

Benefits to Offshore Wind and Perceived Drawbacks

The benefits associated with offshore wind are outlined in Table 1.

Benefit	Comment
Security of Energy Supply	<ul style="list-style-type: none"> Wind enhances energy supply, diminishing the need for oil and gas
Power Grid Stability	<ul style="list-style-type: none"> Offshore wind farms are important for energy transition success and grid stability
Sustainable Grid Power	<ul style="list-style-type: none"> Wind energy is a clean, free, and abundant resource that can be extracted and converted into electricity without emissions
Environmental Protection Standards	<ul style="list-style-type: none"> The industry complies with international regulations and strict environmental standards
Reduced Pollution	<ul style="list-style-type: none"> Wind farming is a renewable energy source
Affords Benefits to the Marine	<ul style="list-style-type: none"> Bans on fishing in offshore wind farms improves fish stocks and wind turbine foundations act as artificial reefs
Green Hydrogen Production	<ul style="list-style-type: none"> Green hydrogen enables energy-intensive industries such as cement, steel, or chemical plants to improve significantly their carbon footprint
High Acceptance Level	<ul style="list-style-type: none"> Far-shore farms are preferred, as they are less visible but can be more expensive and less feasible
Job Creation	<ul style="list-style-type: none"> Offshore investment creates opportunities in manufacturing, engineering, construction, marine services, local coastal transport, turbine operations, and professional services. Enables education and training opportunities
Export Potential	<ul style="list-style-type: none"> The market for offshore wind energy is growing rapidly

Table 1: Key Benefits to Offshore Wind

Offshore wind energy can serve as the foundation for security of supply in a future renewable energy system. Oil and gas reserves are limited, more polluting, and when externalities are considered, more expensive. Wind energy is a clean, free, and abundant resource that can be extracted and converted into electricity without emissions. Phasing out fossil fuelled power plants and replacing them with wind power would help to address climate change. As a cleaner energy source, it would reduce unnecessary health problems, increase lifetime expectancy, and mitigate health related costs. Offshore wind farms are in-dispensable for energy transition and are an important factor for the stability of the power grid. Being located offshore, they will experience a much greater percentage of consistent winds compared to onshore wind turbines. The wind does not encounter obstacles such as buildings, hills, valleys, and trees that can impede wind speeds. Offshore wind turbines are able to generate more power compared to other onshore turbines.

Wind farming is a renewable energy source that reduces air pollution by replacing the more polluting energy sources with wind-generated power, helping to reduce emissions of sulphur dioxide, nitrogen oxides, and carbon dioxide. Significant efforts are being

undertaken in all areas of the offshore wind industry to protect the environment. The industry complies with international regulations and strict environmental standards, and it designs its production processes as ecologically as possible. The marine environment can benefit from offshore wind. The ban on fishing in offshore wind farms can have a positive effect on fish stocks. The foundations of offshore wind turbines can also act as artificial reefs. The use of green hydrogen produced with renewable energy may enable energy-intensive industries such as cement, steel, or chemical plants to significantly reduce their carbon footprint. The production of green hydrogen from offshore wind energy using electrolysis is already possible on an industrial scale. Hydrogen production from wind power is set to play a fundamental role, especially in sector coupling. One example is the production of synthetic fuels from green hydrogen for aviation.

Social acceptance of offshore wind is expected to increase substantially, as people become aware of the positive impacts of offshore wind energy. Wind turbines have been known to

IEA Wind (TCP-Technology Cooperation Programme) Task 28 Joint Operating Agents:

Dr. Garry Keegan, CEO, Infrastructure Projects Consulting, Dublin, Ireland gmk@ipc10.com

Dr. Suzanne Tegen, Assistant Director, Center for the New Energy Economy Denver, Colorado, USA Suzanne.tegen@colostate.edu

This project has been supported with financial contribution from Sustainable Energy Authority of Ireland under the SEAI Research, Development and Demonstration funding programme 2019, Grant number 19/RDD/554.

Disclaimer: The authors assume no responsibility or liability for any errors or omissions in the content of this summary guide. The information contained in this summary guide is provided on an "as is" basis with no guarantees of completeness, accuracy, usefulness, or timeliness. All views expressed represent the author's opinion based on their experience and expertise.

produce a lot of noise. As offshore turbines are typically located far from the coast, and away from residential areas, noise is not a significant issue. Consequently, offshore wind farms enjoy a high level of acceptance among the population. Far-shore farms may be preferred to near-shore farms, as they are less visible, however these can be expensive, also floating wind turbine technology requires further development which will further enable the feasibility of far-shore.

The Global Wind Energy Council (GWEC) and the Global Wind Organisation reported in April 2020 that offshore markets will require 77,000 trained employees by 2024 to support growth targets. They calculate 2.5 jobs per megawatt per project.¹ It is important to note, job creation may not necessarily be locally focused, so projects need to be careful not to over-promise and under-deliver in this regard when communicating with local host and coastal communities. The value chain of the offshore wind industry has been characterised by small and medium-sized enterprises from the beginning, which can bolster local host-community, port, and coastal economies. The industry is strongly

committed to a growing international training sector and has a high level of qualification. Offshore investment will create opportunities in manufacturing, engineering, construction, marine services, local coastal transport, turbine operations, and professional services. Peripheral coastal communities could be transformed by these new employment opportunities. The know-how and added value of offshore wind industry offer substantial potential for export. The market for offshore wind is growing rapidly, not only in Europe, but also in Asia and North America. The International Energy Agency estimates the capacity for offshore wind farms will increase by a factor of fifteen over the next twenty years.

Perceived Drawback	Comment
Natural Environment	<ul style="list-style-type: none"> Potential decrease in fish-stock and marine life Concerns for the bird population and their flightpaths Changes to the natural beauty and quality of coastline Eroding the value of unspoilt nature Visual intrusion due to turbines
Livelihood	<ul style="list-style-type: none"> Local fishermen are concerned about the loss of their livelihood, skills, and way of life Interference with shipping routes and increased risk of collisions
Culture	<ul style="list-style-type: none"> Interrupt or damage local culture and values Poor fit with the ascribed characteristics and values of a coastal landscape Damaging the attachment people have to an area Potential for a democratic deficit
Living Environment	<ul style="list-style-type: none"> Erode the local residents' living environment in terms of their view and real estate value Negative effects on recreational activities including boating, fishing and yachting
Business Interests	<ul style="list-style-type: none"> Negative impact on tourism, heritage, fishing, leisure crafting, air traffic, and telecommunications
Health and Safety	<ul style="list-style-type: none"> The presence of EMF Potential and safety impacts of cable landing points/onshore grid connections, cable routes, and substations

Table 2: Stakeholders' Perceived Drawbacks of Offshore Wind



IEA Wind (TCP-Technology Cooperation Programme) Task 28 Joint Operating Agents:

Dr. Garry Keegan, CEO, Infrastructure Projects Consulting, Dublin, Ireland gmk@ipc10.com

Dr. Suzanne Tegen, Assistant Director, Center for the New Energy Economy Denver, Colorado, USA Suzanne.tegen@colostate.edu

This project has been supported with financial contribution from Sustainable Energy Authority of Ireland under the SEAI Research, Development and Demonstration funding programme 2019, Grant number 19/RDD/554.

Disclaimer: The authors assume no responsibility or liability for any errors or omissions in the content of this summary guide. The information contained in this summary guide is provided on an "as is" basis with no guarantees of completeness, accuracy, usefulness, or timeliness. All views expressed represent the author's opinion based on their experience and expertise.