

ArcGis Online Manual



Introduction

What is GIS?

GIS is the acronym for Geographical Information Systems. This means that a software can create many layers of geographical data on one map so that the data is easier to visualise and analyse. We use GIS for many things such as crime rates, volcano awareness, road connections and what we are focusing on, renewable energy. In the case of renewable energies, GIS can help in finding the best areas for renewable energies, for example where the highest wind speeds are or when the sun is most prominent. From GIS renewable energy companies can prepare many documents to show customers which product is best suited for their area (Wind turbines, solar panels or biomass boilers). In your own time you can read more about renewable energies on BBC Bitesize. Here is the link - http://www.bbc.co.uk/schools/gcsebitesize/geography/energy_resources/energy_rev2.shtml.

GIS and Wind Power

Your project will consist of plotting data of wind turbines in Cookstown and Dungannon. The reason for this is to increase your knowledge of the amount of renewable energy resources around our area. The final outcome from this exercise is that you should understand the importance of renewable energy and also the dangers and advantages/disadvantages of having wind turbines close to built up areas. You will relate renewable energies with your knowledge of urban and rural areas to decide where are the better areas for wind turbines. You will complete this manual in a series of exercises and this will be over 3 of your geography lessons.

Learning Outcomes for this Assignment (KNOWLEDGE)

1. To understand when to use GIS and what it is used for.
2. Manage data correctly to be able to see the importance of wind turbine distribution.
3. Be able to identify impacts of turbines on rural and urban towns using own knowledge of these areas.
4. Be able to use the time given effectively to complete tasks.
5. Have a completed GIS Map and understand what each layer is used for.

For this piece of work you will be signing up to an online GIS software, called ArcGis Online. You will be adding layers such as, a basemap, wind turbines, towns and buffer layers. Each of these layers will enable you to have a completed map with Wind Turbines in the Cookstown and Dungannon area and at the end of the exercises you should know why each of these layers are needed. At the end you will be asked a series of questions on GIS and wind energy to ensure you have clear understanding of the project.

Sign in/up to ArcGIS Online

Sign In

Don't have an ArcGIS account?

Sign up for a 60-day trial.

[TRY ARCGIS](#)

ArcGIS Public Account

An ArcGIS Public Account is a personal account with limited usage and capabilities and is meant for non-commercial use only.

[CREATE A PUBLIC ACCOUNT](#)

If you have signed up for an Esri Account, you have automatically been given access to an ArcGIS Public Account and you can use the same sign-in credentials for both.

Sign In

esri

Username

Password

Keep me signed in

[SIGN IN](#)

[Forgot password?](#) [Forgot username?](#)

[Sign in with enterprise account](#)

Exercise 1:

Firstly, you will need to sign up for an ArcGIS online account.

Use your school email as your username and 'Dungannon1' as your password so that it will be easily remembered for future projects.

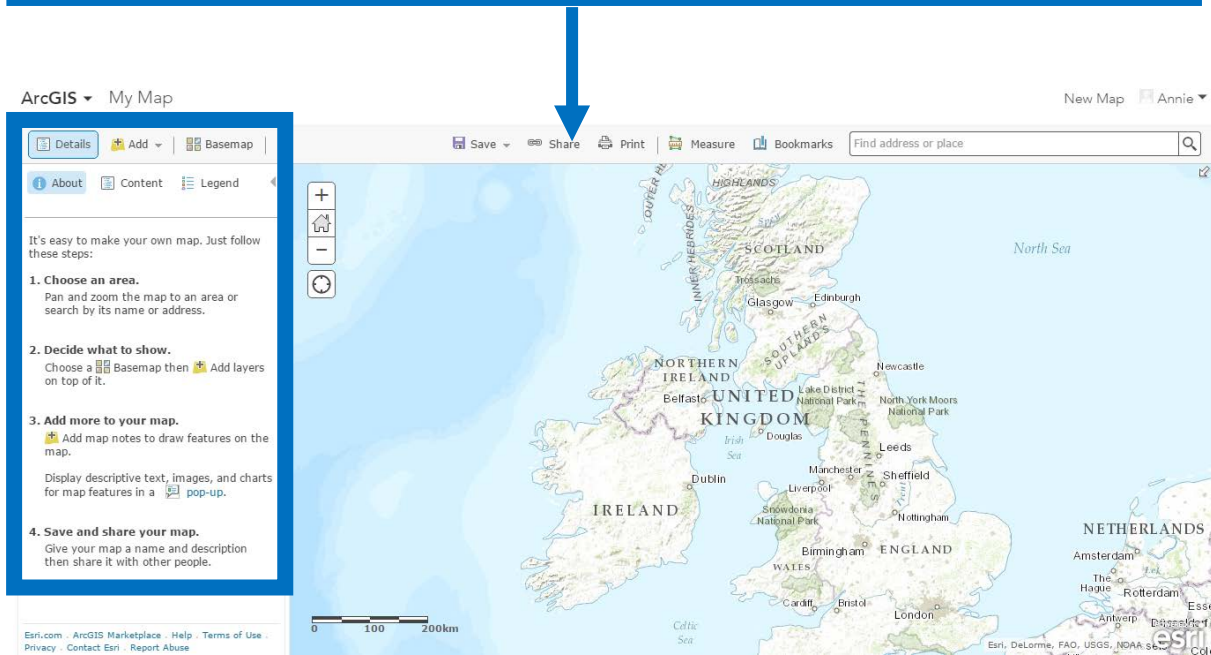
Get used to Maps

Exercise 2:

Take 5-10 minutes and explore maps on ArcGIS.

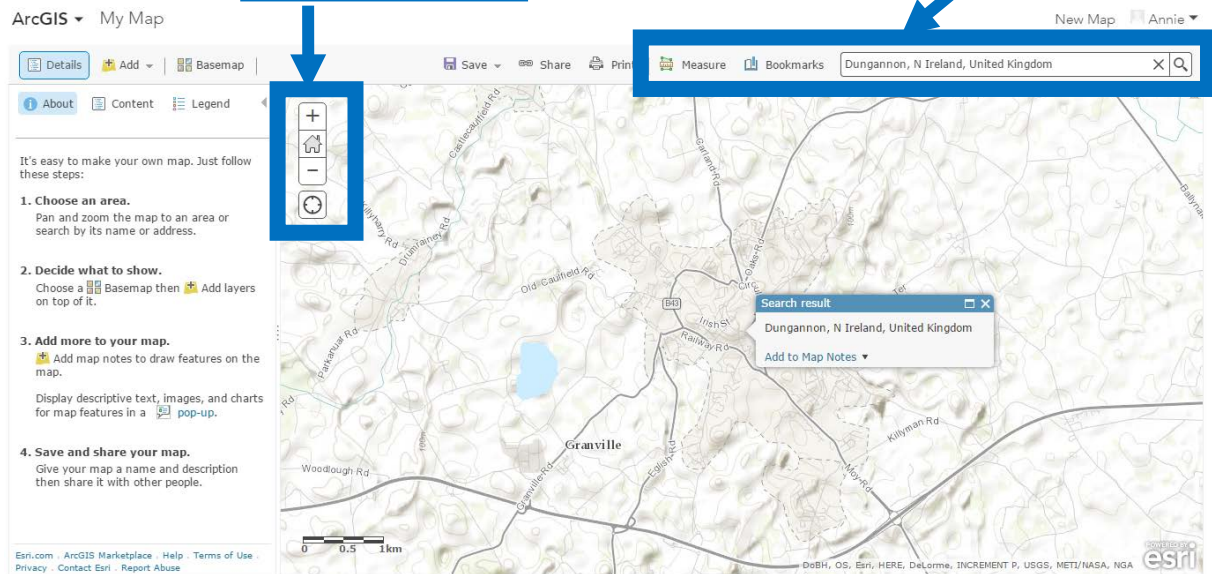
Try to find your home or school on the maps using the search box.

You can also look at other parts of the world from ArcGIS online.



Use these buttons to zoom in and out of your map

Search Box



Add Basemap

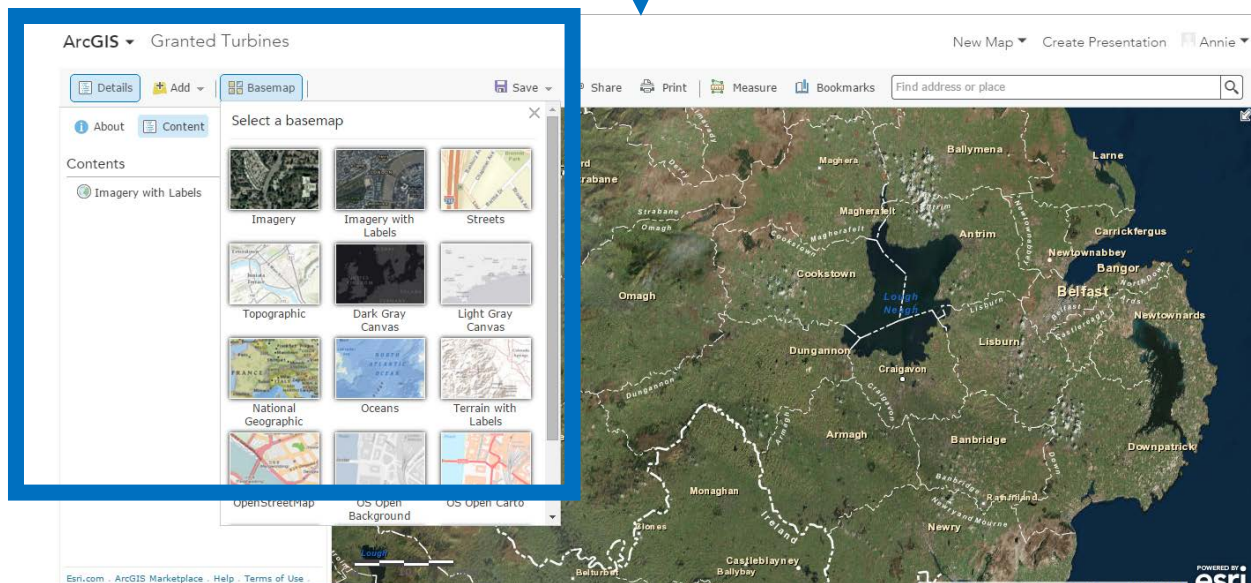
Exercise 3:

To start our analysis on the GIS Project, we must add a basemap. A basemap allows us to see the world in different ways, e.g. with streets, topography or through imagery.

For this exercise you should add the basemap “Imagery with Labels”.

We use this basemap so that we know where exact places are in Northern Ireland. It will become more important later on when we add more layers to the map. The basemap is your foundation for the rest of our layers.

Other basemaps may be used to show different things, i.e. Topography for heights of land



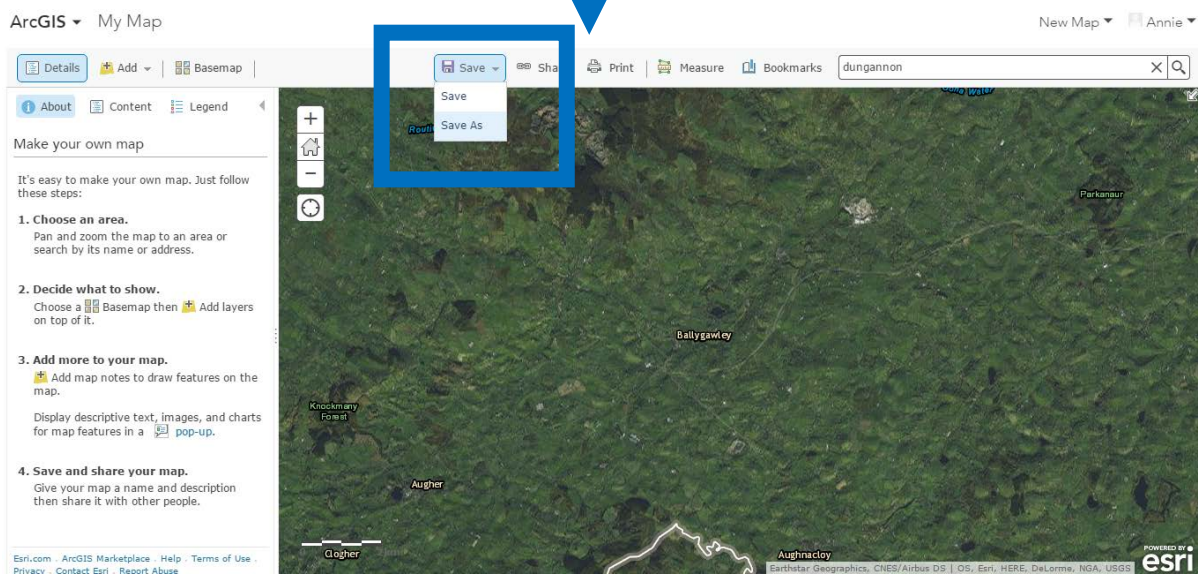
Save Work

Exercise 4a:

It is very important to save your work along the way so nothing gets lost.

This is a very simple step and I would encourage you to do it more often.

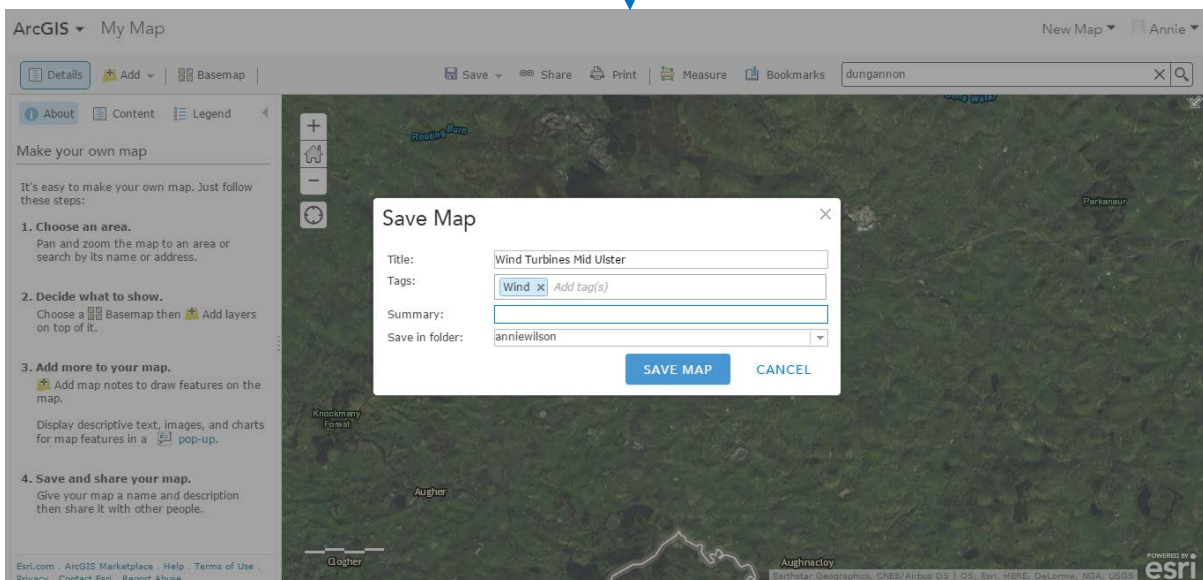
The first time you save you map you need to click on the 'Save' button above your map and then the 'Save as' tab.



Exercise 4b:

Use an appropriate title for your map and something that you will remember e.g. 'Wind Turbines Mid Ulster'.

For any other time you are saving you just need to click 'Save' then 'Save' again rather than 'Save as'. This will save any added work to the same map.



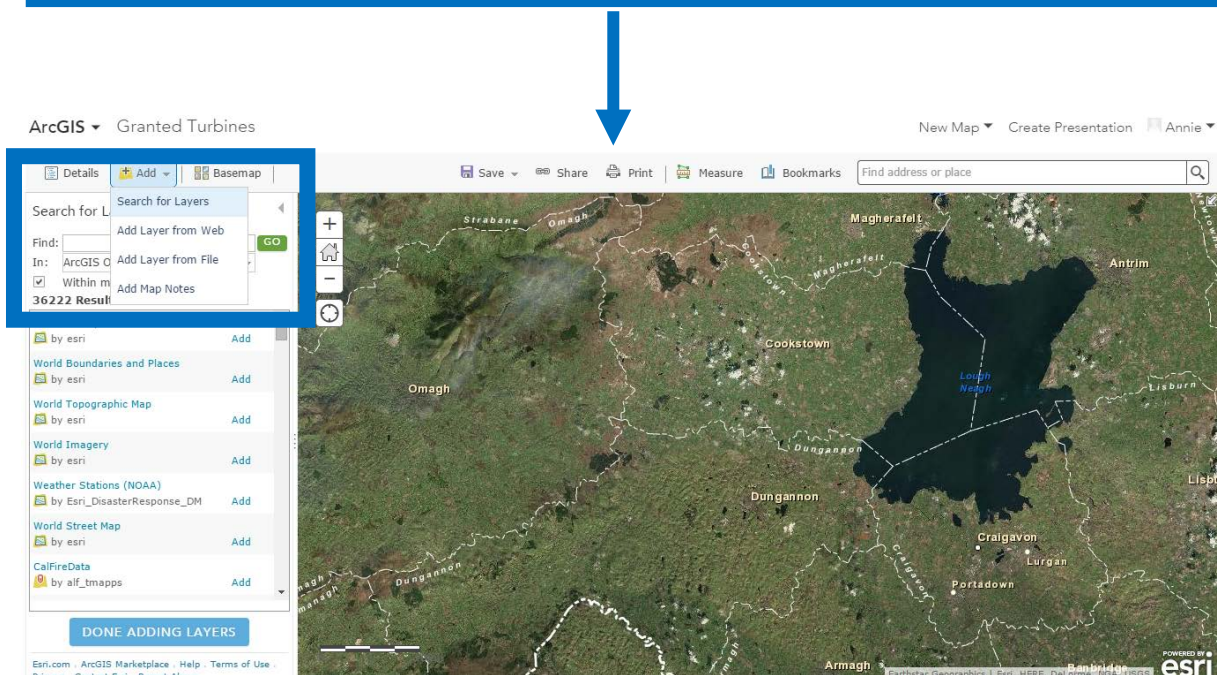
Add Wind Turbine Layer

Exercise 5:

There are 2 wind turbine layers to be added; one layer for all of the turbines in the Cookstown area and the other for all of those that are in Dungannon and its surrounding areas.

To do this you need to click the 'Add Layer' tab at the top left of your map, then click 'Search for Layers'.

In the search box can type 'Cookstown' and find the 'Cookstown Granted' layer. Do the same for the Dungannon Turbines layer.



Details Add ▾ Basemap Save Share Print Measure Bookmarks Find address or place

Search for Layers

Find: GO

In: ArcGIS Online

9 Results Found

- 1CBANAGOL by roisinp Add
- DungannonBusStops
- DungannonBusRoutes by selbUser Add
- Assets by NIHE_GIS Add
- Dungannon_Granted by anniewilson Remove
- SDSAddressViewer_AddressTransferABC by NIHE_GIS Add
- by anniewilson Add

DONE ADDING LAYERS

Details Add ▾ Basemap Save Share Print Measure Bookmarks Find address or place

Search for Layers

Find: GO

In: ArcGIS Online

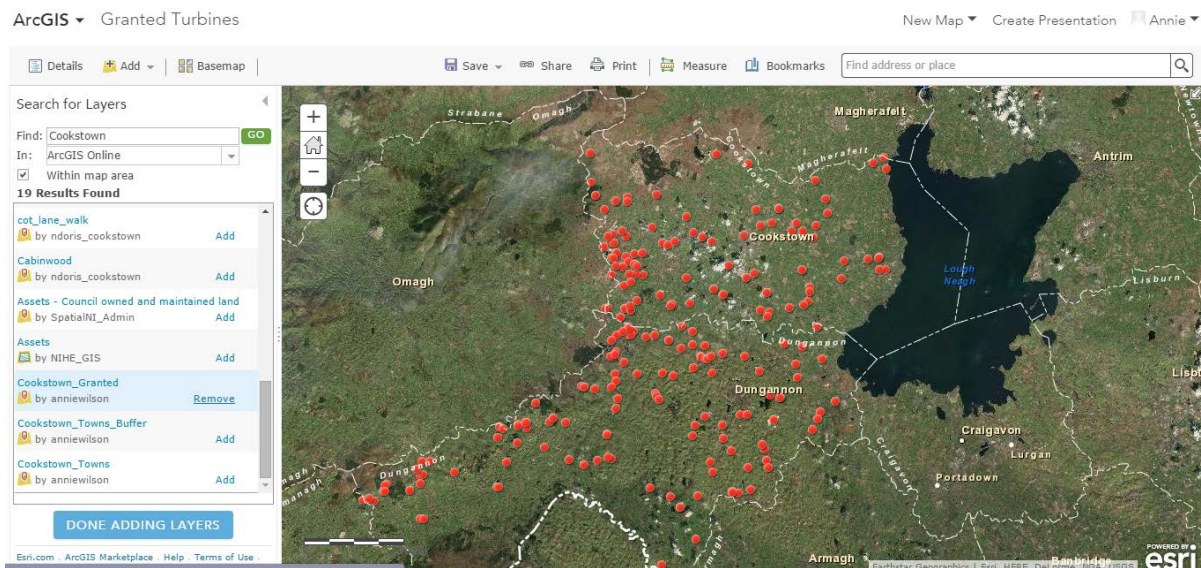
19 Results Found

- cat_lane_walk by ndoris_cookstown Add
- Cabinwood
- Assets - Council owned and maintained land by SpatialNI_Admin Add
- Assets by NIHE_GIS Add
- Cookstown_Granted by anniewilson Remove
- Cookstown_Towns_Buffer by anniewilson Add
- by anniewilson Add

DONE ADDING LAYERS

As you can see, the borders on the basemap make it easier to see what area you are using.

Once these two layers have been added, click the 'Done Adding Layers' tab. Your map should look like the one shown below.



***Additional Exercise 1:**

Use this map to see how many wind turbines are in your area – For further research you could map the wind turbines throughout the whole of Northern Ireland. This would give you a clear distinction of the spatial distribution of wind turbines in NI.

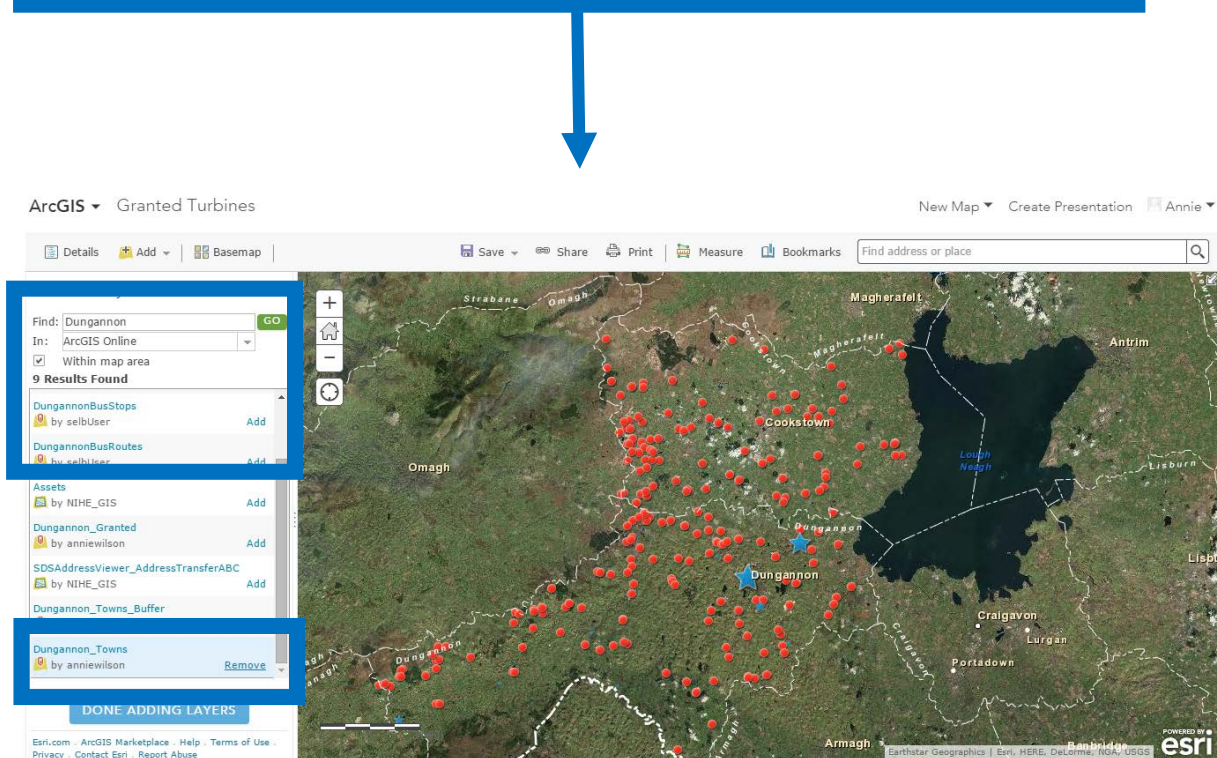
It may also be interesting to change your basemap to topography. The topography basemap will give you an indication of the terrain where turbines are built. This could be useful during an Urban-Rural debate on wind turbines. To do this, you would need to select the 'Topographic' Basemap layer at the beginning of Exercise 3.

Add Towns Layer

Exercise 6:

For this exercise you will follow the same steps as before. When adding layers to your map you will always use the 'Add Layer' tab and search for the layer, (unless you have been given a layer to use from your computer, which you would add using the 'Add Layer from file' tab).

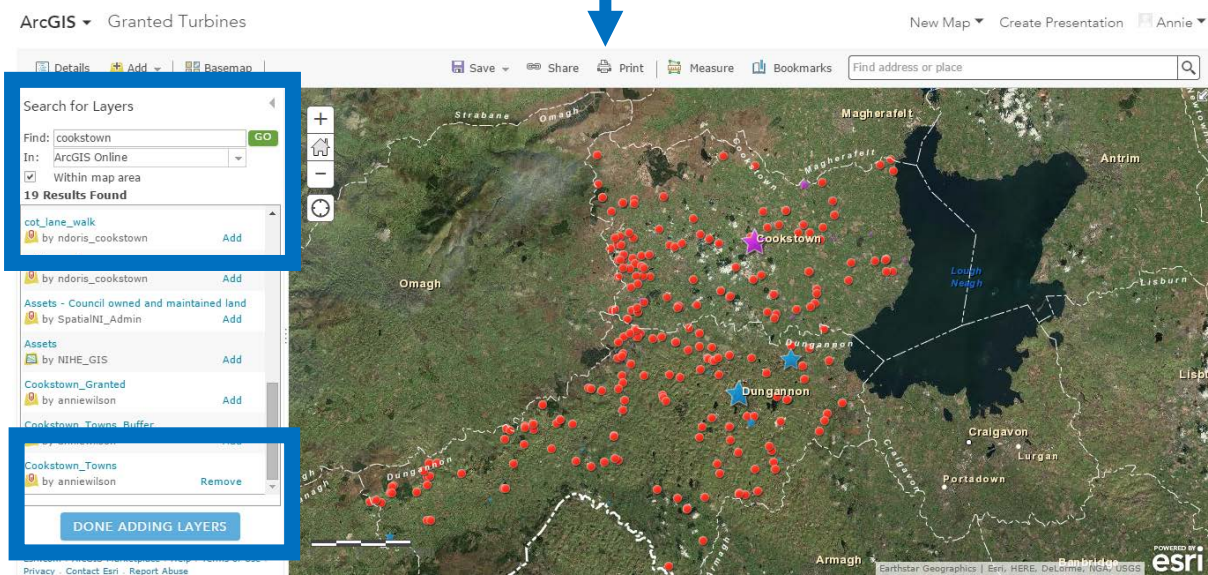
Again, add two layers; one for 'Cookstown Towns' and the other for 'Dungannon Towns'.



These two layers will show you where the two larger towns are and all the other towns in their district. From this you should be able to see a pattern of where wind turbines are.

Remember to click 'Done Adding Layers' when finished.

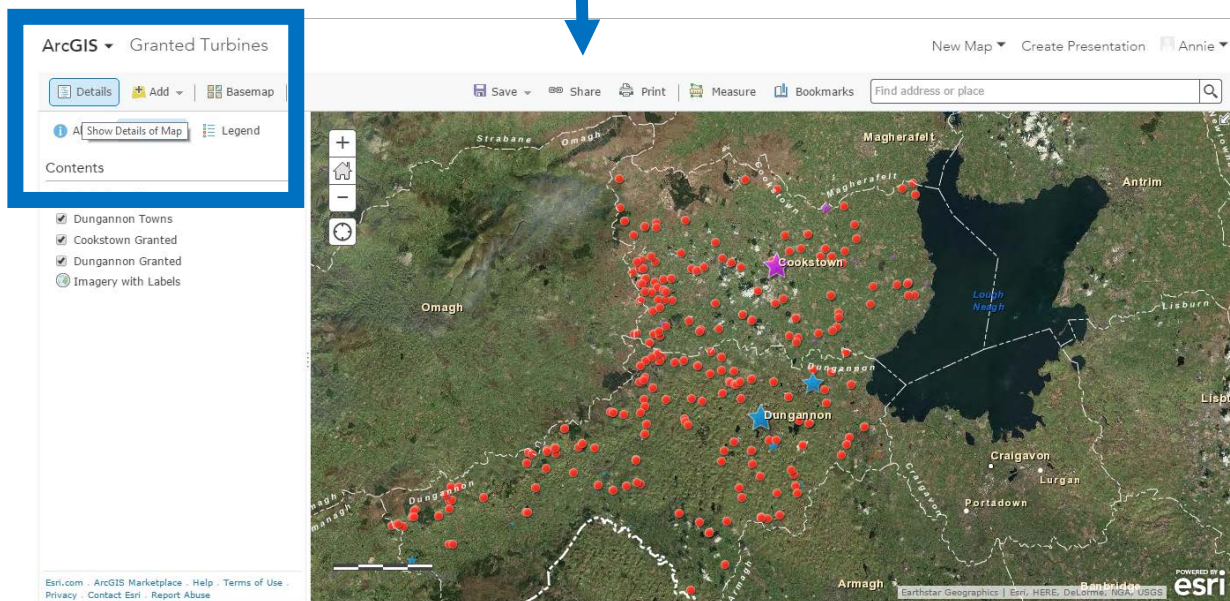
Remember to SAVE your work!!



Change Symbols

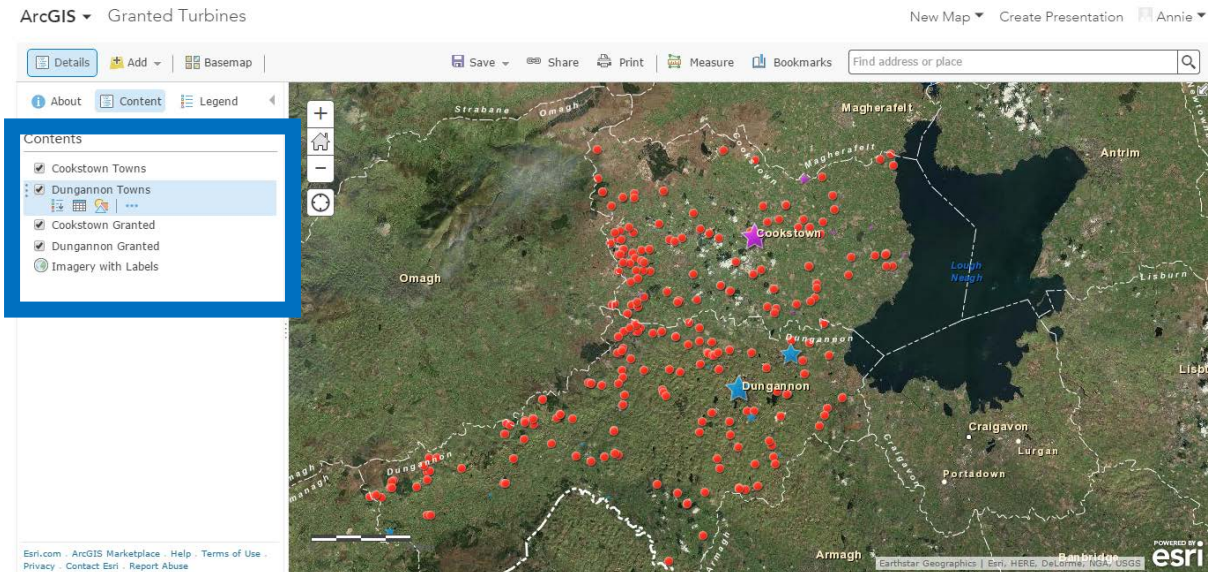
Exercise 7a:

In order to make your map unique, you can change the symbols of each layer. To change the symbols you need to make sure that you are on the 'Details' tab. This tab shows you each of your layers on the map.



Exercise 7b:

When you click on a specific layer, a set of symbols will appear. To change the symbols of your layers, click the shapes symbol. This will bring you to a new set of choices for the map.



The purpose of changing symbols is to show a difference between each of the layers you have on your map. It is important to know what each symbol is showing and that it is a clear indication of the points in the layer.

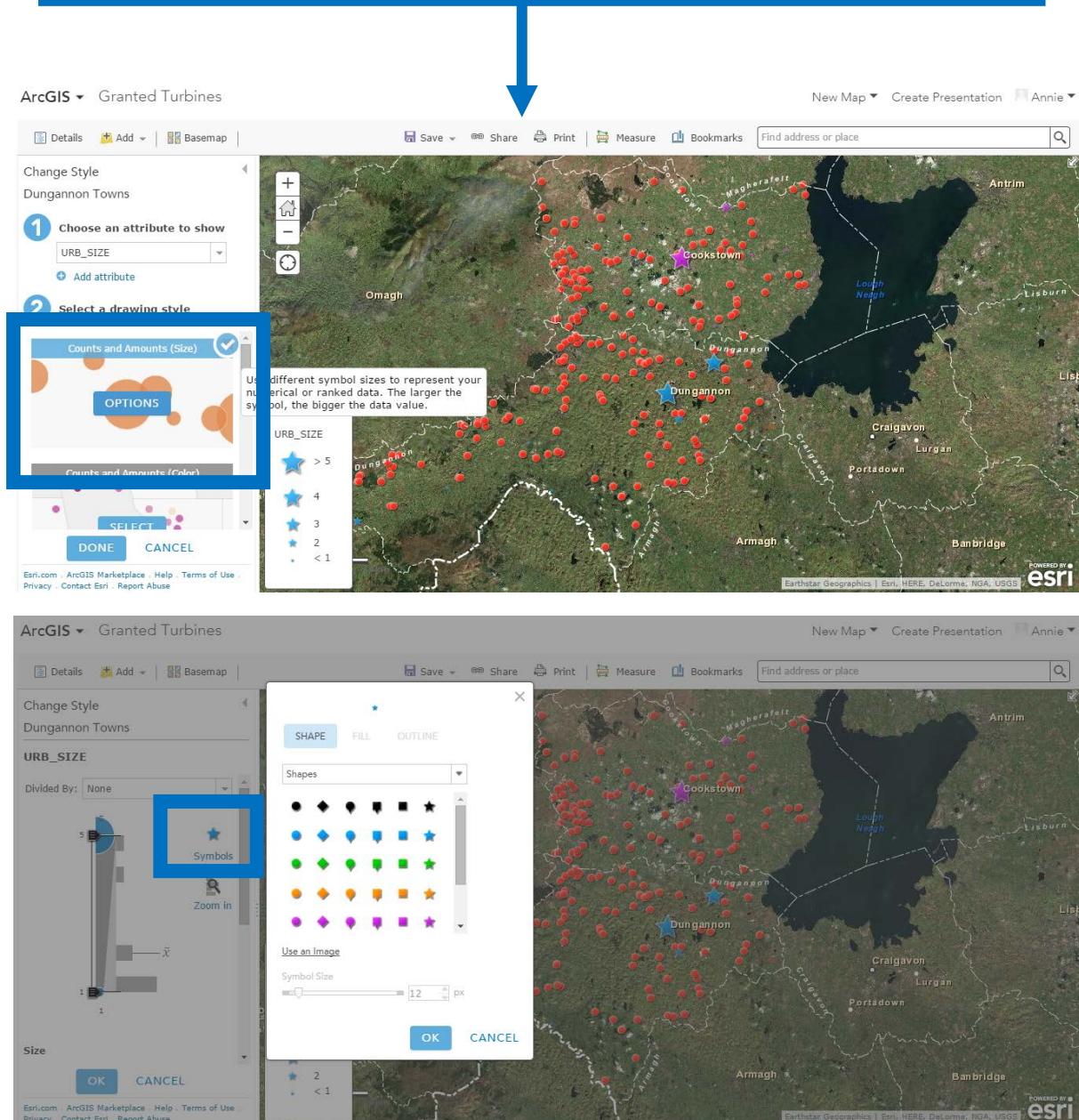
Also, changing symbols gives your map the individuality it needs! You can then know which map belongs to you.

Exercise 7c:

For the 'Towns' layers you would want to have a sizing symbol to show the different densities in each town.

Choose whichever symbol you like for each layer. Using the 'Shape, Fill and Outline' tabs at the top of this window, you can make the symbols even more individual for your own map.

N.B. It is easier to have the same symbol, possibly in a different colour for the same type of layer i.e. Towns OR Turbines.



Add a Buffer Layer

Exercise 8:

For this exercise, you will add buffer layers to each of the 'Towns' layers.

A buffer is a larger area around a certain point, it can be used to show how many turbines are within a radius of a town or village. In this case the buffer zones are a 2 mile radius around each town.

I have already made the buffer zones as this cannot be done on ArcGIS online. The software I used to create the buffer layers was ArcMaps.

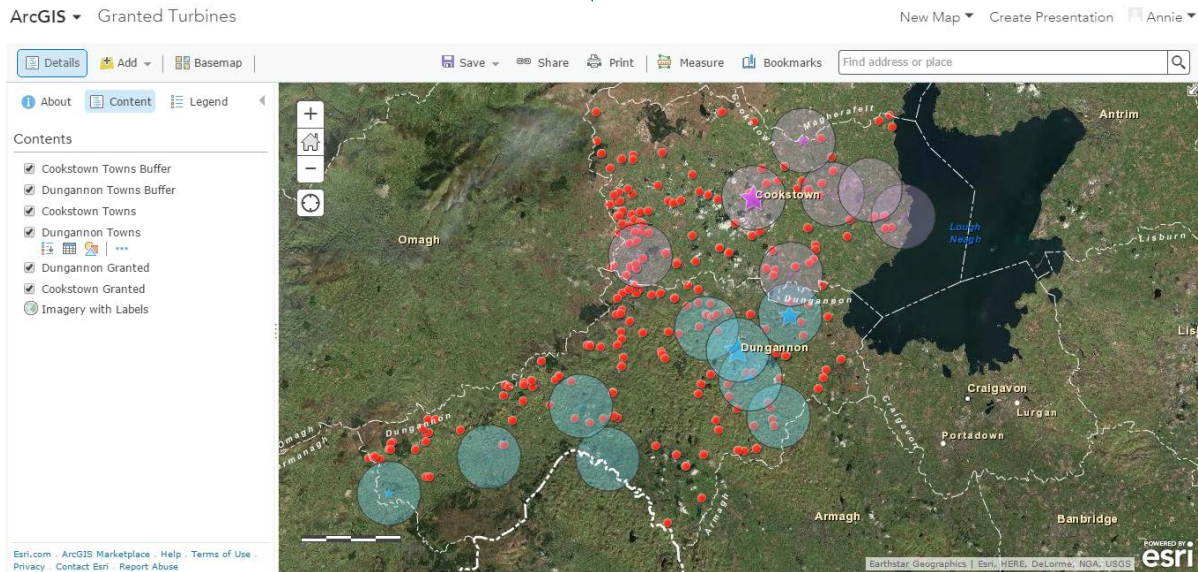
To add the layers it is the same as exercises 4 and 5. In the search box put, 'Dungannon Towns Buffer' and 'Cookstown Towns Buffer'.

The image displays two screenshots of the ArcGIS online interface, illustrating the process of adding buffer layers to a map. The top screenshot shows the 'Search for Layers' panel with 'Dungannon Towns Buffer' entered in the search box. The 'Save' button in the top navigation bar is highlighted with a blue box, and a blue arrow points from the text above to this button. The bottom screenshot shows the 'Search for Layers' panel with 'Cookstown Towns Buffer' entered in the search box. The 'DONE ADDING LAYERS' button at the bottom of the search panel is highlighted with a blue box. Both screenshots show a map of the region around Lough Neagh with red dots representing turbines and blue circles representing buffer zones around towns like Dungannon and Cookstown.

You need to have all layers present on your map to fully understand the purpose of the buffer.

After adding both buffer layers, your map should now look like the one below.

What would be affected if there are too many turbines in one area?



**Additional Exercise 2:*

Similarly to the first additional exercise, you could add all of the towns in Northern Ireland and add their buffers also. This will give you more information on the distribution of wind turbines and their positions around rural and urban areas.

You can complete a fuller report on where turbines can be built in Northern Ireland.

Show Table of Attributes

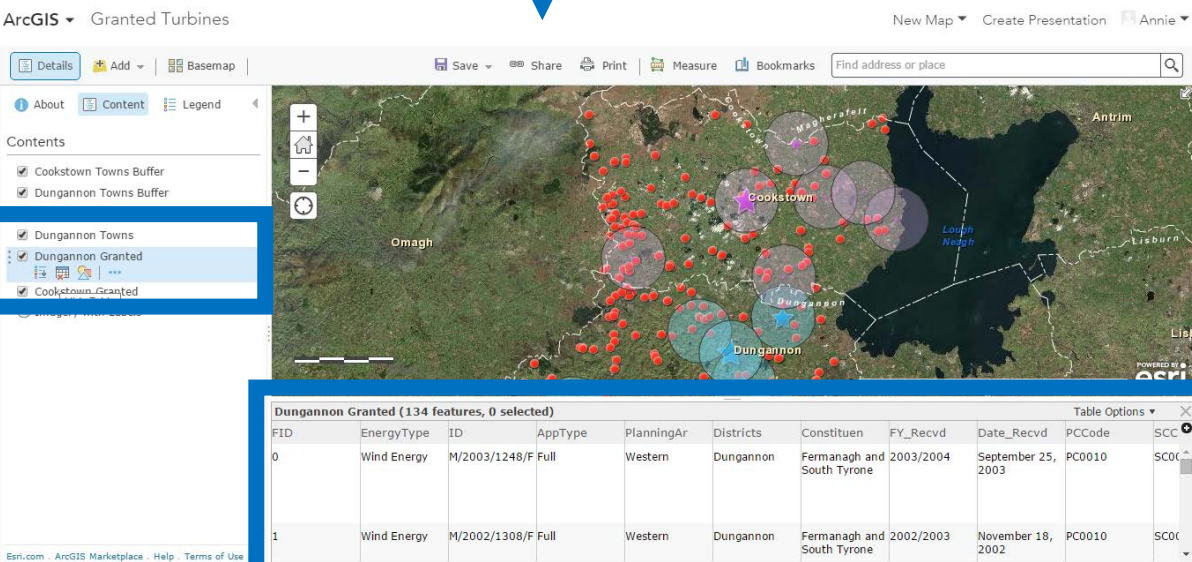
Exercise 9:

A 'Table of Attributes' is a table that shows details of every point on your map.

To get the 'Table of Attributes' to appear onscreen you can click the small table icon that will show when you click a certain layer.

Similarly to exercise 6, you must ensure that you are on the 'Details' tab in order to see all of your layers present on the map.

From the 'Table of Attributes' you can see all the fine details of each turbine, e.g. when it was built, what the purpose of building it was and what it is used for etc.



The screenshot shows the ArcGIS Online interface for a map titled 'Granted Turbines'. The map displays several red circular markers representing wind turbines, with semi-transparent buffer zones around them. The interface includes a top navigation bar with options like 'New Map', 'Create Presentation', and 'Annie'. A left-hand pane shows the 'Contents' list with several layers checked, including 'Dungannon Granted'. A table window is open over the map, displaying the following data:

Dungannon Granted (134 features, 0 selected)										
FID	EnergyType	ID	AppType	PlanningAr	Districts	Constituen	FY_Recvd	Date_Recvd	PCCode	SCC
0	Wind Energy	M/2003/1248/F	Full	Western	Dungannon	Fermanagh and South Tyrone	2003/2004	September 25, 2003	PC0010	SCC
1	Wind Energy	M/2002/1308/F	Full	Western	Dungannon	Fermanagh and South Tyrone	2002/2003	November 18, 2002	PC0010	SCC

The fine details come from the data that has already been produced for you on the software that previously made the buffer layers; ArcMaps.

By using this software I was able to take the data from DOE on turbines in NI, create the layers and upload them to ArcGisOnline.

If you are interested in other data available, just ask

Measure or Count Data

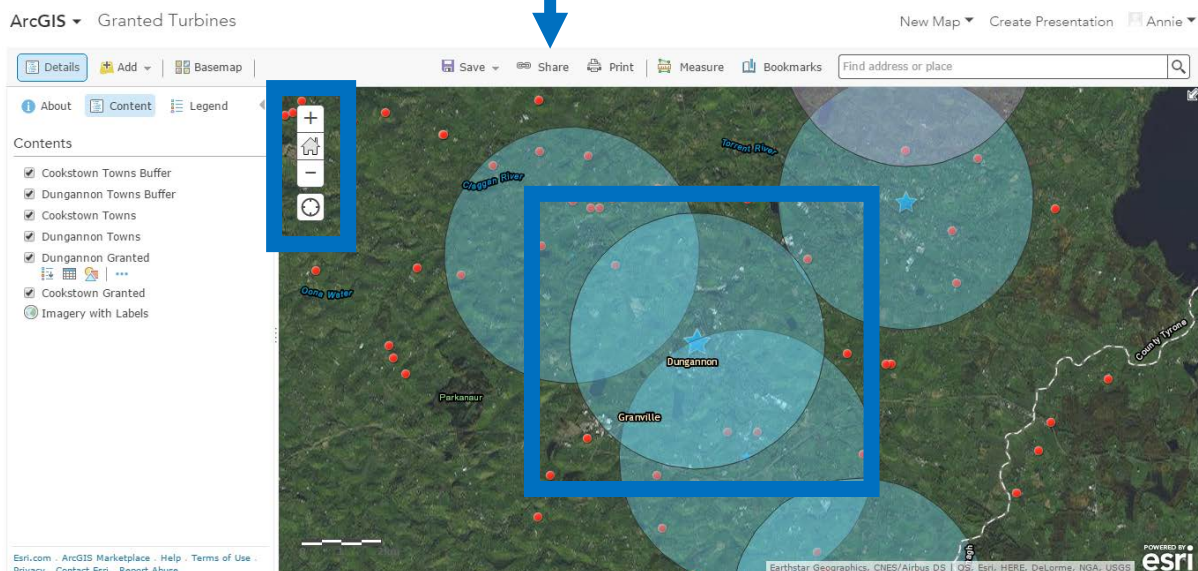
Exercise 10:

Using the 'Zoom' buttons on the map you can zoom in and out of different areas. For this exercise you are required to zoom to Dungannon.

Once you can clearly see Dungannon, count how many turbines are in the 2 mile buffer zone.

You can also zoom to a smaller town and count all the turbines there.

From this you should be able to make a conclusion on where turbines are mostly situated in Northern Ireland – Are they in URBAN or RURAL areas?



Quiz:

- 1 – What does GIS stand for?
- 2 – Give an example when you would use GIS.
- 3 – How might wind turbines affect an urban area?
- 4 – How important is the use of Wind Energy in NI?
- 5 – What is the purpose of a basemap? Can you name 3 types of basemaps?
- 6 – Why do we need a buffer?
- 7 – Why are turbines predominantly in rural areas?

Additional Exercise 3:

Write a report on the spatial distribution of wind turbines in Northern Ireland. From all of your exercises and additional exercises, you should be able to confidently write a report concerning the impacts of a wind turbine.

From your own knowledge you should be able to include information on the urban upset of wind turbines. Comment on the positive and negative impacts of wind energy and use as many references as possible. Here are some to start you off:

<http://www.technologystudent.com/energy1/wind8.htm>

<http://energy.gov/eere/wind/advantages-and-challenges-wind-energy>

<http://www.britaingallery.com/british-life/environment/wind-turbines.php>

Summary

You should now be able to apply GIS as and when required to provide outcomes for geographical use. You should be confident with using ArcGIS Online for future assignments throughout your academic path. There are other GIS software packages that you will come across when using GIS, i.e. ArcMaps, Google Earth, QGIS. They will each have the same outcome of spatial analysis.

The overall purpose to this exercise is to have a broader knowledge of GIS and be able to manage the data correctly. You should now be able to identify 'How many turbines are within a certain area?' and also how they can impact that area. You should understand why we use such layers as the basemap or a buffer and what their functions are.