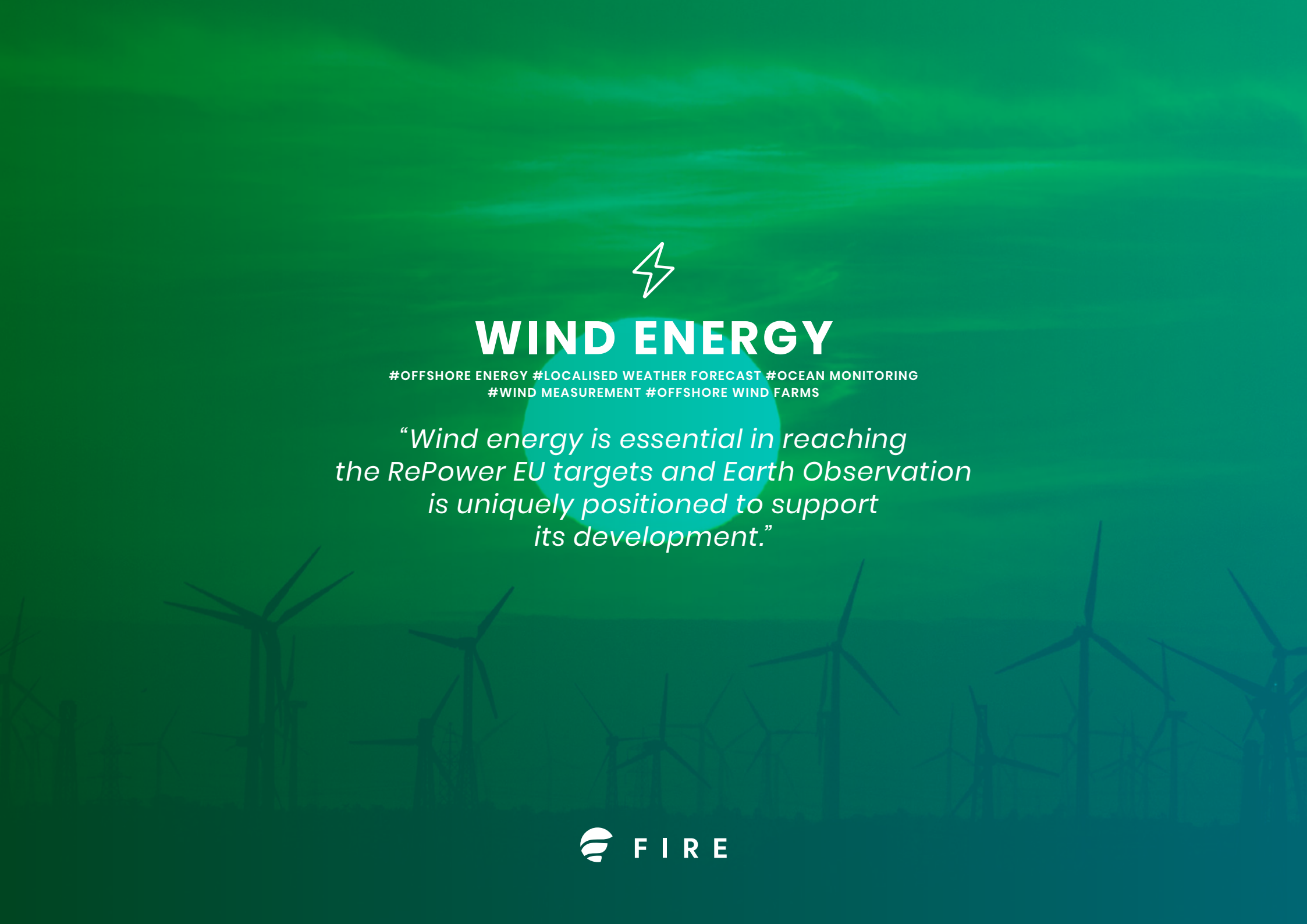
WIND ENERGY
#OFFSHORE ENERGY #LOCALISED WEATHER FORECAST #OCEAN MONITORING
#WIND MEASUREMENT #OFFSHORE WIND FARMS
“Wind energy is essential in reaching
the RePower EU targets and Earth Observation
is uniquely positioned to support
its development.”
FIRE

TODAY

WHERE ARE WE NOW?

The current state-of-play in the sector. Maturity of EO and its contribution to addressing the challenges of the sector.

POLICY

- Strong **political momentum** at the EU and global level.
- Policy is in place addressing the need to increase the share of **renewable energy** and leverage the opportunities of **offshore wind farms** in a **sustainable** way, while taking into account the **growing global energy demand**.

Main relevant policies and initiatives:

- RePower EU
- EU Strategy on Offshore renewable energy
- EU's Strategy for a Sustainable Blue Economy (EU Green Deal)

EO MARKET MATURITY

- **Existing initial traction** of EO-based applications in the sector.
- EO is used in renewable energy **site selection, planning** and **monitoring**, **renewable energy assessment potential**, and **forecasting**.
- **Future substantial growth** is expected.

R&D

- **Optimizing prediction models** for localised weather, output and operations.
- Innovations, expansion and management of **offshore wind farms**.
- Predicting future **energy demand and supply**.
- Focus on **EO integration with in-situ** and (emerging) **technologies** and **data streams**.

TOMORROW

WHERE DO WE WANT TO BE?

Guiding aims and priorities for the future as defined through the FIRE consultation process with sectoral users and EO professionals.

METOCEAN PARAMETER MEASUREMENT

- **Use of satellite-based measurements** with **scatterometry** and **SAR** for **measuring offshore wind patterns**, both for analysis of long terms trends and for input to operations.
- **Use of altimetry** to determine the **sea surface level** and **significant wave height**.

LOCALISED WEATHER PREDICTION

- **Precise weather forecasts** at the turbine scale.
- **Plan the operations and the supply** of a wind farm.
- **Improved warning of extreme events** with the use of EO solutions.

INTEGRATED MODELS OF SUPPLY AND DEMAND

- **Analyse long term trends** in both energy potential and energy demand.
- **EO solutions** for the sector including weather forecasts, in situ data, socio-economic data and historic records of electricity demands.

ECOSYSTEM IMPACT ASSESSMENT

- **Full use of EO data** in identifying and monitoring **"go-to-areas" for the deployment of wind farms** (and other renewables).

HOW TO GET THERE?

Selected actions to be taken by the community of practitioners (both EO and non-EO) to achieve the envisaged future.

ROADMAP ACTIONS

01 AWARENESS-RAISING IN THE WIND ENERGY INDUSTRY

Further **promote awareness of EO** within the wind industry to **increase the uptake of current services** by key players. The established dialogue will also serve to **build relationships** between the two communities while **increasing interest in further developments** ahead of subsequent actions.

SHORT-TERM
1-2 years

IMPACT

End users	MEDIUM
EO service providers	LOW
Multipliers	HIGH
Governance actors	LOW

WHY

- **Build up the community** that will participate in further research.
- **Spread of awareness** about EO within the wind energy community.

HOW

Showcase existing case studies on EO benefits for the wind energy industry.

Widely disseminate the case study through various channels to the targeted audience.

Ensure significant **EO representation at key wind industry events**, through submitted presentations, manned stands or side event organisation.

WHO

EU institutions

Sector professionals

End users

HOW TO GET THERE?

Selected actions to be taken by the community of practitioners (both EO and non-EO) to achieve the envisaged future.

ROADMAP ACTIONS

02 DEMONSTRATE VALUE OF EO IN VARIOUS OPERATIONAL WIND ENERGY SCENARIOS

Support key case studies of EO use within the wind energy industry covering themes in areas of high interest. As well as being valuable research, these will also serve to further promote EO within the industry, while building bridges between the EO and the wind industry by allowing them to work together on a key project.

MID-TERM
2-5 years

IMPACT

End users	MEDIUM
EO service providers	MEDIUM
Multipliers	MEDIUM
Governance actors	MEDIUM

WHY

- Benefits to end users: **new solutions** based on EO meeting real user needs.
- Benefits to EO service providers: **new opportunities to develop and promote solutions** to the wind industry.
- Multipliers: **building links** between the two communities that will last beyond the immediate project lifetimes.

HOW

Provide funding for a series of case studies for improved usage of EO by the wind energy industry.

Funding for these case studies could be provided either through a **Horizon Europe call** (IA) or through a **call similar to the "Copernicus Demos" ITT issued by EUSPA**.

WHO

EU institutions | Sector professionals | EO service providers | End users

HOW TO GET THERE?

Selected actions to be taken by the community of practitioners (both EO and non-EO) to achieve the envisaged future.

ROADMAP ACTIONS

- 01 AWARENESS-RAISING IN THE WIND ENERGY INDUSTRY
- 02 DEMONSTRATE VALUE OF EO IN VARIOUS OPERATIONAL WIND ENERGY SCENARIOS
- 03 **DEVELOP INTEGRATED SUPPLY AND DEMAND MODELS EXPLOITING EO AND COPERNICUS**
- 04 DEVELOP LONG-TERM FORECASTING CAPABILITIES

03 DEVELOP INTEGRATED SUPPLY AND DEMAND MODELS EXPLOITING EO AND COPERNICUS

Development of **integrated supply & demand models** for the renewable energy industry, ensuring that they fully exploit the capacities of Earth Observation and Copernicus.

MID-TERM
2-5 years

IMPACT

End users	MEDIUM
EO service providers	LOW
Multipliers	HIGH
Governance actors	HIGH

WHY

- The key output is the **availability of an integrated demand and supply model** available to regulators and industry stakeholders.
- Technical impacts include **improved accuracy of the model outputs against currently used methods**, e.g. more accurate and timely prediction of critical periods (high demand/low supply).

HOW

Develop an integrated model of demand and supply using **inputs from multiple sources**.

Dedicated **investment through a Horizon call**.

WHO

EU institutions | Copernicus Services | Researchers, academia | Sector professionals

HOW TO GET THERE?

Selected actions to be taken by the community of practitioners (both EO and non-EO) to achieve the envisaged future.

ROADMAP ACTIONS

04 DEVELOP LONG-TERM FORECASTING CAPABILITIES

The development of **long-term forecasting capabilities** enabling **realistic planning of the required wind energy capabilities** is essential for the realisation of the ambitious goals under **RePowerEU**.

MID-TERM
2-5 years

IMPACT

End users	MEDIUM
EO service providers	LOW
Multipliers	HIGH
Governance actors	HIGH

WHY

- The key output is the **availability of a long-term demand and supply** prediction model available to regulators and industry.
- Technical impacts include **improved accuracy of the model outputs against currently used methods**.

HOW

Link the **industry's models** to **long-term projections of demand for electricity and wind supply** in a changing climate.

Link this task to the **Destination Earth** (DestinE) **initiative**, either through being specifically performed as **a use case** or through **a separately funded project** but with strong links to DestinE.

WHO

EU institutions | Copernicus Services | Researchers, academia | Regional/national authorities

... to know more ...

The FIRE project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 869634.