

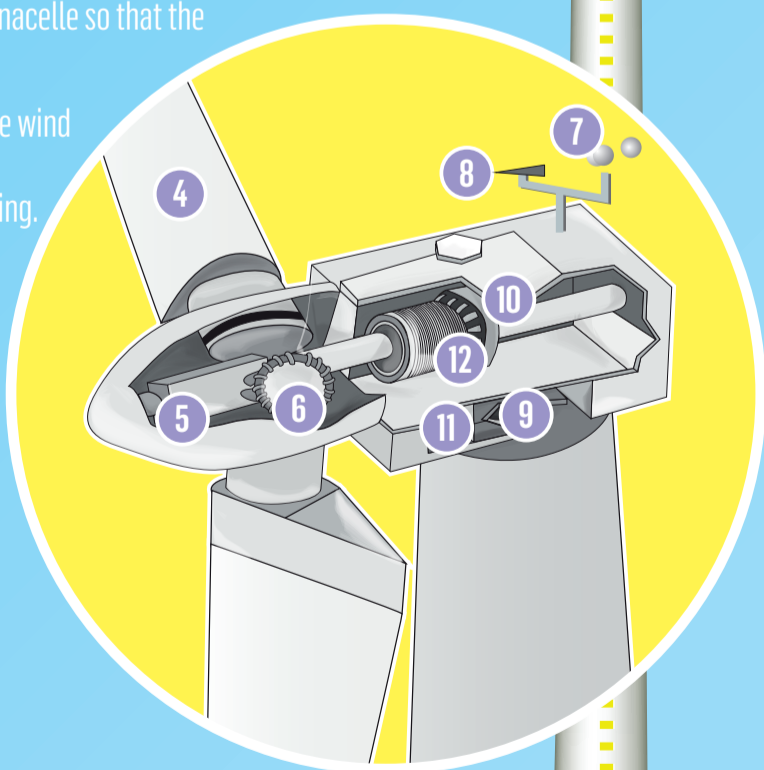
THE POWER OF THE WIND

THE SCIENCE BEHIND WIND POWER AND WIND TURBINES

WHAT IS WIND POWER? Wind turbines harness the power of the wind and use it to generate electricity. Simply stated, a wind turbine works the opposite of a fan. Instead of using electricity to make wind, like a fan, wind turbines use wind to make electricity. Wind is a good way to get energy. The wind almost never stops, especially here in Ireland. It is also clean. This type of energy is called 'green' or 'renewable'. Renewable means it will never run out.

WHAT A WIND TURBINE CONSISTS OF

- 1. THE TOWER:** Raises the blades to capture the most wind. The higher the tower the more electricity is produced.
- 2. THE HUB:** The hub looks like the nose of the wind turbine. The rotor blades are usually attached to the hub on the ground. A crane lifts them, and fitters mount them to the hub.
- 3. THE NACELLE:** The nacelle at the top of a wind turbine tower houses the generator and other technical components. The cables carrying the large amount of electricity from the generator of the wind turbine are nearly as thick as your arm. The cables carry the electricity that has been generated by wind power to our homes.
- 4. THE ROTOR:** The turbine's three blades that capture wind energy for electricity generation. The rotor blades are shaped like the wings of an airplane. They can catch the wind better than anything else.
- 5. DRIVE SHAFT:** The rotor turns the drive shaft with great power. That is why the shaft has to be very thick.
- 6. GEARBOX:** The gears in the gearbox turn the slow rotation of the rotor into quick rotation for the generator so that it can produce as much electricity as possible.
- 7. ANEMOMETER:** The anemometer measures the speed of the wind. It constantly sends information about the wind speed to the controller. In case of a storm the rotor is slowed down.
- 8. WIND VANE:** The wind vane is turned by the wind. It tells the controller from which direction the wind is blowing. The controller tells the yaw motor how to turn the rotor into the wind.
- 9. YAW MOTOR:** The yaw motor turns the nacelle so that the rotor always faces the wind.
- 10. MECHANICAL BRAKE:** Is used when the wind turbine has to be repaired or serviced. It ensures that the rotor will not start turning.
- 11. CONTROLLERS:** Are small computers. They monitor the many parts of the wind turbine and make sure that it always faces the wind.
- 12. GENERATOR:** Is driven by the thick shaft. It produces electric current when it is turning. The current is sent down through thick cables.



HOW DOES A WIND TURBINE PRODUCE ELECTRICITY?

- The wind sets the rotor blades in motion
- A generator transforms the motion's energy into electricity
- The electricity flows through power lines to your home

WIND ENERGY IN NUMBERS

1992 Ireland's first commercial wind farm was commissioned at Bellacorick, Co. Mayo

1833MW The Republic of Ireland's wind capacity (June 2013)

166 Wind farms in the Republic of Ireland (August 2013)

88.5MW The wind capacity of Ireland's largest wind farm at Meentycat Co. Donegal

40% The 2020 target for renewable electricity

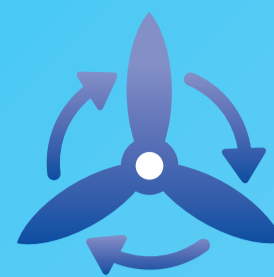
DID YOU KNOW?

- The Island of Ireland has over 2,350 megawatts of installed wind capacity - this is equivalent to the energy required to power approximately **1.5 million homes**
- At particular time intervals, wind has produced enough power to meet **50%** of Irish electricity demand - In 2011, renewable generation supplied Ireland with **18%** of its electricity demand
- A standard wind turbine can power **13,479 fridges**
- A wind turbine can generate energy for between **20 to 25 years**
- A standard wind turbine displaces **2,365 tonnes of CO₂ per year**
- The use of renewables in the Republic of Ireland in 2011 avoided emissions of **3.6 million tonnes of CO₂**
- A standard wind turbine can power **28,000,000 kettles**
- The Republic of Ireland imports approx €6 billion of fossil fuel each year - the use of renewables accounted for a saving of nearly **€300 million** on gas imports to Ireland in 2011

WIND ENERGY AND NATURE

- NO fuel**
- NO greenhouse gases**
- NO air pollution**
- NO water pollution**
- YES clean energy**

To learn more about wind power please visit: IWEA's website - www.iwea.com



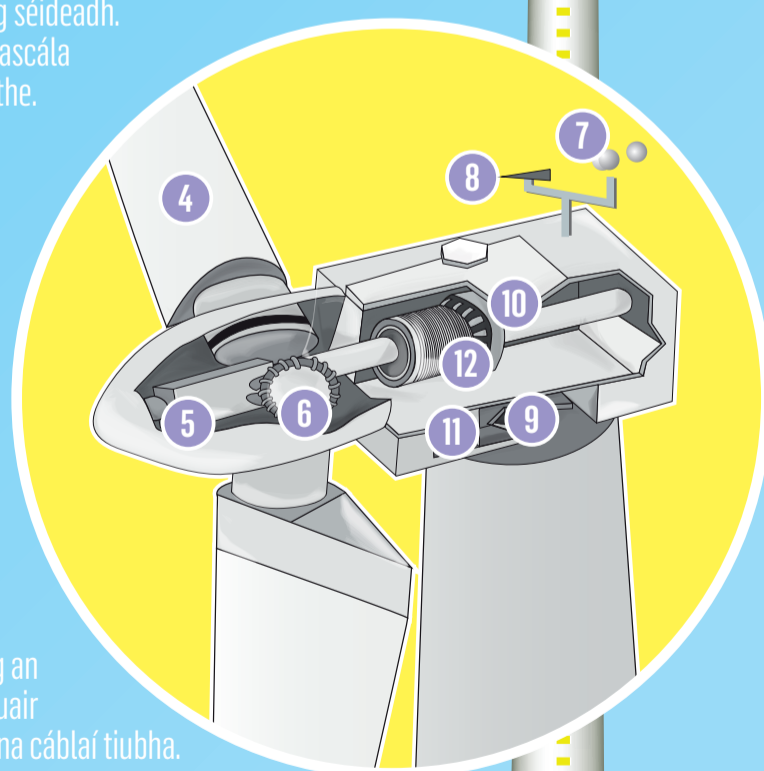
CUMHACHT NA GAOITHE

AN EOLAÍOCHT A BHAINNEANN LE CUMHACHT GHAOITHE AGUS TUIRBÍNÍ GAOITHE

Cad í cumhacht ghaoithe? Bainneann tuirbíní ghaoithe úsáid as cumhacht na gaoithe agus gineann siad leictreachas aisti. Go bunúsach, oibríonn tuirbín ghaoithe go contrártha le gaothrán. Seachas leictreachas a úsáid le gaoth a dhéanamh, cosúil le gaothrán, úsáideann tuirbíní ghaoithe an gaoth le leictreachas a dhéanamh. Is slí mhaith í an gaoth le fuinneamh a fháil. Ní stopann an gaoth ag séideadh beagnach, anseo in Éirinn ach go háirithe. Chomh maith leis sin, tá sí glan. Níl aon truailliú ag baint léi. Tugtar **'glas'** nó **'in-athnuaite'** ar an saghas fuinnimh seo. Ciallaíonn in-athnuaite nach n-ídtéar é go brách.

CAD A BHÍONN TUIRBÍN GAOITHE COMHDHÉANTA DE

- An Túr:** Ardaíonn sé na lanna chun an méid is mó ghaoithe a fháil. Dá airde an túr, is mó leictreachais gur féidir a ghiniúint.
- An Mol-Tá:** An mol cosúil le srón an tuirbín. Tá na lanna ceangailte don mhol. Tá lanna an rótair ceangailte don mhol ar an talamh de ghnáth. Ardaíonn crann tógála na lanna, agus ceanglaíonn feisteoirí iad don mhol.
- An Naoisil:** Tá an gineadóir agus comhpháirteanna teicniúla eile suite sa naoisil atá ar bharr thúr an tuirbín ghaoithe. Tá na cáblaí a iompraíonn an méid mór den fuinneamh ó gineadóir an tuirbín ghaoithe beagnach chomh tiubh le géag do láimhe. Cuireann céachta cábla na cáblaí sa talamh. Iompraíonn na cáblaí an leictreachas atá ginte ag an gcumhacht ghaoithe go dtí ár dtithe.
- An Rótar:** Gabhann trí lann an tuirbín cumhacht ghaoithe le haghaidh giniúint leictreachais. Tá lanna an rótair múnlaite cosúil le sciatháin eitleáin. Tá siad in ann greim a fháil ar an n-gaoth níos fearr ná aon rud eile.
- An Seafta Tiomána:** Casann an rótar an seafta tiomána go han-chumhachtach. Sin é an fáth go gcaitheann an seafta a bheith an-tiubh.
- An Gearbhosca:** Athraíonn na gearanna sa ghiarbhosca mall-rothlú an rótair go mear-rothlú don gineadóir ionas go bhfuil sé in ann an méid is mó leictreachais a tháirgeadh.
- An tAinéimiméadar:** Tomhaiseann an t-ainéimiméadar luas na gaoithe. Cuireann sé eolas faoi luas na gaoithe chuig an rialaitheoir go leanúnach. I gcás stoirme, moillíonn an rótar.
- An Eite Ghaoithe:** Casann an gaoth an eite ghaoithe. Cuireann sé in iúl don rialaitheoir cén treo ina bhfuil an gaoth ag séideadh. Cuireann an rialaitheoir in iúl don mhótar luascála cén chaoi an rótar a chasadh i dtreo na gaoithe.
- An Mótar Luascála:** Casann an mótar luascála an naoisil ionas go bhfuil sé in aghaidh na gaoithe i gcónaí.
- An Coscán Meicniúil:** Úsáidtear an coscán meicniúil nuair atá gá leis an tuirbín ghaoithe a dheisiú nó a sheirbhísiú.
- Na Rialaitheoirí:** Is ríomhairí beaga iad na rialaitheoirí. Déanann siad monatóireacht ar na páirteanna éagsúla den tuirbín ghaoithe agus déanann siad cinnte de go mbíonn sé in aghaidh na gaoithe i gcónaí.
- An Gineadóir:** Tá an gineadóir tiomáinte ag an seafta tiubh. Táirgeann sé sruth leictreach nuair atá sé á chasadh. Cuirtear an sruth síos tríd na cáblaí tiubha.



CONAS A THÁIRGEANN TUIRBÍN GAOITHE LEICTREACHAS?

- Cuireann an gaoth lanna an rótair ag gluaiseacht.
- Déanann an gineadóir leictreachas as fuinneamh na gluaisne.
- Ritheann an leictreachas tríd na línte cumhachta go dtí do theachsa.

UIMHREACHA A BHAINNEANN LE FUINNEAMH GAOITHE.

- 1992** Coimisiúnaíodh an chéad fheirm ghaoithe thráchtála in Éirinn i mBéal Átha Chomhraic, Co. Mhaigh Eo.
- 1833MW** Acmhainn ghaoithe Phoblacht na hÉireann (Meitheamh, 2013)
- 166** Líon na bhfeirmeacha ghaoithe in Éirinn (Lúnasa, 2013)
- 88.5MW** An acmhainn ghaoithe atá ag an bhFeirm Ghaoithe is mó in Éirinn i Meentycat, Co. Dhún na nGall.
- 40%** Sprioc 2020 le haghaidh leictreachais in-athnuaite.

AN BHFUIL A FHIOS AGAT?

- Tá níos mó ná 2,350 meigeavata de acmhainn ghaoithe suiteáilte ag Oileán na hÉireann. -tá sé seo ar chomhbhrí leis an méid fuinnimh atá riachtannach chun cumhacht a thabhairt do bheagnach **1.5 milliún teach**
- Ar eatraimh ama áirithe, táirgeadh dóthain fuinnimh ag an n-gaoth chun **50%** de éileamh leictreachais na hÉireann a shásamh. -Sa bhliain 2011, sholáthair giniúint in-athnuaite **18%** de éileamh leictreachais na hÉireann.
- Tá tuirbín ghaoithe caighdeánach in ann cumhacht a thabhairt do **13,479 cuisneoir**
- Tá tuirbín ghaoithe in ann fuinneamh a ghiniúint ar feadh idir **20 agus 25 bliain**
- Díláithríonn tuirbín ghaoithe caighdeánach **2,365 tona de CO₂ in aghaidh na bliana**
- Sa bhliain 2011, seachnóidh **3.6 milliún tona de astaíochtaí CO₂** de bharr gur baineadh úsáid as athnuaiteáin i bPoblacht na Éireann.
- Tá tuirbín ghaoithe caighdeánach in ann cumhacht a thabhairt do **28,000,000 citeal**
- Allmhairíonn Poblacht na hÉireann beagnach 6 billiún euro de bhreosla iontaise gach uile bhliain. -Coiglíodh beagnach **€300 milliún** ar allmhairí gás go hÉirinn sa bhliain 2011 de bharr úsáid in-athnuaiteán.

FUINNEAMH GAOITHE AGUS AN NÁDÚR: NÍ BHAINNEANN SÉ LE-

- breosla
- gáis cheaptha teasa
- truailliú aeir
- truailliú uisce
- Bainneann sé le- Fuinneamh Glan

Más mian leat tuilleadh eolais a fháil faoi chumhacht ghaoithe féach ar ár suíomh gréasáin le do thoil, ag: www.iwea.com