A TETRA TECH COMPANY

GEOGRAPHIC INFORMATION SYSTEM (GIS) TECHNICAL HANDBOOK FOR REGIONAL RENEWABLE ENERGY STRATEGY (RRES) METHODOLOGY STEP 3: *DETERMINATION OF RENEWABLE ELECTRICITY RESOURCE POTENTIAL*

A Guide for Regional Assemblies to complete Step 3 of the RRES Methodology

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Prepared by:	**Prepared for:**
RPS	**SEAI**

Contents

Tables

Figures

Glossary of Terms, Abbreviations, Acronyms and Document Key

Term	Definition[1]
Attribute or Attribute Table	Values that provide information about a feature, raster cell, or record in a GIS. For example, the attributes of a building feature might include its name, city, and label font when shown on a web map.
Available Areas	The Areas remaining following the removal of the Exclusion Areas.
Baseline	The baseline is defined as the current 'energised' capacity based on renewable electricity projects (onshore wind and solar photovoltaics (PV)) that are installed and operational in the region.
Buffer	An area of specified distance around one or more features resulting in a polygon enclosing a point, line, or polygon at the specified distance. It should be noted that for the purposes of this report, this is a GIS term taken or adapted from the Environmental Systems Research Institute (ESRI) Geographic Information System (GIS) Dictionary[1].
Capacity Intensity Factor (CIF)	A Capacity Intensity Factor (CIF) is an assumed rate of energised capacity over a square kilometre (km^2) if that land was devoted to the renewable energy technology in question. CIF are measured in megawatts (MW) per kilometre squared (km^2). Note: The following CIFs should be used for this exercise: • Wind: 15 MW/km^2 • Solar Photovoltaic (PV): 50 MW/km^2 These CIFs have been developed based on the Sustainable Energy Authority of Ireland (SEAI) research, which was based on data on existing projects, previous research, and industry reports. Commercial considerations and design trends in technology were also taken into account.
Constraints	These are likely or potential impediments, barriers or restrictions to grid-scale onshore wind energy or solar photovoltaic (PV) development.
Criteria	These are measurable attributes.
Defined Area	A Defined Area is the area located inside the boundary of any particular feature e.g. the area inside a CSO settlement boundary, Special Area of Conservation (SAC), etc.
Definition Query	A Definition Query is a tool used in a Geographic Information System (GIS) to filter Features in a GIS Layer based on specific criteria. It allows the user to display and work with only a subset of the data without altering the original dataset. This is particularly useful for focusing on relevant features for analysis, visualisation, or processing. It should be noted that for the purposes of this report, this is a GIS term taken or adapted from the Environmental Systems Research Institute (ESRI) GIS Dictionary[1].
Energised Capacity	Energised Capacity is defined as the maximum amount of electricity that can be generated by renewable electricity projects (grid-scale onshore wind and solar photovoltaic (PV)) that are currently installed and operating in the region. It is measured in total megawatts (MW).
Exclusion Areas	These are areas that have been identified through the geoprocessing of Exclusion Criteria and subsequently determined to be unsuitable for renewable electricity development. They should, therefore, not be considered for further analysis. See further details in **Phase B - Stage 1** and **Figure 13**.
Exclusion Criteria	Exclusion Criteria are definitions applied to datasets that when inputted into a Geographic Information System (GIS) model, results in the identification of areas that are unsuitable for renewable electricity development and should therefore not be considered for further analysis. Minimum Exclusion Criteria have been identified for the purposes of this exercise and are detailed in **Phase B** below.
Feature[1]	These are any part of the earth's surface, or anything found on the earth's surface, that can be represented on a map. Features can represent various types of geographic entities, such as points, lines, polygons, or more complex objects like networks or surfaces. Each feature typically has associated attributes that provide additional

[1] GIS terms taken or adapted from ESRI GIS Dictionary: https://support.esri.com/en-us/gis-dictionary

Term	Definition[1]
	information - such as its name, population, or elevation - and may have additional, spatial characteristics, such as geographic coordinates. It should be noted that for the purposes of this report, this is a GIS term taken or adapted from the Environmental Systems Research Institute (ESRI) GIS Dictionary[1].
Gap-to-Capacity Allocation	The Gap-to-Capacity Allocation refers to the difference between the current renewable electricity energised capacity for the region and the Regional Renewable Electricity Capacity Allocations (as set out in the revised National Planning Framework 2025). This difference is measured in megawatts (MW).
Geospatial Analysis	This is the process of collecting, managing, analysing and visualising geographic data using Geographic Information System (GIS).
Geographic Information System (GIS)	A Geographic Information System (GIS) is a system that creates, manages, analyses and maps all types of data. GIS connects data to a map, integrating location data (where things are) with all types of descriptive information (what things are like there). This provides a foundation for mapping and analysis that is used in science and almost every industry. GIS helps users understand patterns, relationships and geographic context. The benefits of using GIS include improved communication and efficiency as well as better management and decision making.
GIS Layer[1]	This is the visual representation of a geographic dataset in any digital map environment. A Geographic Information System (GIS) Layer contains a set of Features. It should be noted that for the purposes of this report, this is a GIS term taken or adapted from the Environmental Systems Research Institute (ESRI) GIS Dictionary[1].
GIS Project	A Geographic Information System (GIS) Project is a file set up in GIS to organise, manage and display the resources related to the work; allowing data visualisation.
Project Delivery Rate (PDR)	A Project Delivery Rate (PDR) is an assumed percentage of success for converting land that is theoretically available (based on high-level mapping exercises) into an operational renewable electricity project. It is based on an assessment of cumulative probability of previous projects and informs the likelihood of a given land area, ultimately and successfully, converting into an operational grid-scale onshore wind or solar PV development. The PDR takes into account attrition at all stages of project delivery, including land availability, planning consent, grid connection, power purchase auction/ agreement and project funding. Note: A PDR of 15% should be used for the Step 3 exercise. This PDR was developed by the SEAI, based on practical experience from historical project development.
Ramsar site	A Ramsar site is a wetland site designated to be of international importance under the Ramsar Convention, also known as "The Convention on Wetlands", an international environmental treaty signed on 2 February 1971 in Ramsar, Iran, under the auspices of UNESCO.
Raster Data	This is data, used in Geographic Information Systems (GIS), which is made up of a grid of equally sized pixels, each with a single unique value (e.g. colour, elevation, temperature). Displaying data in raster form is best suited to continuous data, where values smoothly transition across space. It should be noted that for the purposes of this report, this is a GIS term taken or adapted from the Environmental Systems Research Institute (ESRI) GIS Dictionary[1].
Regional Renewable Electricity Capacity Allocations	Regional Renewable Electricity Capacity Allocations (measured in MW) set out what each Regional Assembly must plan for in order to facilitate the 2030 national renewable electricity generation targets and as set out in the revised National Planning Framework 2025. These allocations are to be integrated into the Regional Spatial and Economic Strategies and the associated Regional Renewable Energy Strategies and in addition are to be translated to county-level target power capacity allocations that will inform City and County Development Plans.
Renewable Electricity	Renewable Electricity is the electricity that is generated from renewable energy sources such as wind, solar, hydropower, or ocean energy. This Handbook focuses on

<table>
<tr><th>Term</th><th>Definition[1]</th></tr>
<tr><td></td><td>renewable electricity generated from grid-scale onshore wind and solar photovoltaic (PV) only.</td></tr>
<tr><td>Renewable Energy</td><td>‘Energy from renewable sources’ or renewable energy refers to energy derived from renewable non-fossil sources, namely wind, solar (solar thermal and solar PV) and geothermal energy, osmotic energy, ambient energy, tide, wave and other ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas, and biogas[2].</td></tr>
<tr><td>Geospatial Sensitivity Classification</td><td>These are classifications assigned to Available Areas based on defined Sensitivity Criteria following a process of geospatially classifying sensitivity (as set out in detail in Phase B – Stage 2). Sensitivity, in this context, means the potential for renewable electricity development to have a human health and/or environmental impact, with some cultural and infrastructural aspects considered.
Ultimately, Available Areas should be geospatially classified into High, Medium, Low or No sensitivity in terms of renewable electricity development.
<table>
<tr><td>High Sensitivity Areas</td><td>These are areas within which renewable electricity development (grid-scale onshore wind and solar photovoltaic (PV)) could have a potentially significant negative effect on human health, the environment, cultural heritage and/or other infrastructure.</td></tr>
<tr><td>Medium Sensitivity</td><td>These are areas within which renewable electricity development (grid-scale onshore wind and solar PV) could have a potentially moderate negative effect on human health, the environment, cultural heritage and/or other infrastructure</td></tr>
<tr><td>Low Sensitivity</td><td>These are areas within which renewable electricity development (grid-scale onshore wind and solar PV) could have a potentially limited effect on human health, the environment, cultural heritage and/or other infrastructure.</td></tr>
<tr><td>No Sensitivity</td><td>These are areas within which renewable electricity development (grid-scale onshore wind and solar PV) would not be expected to have any negative impact on human health, the environment, cultural and/or other infrastructure.</td></tr>
</table></td></tr>
<tr><td>Sensitivity Criteria</td><td>These are attributes/feature types/proximity to specific features that increase the sensitivity of an area in terms of renewable electricity development (grid-scale onshore wind or solar photovoltaic (PV)). Sensitivity, in this context, means the potential for renewable electricity development to have a human health and/or environmental impact, with some cultural and infrastructural aspects considered.
A range of Sensitivity Criteria have been identified for the purposes of this exercise and are detailed in Phase B – Stage 2.</td></tr>
<tr><td>Special Areas of Conservation</td><td>A Special Area of Conservation is a site designated under the EU Habitats Directive that supports natural habitats and/or species of European Union importance and enables them to be maintained or, where appropriate, to be restored at a favourable conservation status in their natural range.</td></tr>
<tr><td>Special Protection Areas</td><td>A Special Protection Area is a site designated under the EU Birds Directive to safeguard populations of listed rare, vulnerable, or migratory bird species, all regularly and naturally occurring wild bird species within the EU, as listed by the European Commission.
It should be noted that some Special Protection Areas may overlap with Special Areas of Conservation.</td></tr>
<tr><td>Total Theoretical Land Area</td><td>The total land area, measured in km^2, to be identified, accounting for the assumed Project Delivery Rate (PDR), in order to ensure the Minimum Required Land Area is delivered.</td></tr>
<tr><td>Vector Data</td><td>This is data, used in Geographic Information Systems (GIS), represented through geometric shapes (i.e. lines, points, and polygons). Vector data offers high precision and accuracy and is best suited for representing discrete well-defined features.</td></tr>
</table>

[2] Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652

Term	Definition[1]
	It should be noted that for the purposes of this report, this is a GIS term taken or adapted from the Environmental Systems Research Institute (ESRI) GIS Dictionary[1]. See the following non-technical for more information: GIS Handbook for municipalities - UN[3]

Abbreviation / Acronym	Definition
AA	Appropriate Assessment
CAP	Climate Action Plan
CDP	County Development Plan
CFRAM	Catchment Flood Risk Assessment and Management
CIF	Capacity Intensity Factor
DCEE	Department of Climate, Energy and the Environment
ECP	Enduring Connection Policy
GIS	Geographic Information Systems
FPM	Freshwater Pearl Mussel
km / km^2	Kilometre / Kilometres Squared
LAs	Local Authorities
MW	Megawatt
NHA	Natural Heritage Area
NPF	National Planning Framework
NPWS	National Parks and Wildlife Service
PDR	Project Delivery Rate
PV	Photovoltaic
RAs	Regional Assemblies
RSES	Regional Spatial and Economic Strategy
RRES	Regional Renewable Energy Strategy
RPO	Regional Policy Objective
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SEAI	Sustainable Energy Authority of Ireland
SFRA	Strategic Flood Risk Assessment
SPA	Special Projection Area
UNESCO	United Nations Educational, Scientific, and Cultural Organisation

[3] https://unhabitat.org/sites/default/files/download-manager-files/GIS%20Handbook%20for%20Municipalities.pdf

1 BACKGROUND AND OVERVIEW TO THE HANDBOOK

Aligned with the requirements of Section 29(1)(e) of the Planning and Development Act 2024, the aim of this Technical Handbook (which forms part of the wider Regional Renewable Energy Strategy (RRES) Methodology), is to support the Regional Assemblies in undertaking **Step 3 of the six-step Regional Renewable Energy Strategy (RRES) Methodology: Determining the Renewable Electricity Resource Potential for the region** (as illustrated in **Figure 1**).

Solely acting as a decision support tool, the identification of renewable energy resource potential for the region through this RRES methodology, is undertaken to support the allocation of Regional Renewable Electricity Capacity Allocations, in line with National Planning Objective 74 of the Revised National Planning Framework (NPF)[4].

The RRES is prepared as forming part of the wider Regional Spatial and Economic Strategy (RSES) and, as such, will not formally spatially designate or allocate where (within Planning Authority administrative areas) renewable electricity capacity may be developed. The statutory designation of lands for renewable energy development is to be undertaken as part of the City / County Development Plan (CDP) process (as adopted by the Elected Members of the Local Authority), which may include a Local Authority Renewable Energy Strategy (LARES) or Wind Energy Strategy. As such, each individual Planning Authority is to determine which land areas are most suited and least suited for grid-scale renewable electricity development, following the completion and adoption of the RRES, by their respective Regional Assembly.

The RRES, will be subject to all statutory iterative environmental assessments, including, *inter alia*, Strategic Environmental Assessment (SEA)[5], Appropriate Assessment (AA)[6] and Strategic Flood Risk Assessment (SFRA)[7]. The RRES, as a component of the RSES, will also undergo statutory public consultation (in accordance with the requirements of the Planning and Development Act 2024) and will be adopted by the Elected Members of the Regional Assembly. The methodology set out hereunder, addressing Step 3 of the six-step RRES Methodology, should be appropriately integrated into those statutory processes.

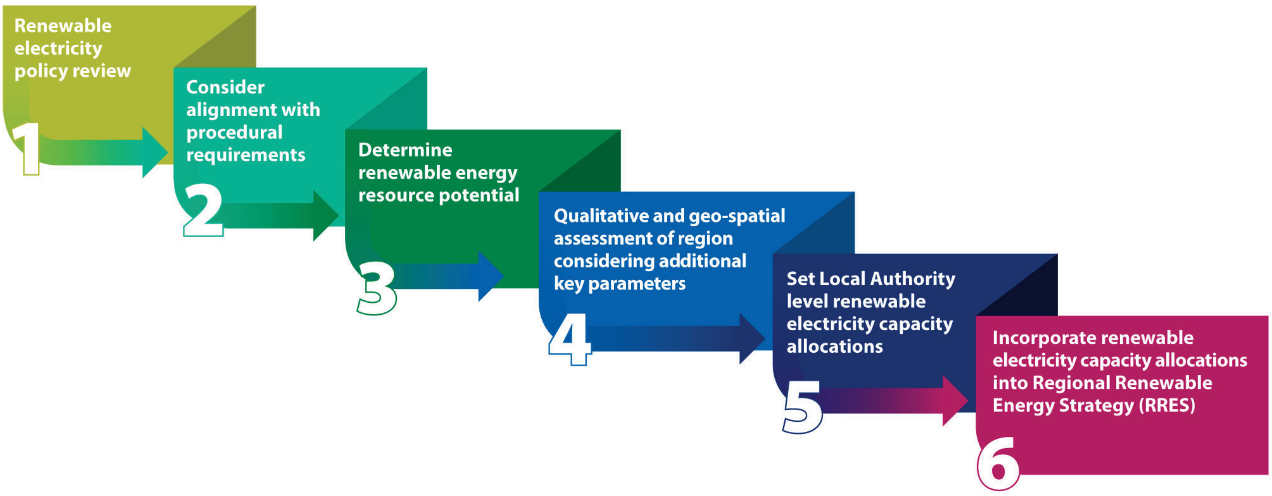

Figure 1. Overview of the 6-Step RRES Methodology.

[4] The National Planning Framework

[5] As required on a mandatory basis under S.I. 436 of 2004, as amended by S.I. 201 of 2011.

[6] As required under of Article 6(3) of the EU Habitats Directive (92/43/EEC) as transposed into Irish law through the European Communities (Birds and Natural Habitats) Regulations 2011 (S.I. 477 of 2011), as amended.

[7] As required as per the Planning and Development Act 2000 and Planning Act 2024.

Steps 3, 4 and 5 comprise the core methodology of developing a RRES. A detailed description of the interrelationship between these steps is outlined in **Figure 2.**

The outputs from Step 3 should subsequently feed into the delivery of the following steps:

- Step 4: Qualitative and geo-spatial assessment of region considering additional key parameters.
- Step 5: Set Local Authority-level Target Power Capacity Allocations.

The outputs from these steps should also be informed through the environmental assessment process of the RSES.

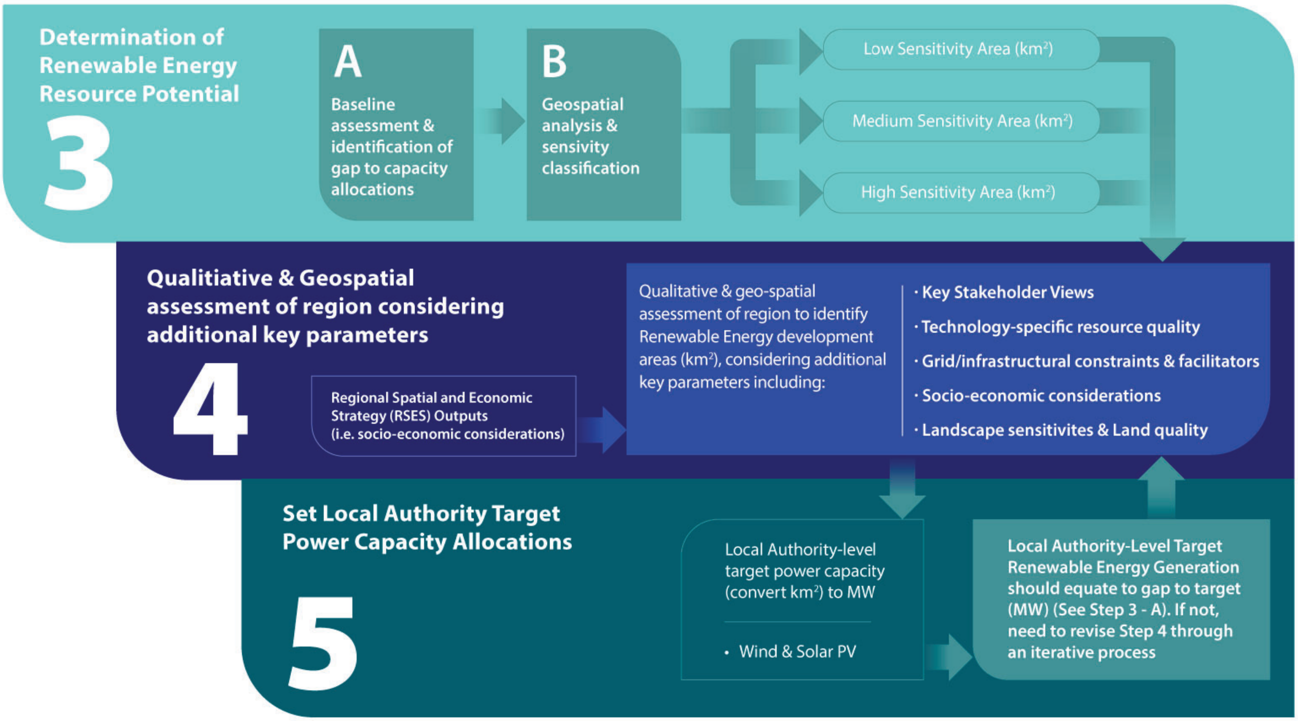

Figure 2. Steps 3-5 of the RRES Methodology.

This Handbook (and all supporting databases, parameters and weightings) has been developed in line with the Regional Renewable Electricity Capacity Allocations as set out in the Revised NPF[4] (which are aligned with national 2030 renewable electricity targets). The following sections and supporting parameters and weightings provide a guide for the effective implementation of these steps in line with the Revised NPF[4] requirements.

For the purposes of this Handbook, any examples have been developed using Geographic Information System (GIS) software[8].

[8] All examples in this Handbook have been prepared using ESRI ArcGIS Pro, Version 3.3. Refer to the metadata in Appendix Y for further information and command scripts used. Please note that this methodology can be replicated using other GIS software.

2 RRES METHODOLOGY: STEP 3 PROCESS IN DETAIL

The aim of Step 3 is to **determine the renewable electricity resource potential for the region**, by spatially identifying key areas (measured in kilometres squared (km^2) within the region, that can potentially be developed for renewable electricity projects (grid-scale onshore wind and solar photovoltaic (PV)), in a manner consistent with proper planning and sustainable development.

It is important to note that any planning applications for renewable energy developments, will continue to be subject to detailed assessment by the relevant local Planning Authority or An Coimisiún Pleanála and will be subject to all relevant planning and environmental legislation and regulations.

There are two Phases to this Step:

- **Phase A - Baseline assessment and identification of renewable electricity 'Gap to Capacity Allocation'; and**
- **Phase B - A geospatial analysis and sensitivity classification.**

Phase A involves undertaking a **Baseline Assessment** of the installed renewable electricity capacity (measured in megawatts (MW)) within the region and then identifying the remaining **Gap to Capacity Allocation** in order to achieve the regional '% of National Share in 2030' as set out in the First Revised NPF[9] (DHLGH, 2025, *pg. 135)*, which is aligned with the 2030 National Targets set out in the Climate Action Plan (CAP 2025) (see **Figure 3**).

Key Targets

National Target	2025	2030
Renewable Electricity Share	50%	80%
Onshore Wind	6 GW	9 GW
Solar	Up to 5 GW	8 GW
Offshore Wind	-	At least 5 GW
New Flexible Gas Plant	-	At least 2 GW
Demand Side Flexibility	15-20%	20-30%

Figure 3. 2030 National Targets as set out in CAP 2025[10].

In line with a spatial plan-led approach, the Gap to Capacity Allocation will ultimately be converted to total required land-take (measured in km^2) as opposed to renewable electricity capacity (measured in MW). This conversion is necessary to directly inform the subsequent spatial allocation and designation by each Local Authority (as part of their CDPs), within their respective administrative areas, so that, collectively, national renewable electricity targets can be met. Detailed instructions for undertaking this gap analysis and conversion are set out below.

Phase A has five key stages (as illustrated in **Figure 4**):

- Stage 1 - Baseline Assessment;
- Stage 2 - Determine the 2030 Regional Renewable Electricity Capacity Allocations;
- Stage 3 - Identify the Gap to Capacity Allocations;

[9] National Planning Framework First Revision – April 2025 - The National Planning Framework (Page 135)

[10] Climate Action Plan 2025

- Stage 4 - Convert Gap to Capacity Allocation into Minimum Required Land Area; and
- Stage 5 - Convert Minimum Required Land Area into Total Theoretical Land Area.

Phase B requires a **quantitative geospatial analysis** of each region in order to spatially identify land areas in order to facilitate sufficient development to meet the renewable electricity Gap to Capacity Allocations, as determined in Phase A. Firstly, certain physical constraints are identified and excluded from the analysis; the remaining areas within the region are then spatially classified (measured in km^2) into *High, Medium, Low* or *No* sensitivity, based on distance from certain environmental, planning and infrastructural factors. These areas should be then considered for renewable electricity development potential; and then be subsequently aggregated and compared with the total required land-take in order to meet the Gap to Capacity Allocations as determined in Phase A.

An iterative approach within the second Phase analysis (in terms of the quantity of land taken from each sensitivity spatial classification) may need to be undertaken, in order that sufficient areas can be identified within the region, to meet the total required land-take.

Phase B has four key Stages (as illustrated in **Figure 4**):

- Stage 1 – Identify Available Areas;
- Stage 2 – Geospatially Classify Available Areas in terms of Sensitivity;
- Stage 3 – Aggregate the Land Areas per Geospatial Sensitivity Classification; and
- Stage 4 – Compare Phase B outputs with Phase A.

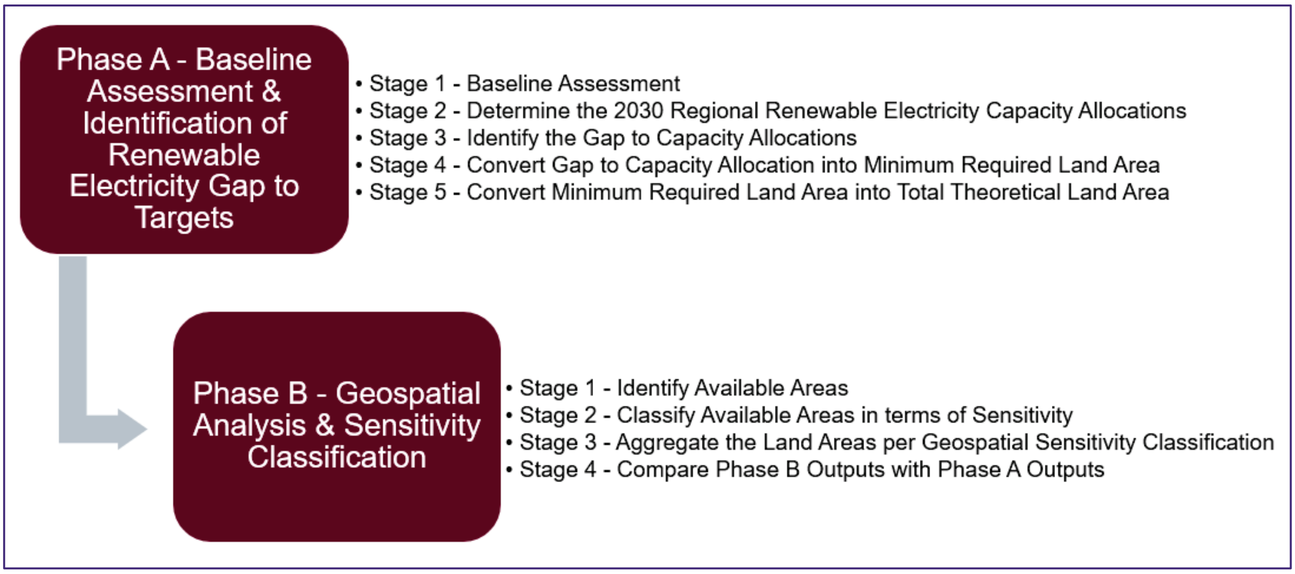

Figure 4. Overview of Step 3.

Phase A - Baseline assessment and identification of renewable electricity ‘Gap to Capacity Allocation’

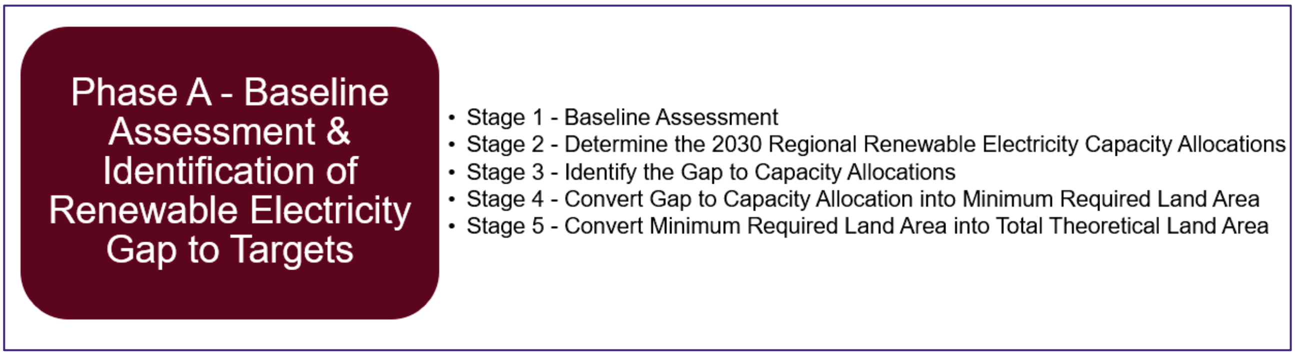

Figure 5. Overview of Step 3 – Phase A.

Stage 1: Baseline Assessment

The first stage is to undertake a Baseline Assessment of the current *energised capacity* in the region. Energised capacity is defined as the maximum amount of electricity that can be generated by renewable electricity projects (grid-scale onshore wind and solar PV) that are currently installed and operating in the region. It is measured in total megawatts (MW).

To undertake a Baseline Assessment in each region, the assessor will need to collate data on all relevant connected projects (i.e. energised capacity) and calculate the total operational energised capacity in total MW per region. This should be based on the most recently available data from EirGrid and ESB Networks; the main sources of which are set out in **Table 1**.

Table 1. Main sources of data for undertaking a baseline assessment of the current energised capacity in each region.

	Sources of Information
1	EirGrid Transmission and Distribution Connected Renewable Generation (grid-scale onshore wind and solar PV included).)[11].
2	EirGrid Transmission Contracted Generators (Wind and Non-wind generators).)[12].
3	SEAI databases of existing Wind Turbines and Solar Farms
4	DHLGH - National Planning Framework: First Revision

> **Note 1:** ***It should be noted that the resulting Baseline Assessment per renewable electricity technology (grid-scale onshore wind and solar PV), may vary from the Baseline Assessments undertaken in the development of the Regional Renewable Electricity Capacity Allocations (see “Energised Capacity 2023 (MW)” as set out in Table 9.1 of the First Revised NPF as these relate to a 2023 baseline (see Figure 6).***

[11] System and Renewable Data Reports | Grid Information | EirGrid

[12] Connected and Contracted Generators | Customer Information | EirGrid

This was a 2023 Baseline Assessment of *energised capacity*

Table 9.1 | Regional Renewable Electricity Capacity Allocations

Region	Energised capacity 2023 (MW)	Additional Renewable Power Capacity Allocations (MW)	Total % of National Share in 2030	Energised Capacity 2023 (MW)	Additional Renewable Power Capacity Allocations (MW)	Total % of National Share in 2030
	Onshore Wind			**Solar PV**		
Eastern and Midlands	284	1,966	25%	306	3,294	45%
Northern and Western	1,761	1,389	35%	0.3	959	12%
Southern	2,622	978	40%	138	3,302	43%
Total	**4,667**	**4,333**		**445**	**7,555**	

Figure 6. Table 9.1 of the Revised NPF[4] (DHLGH, 2025, pg.135) setting out the Regional Renewable Capacity Allocations for renewable electricity projects (grid-scale onshore wind and solar PV); with an additional description of 'Energised Capacity 2023 (MW)'.

Stage 2: Determine the 2030 Regional Renewable Electricity Capacity Allocations

The second stage is to determine the 2030 Regional Renewable Electricity Capacity Allocation for grid-scale onshore wind and solar PV, in line with national targets set out in the Climate Action Plan (CAP) 2025.

These capacities are calculated based on the 'Total % of National Share in 2030' split out per region per applicable renewable electricity technology, as outlined in Table 9.1 of the Revised NPF[4] which sets out the Regional Renewable Electricity Capacity Allocations in line with CAP 2024[10] (see **Figure 7**).

An overview of this calculation, and the resultant 2030 Regional Renewable Electricity Capacity Allocations, are set out below in **Table 2**.

Note 2: ***It should be noted that, as highlighted above, an up-to-date Baseline Assessment of each renewable electricity technology (grid-scale onshore wind and solar PV), may vary from the Baseline Assessments ('Energised Capacity 2023 (MW)) undertaken in the development of the Regional Renewable Electricity Capacity Allocations, as these relate to a 2023 baseline. If this is the case, the Gap to Capacity Allocation (MW) will accordingly vary from the 'Additional Renewable Power Capacity Allocations (MW)' as set out in Table 9.1 of the Revised NPF[4] (DHLGH, 2025, pg.135), see Figure 8.***

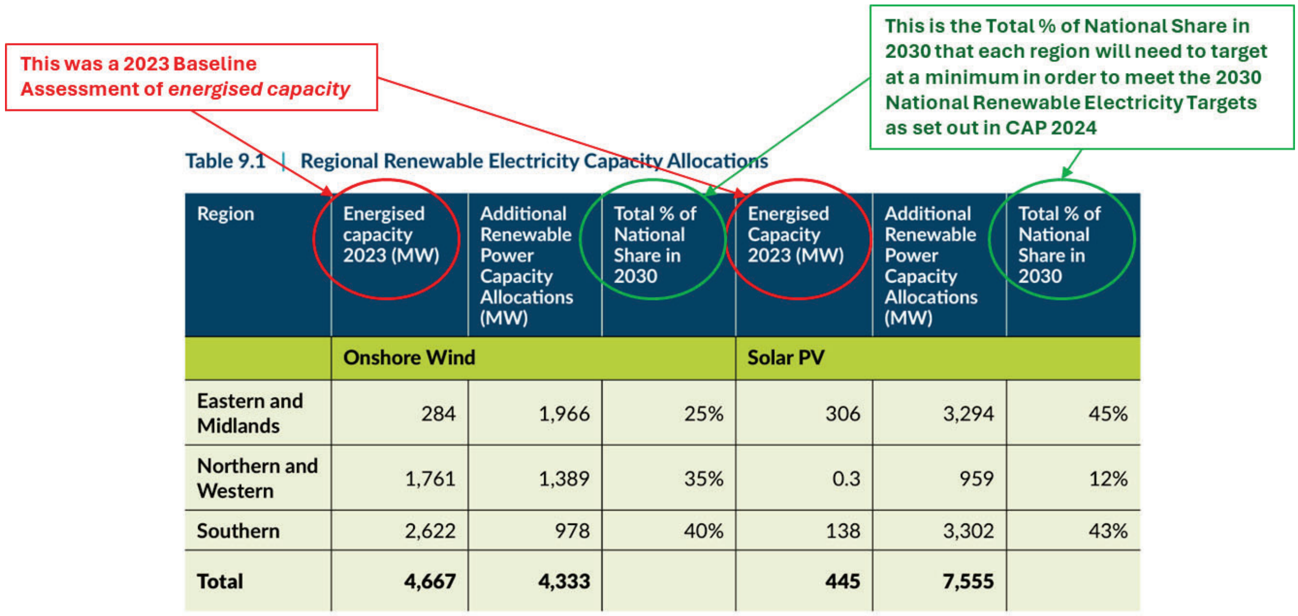

Table 9.1 | Regional Renewable Electricity Capacity Allocations

Region	Energised capacity 2023 (MW)	Additional Renewable Power Capacity Allocations (MW)	Total % of National Share in 2030	Energised Capacity 2023 (MW)	Additional Renewable Power Capacity Allocations (MW)	Total % of National Share in 2030
	Onshore Wind			Solar PV		
Eastern and Midlands	284	1,966	25%	306	3,294	45%
Northern and Western	1,761	1,389	35%	0.3	959	12%
Southern	2,622	978	40%	138	3,302	43%
Total	**4,667**	**4,333**		**445**	**7,555**	

Figure 7. Table 9.1 of the Revised NPF[4] (DHLGH, 2025, pg.135) setting out the Regional Renewable Capacity Allocations for renewable electricity projects (grid-scale onshore wind and solar PV); with an additional description of "Total % of National Share in 2030".

Table 2. 2030 Regional Renewable Electricity Capacity Allocations based on the percentage of national share allocated to each Regional Assembly as set out in the revised NPF[4] (DHLGH, 2025, pg.135).

	2030 National Renewable Electricity Target (MW)	Total % of National Share in 2030	2030 Regional Renewable Electricity Capacity Allocations (MW)[13]	2030 National Renewable Electricity Target (MW)	Total % of National Share in 2030	2030 Regional Renewable Electricity Capacity Allocations (MW)
	Onshore wind			Solar PV		
Eastern & Midlands	9,000	25%	2,250	8,000	45%	3,600
Northern & Western		35%	3,150		12%	960
Southern		40%	3,600		43%	3,440

[13] Figures represent total installed capacity, including both currently energised capacity and that additional capacity which needs to be planned for, that each Regional Assembly are to plan to achieve by 2030. These figures are calculated using following equation: 2030 National Renewable Electricity Target x Total % of National Share in 2030 (e.g. 9,000 * 0.25 = 2,250).

This was a 2023 Baseline Assessment of *energised capacity*

This is the Total % of National Share in 2030 that each region will need to target at a minimum in order to meet the 2030 National Renewable Electricity Targets as set out in CAP 2024

Table 9.1 | Regional Renewable Electricity Capacity Allocations

Region	Energised capacity 2023 (MW)	Additional Renewable Power Capacity Allocations (MW)	Total % of National Share in 2030	Energised Capacity 2023 (MW)	Additional Renewable Power Capacity Allocations (MW)	Total % of National Share in 2030
	Onshore Wind			**Solar PV**		
Eastern and Midlands	284	1,966	25%	306	3,294	45%
Northern and Western	1,761	1,389	35%	0.3	959	12%
Southern	2,622	978	40%	138	3,302	43%
Total	**4,667**	**4,333**		**445**	**7,555**	

This is the Total % of National Share in 2030 that each region will need to target at a minimum in order to meet the 2030 National Renewable Electricity Targets as set out in CAP 2024

Figure 8. Table 9.1 of the Revised NPF[4] (DHLGH, 2025, pg.135) with an additional description of 'Additional Renewable Power Capacity Allocations (MW)'.

Stage 3: Identify the Gap to Capacity Allocation

The third stage is to determine the difference between the regional Baseline Assessment and the 2030 Regional Renewable Electricity Capacity Allocation per renewable electricity technology (grid-scale onshore wind and solar PV) identified in Stage 2.

The Gap to Capacity Allocation (measured in MW) defines the minimum additional capacity that each Regional Assembly must plan for in order to achieve the 2030 Regional Renewable Electricity Capacity Allocations. As highlighted above, should the Baseline Assessment vary from the 2023 baseline ('Energised capacity 2023 (MW)') as set out in Table 9.1 of the Revised NPF (*pg.135*), the Gap to Capacity Allocation will vary from the 'Additional Renewable Power Capacity Allocations (MW)' set out in the same Table (per **Figure 8**).

To calculate the Gap to Capacity Allocation simply subtract the up-to-date Baseline Assessment, identified in Stage 1, from the 2030 Regional Renewable Electricity Capacity Allocations, calculated in Stage 2, following the calculation set out in **Figure 9**.

> **Note 3:** ***It is important to note that the 2030 Regional Renewable Electricity Capacity Allocations (MW) establish what each Regional Assembly must plan for in order to facilitate, at a minimum, the 2030 national renewable electricity generation targets.***

2030 Regional Renewable Electricity Capacity Allocation (MW) – Baseline Assessment (MW) = Gap to Capacity Allocation (MW)

For example: the 2030 Regional Renewable Electricity Capacity Allocation for grid-scale onshore wind in the Eastern and Midlands region is 2,250MW, and there is currently 600MW of installed onshore wind capacity (a hypothetical increase to the 2023 baseline), the Gap to Capacity Allocation is therefore 1,650MW.

2,250 (MW) – 600 (MW) = 1,650 (MW)

Figure 9. Calculation of Gap to Capacity Allocation (MW).

Stage 4 - Convert the Gap to Capacity Allocation into Minimum Required Land Area

The fourth stage is to convert the Gap to Capacity Allocation (which is measured in MW) to an estimated Minimum Required Land Area (measured in km^2) determined to deliver the required capacity to meet the Gap to Capacity Allocation. This is done by applying *Capacity Intensity Factors (CIFs)* to the Gap to Capacity Allocation in order to determine the Minimum Required Land Area (km^2).

CIFs (measured in MW per km^2) are the assumed rate of renewable electricity capacity for a land area, if that area was devoted entirely to renewable electricity technology.

In order to meet the 2030 Regional Renewable Electricity Capacity Allocations, as determined in Stage 3, the following CIFs should be used for this step, based on the calculation set out in **Figure 10**:

- Wind: 15 MW/km^2
- Solar PV: 50 MW/km^2

Note 4: ***It should be noted that in cases where it may be suitable to vary the CIFs on a regional or local basis. Any proposed changes should be agreed in advance between the Department of Climate, Energy and the Environment, (DCEE), the Department of Housing, Local Government and Heritage (DHLGH) and each Regional Assembly, in order to ensure that the proposed CIFs remain consistent and aligned with the achievement of the 2030 national renewable electricity targets.***

Gap to Capacity Allocation (MW) ÷ Capacity Intensity Factor (CIF) for applicable renewable electricity technology (MW/km^2) = Minimum Required Land Area (km^2)

For example, if the Gap to Capacity Allocation for grid-scale onshore wind (MW) has been identified as 1,650MW, and the applicable CIF is 15MW/km^2, the Minimum Required Land Area to be developed for grid-scale onshore wind is calculated to be 110km^2.

1,650 (MW) ÷ 15 (MW/km^2) = 110 (km^2)

Figure 10. Calculation of Minimum Required Land Area (km^2).

Stage 5 – Convert the Minimum Required Land Area into Total Theoretical Land Area

This Stage takes into consideration the fact that not all projects that are proposed ultimately reach completion. This is known as 'project attrition'.

To account for this, a *Project Delivery Rate (PDR*) must be applied to the Minimum Required Land Area (km^2) in order to determine the Total Theoretical Land Area (km^2) to be identified in order to achieve the Gap to Capacity Allocation.

A PDR is an assumed percentage of success for converting land that is theoretically available (based on high-level mapping exercises) into an operational renewable electricity project. It is based on the assessment of cumulative probability of previous projects and informs the likelihood of a given land area, ultimately and successfully, converting into an operational onshore wind or solar PV farm, taking into account attrition at all stages of project delivery, including land availability, planning consent, grid connection, power purchase auction/ agreement and project funding.

Across both technology types, the following PDR should be used for this exercise, based on the calculation set out in **Figure 11**:

- **PDR: 15%**

Once the Total Theoretical Land Area (km^2) is calculated for both grid-scale onshore wind and solar PV, this provides the total land area (km^2) that will need to be identified at a regional level in order to facilitate sufficient development to meet the renewable electricity Gap to Capacity Allocations.

Note 5: ***In cases where it may be suitable to vary the PDR on a regional or local basis should be agreed in advance between the DCEE, the DHLGH and each Regional Assembly in order to ensure that the proposed PDR remains consistent and aligned with the achievement of the national targets.***

Minimum Required Land Area (km^2) ÷ PDR (%) = Total Theoretical Land Area (km^2)

For example, if 110 km^2 is required for grid-scale onshore wind development, and the assumed PDR is 15%, then the total theoretical land area required to meet the renewable electricity Gap to Target is calculated to be 733.3 km^2.

110 (km^2) ÷ 0.15 (%) = 733.3 (km^2)

Figure 11. Calculation of Total Theoretical Land Area (km^2).

Phase B - Geospatial Analysis and Sensitivity Classification

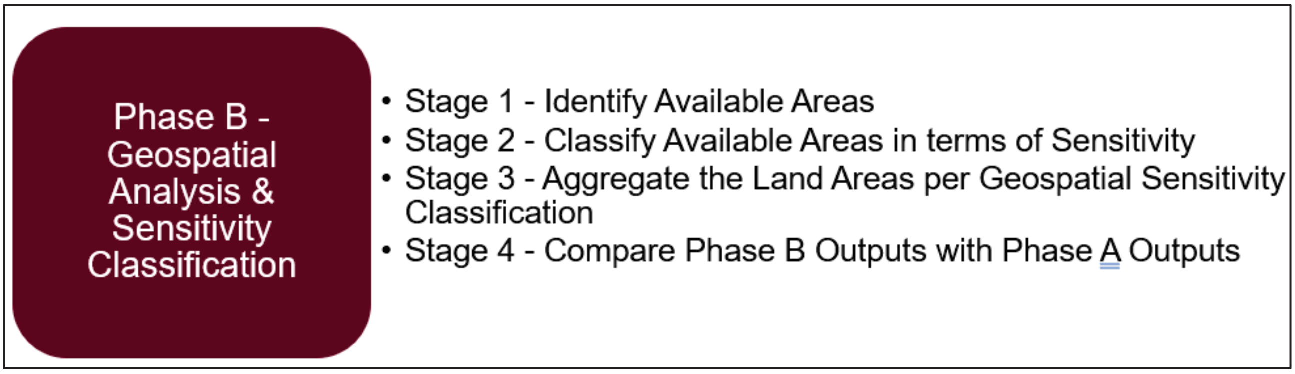

Figure 12. Overview of Step 3 – Phase B.

Stage 1: Identify Available Areas

The first stage of Phase B is to identify areas unsuitable for renewable electricity development (*Exclusion Areas*) and remove them from further analysis, leaving *Available Areas* for further geospatial analysis.

This stage of analysis is undertaken by calculating the total Regional Assembly area of interest in km^2 in the GIS software; then removing the areas unsuitable for renewable electricity development based on Exclusion Criteria specific to the renewable electricity technology (i.e. grid-scale onshore wind or solar PV, see **Table 3**).

Exclusion Criteria are definitions applied to datasets that when input into the Geographic Information System (GIS) model identify areas that are unsuitable for renewable electricity development and therefore should not be further considered for analysis.

Each *Exclusion Criterion* should be presented using its *Defined Area* or an associated attribute. The Defined Area is the area located inside the boundary of any particular feature, i.e. the area inside a CSO settlement boundary, Special Area of Conservation (SAC) etc. A single *Exclusion Area* is given as the *Defined Area* plus a *Buffer*, if specified by the *Exclusion Criterion*, see **Figure 13**. A *Buffer* is a given distance around each *Defined Area*, which in essence increases the footprint of the *Exclusion Area*. Where relevant, each Buffer is specific to each Criterion and is expressed as a specific measurement, e.g. meters (m), five times rotor diameter, etc.

The merging of each Exclusion Area defined by the Exclusion Criteria results in multiple *Exclusion Areas*.

The Exclusion Criteria definitions per renewable electricity technology to be used in this exercise are set out in **Table 3**. It is important to note that the buffers and criteria differ when identifying areas for grid-scale onshore wind versus solar PV.

These Exclusion Areas are removed from further analysis by simply subtracting them from the total land area of the Region of Interest, resulting in Available Areas for further geospatial analysis.

Figure 13 provides a high-level overview of this process.

It is recommended that each Regional Assembly use the convention in this document that Exclusion Areas should be coloured Grey, in line with the RGB colour model: 204,204,204 (see **Note 8**).

Note 6: It is important to note that the Exclusion Criteria and associated Buffers specified for this exercise were determined in consultation with DCEE, DHLGH and the SEAI through national renewable energy and spatial policy / modelling frameworks, based on international best practice and research. The rationale for each criterion is given in Appendix A. Any changes to EU and national legislation, national policy, guidelines or published resources should be considered when applying these criteria. All evidence arising from environmental assessments should be taken into account when applying these criteria.

When undertaking this methodological approach, regional assemblies should also be cognisant of the need for transboundary consultation where they border another jurisdiction, particularly within the terms of the SEA Directive and the consideration of the potential impact of new development to adjacent protected areas.

Note 7: ***It should be noted that for the purposes of GIS analysis, raster processing is the most efficient way to process a high number of overlapping layers; following which the layers can be converted back to polygon form.***

Note 8: ***The RGB colour model is a widely used system for representing colours in digital devices. It stands for Red, Green, Blue, and each colour is created by combining these three primary colours at varying intensities. Each of the three colours can have an integer value ranging from 0 to 255, resulting in a total of 16,777,216 possible colours.***

Table 3. RRES Exclusion Criteria for grid-scale onshore wind and solar PV*.

GIS layer	Exclusion Criteria for Wind	Exclusion Criteria for Solar
Central Statistics Office (CSO) settlements[14]	Defined Area	Defined Area
GeoDirectory (Used to map 'Dwellings' as defined in Appendix A)	Defined Area + 500m Buffer	Defined Area + 25m Buffer
Connected turbines (grid-scale onshore wind)	5 times rotor diameter[15] from point dataset	250m Buffer from point dataset
Overhead Power Cables	250m Buffer from centreline	25m Buffer from centreline
Gas Network	250m Buffer from centreline	9m Buffer** from centreline
Motorways, National Roads and Rail lines	220m Buffer from centreline	10m Buffer from centreline
Main Rivers†	20m Buffer from centreline	20m Buffer from centreline
Lakes	Defined Area + 10m Buffer	Defined Area + 10m Buffer
Transitional Waterbodies	Defined Area + 10m Buffer	Defined Area + 10m Buffer
United Nations Educational, Scientific, and Cultural Organisation (UNESCO) World Heritage Site	Core and Buffer Zone of inscribed sites	Core and Buffer Zone of inscribed sites

** Please note, the supporting references and source data for these criteria are set out in **Appendix A**.*

*** Please note, that in relation to solar: '…it is important that Gas Networks Ireland is contacted at the earliest possible stage in the project in order to ensure that all of the requirements of this document are fully understood.*' (Gas Networks Ireland, 2023. p.4.).

† *Note comment in **Appendix A**: 'Smaller rivers generally not considered for national/regional mapping purposes, although will need to be considered during individual project planning and construction phase; Salmonid and rivers in SPA / SACs may need further attention.'*

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[14] The CSO Dataset is used as a pre-processing step to remove the need to buffer multiple dwellings in urban areas.

[15] The 5 times rotor diameter modelling is based on existing wind turbines and should use the most up to date SEAI turbines database and related information.

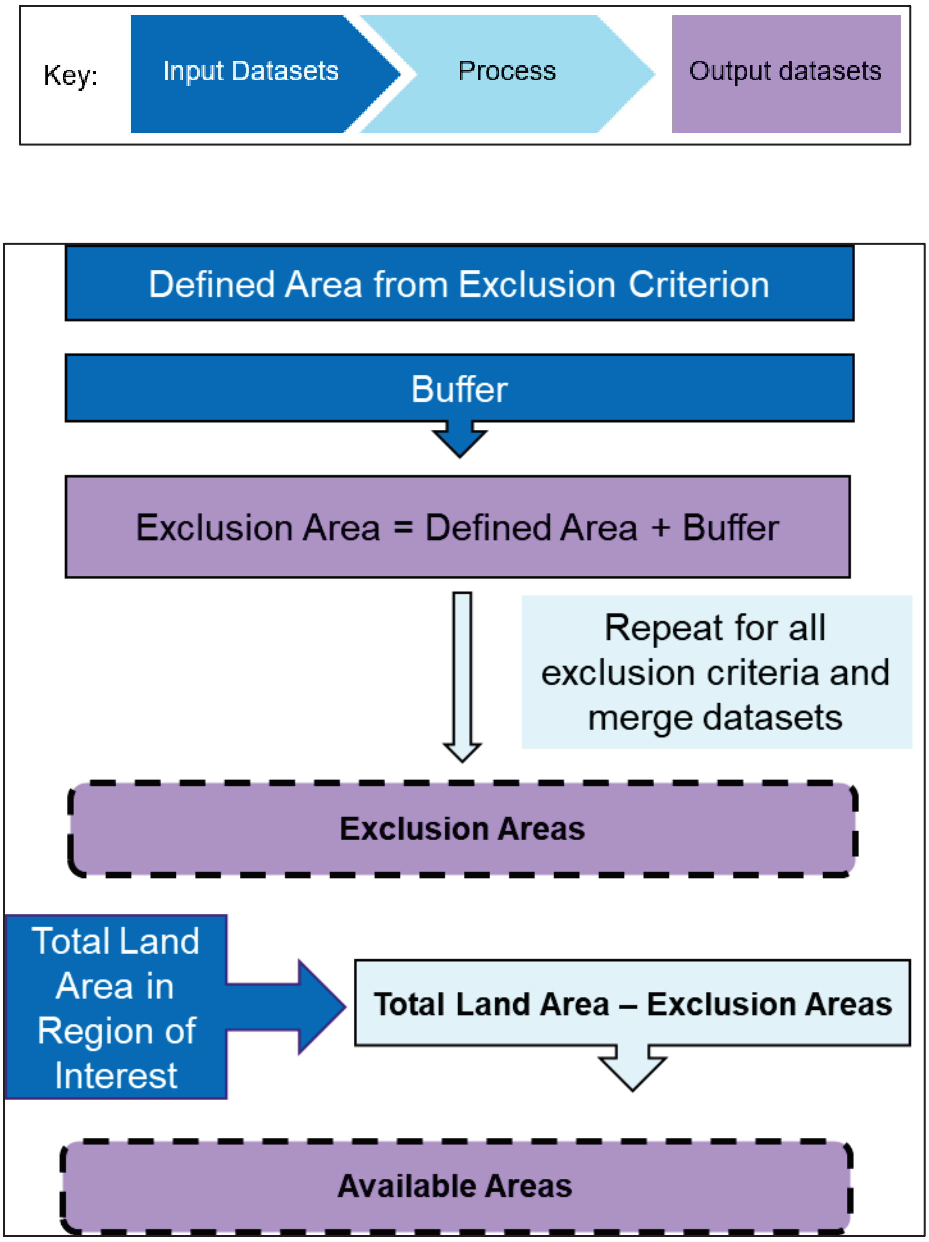


Figure 13. Overview of identifying and removing Exclusion Areas from further geospatial analysis.

Stage 2: Geospatially Classify Available Areas in Terms of Sensitivity

The next stage is to geospatially classify the Available Areas in terms of sensitivity to renewable electricity development (grid-scale onshore wind or solar PV). Sensitivity, in this context, means the potential for renewable electricity development to have a human health and/or environmental impact, with some cultural and infrastructural aspects considered.

Geospatial sensitivity classifications are assigned to Available Areas based on defined *Sensitivity Criteria*, which are attributes/feature types/proximity to specific features that increase the sensitivity of an area in terms of renewable electricity development.

For the purposes of this exercise, geospatial sensitivity classification is based on the consideration of specific Sensitivity Criteria within the Available Areas per renewable electricity technology, as listed in **Tables 4** and **5**. Similar to the Exclusion Areas, Sensitivity Buffers are a given distance around a Sensitivity Criterion, which in essence increases the footprint of areas that are sensitive in terms of renewable electricity development.

This geospatial analysis should be undertaken **separately for grid-scale onshore wind and solar PV** and detailed instructions for undertaking this geospatial analysis comprising five key sub-stages are outlined in **Table 6**.

Ultimately, Available Areas should be geospatially classified into *High, Medium, Low* or *No* sensitivity in terms of renewable electricity development.

- ***High** Sensitivity Areas* are areas within which renewable electricity development (grid-scale onshore wind and solar PV) could have a potentially significant negative effect on human health, the environment, cultural heritage and/or other infrastructure.
- ***Medium** Sensitivity Areas* are areas within which renewable electricity development (grid-scale onshore wind and solar PV) could have a potentially moderate negative effect on human health, the environment, cultural heritage and/or other infrastructure.
- ***Low*** Sensitivity Areas are areas within which renewable electricity development (grid-scale onshore wind and solar PV) could have a potentially limited effect on human health, the environment, cultural heritage and/or other infrastructure.
- ***No*** Sensitivity Areas are areas within which renewable electricity development (grid-scale onshore wind and solar PV) would not be expected to have any negative impact on human health, the environment, cultural and/or other infrastructure.

Table 4. Onshore Wind Sensitivity Criteria for each Sensitivity Classification*.

	GIS layer	High Sensitivity Criteria	Medium Sensitivity Criteria	Low Sensitivity Criteria
1	GeoDirectory Used to define dwellings	500 - 880m Buffer	880 – 1,000m Buffer	N/A
2	Special Areas of Conservation (SAC)	Defined Area	0 - 500m Buffer	500 – 1,000m Buffer
3	Special Protected Areas (SPA)	Defined Area	0 - 500m Buffer	500 – 1,000m Buffer
4	Ramsar Sites (Wetlands)	Defined Area	0 - 500m Buffer	500 – 1,000m Buffer
5	Natural Heritage Areas (NHAs)	Defined Area	0 - 500m Buffer	500 – 1,000m Buffer
6	Potential Natural Heritage Areas (pNHAs)	Defined Area	0 - 500m Buffer	500 – 1,000m Buffer
7	Annex I Habitats under the Habitats Directive†	Defined Area	0 - 500m Buffer	500 – 1,000m Buffer
8	Freshwater Pearl Mussel (FPM) Dataset – National	Defined Area	0 - 500m Buffer	500 – 1,000m Buffer

	GIS layer	High Sensitivity Criteria	Medium Sensitivity Criteria	Low Sensitivity Criteria
	Parks & Wildlife Services (NPWS)			
9	Main Rivers	20 – 50m Buffer	50 – 250m Buffer	250 – 400m Buffer
10	Lakes	10 – 50m Buffer	50 – 250m Buffer	250 – 400m Buffer
11	Transitional Waterbodies	10 – 50m Buffer	50 – 250m Buffer	250 – 400m Buffer
12	Catchment Flood Risk Assessment and Management (CFRAM) Flood Mapping †	N/A	1 in 10 mapping: High Probability flood events	N/A
13	Soil Category	Upland Peat	Lowland Peat	Good Quality Soils
14	Landslide Susceptibility	High	Moderately High	Moderately Low
15	Groundwater Vulnerability Map	Extreme (X and E)	High	Moderate
16	Geological heritage sites	N/A	County Geological Site (CGS) boundary - defined area	N/A
17	United Nations Educational, Scientific, and Cultural Organisation (UNESCO) World Heritage Site	Buffer 5,000m from outer zone for inscribed sites or 5,000m from point for 'tentative' sites	N/A	N/A

* *Please note, the supporting references and source data for these criteria are set out in **Appendix A**.*
† *All relevant layers should be merged into one single layer*

Table 5. Solar Sensitivity Criteria for each Sensitivity Classification*.

	GIS layer	High Sensitivity Criteria	Medium Sensitivity Criteria	Low Sensitivity Criteria
1	GeoDirectory (Used to define dwellings)	25 - 50m Buffer	50 - 100m Buffer	N/A
2	Gas Network	9 - 200m Buffer	N/A	N/A
3	Special Areas of Conservation (SAC)	Defined Area	0 - 250m Buffer	250 - 500m Buffer
4	Special Protected Areas (SPA)	Defined Area	0 - 250m Buffer	250 - 500m Buffer
5	Ramsar Sites (Wetlands)	Defined Area	0 - 250m Buffer	250 - 500m Buffer
6	Natural Heritage Areas (NHAs)	Defined Area	0 - 250m Buffer	250 - 500m Buffer
7	Potential Natural Heritage Areas (pNHAs)	Defined Area	0 - 250m Buffer	250 - 500m Buffer
8	Annex I Habitats under the Habitats Directive †	Defined Area	0 - 250m Buffer	250 - 500m Buffer

	GIS layer	High Sensitivity Criteria	Medium Sensitivity Criteria	Low Sensitivity Criteria
9	Freshwater Pearl Mussel (FPM) Dataset – National Parks & Wildlife Services (NPWS)	Defined Area	0 - 250m Buffer	250 - 500m Buffer
10	Main Rivers	20 – 50m Buffer	50 – 115m Buffer	115 - 250m Buffer
11	Lakes	10 – 50m Buffer	50 – 115m Buffer	115 - 250m Buffer
12	Transitional Waterbodies	10 – 50m Buffer	50 – 115m Buffer	115 - 250m Buffer
13	Catchment Flood Risk Assessment and Management (CFRAM) Flood Mapping †	N/A	1 in 10 mapping: High Probability flood events	N/A
14	Soil Category	Upland Peat	Lowland Peat	Good Quality Soils
15	Landslide Susceptibility	High	Moderately High	Moderately Low
16	Groundwater Vulnerability Map	Extreme (X and E)	N/A	N/A
17	Geological heritage sites	N/A	CGS boundary - defined area	N/A
18	United Nations Educational, Scientific, and Cultural Organisation (UNESCO) World Heritage Site	Buffer 5km from outer zone for inscribed sites or 5km from point for 'tentative' sites	N/A	N/A

** Please note, the supporting references and source data for these criteria are set out in* ***Appendix A****.*
† All relevant layers should be merged into one single layer

> **Note 9:** ***The generation of a map in the following table does not necessarily mean a physical or printed out map, but one that can be visualised in GIS software and that can be turned on/off as required in this software.***

Table 6. Detailed GIS instructions for Geospatial Classification of Available Areas in terms of sensitivity.

Phase B - Stage 2: Classifying Available Areas in terms of sensitivity		
Sub-stage	**Detailed Instructions**	**Supporting Figures/Tables/Appendices**
1	Start with Available Areas and assign these Areas with a score of '0'.	N/A
2	Include the relevant Sensitivity Criteria as GIS layers within the GIS model. The Sensitivity Criteria specified for this exercise are set out in **Table 4** and **Table 5.**	Tables 4 and 5
3	For each Sensitivity Criteria, create a map for the regional area assigning the following ranks, based on the No<Low<Medium<High classification as set out in **Table 4** and **Table 5.** • High Sensitivity = "5" • Medium Sensitivity = "3"	Tables 4 and 5

<table>
<tr><th colspan="3">Phase B - Stage 2: Classifying Available Areas in terms of sensitivity</th></tr>
<tr><td></td><td>

Low Sensitivity = “1”
Any remaining Areas with a rank of “0” will be assigned to a ‘No sensitivity’ identified classification. Note: it is likely only the Solar PV output will have areas of “No sensitivity”.

Sub-stage 3 will result in the production of up to 17 maps for each sensitivity classification for grid-scale onshore wind and up to 18 maps for solar PV, for each sensitivity classification.
Some sensitivity criteria are N/A or there could an empty dataset (e.g. in the case of ‘No sensitivity’), but potentially 4 x 17 = 68 maps will be generated for Wind and 4 x 18 = 72 maps for solar.
</td><td></td></tr>
<tr><td>4</td><td>
For each renewable electricity technology, the maps generated in the previous sub-stage must be overlaid to create a consolidated sensitivity map for the regional assembly areas for both grid-scale onshore wind and solar PV. These polygons will comprise top-level polygons generated by the underlying polygons aligned with each Sensitivity Criteria GIS sub-layer (see Figure 14 and Appendix B, for example).
It is important to undertake this Sub-stage in the following order:
<ol type="a">
Aggregate High sensitivity layers into a single layer. Any overlaying polygons will be given a cumulative score; a sum of their rank(s) (e.g. 5, 10, 15, etc.). The high sensitivity areas are removed from the medium sensitivity maps;
The remaining medium sensitivity layers should be then aggregated into a single layer. Any overlaying polygons will be given a cumulative score; a sum of their rank(s) (e.g. 3, 6, 9, etc.). The high and medium sensitivity areas are removed from the low sensitivity maps; and
The remaining low sensitivity layers should be aggregated into a single layer. Any overlaying polygons will be given a cumulative score; a sum of their rank(s) (e.g. 1, 2, 3, etc.).
Any remaining available areas still with score of ‘0’ will be assigned to ‘No sensitivity identified’ classification.

The output of this sub-stage will be 4 maps for each of wind and solar, of ‘High’, ‘Medium’, ‘Low’ and ‘No’ sensitivity classification. The individual polygons of each map will not overlap due to the processing order as described above.
Every top-level polygon will have therefore have three key characteristics as set out in Table 7.
For example, if an individual polygon has 3 sub-layers that are of high sensitivity criteria (any medium or low sensitivity criteria would be ignored); then the polygon would be assigned the following attributes:
Sensitivity Classification = ‘High’
Cumulative sensitivity score = 15
If an individual polygon has 3 sub-layers that are of medium sensitivity criteria and no high sensitivity sub-layers (any low sensitivity criteria would be ignored); then the polygon would be assigned the following attributes:
Sensitivity Classification = ‘Medium’
Cumulative sensitivity score = 9
If an individual polygon has 3 sub-layers that are of low sensitivity criteria and no high sensitivity or medium sub-layers; then the polygon would be assigned the following attributes:
Sensitivity Classification = ‘Low’
</td><td>Figures 14 and 15

Appendix B

Table 7</td></tr>
</table>

Phase B - Stage 2: Classifying Available Areas in terms of sensitivity		
	Cumulative sensitivity score = 3 **Figure 14,** reproduced in more detail in Appendix B, gives an example of how overlapping layers are processed in this sub-stage. The ringed area in this hypothetical example includes a polygon where a High region of sensitivity from one criterion overlaps a region of Low sensitivity from another criterion. This polygon would be assigned the following attributes: **Sensitivity Classification = 'High'** **Cumulative sensitivity score = 5** Another polygon within the ringed area is overlap two Medium sensitivity criteria and one Low sensitivity criteria. This polygon would be assigned the following attributes: **Sensitivity Classification = 'Medium'** **Cumulative sensitivity score = 6** For completeness, there are further polygons within the ringed area of Low or Medium sensitivity criteria that overlap an 'Exclusion' criterion area (see Stage 1 of Phase B); this remains an 'Exclusion' in the final output. More detailed instructions for undertaking this process using GIS are set are set out below in **Figure 15**.	
5	The next Sub-stage is to colour-code the top-level map according to the individual polygon attributes as follows: • Where the **Sensitivity Classification** is 'No' – colour code: Blue (RGB: 0,197,255); • Where the **Sensitivity Classification** is 'Low' – colour code: Green (RGB: 76,230,0); • Where the **Sensitivity Classification** is 'Medium' – colour code: Yellow (RGB: 255,255,0); • Where the **Sensitivity Classification** is 'High' – colour code: Orange (RGB: 255,170,0) The preceding RGB codes are those used for differentiating High, Medium and Low sensitivity in simple mapping and used in **Appendix A.** However, to aid visualisation and analysis within each sensitivity criteria, the colours should be graduated from light to dark, according to the cumulative score for each individual polygon, using the colours as illustrated in **Table 8**[16] See **Figure 16 (**Maps A-E show some examples of the application of this colour coded approach to sensitivity mapping at National and Local levels) and **Figure 17 (**an example of how rank of layers within High sensitivity rank are created, intersect and can be utilised for further analysis) for illustrative examples. An overview of the entire Phase B process up to this point is set out below in **Figure 18** (see also **Appendix B** for greater clarity).	Appendices A and B Figures 16, 17 and 18 Table 8

[16] More than 9 graduated colours are difficult to differentiate. Due to the nature of sensitivity criteria used, not all layers overlap, so it is unlikely that more colours will be required.

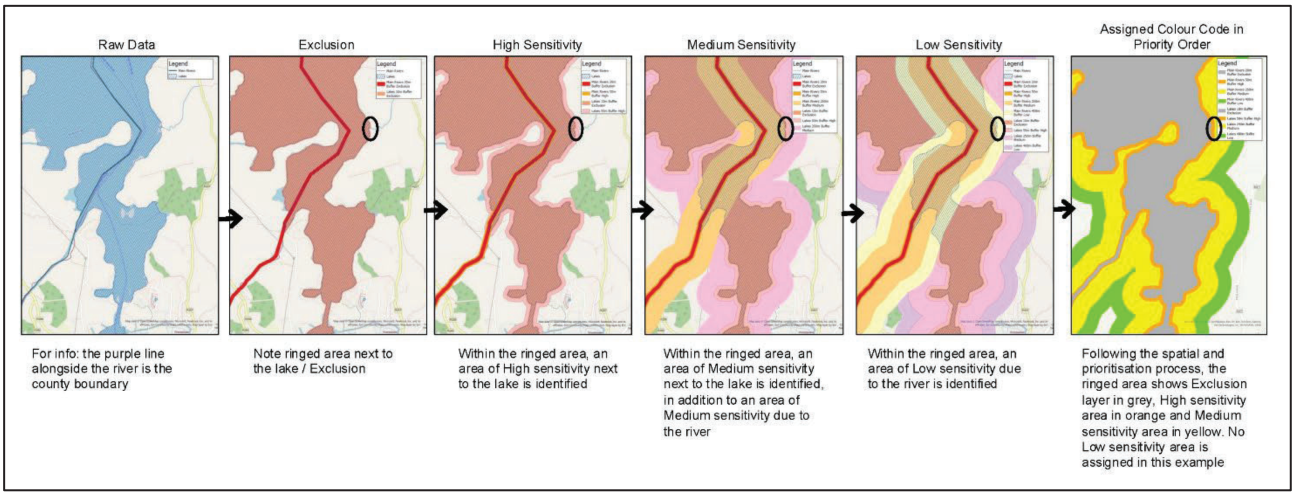
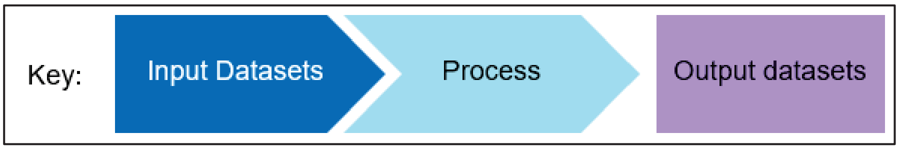


Figure 14. Polygon map for two waterbody layers, examples used for illustrative purposes (see also Appendix B for greater clarity).

Table 7. Three key characteristics of each polygon.

Geospatial Sensitivity Classification	Cumulative Sensitivity Score	Physical Area
'High', 'Medium', 'Low', or 'No' sensitivity identified' This is based on the highest classification of any underlying sub-layers	Integer multiple of 1, 3, or 5 This is based on the cumulative score of the sensitivity ranking of the sub-layers.	Number This is the area of the polygon measurable in m^2. Calculated by GIS software.



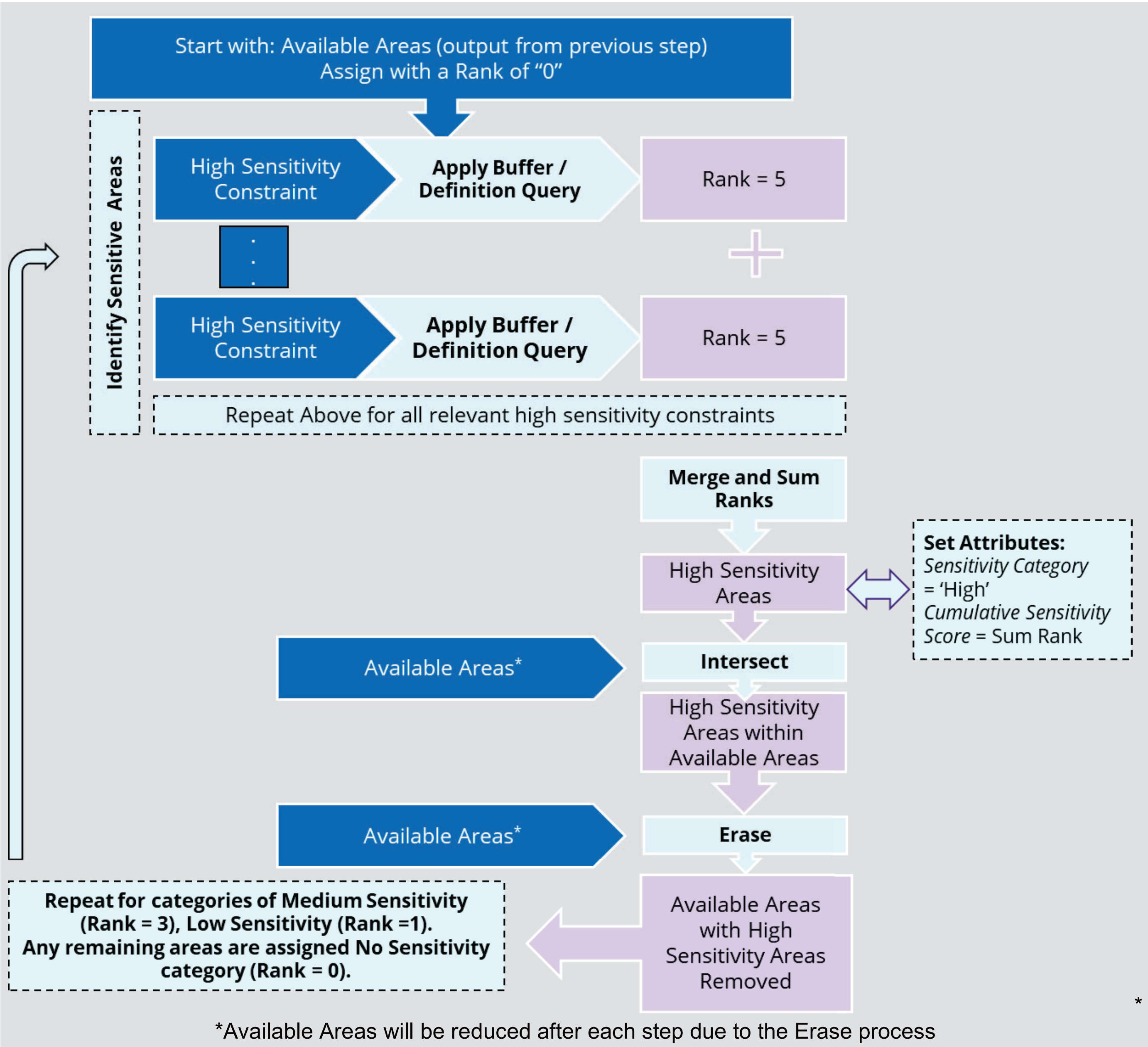
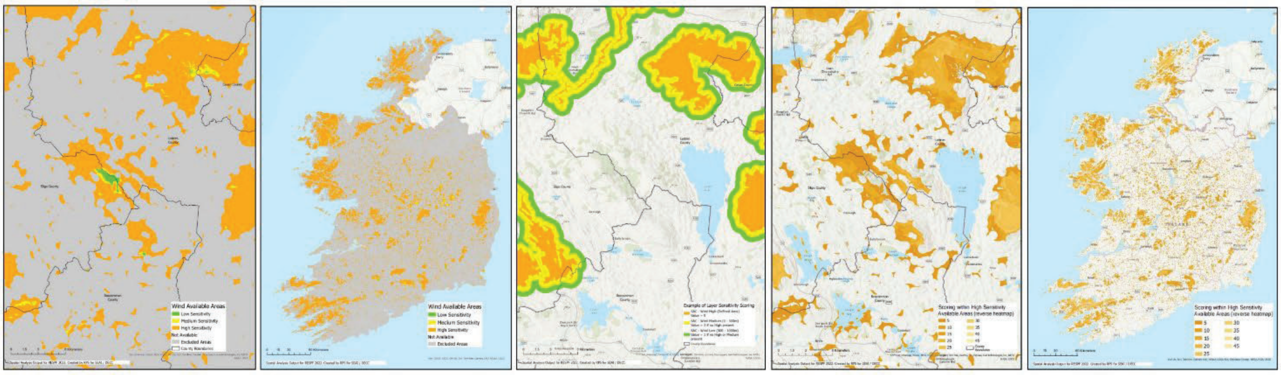


Figure 15. An overview of the GIS procedure for undertaking Sub-stage 4.

Table 8. Colour Coding the Geospatial Sensitivity Classifications*.

No Sensitivity		Low Sensitivity		Medium Sensitivity		High Sensitivity	
Cumulative Sensitivity Score	RGB	Cumulative Sensitivity Score	RGB	Cumulative Sensitivity Score	RGB	Cumulative Sensitivity Score	RGB
		1	56,168,0	3	230,230,0	5	230,152,0
		2	69,178,15	6	234,234,25	10	233,162,18
		3	83,187,31	9	237,237.45	15	236,172,36
		4	98,197,49	12	240,240,70	20	238,181,55
0	0,197,255	5	114,207,68	15	243,243,95	25	241,191,74
		6	131,216,90	18	246,246,120	30	244,200,93
		7	149,226,112	21	249,249,145	35	247,209,113
		8	169,236,137	24	252.252,167	40	249,218,133
		9	189,245,162	27	255,255,190	45	252,227,154

** The lower the cumulative sensitivity score, the less sensitive the Area is to the specific renewable electricity technology development. Hence darker colours are used for lower scores (a reverse heatmap).*



Map A: Low-Med-High Mapping - Wind Local

Map B: Low-Med-High Mapping - Wind National

Map C: Example High-Med-Low Layer Scoring - Wind Local

Map D: Scoring within High Sensitivity Areas only - Wind Local

Map E: Scoring within High Sensitivity Areas only - Wind National

Figure 16. Sample Sensitivity Mapping Outputs (1) (see also Appendix B for greater clarity).

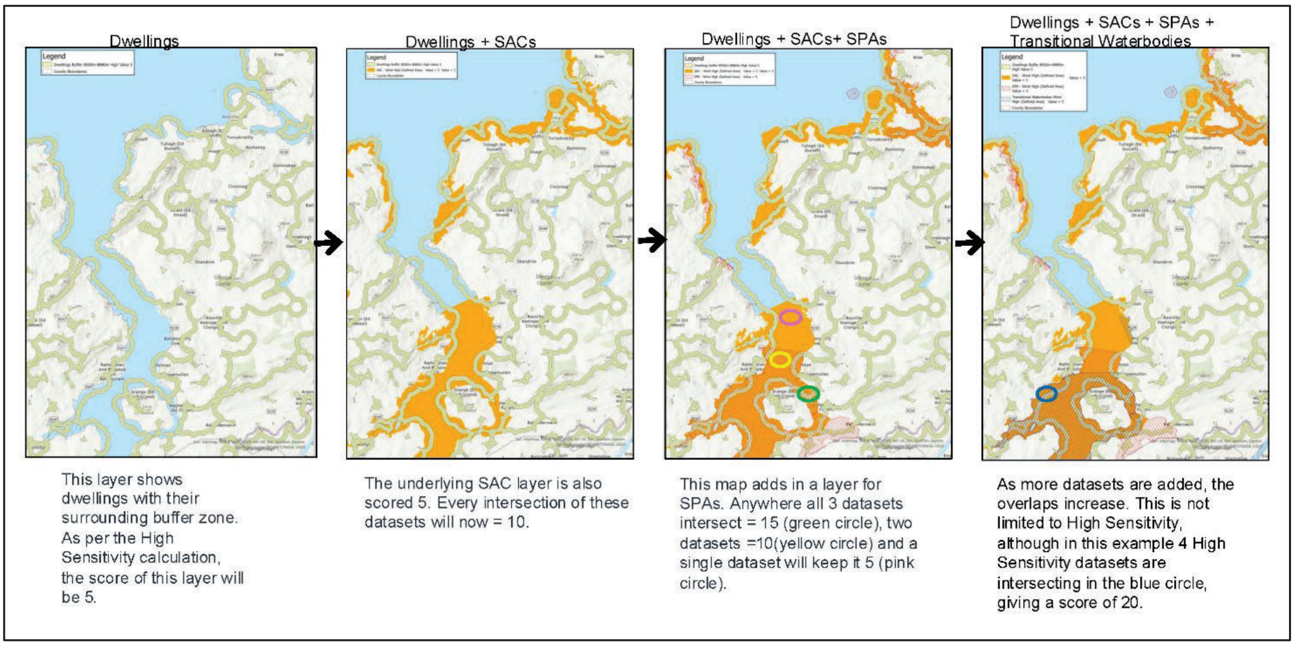


Figure 17. Sample Sensitivity Mapping Outputs (2) (see also Appendix B for greater clarity).

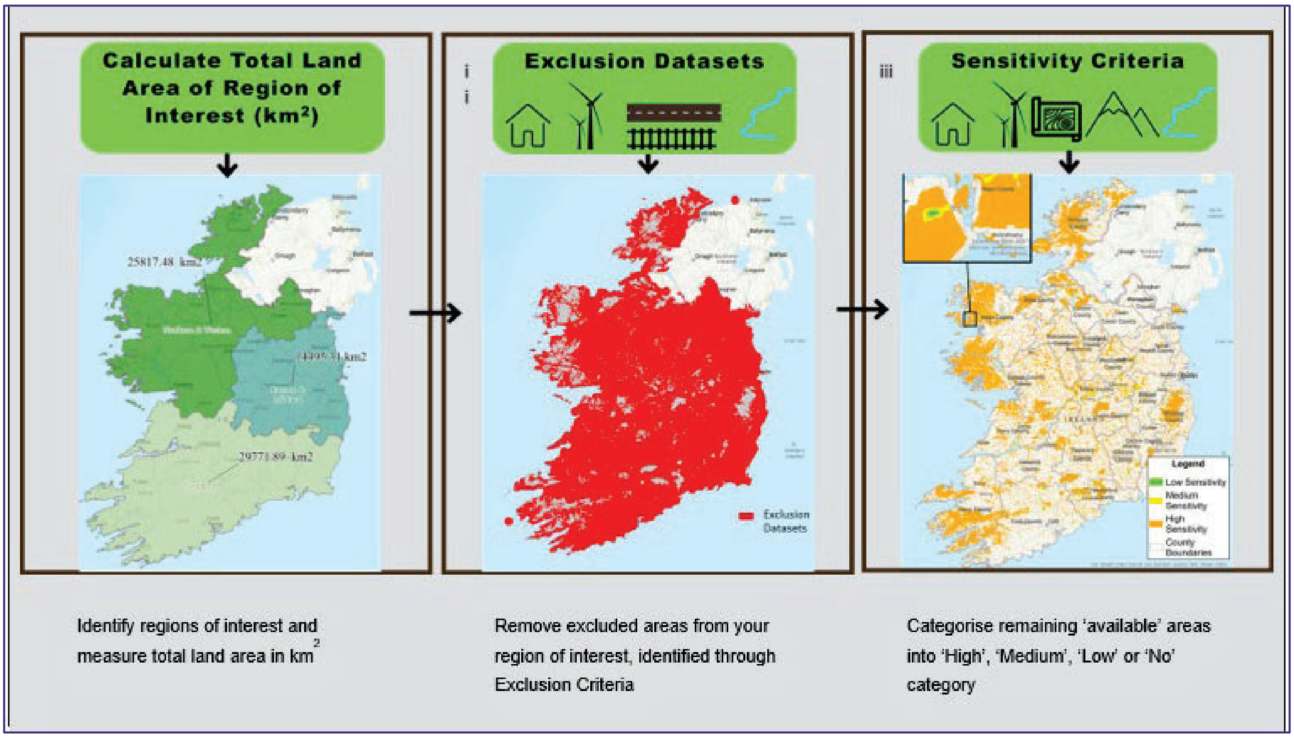


Figure 18. Overview of Phase B process to this point (see also Appendix B for greater clarity).

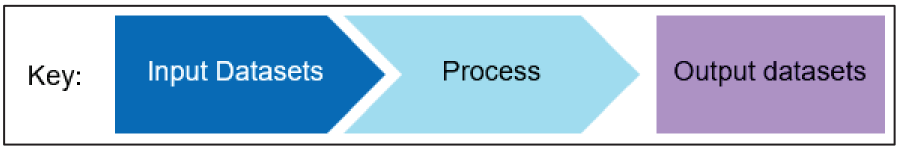
Stage 3: Aggregate the Land Areas per Geospatial Sensitivity Classification

The third stage is to aggregate the physical area of all 'like polygons' in order to determine and compare the land area (measured in km^2) of High, Medium, Low and No sensitivity areas (and the range of accumulated sensitivity scores within each ranking across each polygon) within the Available Areas identified in the regional area. An illustrative example for grid-scale onshore wind is set out in **Table 10**. GIS software can be used to undertake this stage, as detailed in **Figure 19** (see **FAQs** for more details).

Table 9. Identification of land area (km^2) for each Geospatial Sensitivity Classification and their Cumulative Sensitivity Score for grid-scale onshore wind*.

Geospatial Sensitivity Classification	Cumulative Sensitivity Score*	Physical Area, converted to km^2	Cumulative km^2
No	0	7	7
Low	1	4	4
Low	2	2	6
Low	…	…	…
Low	17	6	12+
Medium	3	20	20
Medium	6	30	50
Medium	…	…	…
Medium	51	14	64+
High	5	24	24
High	10	2	26
High	…	…	…
High	85	5	31+
(No + Low + Medium + High) Total Available Area			**114+**

** This Table is illustrative and does not include an exhaustive list of all possible sub-classification within High, Medium or Low Sensitivity rankings. This will be generated through the regional-specific process.*



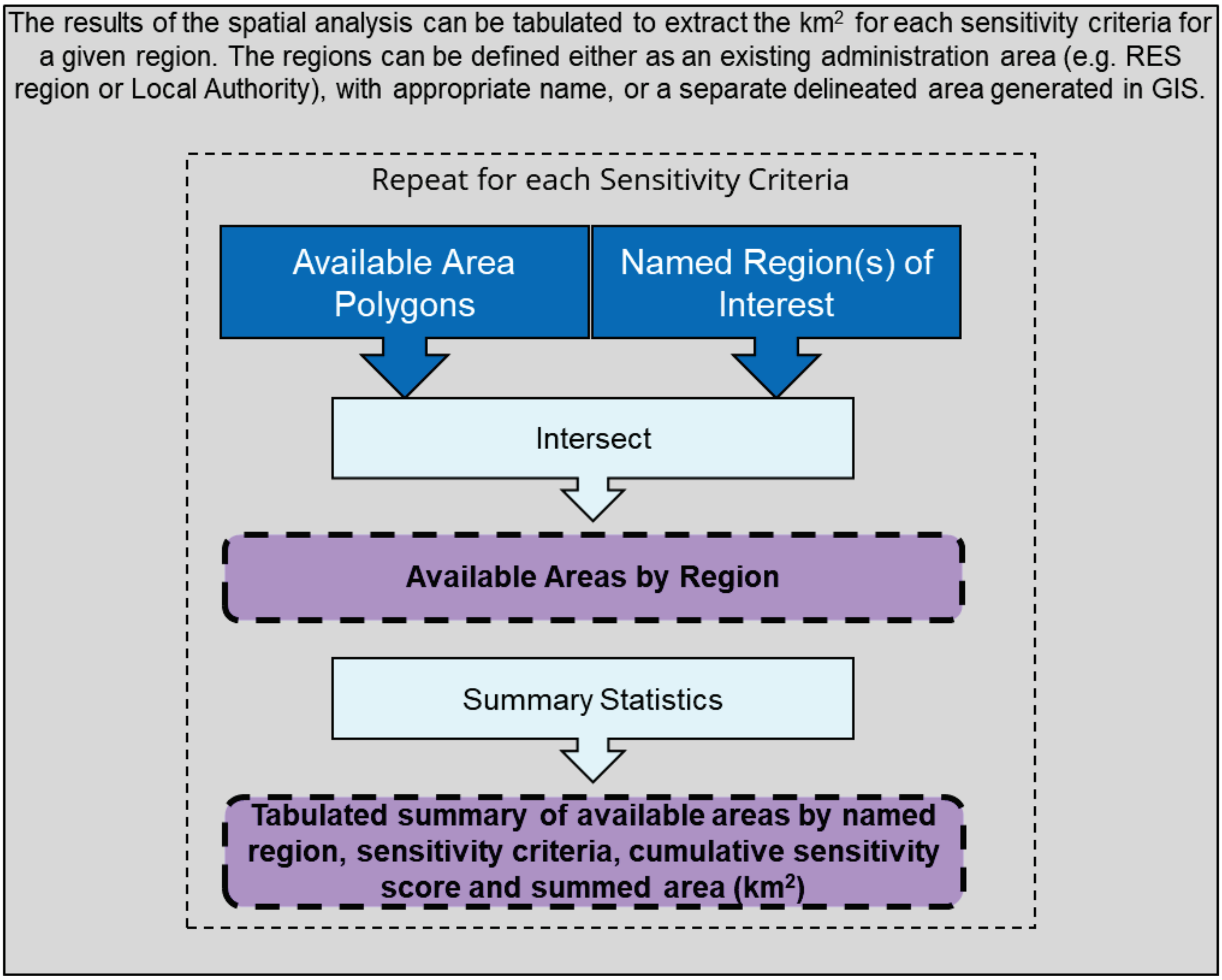


Figure 19. GIS process for tabulating results of geospatial analysis.

Stage 4: Compare Phase B outputs with Phase A Outputs

Now that the Available Areas are classified in terms of sensitivity and quantified these Areas in km^2, the assessor will need to determine whether sufficient land area within the region has been identified to meet the Total Theoretical Land Area (km^2) for both grid-scale onshore wind and solar PV (as determined in Phase A) in order to facilitate sufficient development to meet the renewable electricity Gap to Capacity Allocations.

When considering Available Areas for renewable electricity development, it is recommended that the assessor consider **No Sensitivity** areas initially, followed by areas identified as **Low Sensitivity** (and within those areas, areas with the lowest aggregated sensitivity scores). This process should also be informed by the environmental assessment process at both the RSES and the CDP level

Where there is a shortfall of No and Low Sensitivity areas to achieve the renewable electricity Gap to Capacity Allocation, the assessor will then need to consider including areas from the **Medium** and then the **High Sensitivity** classification as required**.**

The decision around which areas could be added from the High Sensitivity classification will likely vary between Regional Assemblies, depending on the profile of the region (e.g. urban/rural; inland/coastal; etc) as well as regional (RSES) and local (City / County Development Plan) policy objectives and the particular characteristics of any identified constraints (e.g. the associated environmental assessments may indicate that some sites can accommodate a particular technology in a manner that does not interfere with any environmental protection objectives, so long as appropriate mitigation is deployed).

3 NEXT STEPS

Upon completion of Step 3 of the RRES Methodology, the assessor should proceed through Steps 4 and 5 to complete the core methodology in developing a RRES:

- Step 4: Qualitative and Geospatial Assessment of the region considering additional key parameters; and
- Step 5: Set Local Authority-level renewable electricity Target Power Capacity allocations.

It should be noted that there may be iterations required between Steps 4 and 5 using the datasets available if there is a shortfall in the Available Areas, versus the required land-take to meet the renewable electricity Gap to Targets or through the iterative process of the environmental assessments. Each Regional Assembly and Local Authority must, as part of this iterative process, collate information on the development pipeline (by way of a review of extant / existing planning permissions) to ensure that, as a minimum, each LA accepts a capacity allocation that protects projects that have planning permission, but are yet to be constructed. This will involve identifying and tabulating, where possible, the proposed megawatt (MW) figure from all relevant planning application documentation, at both local authority and An Coimisiún Pleanála level, for each Regional Assembly area.

4 FREQUENTLY ASKED QUESTIONS

Q1. Once the Available Areas have been classified in terms of sensitivity and then quantified in km^2, how does the user assess the renewable electricity resource potential per sensitivity classification (*High, Medium, Low or No*)?

A1. To assess the renewable electricity resource potential, the user will simply need to apply the *Capacity Intensity Factor (CIF)* per sensitivity classification. Under Phase A, a CIF is an assumed rate of energised capacity over a km^2 if that land was devoted to the renewable energy technology in question. It is measured in MW per km^2.

As advised, the following CIFs should be used for this exercise, following the calculation set out in **Figure 20**:

- Wind: 15 MW/km^2
- Solar PV: 50 MW/km^2

An illustrative example for assessing the renewable electricity potential of grid-scale onshore wind based on outputs from Phase B – Stage 3 is set out in **Table 10.**

Cumulative km^2 per Geospatial Sensitivity Classification (km^2) x Capacity Intensity Factor (CIF) for applicable renewable electricity technology (MW/km^2) = Renewable Electricity Resource Potential (km^2)

For example, see **Table 10** for illustrative examples based on **Table 9**.

Figure 20. Calculation of Renewable Electricity Resource Potential per Sensitivity Classification.

Table 10. Calculation of Renewable Electricity Potential per Geospatial Sensitivity Classification per Cumulative km² for grid-scale onshore wind, drawn from Table 9 above*.

Geospatial Sensitivity Classification	Cumulative km^2	CIF for grid-scale onshore wind (MW/km^2)	Renewable Electricity Potential per Geospatial Sensitivity Classification (MW) (= Cumulative km^2 x CIF for grid-scale onshore wind ($15MW/km^2$))
No	7	15	105
Low	4	15	60
Low	6	15	90
Low	…	…	…
Low	12+	15	180+
Medium	20	15	300
Medium	50	15	750
Medium	…	…	…
Medium	64+	15	960+
High	24	15	360
High	26	15	390
High	…	…	…
High	31+	15	465+
No + Low + Medium + High	**114+**	**15**	**1,710+**

** This Table is illustrative and does not include an exhaustive list of all possible sub-classification within High, Medium, Low or No Sensitivity rankings. This will be generated through the regional-specific process.*

Q2. How does the user determine the potential capacity of renewable electricity projects in a region, taking into account delivery rates?

A1. To assess the potential capacity of renewable electricity projects in a region, the user will simply need to apply the *Project Delivery Rate (PDR)* to the resource potential for that region.

The Resource Potential for an area, as defined above, assumes this land is entirely developed to facilitate the renewable technology in question. In practice, as explained in Phase A – Stage 5, not all lands identified will be converted to delivered projects. To calculate the Potential Capacity of Delivered Projects within an area, the *Project Delivery Rate (PDR)* should be applied, following the calculation given in **Figure 21** and as illustrated in **Table 11**.

Renewable Electricity Resource Potential in region (km^2) x Project Delivery Rate (PDR) = Potential Capacity of Delivered Projects in region

For example, see **Table 11** below for illustrative examples based on **Table 10** above.

Figure 21. Calculation of Potential Capacity of Delivered Projects.

Table 11. Calculation of Potential Capacity of Delivered Projects km^2 for grid-scale onshore wind, drawn from Table 10 above*.

Geospatial Sensitivity Classification	Renewable Electricity Potential per Geospatial Sensitivity Classification (MW)	PDR for grid-scale onshore wind (%)	Potential Capacity of Delivered Projects in region (MW) (= Renewable Electricity Resource Potential in region x PDR for grid-scale onshore wind (15%))
No	105	15%	15.75
Low	60	15%	9
Low	90	15%	13.5
Low	…	…	…
Low	180+	15%	27+
Medium	300	15%	45
Medium	750	15%	112.5
Medium	…	…	…
Medium	960+	15%	144+
High	360	15%	54
High	390	15%	58.5
High	…	…	…
High	465+	15%	69.75+
No + Low + Medium + High	**1,710+**	**15%**	**256.5 +**

** This Table is illustrative and does not include an exhaustive list of all possible sub-classification within High, Medium, Low or No Sensitivity rankings. This will be generated through the regional-specific process.*

Q3. Will the final outputs from Step 3 be Tables and/or Maps?

A3. In order to identify Local Authority capacity allocations, Steps 3, 4 and 5 of the methodology will involve the generation of a range of both Tables and Maps to aid the decision-making process, but ultimately, the required final output is a numerical figure/allocation for each Local Authority. The Revised National Planning Framework, under National Planning Objective 74, does states that 'Each Regional Assembly must plan, through their Regional Spatial and Economic Strategy, for the delivery of the regional renewable electricity capacity allocations indicated for onshore wind and solar reflected in Table 9.1, and identify allocations for each of the local authorities, based on the best available scientific evidence and in accordance with legislative requirements, in order to meet the overall national target'.

As such, the mapping to be undertaken as part of the RRES Methodology is to be used as part of this decision-making process. The mapping is not required to be used to spatially designate or allocate lands as part of the RRES and wider RSES. As such the following are considered the key outputs of Steps 3, 4 and 5:

- **Step 3 - Phase A: Baseline assessment and identification of gap to targets:** This step will involve the generation of a number of numerical tables, using data from a number of sources including SEAI, EirGrid and ESBN;
- **Step 3 – Phase B: Geospatial analysis and sensitivity classification:** This step will result in a range of mapping outputs i.e. GIS, utilising a range of exclusion areas and spatial datasets relating to *High, Medium, Low* and *No* sensitivity areas, suitable for grid-scale onshore wind and solar PV development; and
- **Step 4 - Qualitative and geospatial assessment of the region considering additional parameters:** This step will build on the mapping outputs i.e. GIS, of Step 3, by overlaying relevant GIS datasets relevant to qualitative parameters such as: grid infrastructure, technology-specific resource quality, landscape character, iterative alignment with all ongoing statutory environmental assessments (as part of wider RSES) etc.

  Regional Assemblies should undertake this qualitative and geospatial analysis having regard to wider RSES development and statutory requirements as set out in the relevant planning legislation. This step is intended to be iterative in consideration of wider RSES development and related environmental assessments and there should be a common approach developed across the three Regional Assemblies to ensure consistency;
- **Step 5 – Set Local Authority-level target power capacity allocations:** This step will involve the generation of a number of numerical tables, based on the GIS mapping outputs of Steps 3 and 4. The process for determining specific Local Authority-level capacity allocations, is undertaken by quantifying the areas identified of renewable electricity resource potential, generated through Steps 3 and 4, into Local Authority-level target power capacity allocations (MW), through the application of capacity intensity factors (CIFs) and project delivery rates, as set out in the RRES Methodology. This step must also account for extant / existing planning permissions across each Regional Assembly area, based on a review of planning application documentation at local authority level and by An Coimisiún Pleanála at the national level.
  - It is important to note that the Regional Renewable Electricity Capacity Allocations (measured in MW) set out what each Regional Assembly must plan for in order to facilitate the 2030 national renewable electricity generation targets and as set out in the revised National Planning Framework.
- **Step 6 – Incorporate Renewable Electricity Capacity Allocations into Regional Renewable Energy Strategy:** This step will involve the inclusion of a Table(s) in the RRES (and wider RSES, together with relevant Regional Policy Objectives (RPOs)), outlining the renewable electricity capacity allocations for allocation to the constituent Local Authorities within each Regional Assembly area.

Q4. How do I summarise and tabulate data when using GIS

A4. See **Figure 22**, illustrating an example, noting the following:

- To summarise the GIS data documented in **Appendix A**, the 'Summary Statistics' geoprocessing tool can be used (also accessed via 'Summarize' in the Attribute Table).
- An outline of the approach to be taken for calculating the total Low Sensitivity area is given in the diagram below.
- For some statistics, the user may need to **filter** the GIS layer before undertaking the 'Summary Statistics' function.
- Filtering of a layer is undertaken using the **'Definition Query'** option under Layer Properties.
- Users should refer to the accompanying Excel spreadsheet (**Appendix A**) to complete this step.

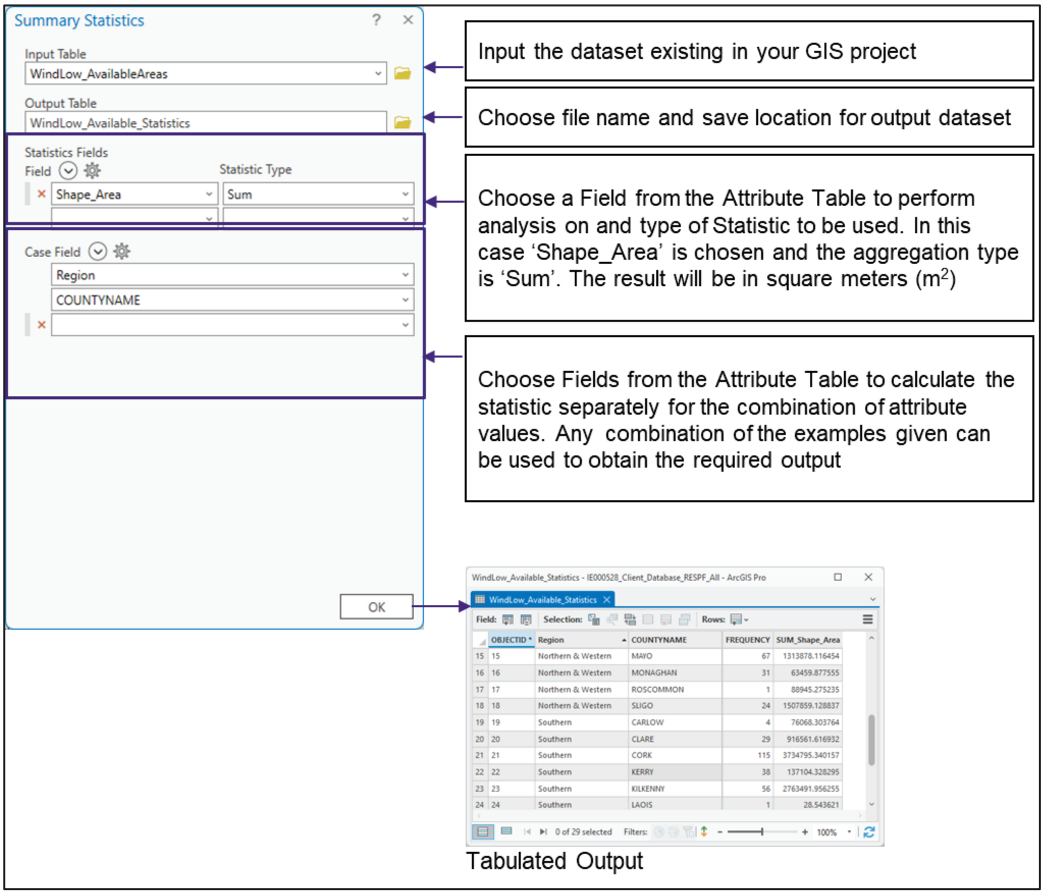


Figure 22. An illustrated example.

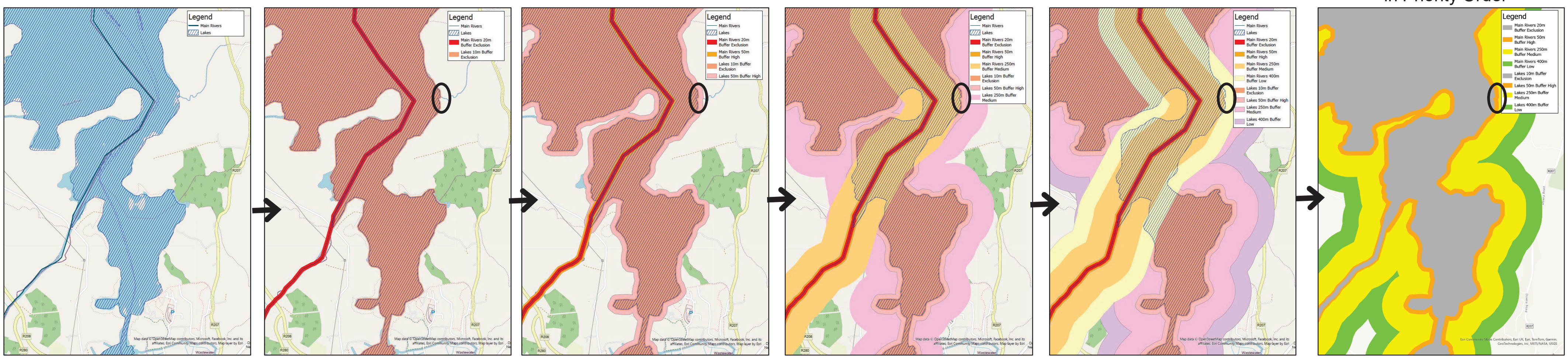
Appendix A – Regional Methodology Exclusion & Sensitivity Criteria dated 30/09/2025

SEE STANDALONE EXCEL SPREADSHEET

Appendix B – Mapping

See below for higher definition mapping examples.

Raw Data | Exclusion | High Sensitivity | Medium Sensitivity | Low Sensitivity | Assigned Colour Code in Priority Order



For info: the purple line alongside the river is the county boundary

Note ringed area next to the lake / Exclusion

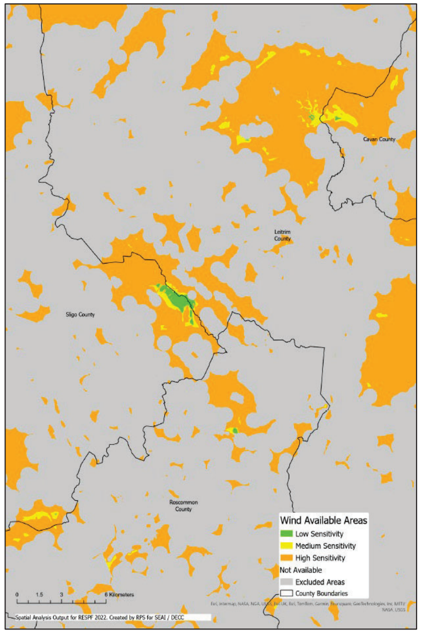
Within the ringed area, an area of High sensitivity next to the lake is identified

Within the ringed area, an area of Medium sensitivity next to the lake is identified, in addition to an area of Medium sensitivity due to the river

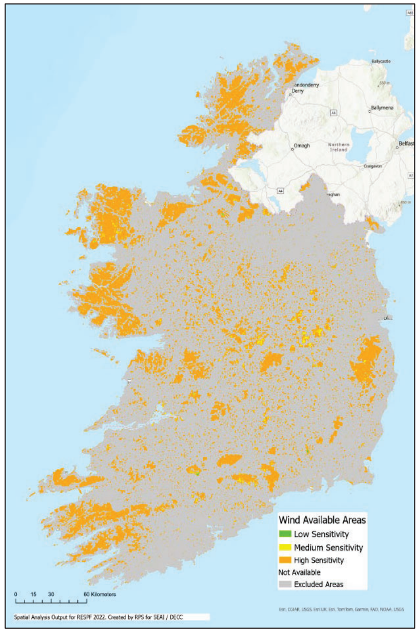
Within the ringed area, an area of Low sensitivity due to the river is identified

Following the spatial and prioritisation process, the ringed area shows Exclusion layer in grey, High sensitivity area in orange and Medium sensitivity area in yellow. No Low sensitivity area is assigned in this example

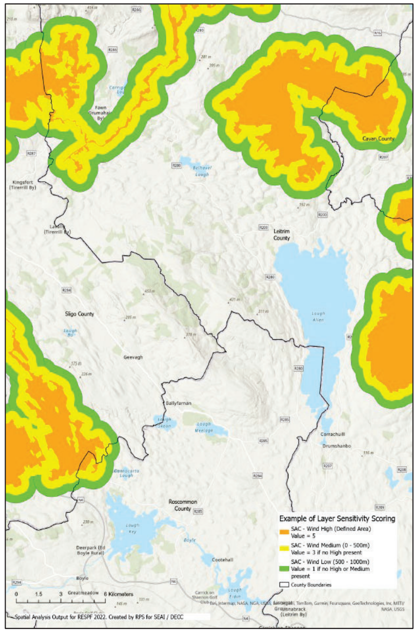
Figure 23: Higher-definition version of Figure 14 - Polygon map for two waterbody layers, examples used for illustrative purposes.



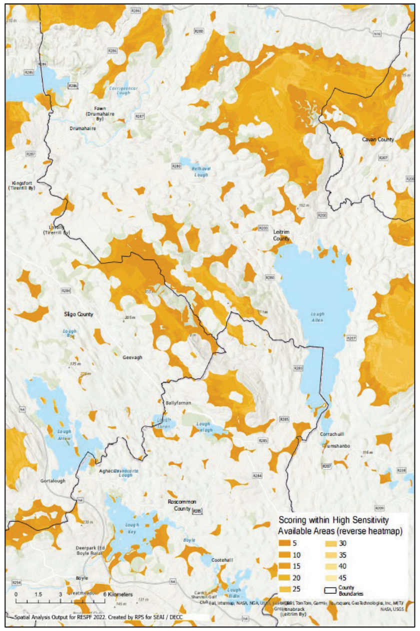
Map A: Low-Med-High Mapping - Wind Local



Map B: Low-Med-High Mapping - Wind National



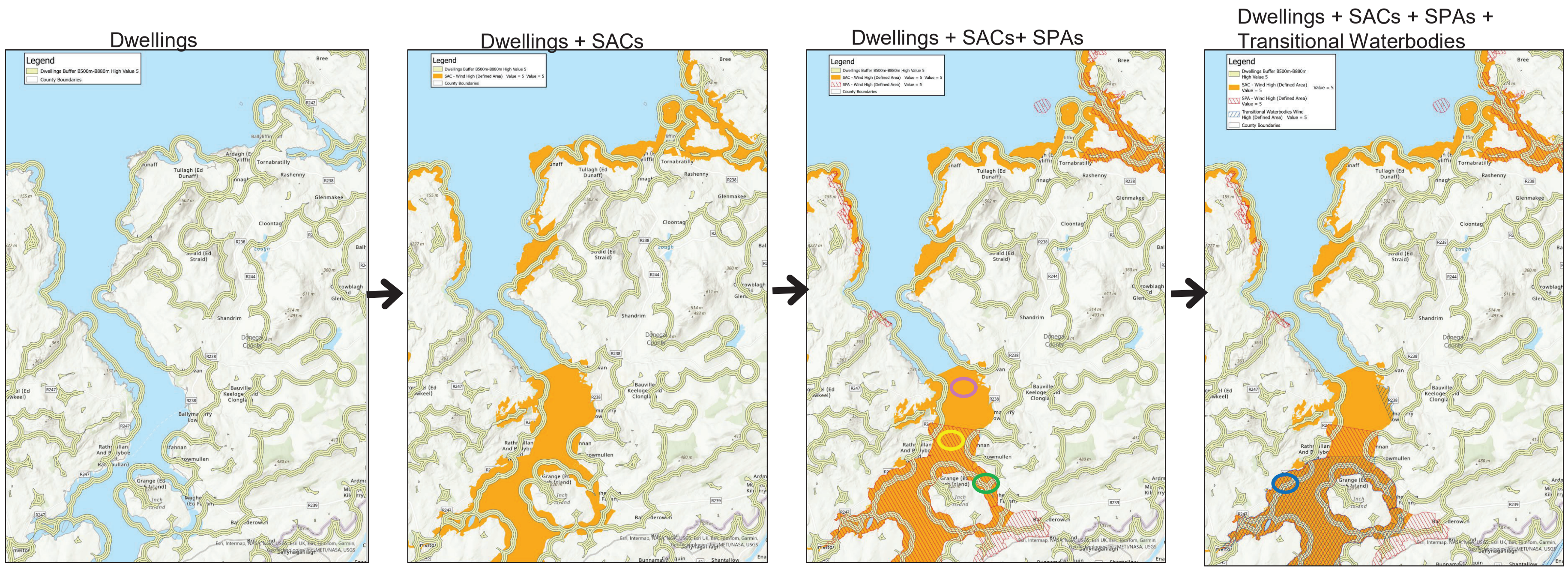
Map C: Example High-Med-Low Layer Scoring - Wind Local



Map D: Scoring within High Sensitivity Areas only - Wind Local

Map E: Scoring within High Sensitivity Areas only - Wind National

Figure 24: Higher definition version of Figure 16: Sample Sensitivity Mapping Outputs (1).



This layer shows dwellings with their surrounding buffer zone. As per the High Sensitivity calculation, the score of this layer will be 5.

The underlying SAC layer is also scored 5. Every intersection of these datasets will now = 10.

This map adds in a layer for SPAs. Anywhere all 3 datasets intersect = 15 (green circle), two datasets =10(yellow circle) and a single dataset will keep it 5 (pink circle).

As more datasets are added, the overlaps increase. This is not limited to High Sensitivity, although in this example 4 High Sensitivity datasets are intersecting in the blue circle, giving a score of 20.

Figure 25: Higer definition version of Figure 17: Sample Sensitivity Mapping Outputs (2)

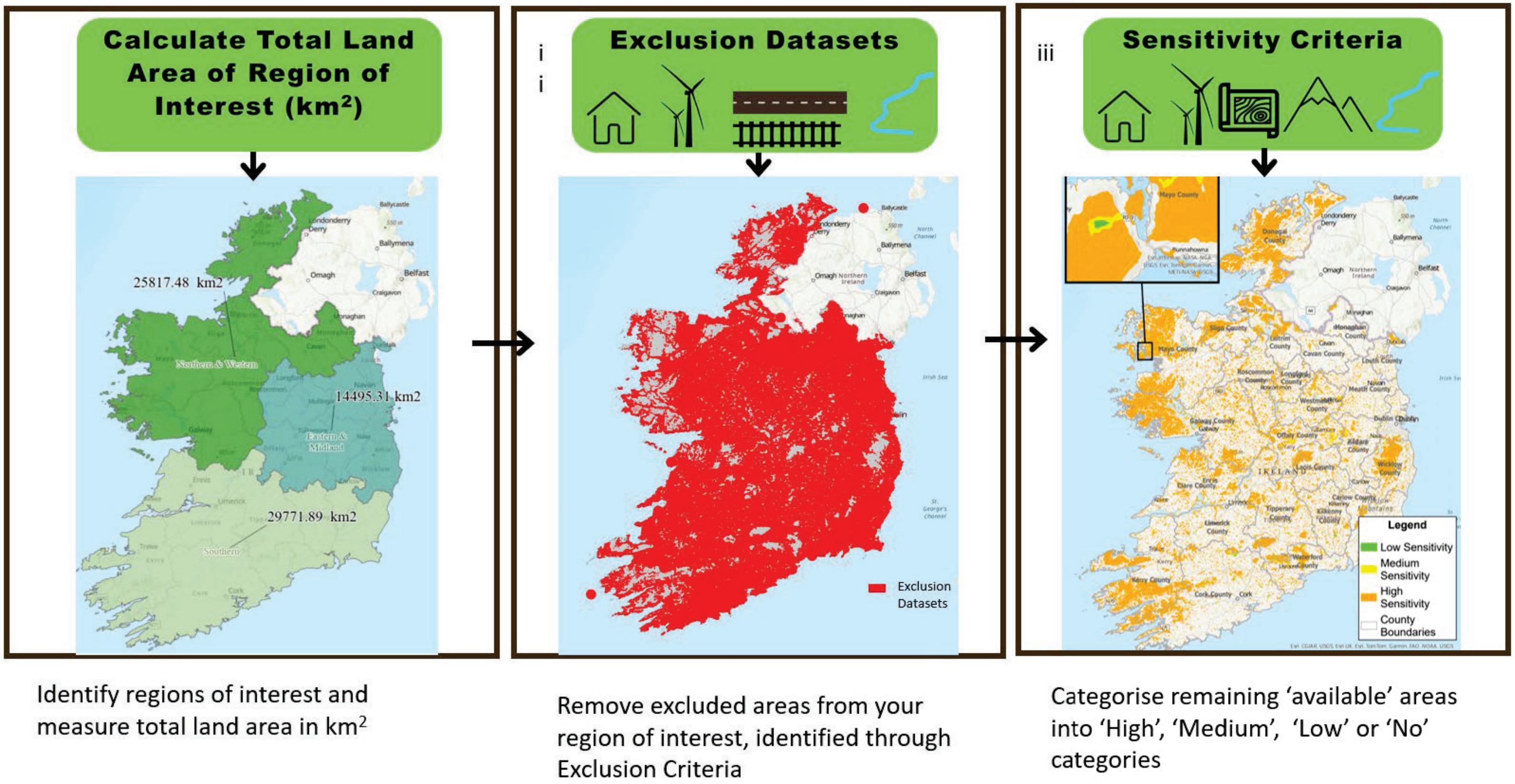


Figure 26: Higher definition version of Figure 18: Overview of Phase B process to this point