The Rheidol Hydro Electric scheme is the largest of its kind in England and Wales. Since 1962, the scheme has generated renewable energy by using the rainwater that falls on the surrounding Plynlimon Mountains.

Located within and above the scenic Rheidol Valley near Aberystwyth in Mid-Wales, the scheme is made up of an interconnected group of reservoirs, dams, pipelines, aqueducts and power stations, and covers a total area of 162 square kilometres. The annual energy production is about 85 GWh – enough to power 20 000 homes.
FACTS:

- Installed Capacity: 56 MW
- Energy Production (average): 87.0 GWh/y
- Highest Production (2000): 132.7 GWh/y
- Lowest Production (1996): 55.1 GWh/y
- Number of Turbines: 7
- Speed of Water through Turbine: 210 k/h (130 mph)
- Amount of Water through Turbine: 4 000 gallons/second
- Average Annual Rainfall: 2 179 mm
- Record Annual Rainfall (2000): 3 154 mm
- Lowest Annual Rainfall (1976): 1 471 mm
- Catchment Area: 162 km²
- Total Length of Tunnels: 10 km
- Size of Tunnels: 2.9 m Diameter
- Max Capacity Nant-y-Moch: 5 200 million gallons
- Max Capacity Dinas: 700 million gallons
- Nant-y-Moch Dam - Height: 52 m
- Nant-y-Moch Dam - Length: 351 m
- Dinas Dam - Height: 26 m
- Dinas Dam - Length: 108 m
HOW ELECTRICITY IS PRODUCED

The water is held in the reservoirs, from where it is released into the tunnel towards the power station. Water comes into the station through a tube of pipe called the penstock. When generating, water flows through the penstock and past the ball vale, into the spiral casing where the runner is located. Once the pressure has equalled out in the spiral casing the guide veins are opened to allow the water to turn the runner.

The water then turns the runner which turns a shaft. The shaft turns the magnets of the generator, and these are surrounded by the coil of copper wire. This is where electricity is generated at 11,000 volts. From here it is taken to the transformer via cables. At the transformer it is stepped up to 33,000 volts and sent to the substation at Rhydlydan.

From the substation there are four lines, three that supply Aberystwyth and surrounding area and one that gets stepped up to 132,000 volts and sent to Swansea to the national grid.
The upper reaches of the scheme are over 750 metres up in the remote Plynlimon range.

Water flows from Nant-y-Moch reservoir to a power station at Dinas, where it drives a 13 000 kW generator. From the power station, the water flows into Dinas reservoir.

Dinas reservoir supplies water to the largest power station in the scheme at Cum Rheidol, where there are two 20 500 kW generators.

At Cum Rheidol, a further reservoir has been created to avoid large variations in the flow of water down river towards Aberystwyth. This reservoir collects the water that flows through the power station and releases it slowly through a 1 000 kW generator at Cum Rheidol Dam.

During construction, only one home, Nant-y-Moch Farm, and one chapel, Capel Blaenrheidol, were demolished to make way for the scheme. The Farm owners, brothers John and Jim James, were moved to a new house in Capel Dewi where they quickly settled in. In other areas, lives were improved by the building of new water supplies and sewage works, and miles of new roads and bridges to reach previously inaccessible areas.

In the 1950’s Rheidol was way ahead of its time, by taking the environment into consideration when designing the scheme. The award winning Felin Newydd Falls in Cum Rheidol were designed to blend in with the surrounding countryside, and many of the scheme’s building are clad with local stone.

Although the falls at Felin Newydd are 27 m in length, they only use the equivalent water as would flow through a 13 cm pipe.

Staffing at Rheidol reached almost 40 full-time staff by the end of the 1980’s, but now, the Scheme is managed by less than 20 permanent staff, 11 seasonal tour guides and a team of contractors.
1955

Government passes the North Wales Hydro-Electric Act, giving permission for the Rheidol Hydro Electric Scheme.

The aim of the Scheme is to harness the energy of the water, and turn it into a modern source of power.

The Scheme is to be run and owned by the Central Electricity Generating Board (CEGB).

1957 – 1961

1957: 30 men start on the construction work.

1958: 1000 men are now working on the scheme, many of them Irish, housed in three permanent camps, built especially for the scheme.

Excavation of the three dams and pressure tunnels begin.

1959: Work commences on Rheidol Power Station.

1961: Generators 2, 3 and 4 commissioned

Generation of electricity starts at Rheidol Power Station.

1962 – 1964

1962: Nant-y-Moch to Dinas tunnel is filled.

Generator 1 commissioned.

1963: Dinas Power Station is commissioned.

Generator 5 commissioned.

1964: Generator 6 commissioned.

Official Opening of Rheidol Hydro Electric Scheme on 3 July.

The completed scheme cost a total of £10 million to construct.

1972 – 1985

1972: Nant-y-Moch level drops by 7 m, due to coal strike.

1976: Nant-y-Moch level drops by 20 m, due to drought conditions.

1991 – 2001

1991: On the privatisation of the CEGB, the Scheme is taken over by Powergen.

1997: Rheidol Wind Farm is operated from Rheidol Power Station.

2001: Powergen is taken over by the German company, E.on.

2004: Rheidol Control Room has a complete refurbishment.

2009 – 2012

2009: During an exchange of assets, Rheidol Power Station is now owned by Norwegian power company, Statkraft.

2010: Alltualis Wind Farm, Carmarthenshire is completed, and operated from Rheidol Power Station.

Construction work begins on Sheringham Shoal Offshore Wind Farm, off the coast of Norfolk. A joint venture between Statkraft and Statoil, it is to be operated from Rheidol Control Room. The wind farm is expected to be in full operation by mid-2012.

2011: Construction starts on Bailie Wind Farm, Caithness, also to be operated from Rheidol. Completion is due late 2012/early 2013.

Rheidol Hydro Electric Scheme celebrates 50 years of generating pure energy.
Hydroelectric power is clean and renewable – and is actually a form of solar power. Water that evaporates due to solar energy returns in the form of precipitation. Rivers and waterfalls are used for the production of power, and large dams store the water for later use.

Thanks to hydroelectric power, we need not base our supply of electricity on fossil fuels or nuclear power.

Right from the outset, special attention has been paid to the environment throughout the Rheidol scheme. Elaborate landscaping was done to make the scheme blend into the natural beauty of the area. A special ‘fish lift’ and a fish ladder provides access for salmon to reach their spawning ground.

Rainbow trout are reared at Cwm Rheidol in specially-constructed tanks alongside the power station. These fish are put into Dinas and Rheidol Reservoirs where anglers are provided with a put-and-take facility. In order to maintain the river below the scheme, Rheidol is committed, by law, to maintain a compensation flow into the Rheidol River at all times.