



**The strategic plan  
of HEDNO for the  
Non-  
Interconnected  
Islands  
Investments –  
Smart Islands –  
Innovation**

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# Who we are



HEDNO operation kick-off: 2012

[previously: distribution department of PPC S.A]

Organizationally, functionally independent regulated Company

We deliver electricity to 7,4 million consumers across the country through Medium and Low Voltage Networks (total length of network lines 236,000 km) and manage the 32 non-interconnected Islands

We employ 7.000 people

Our mission is to ensure the proper operation, maintenance and development of the **distribution network** and **management of the Non-Interconnected Islands Electricity Systems**

# Our Services



Network Development  
Providing Network Accessibility  
Network Operation  
Consumption Metering

Network Maintenance  
Fault Restoration  
Vulnerable Customers Programs  
Social Residential Tariff

Connection of RES and CHP Generation Units  
Taking necessary measures for mitigating environmental impact and securing optimal participation of RES and CHP units in the electricity production

## **Non-Interconnected Islands Power System Management**

Reliable, efficient and safe operation of their electricity systems

Operation of the Non-Interconnected Islands market

# Times of disruption

International power sector changing rapidly:

- Decarbonization
- Technology disruption (production, transmission, distribution)
- New market players
- New consumer demands
- Digitalization of electricity sector (IT – Data – Telecom – User innovation)

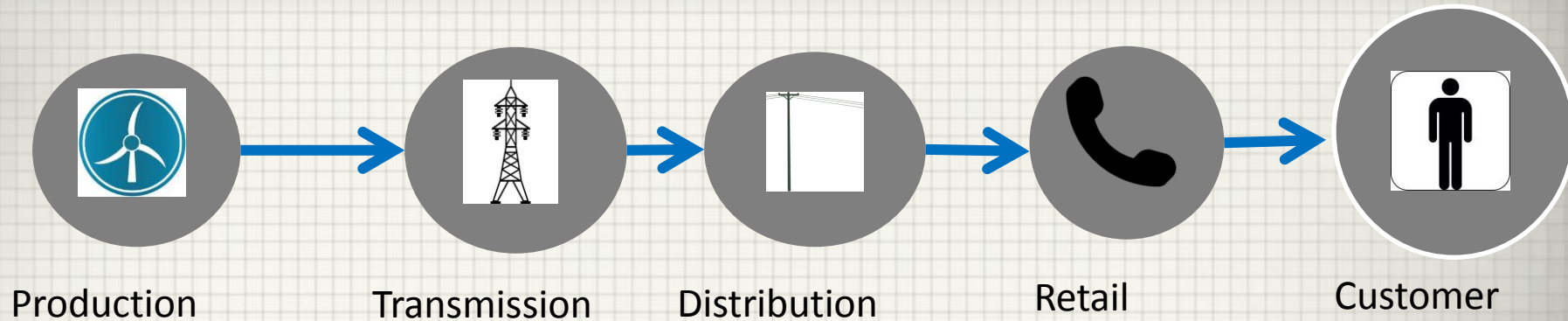
Greek power sector dynamics:

- Market reforms
- New market players
- Increasing need for cost reduction
- RES penetration
- Innovation projects in Islands electricity systems
- Consumer services improvement requirements

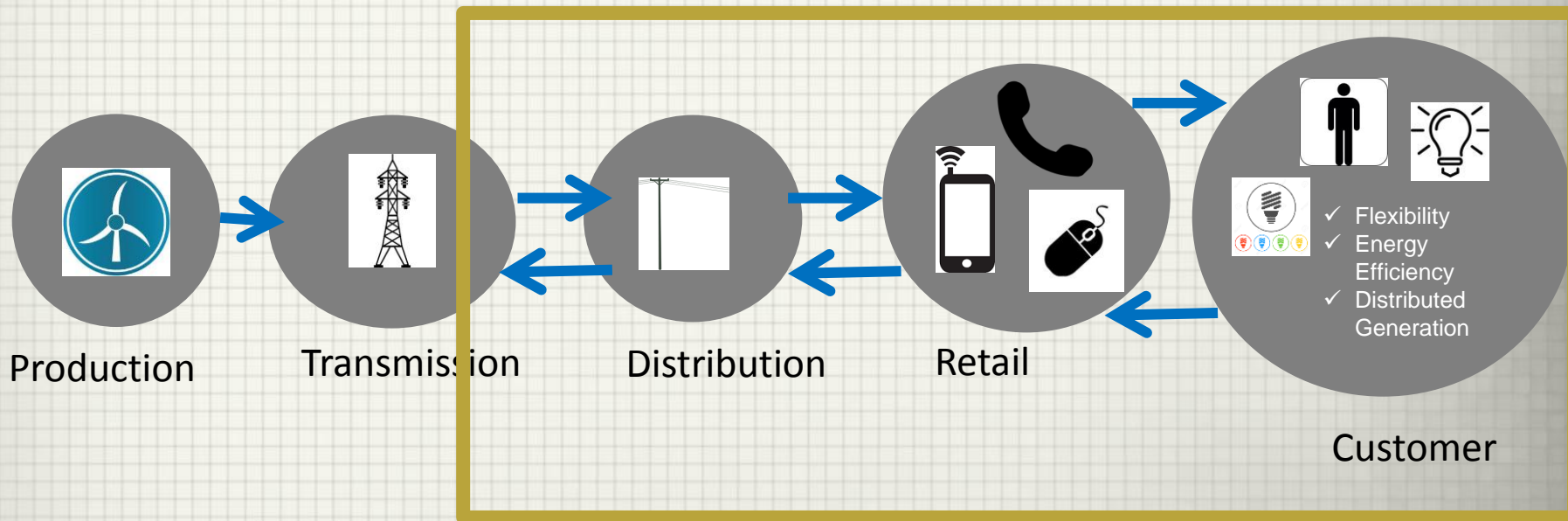


# New business models required

existing model



Future model



DSO and retail market innovation potential

# Our vision and strategy



Our **VISION** is to achieve the best possible combination of **QUALITY** and **LOW-COST SERVICES**, our first concern being the **ENVIRONMENT** protection: towards a distribution platform provider



Our **STRATEGY** is built upon innovation in technologies, processes and business models (Smart Grids, Remote-Smart Metering, Remote Services, Automations, Island Pilot Projects etc.)

**Our Goal is** to transform the Distribution Operator, modernize the Network, innovate in island systems and upgrade the electricity system towards a **“Smart System”** optimizing the infrastructure of the downstream electricity market

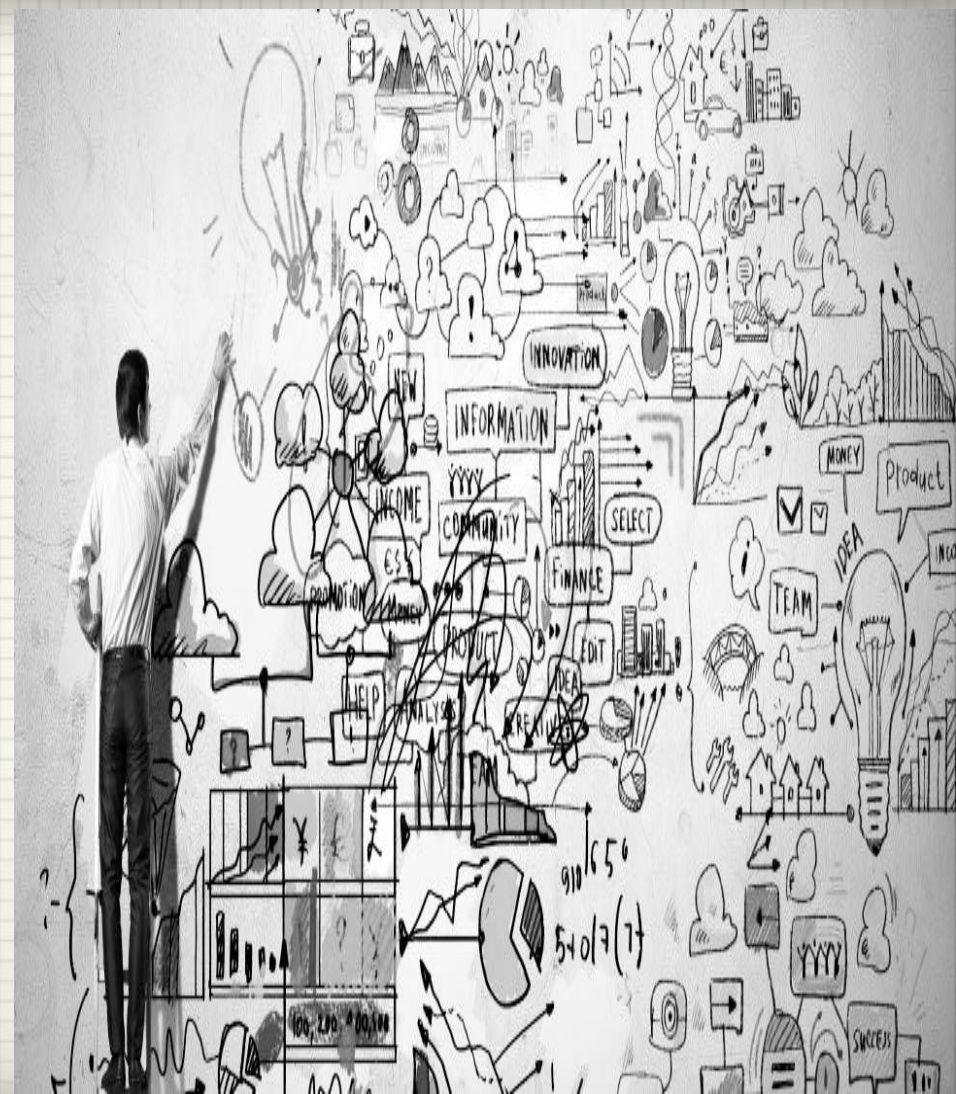
# Our vision and strategy



Radical modernization of the existing Network and transformation of the DSO: optimizing management of the connected consumers and producers and use the islands as test-beds

The future Distribution System will be superior in terms of performance and reliability, while being more customer-centric and at the same time more cost-effective

HEDNO is committed to implement all necessary investments and innovation projects in order to bring smart grids from vision to reality – both in the interconnected and non-interconnected island networks



# Our investment plan

250 million euro per year for reinforcing and modernizing the network

250 million for 12 strategic HEDNO transformation projects

Total 1,2 billion euro  
2015-2020





# RES penetration progress (total)

Amount of RES units installed  
(Interconnected and Islands):  
56.066

Total installed RES capacity  
(Interconnected and Islands)  
(MW): 3.779

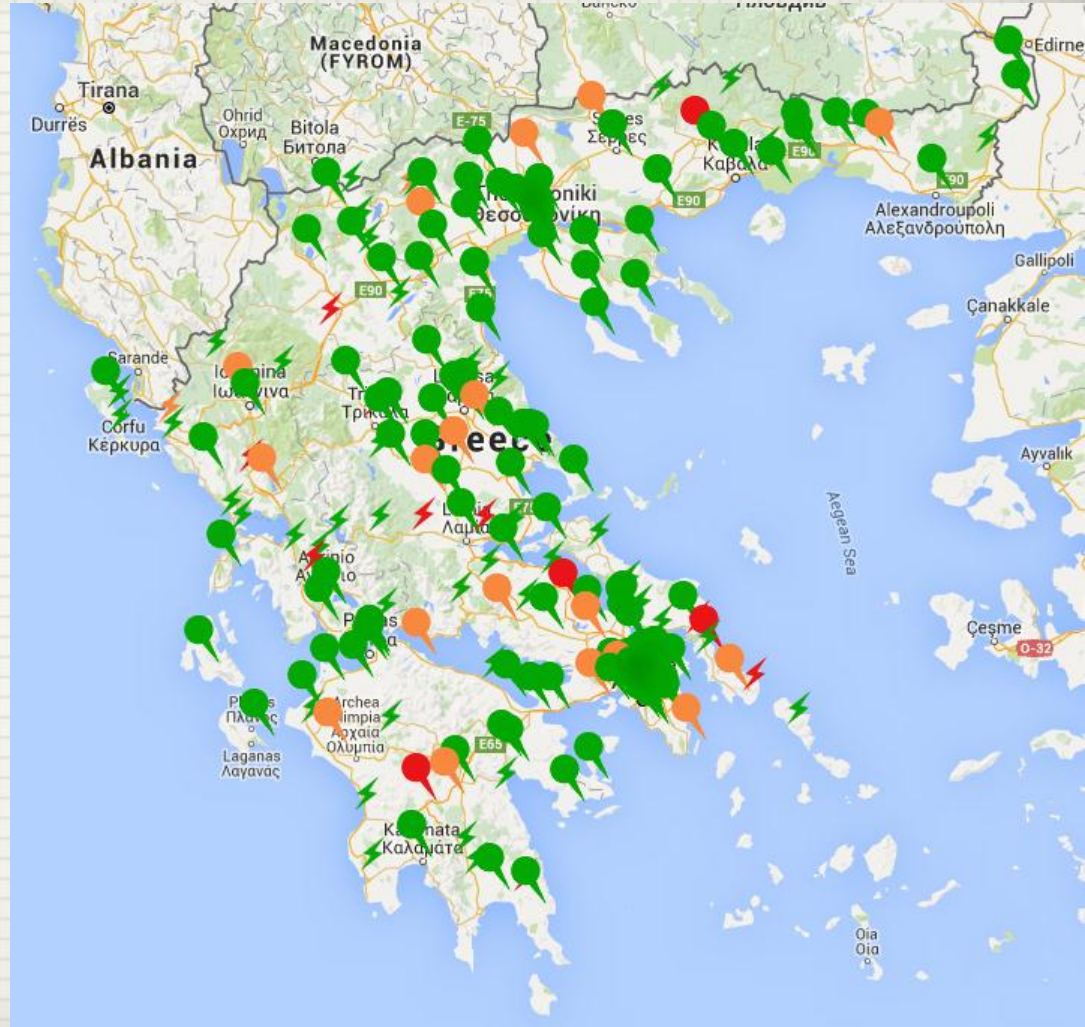
PV roofs (total) Capacity 375MW  
PV L/V (interconnected) Capacity 808 MW  
PV M/V (interconnected) Capacity 1.217 MW  
TOTAL PV (roofs excluded - total) Capacity  
2.162 MW



# RES integration potential (interconnected)



HEDNO website:  
online data of RES power absorption  
potential per substation



<http://renewal.deddie.gr/main.html#>

# RES penetration progress in Islands



Total installed capacity NII –  
**482.44 MW**

Wind farms 322,69  
PV 135,98  
PV roofs 23,47  
Small Hydro 0,30

System Marginal Price (€/MWh)  
**41,40**  
NII - 92,55  
Crete - 96,80

Total installed capacity Crete-  
**296,09 MW**

Wind farms 200,31  
PV 78,29  
PV roofs 17,19  
Small Hydro 0,30

# Energy balance in Islands



Energy Balance in Non-Interconnected Islands (σε GWh)		
	2015	Jan – May 2016
<b>Oil</b>	4.571,20	1.590,23
<b>RES</b>	999,58	373,28
<b>TOTAL</b>	5.570,78	1.963,51
<b>RES %</b>	17,9%	19%
<b>Oil %</b>	82,1%	81%





**2015 – 2020**  
**HEDNO**  
**Transformation**  
**Program**

# 12 Transformation Strategic Projects

- 1. Distribution Network Control Center in Attica (central system) - € 6.8 million**
- 2. Distribution Network Control Center for the Islands (central system) - €4 million**
- 3. Upgrade of Regional Distribution Network Control Centers for the rest of the country (3 Regional Control Centers) - €5million**  
[real-time monitoring and management of Distribution Networks operation]
- 4. Further implementation of Remote Control Equipment - € 60 million**
- 5. Implementation of geographical-information systems for the Distribution Network (GIS)- € 55 million**
- 6. New Customer Service System (ERMIS) - € 15 million**  
[improvement of customer services and new multichannel communication platform (web, call center)]
- 7. Call Centers - € 3 million**  
[planning 3 call centers in Athens, Thessaloniki and Patras]

# Our 12 strategic projects



8. Distribution Network Planning [Expansion planning tools and methodology] - €2million
9. Energy Control Centers for Non Interconnected Islands - €38 million
10. Smart Island Initiative - € 0,5million
11. Telemetry and Management System of residential consumers and small commercial businesses power supplies – Smart Meters – € 39 million  
[pilot project and planning of the roll-out]
12. Supply Chain restructuring - €2 million



## Challenges and HEDNO investments in the 32 Non-Interconnected Islands (NII)





# 1. Infrastructure development

(according to the requirements of the NII Code)

Develop all the necessary infrastructure for the **32 electricity systems**

In order to:

- Determine production cost
- Reduce operational cost
- Reduce consumer cost
- Increase RES penetration
- Ensure uninterrupted electricity supply of consumers

# Main Projects NII

## **Metering infrastructure**

Telemetering Power Plants

(energy produced/h, fuel consumed for its production)

Budget estimate - €8 million

Completion date estimate- 12/2019

## **Energy Control Centers (ECC) in Athens, Crete and Rhodes**

ECC include several systems to perform implementation of market operation, including the preparation of day ahead scheduling, supervision and optimization of autonomous systems' operation and NII settlement.

Budget estimate - €15.5million

Completion date estimate - 6/2020

# Main Projects NII



## **Energy Control Centers (ECC) in the remain 27 electricity systems**

3 stages of implementation

### **Stage 1**

Implementation and extension of SCADA (Supervisory Control and Data Acquisition) and EMS (Energy Management System)

Budget estimate - € 5.7 million

Completion date estimate - 6/2018

### **Stage 2 - Stage 3**

Pilot implementation of ECC infrastructure in 3 electricity systems of NII and their connection with the Central ECC in Athens

Pilot implementation of ECC infrastructure in the remain 24 electricity systems

(planning of stage 2 & 3 will be completed by the end of 2016)

Budget estimate for the whole project around € 12 million

Completion date estimate for the whole project 6/2020

# Main Projects NII



## Development of methodological infrastructure

Analyze the requirements of the Code for the NII, allocate best practices and optional management of electricity systems in NII through ECC

Budget estimate - € 1.5million

Completion date estimate - 6/2019

## Implementation of IT infrastructure for NII

Databases and archives for all participants in the Market (Producers, Load Representatives, Power Plants, Units of each Power Plant, Meters and the Indications received from them).

Budget estimate - € 1million

Completion date estimate - 6/2019

# Main Projects NII



## 2. Smart Island Initiatives

The aim of this strategic project is to develop and implement all the necessary infrastructure for the operation and management of electricity systems in NII with very high RES penetration (more than 60%) Smart island has been submitted to the Ministry of Environment and Energy and after its approval, HEDNO will proceed with the special framework for the project.

After RAE's approval, we will proceed with the tendering procedure

Estimate date of completing tendering procedure - early 2018

Estimated budget of the project until its final assignment - € 0.5 million

## 3. Facilitation of the market reforms

HEDNO - as the NII System Operator - opened the market of Crete 21.06.2016 and will continue the gradual opening of the markets in other NII electricity systems.

### ISLANDS REGIONAL DEPARTMENT (operation):

Total investments on new projects 2012-2016:

€ 213 millions

Total investments on network maintenance 2012-2016: € 226 millions

New Distribution Network Control Center: €4 million

**TOTAL € 443 million**

# Future projects in Islands

1. Smart Island(s) initiative of HEDNO-RAE-Ministry of Energy
2. Storage+PV and new demand side management technologies
3. RES+desalination
4. Smart Street lighting
5. Kythnos island (revisited)
6. Electric Vehicles infrastructure
7. R&D platforms and international cooperation with relevant actors (DSOs-Retail market players-Telecom-IT-R&D community)



# Requirements for success

1. Institutional empowerment [human resources, clear objectives for policy and market actors]
2. Open and continuous collaboration of all relevant policy and business actors
3. Clear and simple market and regulatory environment
4. Long-term national energy planning
5. Regulatory incentives for innovation across the chain and especially downstream
6. Reduce restrictions imposed upon State-Owned companies (human resources, bureaucratic legislative framework)
7. Strengthening international cooperation which leads to specific projects
8. Public and private Investment on R&D



THE END

Thank you very  
much