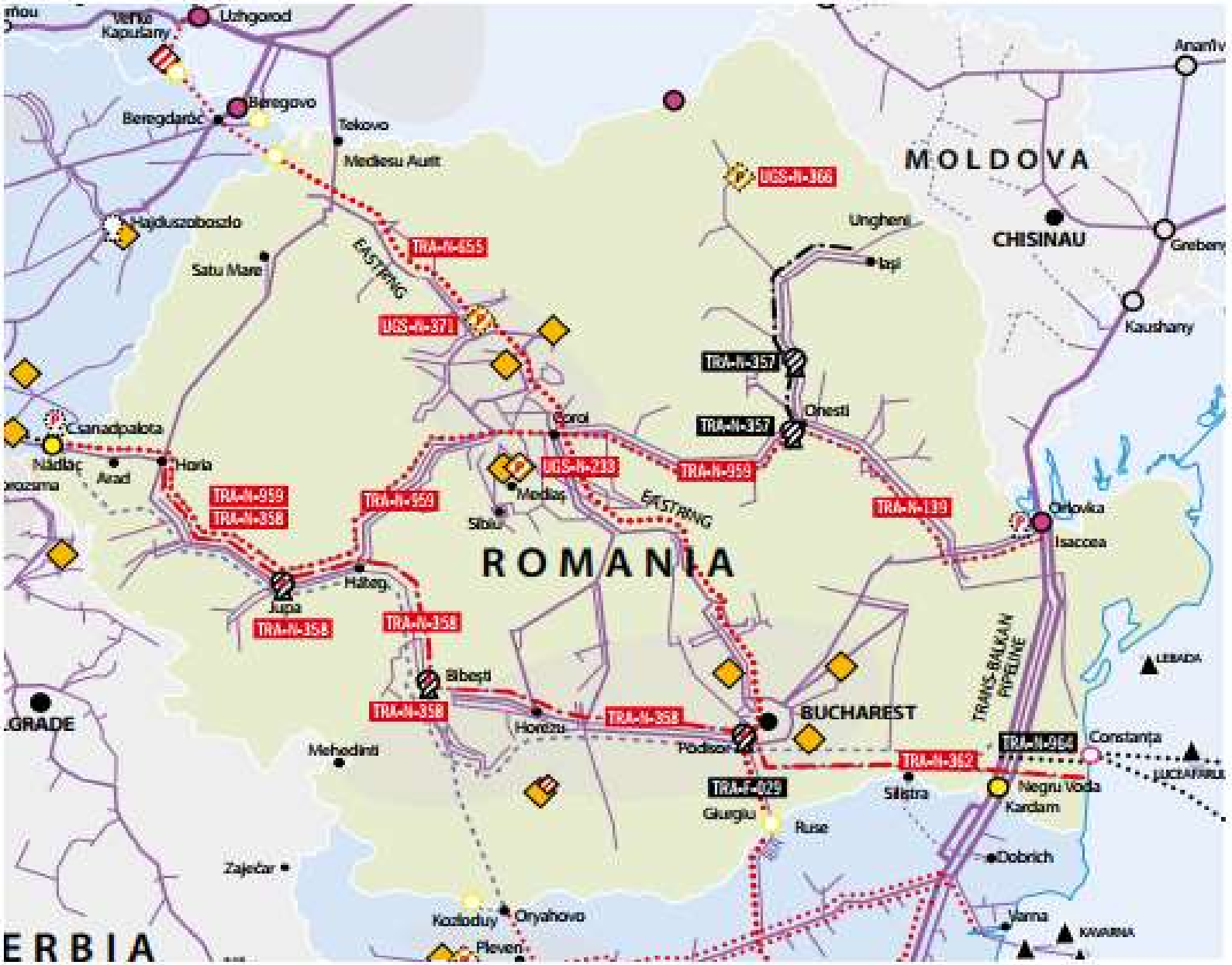

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Financing mechanisms

- **Self-financing**
  - Use of own capital (increase of shares, use of revenues...)
- **Debt-financing**
  - Loan, which is incorporated in the balance sheet of the company
- **Subsidy/incentives from National or European projects**
  - Structural funds 2014-2020 ...
  - **Tax releases....**

Financing mechanisms

- **Third-party financing**
  - Energy Service Companies – ESCOs, that undertake the investment risk

- **Build – Operate – Transfer**
  - Development, operation of a project from a consortium for a period of years, and then the project is fully owned and operated by the state

- **Hybrid schemes (combination of the above)**
  - Specific subsidies, i.e. financing the difference of loan interest between Central and South European countries ...

Financing scheme

- **Energy Service Company (ESCO)**
  - ESCO undertakes the study, constrtruction and operation of a project
  - ESCO undertakes the financing (or the cooperation with banks)
  - ESCO undertakes the risks

ESCOs


NATURE
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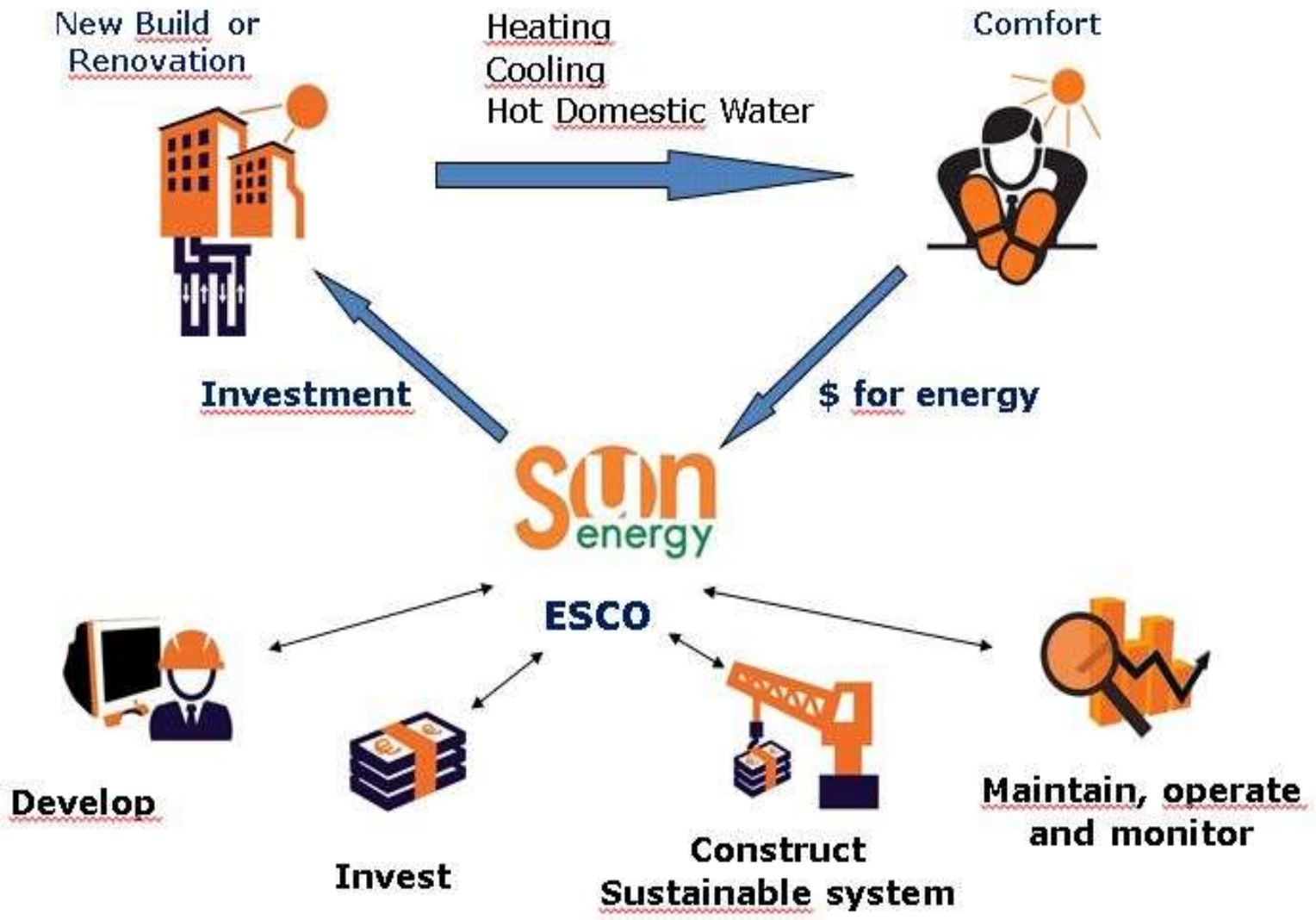

New Build or Renovation
Heating
Cooling
Hot Domestic Water
Comfort
Investment
$ for energy
Sun energy
ESCO
Develop
Invest
Construct Sustainable system
Maintain, operate and monitor

Financing scheme

- **Advantages of Energy Service Company (ESCO)**
  - Risk aversion
  - ESCO integrated experience (in technical and economic issues)
  - Economics of scale- Lower cost of equipment
  - The user does not have any responsibility from for the construction and operation
  - Has reduced energy costs and by the end it also own the equipment
  - Portfolio of services

i.e. ESCO undertakes the operation in a hospital for 10 years, being paid on monthly basis the 80% of the energy costs reduction

Financing scheme

- **Build – Operate – Transfer**
  - The state makes a call for Expression of Interest and consequently a competitive procedure for a project
  - The selected consortium is responsible for the construction, operation and maintenance of the project for a period of time
  - The consortium is paid through the operation of the project
  - The operation of the project is transferred to the state after the end of this period

Financing scheme

- **Advantages of the Build – Operate – Transfer**
  - Investing no (or less) money from the state budget
  - Risk aversion
  - Competitive procedures attract experienced schemes that reduce the whole cost and transfer technology knowledge
  - Foreign investments
  - Optimum performance

  However, there exist:
  - Political risk, regulatory, financial and economic risk (i.e. ex-post change in the terms, through legislation ..

Financing scheme

- **Build – Operate – Transfer (conditions)**
  - Realistic project with satisfying rate of return
  - Risk assessment
  - Distribution of risks, among consortium and the state
  - Clear legal framework
  - Cooperation among the state and the consortium

i.e. A municipality makes a competition for the construction, operation and maintenance of desalination system in some islands

Financing scheme

European projects: Structural funds (ESPA) 2014-2020 (i.e. 26 billion euros for Greece, 21 bn from European budget: 80%) www.espa.gr/

Public-private partnership

http://www.mindev.gov.gr/el/images/sdit/parousiash_sdit-08102014.pdf

Specific projects from state funds: Saving at Home

http://exoikonomisi.ypeka.gr/

ESPA 2014 - 2020

Example of state policy: The new structural European fund is directed 35% directly to regions in Greece, based on the per capita GDP

Distribution by sector:

1 bn Euros in Energy,

2 bn Euros in Environment,

4 bn Euros in Infrastructure (highways, metro...),

2 bn Euros in Education and specialization,

1 bn Euros in Research and Development)

4 bn Euros in Agriculture,

1 bn Euros in Attica region,

0.8 bn Euros in Central Macedonia region

ESPA 2014 - 2020

Main targets:

- Strengthening the **competitiveness** and outreach of businesses (especially SMEs)
- Development and utilization of **human resources capabilities** - active social cohesion
- **Protection of the environment** - transition to an environmentally friendly economy
- Development - modernization - complementing **infrastructure** for economic and social development
- Improving the institutional adequacy and efficiency of **public administration** and local government

New ESPA - Energy

- Renovation of public **infrastructures** for **energy efficiency**, demonstration projects and support measures
- Renovation of **residential sector for energy efficiency**, demonstration projects and support measures
- **Energy efficiency** and demonstration projects in **SMEs** and support measures
- Promoting **energy efficiency in large enterprises**
- High **efficiency cogeneration** and **district heating**
- **Electricity (infrastructure**, interconnections, RES ...)
- **Natural gas (infrastructure**, network expansion ...)
- **Smart** power distribution **systems** of medium and low voltage (smart meters ...)

Tax subsidies

(aa) **district heating installation** or system using renewable energy sources.

(bb) purchase and installation of a **gas heating** system.

cc) purchase and installation of **solar collectors**

(dd) purchase and installation of **decentralized systems** for the production of electricity from RES and **co-generation of electricity and cooling-heating** using natural gas or renewable sources.

(ee) **thermal insulation** in existing buildings

(f) expenditure for the performance of an **energy audit** by a competent inspector.

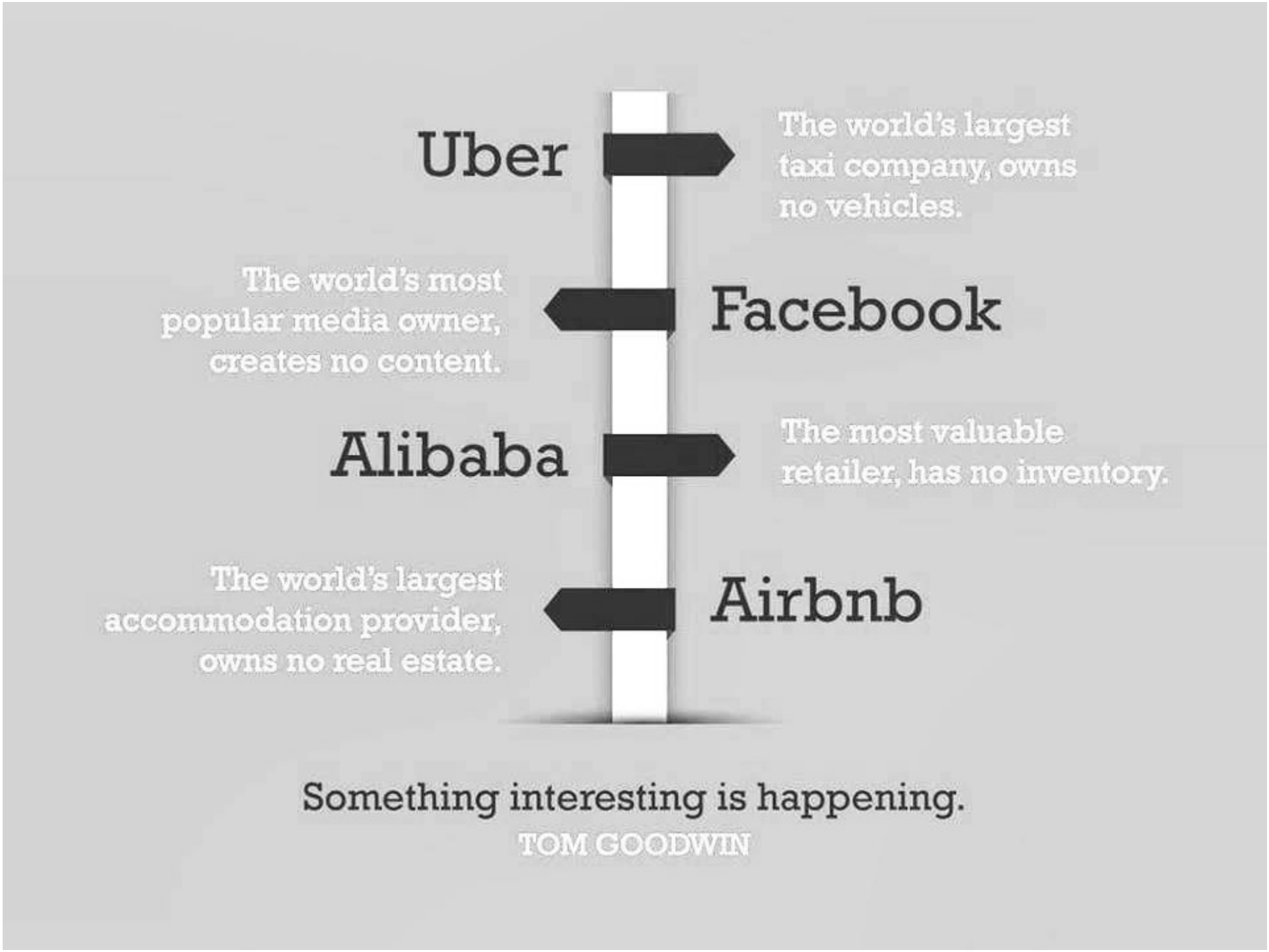
Specific incentives

Grant scheme for the **conversion** of boilers for autonomous and central heating to **natural gas boilers**

Example:

- total grant amount EUR 15 million
- It will cover about 50,000 households
- It subsidizes the costs of converting a burner or boiler, from € 1,000 to € 5,500,
- concerns exclusively areas with low temperature.
- change of fuel in a block of flats, the requirement to secure a 50% plus one, the shares of a block of flats

Road to success?
Engage the others!



Something interesting is happening.

TOM GOODWIN