

Knowledge Exchange and Study Tour in Italy: Grid Digitalization and Cybersecurity

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The institutional framework

Joint Committee

Providing **strategic guidance** and overseeing its implementation.

Funding and strategic promoter of Italian international energy cooperation

Implementing agency: launches calls for proposals, manages projects, and monitoring

Analytical support, impact studies, and policy recommendations based on pilot projects





3DEN's objective

Accelerate the **digital energy transition** by co-financing concrete pilot projects that demonstrate how digital technologies can make energy systems **more efficient, resilient, and competitive, reducing consumption and lowering bills for households and businesses.**



The 3DEN journey



Phase I

2021 - 2024

Brazil, Colombia, India, Indonesia, Morocco, South Africa, Tunisia, and Latin America, Africa, Southeast Asia

28 received proposals

4 pilot projects implemented in Brazil, Colombia, India and Morocco.

Phase II

2025 - 2026

Ethiopia, Brazil, Kenya, Morocco, Nigeria, South Africa, Tanzania and Tunisia

94 received proposals

14 selected projects, announced at COP30.
Implementation started in 2026 for a maximum duration of 24 months.

Phase III

2027 - ...

Geographical and thematic expansion

Development of
a 3DEN **Finance**

Facility

24
Italian
stakeholders
involved in Phase I
and II



Enabling technologies

Urban Sector

- Smart grid and smart meters
- Digital twin for distribution networks
- IoT platforms for real-time monitoring
- Demand response and storage systems
- Energy Management Systems (EMS)

Agri-food Sector

- Sensors for precision irrigation
- Smart solar-powered pumps
- Blockchain for supply chain traceability
- AI for industrial energy optimization
- Digital twins for process efficiency

Cross-cutting

- Big data analytics
- Cloud computing
- Cybersecurity
- Data sharing platforms

How to participate

Who can apply

- International Consortia
- A lead entity with contractual responsibility
- Local presence in the country of implementation is expected

Financial parameters

- Grant provided through call for proposal
- Total budget: 500.000 – 2.000.000 USD
- Minimum level of co-financing: 30% (cash/in-kind)

USD 37.9 M

Aggregated volume of all 18 projects
(grant + co-financing)

Colombia GR

Brazil

HO GR x2

Morocco IN

Tunisia

GR

AG x3

Nigeria

AG

GR

Ethiopia

AG

Kenya

CO

AG x2

Tanzania

AG

South Africa

GR

India

GR

Phase I

Phase II

Grids GR

Housing HO

Industry IN

Agriculture AG

Cooking CO



Success stories

Phase I



Planet Smart Cities Brazil

Planet Smart City's D2FX project enables social housing residents in Brazil to **optimize energy consumption**.

The project promotes flexibility in energy demand and offers great potential for the dissemination of smart energy solutions in vulnerable communities.

-60/70%

savings on
electricity bills

120 MWh

electricity from
renewable sources

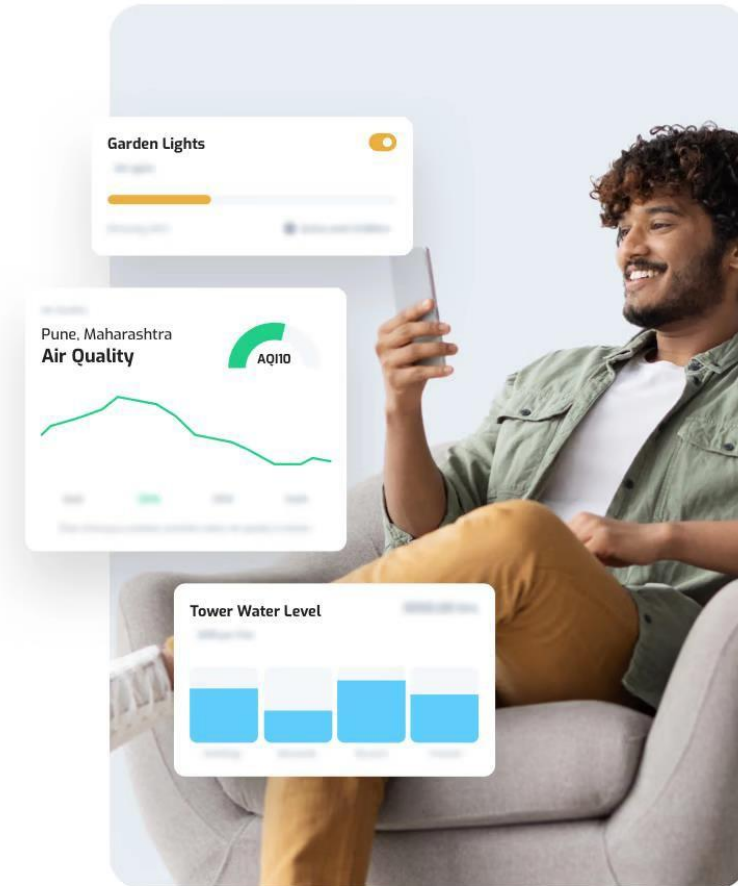


-60%

reduction in
blackout duration
thanks to batteries

-63.6 tCO₂

avoided emissions



Enelflex Colombia

Enel's Enelflex project is the **first demand-side response initiative** in Colombia, with the aim of improving the flexibility of the electricity grid for over 322,000 users.

By redirecting large consumers toward self-produced renewable energy, interruptions and emissions are reduced.

9.3 MW

guaranteed by
the demand flexibility



Equivalent to
12%
of **local demand**

48.8M €

avoided for grid
upgrades

-636 tCO₂

saved annually by
generators



Phase I Impact



340,000
involved users

9.2M USD
mobilized

4 projects
Brazil | Colombia
India | Morocco

5,166 T CO₂
emissions reduction

26 MW
generated



Phase II

3DEN

3DEN Current Status





Pilot projects

Selected

Enel Grids	BRIDGE	DESAIN	Simusolar	Agrivalue	Harvist
Brazil Italy Urban Energy	Tunisia Tunisia Agrifood	Tunisia Italy Urban Energy	Tanzania Tanzania Agrifood	Kenya Kenya Agrifood	Nigeria UK Agrifood

Water4agri	Smart Solar Dairy Hubs	HARVEST	FlexZA-Minigrid	AI-based Irrigation	Urban eCooking	Verde
Tunisia Italy Agrifood	Kenya India Agrifood	Tunisia Italy Agrifood	South Africa Italy Urban Energy	Etiopia Italy Agrifood	Kenya & Tanzania Kenya Urban Energy	Brazil Italy Urban Energy



Example 1

BRIDGE

Dairy Tunisia

Lead by
MEDREC (Tunisia)

Partners

Università Cattolica del Sacro Cuore – UCSC (Italy)
National Agronomic Institute of Tunisia – INAT (Tunisia)
ENERSEM Srl (Italy)
Delice CLC · STIAL · NATILAIT (Tunisia)
ANME · IRESA (Tunisia)

Grant

\$ 2.4M (70% grant 3DEN)

Objective

Tunisia's milk industry sector lacks visibility on energy, water, and carbon performance, and BRIDGE addresses this by **digitalizing the full value chain** to help farmers and processors reduce their environmental footprint while supporting national climate goals and enabling replication.

Solution

Two integrated digital systems:

- Decision Support System (DSS) for farmers: real-time monitoring of carbon and water footprints with actionable recommendations
- Energy & Water Management System (EMS/WMS) for processors: tracks, benchmarks and optimises resource consumption across dairy plants

Impact

- 57,228 tCO₂e/year abatement at pilot scale
- 20,002 Water use reduction (m³/year) at farm phase
- EMS/WMS covering 70%+ of national dairy market



Example 2

FlexZA

Enhancing Energy Resilience in South Africa via Smart Microgrids

Lead by
ENGREEN (Italy)

Partners

North-West University (South Africa), R2M Solution (Italy), Vittoria Tech (South Africa), ARTIO.Tech (Greece)

Grant

\$ 2 M (70% grant 3DEN)

Objective

FlexZA pilots a **smart digital microgrid at NWU campus** to ensure uninterrupted power for critical public services during load-shedding through automated switching to island mode using existing solar and battery infrastructure, creating a scalable model.

Solution

- Automated grid-to-island switching via PLC and IoT sensors
- SCADA/cloud platform for real-time monitoring and analytics
- Priority-based load management to protect critical services
- Replication toolkit for scaling to other institutions across Sub-Saharan Africa

Impact

- 150.4 tCO₂e/year abatement at pilot scale
- Elimination of blackout disruptions at pilot campus
- PV generation will save ~110 MWh/year at NWU campus



Example 3

AIRSI-TT

AI-based irrigation system in Ethiopia

Lead by

RINA Consulting S.p.A. (Italy)

Partners

North-West University (South Africa), R2M Solution (Italy), Vittoria Tech (South Africa), ARTIO.Tech (Greece)

Grant

\$ 2 M (70% grant 3DEN)

Objective

Smart, AI-based solar **irrigation systems for sugarcane** in drought-prone areas.

Solution

- IoT sensors + satellites for monitoring
- AI for optimal irrigation forecasts
- Digital twin of plantations
- Smart solar pump
- Training for local farmers

Impact

- Increase in agricultural yields by 15-20%
- 35-40% reduction in water consumption
- Replacement of diesel-powered systems with solar



Next steps

Phase III

3rd Call for proposals

Indicative: Sept 2026

- Extension of both geographical and thematic scope of 3DEN
- Expected broader participation

Knowledge management

- Development of the official 3DEN website and branding
- Knowledge sharing
- Matchmaking system: creation of a 3DEN Community

3DEN Facility

- Gradual shift away from a system primarily based on grant instruments to a Finance Facility
- Commercial viability of pilot projects



Italy for Mission Innovation (I4MI)

UNDP Rome Center

Italy for Mission Innovation - Objective



Through **Italy for Mission Innovation**, **MASE** consolidates Italy's role as an international hub for sustainable energy innovation, in partnership with the **UNDP Rome Centre** and with the scientific support of **Ricerca Sistema Energetico (RSE)**.



Action Plan

Italy for Mission Innovation focuses on the following **lines of action**:

1 Financing of pilot demonstration projects

Projects will be selected by the UNDP Rome Centre through **competitive calls for proposals**, each dedicated to a specific **technological area**: energy flexibility, renewable energy and sustainable technologies, microgrids, infrastructure, and digitalization for energy efficiency.

2 Project amount

Eligible projects must comply with the following limits:
Total Budget: between €500.000 and €2.500.000

3 Local presence

Projects must be aligned with local needs and the requirements proposed by **local governments**.

The Italy for Mission Innovation initiative, promoted by MASE in partnership with the UNDP Rome Centre, has been structured into specific lines of intervention aimed at supporting sustainable energy innovation.

Italy for Mission Innovation - Governance



The governance model of **Italy for Mission Innovation** in Italy is based on three institutional pillars: **MASE** as strategic promoter, the **UNDP Rome Centre** as management hub, and **RSE** as scientific and technical reference point.



The **Ministry of the Environment and Energy Security (MASE)** is responsible for jointly supervising the entire initiative with UNDP. In addition, UNDP will act as the **managing entity** of the initiative



UNDP is responsible for the following activities: **drafting the Terms of Reference for the call**, communicating with and engaging beneficiaries, **selecting projects**, and monitoring and reporting on their **implementation**.



In this context, MASE has identified **RSE as scientific advisor**. RSE supports the drafting of the Terms of Reference and involves the Italian private sector in the co-design of the RFPs.

I4MI- Areas of Intervention and Geographic Focus

Sector of intervention



Education and training
(pilot projects for technical centres
and academic exchanges)



Health
(telemedicine, health training,
digital systems)



Water
(sustainable management, wells,
efficient irrigation)



Agriculture
(modernization, food security,
climate adaptation)



Energy
(renewables, rural electrification,
green infrastructure)



**Physical and digital
infrastructure**
(railways, connectivity,
digitalization)

Geographic focus

The **geographic focus** of the Italy for Mission
Innovation initiative is the **entire african continent**.



Thank you

