NEGATIVE ASPECTS OF GEOTHERMAL POWER GENERATION.

Geothermal power has enjoyed an almost entirely clean reputation for its low environmental impact in comparison to the fossil fuels. Geothermal plants are claimed to produce no carbon emissions, virtually no liquid or gaseous pollution, and have little impact on their surroundings. Although it is true that geothermal plants are more sustainable than their fossil fuel equivalents, and less environmentally disaterous than hydro (see Thórhallsdóttir, 2007), there are considerable negative effects of their operation, which will be examined here.

Effects of drilling and exploration.

Noise caused by geothermal plants is considerable. During drilling it can reach above the pain threshold of 120dB and once in operation reaches 90dB. In the open landscape such noise can be heard for some distance and reduces the value of tourist sites and local recreation. (Kristmannsdóttir,2003).

Surface disturbance of wilderness has high impact as active sites tend to be in rare landscape types of very high scenic and toursitic (economic) value including 'colourful striking landscapes, hot springs, lavas and glaciers'. (Thórhallsdóttir, 2007). Disturbance includes roads, powerlines, factories, heavy lorries and drilling equipment.

Effects of operation of plant.

Drainage of underground fluids can lead to a number of disturbing effects including;

Drying of hot springs and geysers in the surrounding area, leading to loss of scenery and tourism, and loss of rare thermophillic plants and algal growth. (many examples in USA, eg loss of Brady springs, Nevada, Steamboat Springs geyser, and Long valley springs, Kristmannsdóttir,2003)

Toxic waste water entering clean aquifers due to lowering of the water table.

Violent explosions caused by build up of a 'steam pillow' in empty hot underground reservoirs, which have previosly killed people working in geothermal plants. (see Goff and Goff, 1997).

Subsidence or sinking of land. In Waitakei, New Zealand subsidence of 15m (40cm/year) occurred at one plant.

Landslides can occur due to tempertaure and water level in rocks, especially in tectonically active areas. (See Goff and Goff, 1997 for examples of major landslides induced by geothermal plants.)

Local weather changes caused by emission of steam affecting clouds. (Kristmannsdóttir,2003).

Induced earthquakes caused by lubrication of faults when waste fluid is reinjected into the rocks. Rybach, 2003 shows considerable increase in frequency of earthquakes near geothermal sites.

Air and chemical pollution, including radioactive element Radon, toxic elements Arsenic, Mercury, Ammonia, Boron (highly toxic to plants) and other polluting heavy metals. Waste steam is sprayed over surrounding vegetation (usually rare species in geothermal areas), while waste water is either reinjected (inducing earthquakes), or pumped into streams and lakes untreated, as treatment is considered too costly to be economically viable. (Kristmannsdóttir,2003). In lake Þingvallavatn, a large area of the lake bottom was found to be biologically dead due to toxic hot waste water pollution from nearby geothermal plants, which is altering the lake ecology.
Hydrogen Sulphide (H2S) is also emitted, causing a bad smell and forming the acid rain causing compound SO2 in the atmosphere. Emitted Carbon dioxide (CO2) and H2S are heavy gases and can linger in valleys causing increased pollution for local populations. (Kristmannsdóttir,2003).

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