Ground and air source heat pumps: Benefits and the Renewable Heat Incentive

Source ENERGY

'Installer of the Year' at the National Heat Pump Awards 2013

Ben Hodges

APPROVED INSTALLER MCS NAPIT

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NATIONAL HEAT PUMP AWARDS WINNER 2013

Energy Efficiency & Renewables Awards Finalists 2013

Agenda

- What is a heat pump?
- How do heat pumps work?
- Benefits of heat pumps
- Considerations when installing a ground or air source heat pump
- Types of properties suitable for a heat pump
- The Renewable Heat Incentive
- Looking after a heat pump
- Summary

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What is a heat pump?

Heat pumps use renewable energy to efficiently produce hot water and heating

Ground Source Horizontal

Ground Source Vertical

Air Source

Water Source

Open Source

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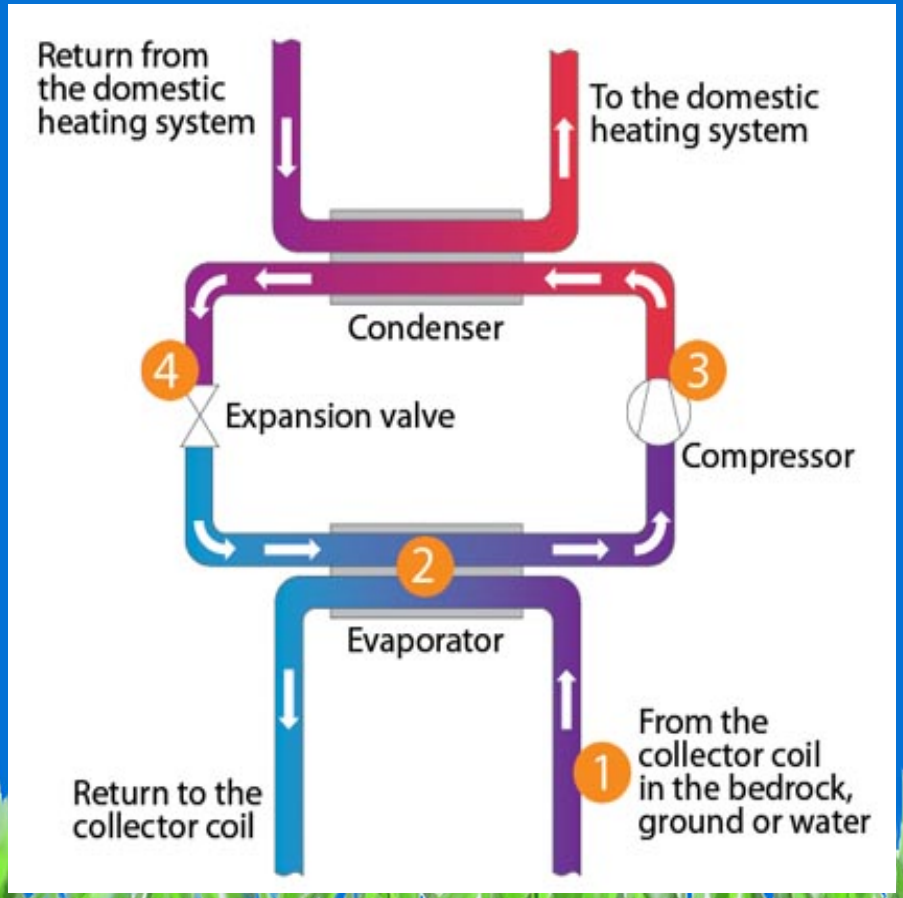
How do heat pumps work?



3-4 kW / hrs

1 kW / hr

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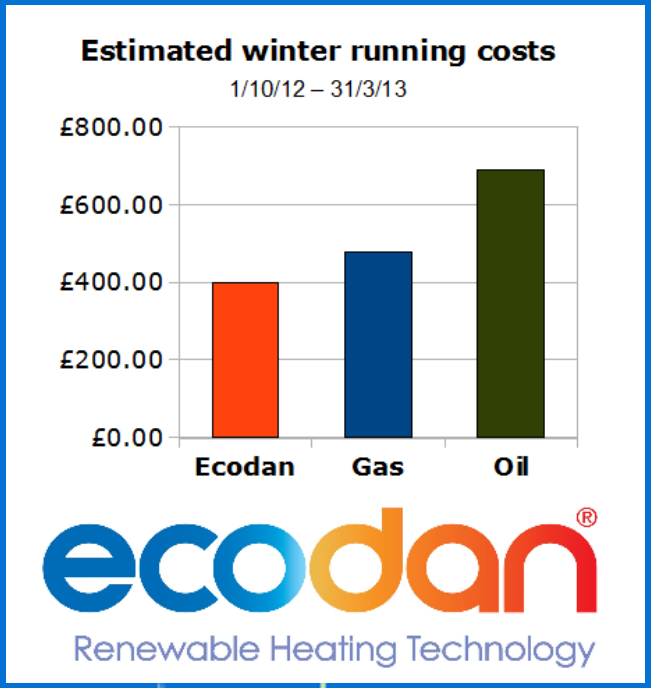
Benefits of installing a heat pump

- **Low energy bills**

Data from Source Energy, Mitsubishi Ecodan 14kW air source heat pump installation.



3 bed domestic property converted from an old swimming pool building.

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Benefits of installing a heat pump

- **The Renewable Heat Incentive**
  Aimed at homeowners, landlords and self-builders
  Get paid £1,000's back over 7 years

- **Eligible for lower VAT (new build 0%, retrofit 5%)**

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Benefits of installing a heat pump

- Reduce your carbon footprint
- Meet low energy building regulations
- Longevity
- Eliminate the risk of carbon monoxide poisoning

Considerations when installing a heat pump

Ground Source

- Cost for drilling/ trench work
- Site space for trench option
- Geology for borehole option
- Site access for drilling rig or digger
- Manifold location
- Location of internal equipment

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Considerations when installing a heat pump

Air Source

- Location of internal equipment
- Location of external equipment
- Noise
- Planning permission
- Power supply (for large properties)

  Dimplex A-class

Dimplex ACCREDITED INSTALLER

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Considerations when installing a heat pump

Heating distribution

- Seasonal Performance Factor (SPF)
    - Effects efficiency and RHI payments
- Underfloor heating
- Radiators (low temperature)

Star rating	GSHP SPF	ASHP SPF
★★★★★★	4.3	3.6
★★★★★	4.1	3.4
★★★★	3.7	3.0
★★★	3.4	2.7
★★	3.1	2.4*
★	2.8	2.1*

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What properties are suitable for heat pumps?

New build

“This provides all space and hot water heating with very low running costs. It is totally automated, requires no regular maintenance and during the past 4 winters has provided high levels of comfort.”

Mr DeSouza (New build with ground source heat pump)

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What properties are suitable for heat pumps?

Renovations and barn conversions

“It provides us with plenty of hot water and the heating system produces a constant temperature and an extremely pleasant environment throughout the entire house. The pump can not be heard at all inside the property.”

Mr Newman (Barn conversion with air source heat pump)

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What properties are suitable for heat pumps?

Existing properties

“Since commissioning the house has changed completely. It is always warm and comfortable and temperature is accurately controlled. The constant condensation and associated damp issues are a thing of the past and we have oodles of hot water. Best of all, it is cheap.”

Mr Bennett
(Existing property, with an air source heat pump to replace night storage heaters)

NATIONAL HEAT PUMP AWARDS SHORTLISTED

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The Renewable Heat Incentive

RHI tariff	Heat Pump	Payment	Tariff length
Domestic	Ground Source	**18.8p/kWh**	7 years
	Air Source	**7.3p/kWh**	7 years
Commercial†	Ground Source	**T1: 8.7p/kWh** **T2: 2.6p/kWh**	20 years
	Air Source	**2.5p/kWh**	20 years

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The Renewable Heat Incentive

Air Source – Domestic RHI

Air Source		SPF				
		2.5	2.7	3	3.4	3.6
Annual kW/hrs	10,000	£438.00	£459.63	£486.67	£515.29	£527.22
	15,000	£657.00	£689.44	£730.00	£772.94	£790.83
	20,000	£876.00	£919.26	£973.33	£1,030.59	£1,054.44
	25,000	£1,095.00	£1,149.07	£1,216.67	£1,288.24	£1,318.06
	30,000	£1,314.00	£1,378.89	£1,460.00	£1,545.88	£1,581.67
	35,000	£1,533.00	£1,608.70	£1,703.33	£1,803.53	£1,845.28
	40,000	£1,752.00	£1,838.52	£1,946.67	£2,061.18	£2,108.89
	45,000	£1,971.00	£2,068.33	£2,190.00	£2,318.82	£2,372.50

Annual RHI payment

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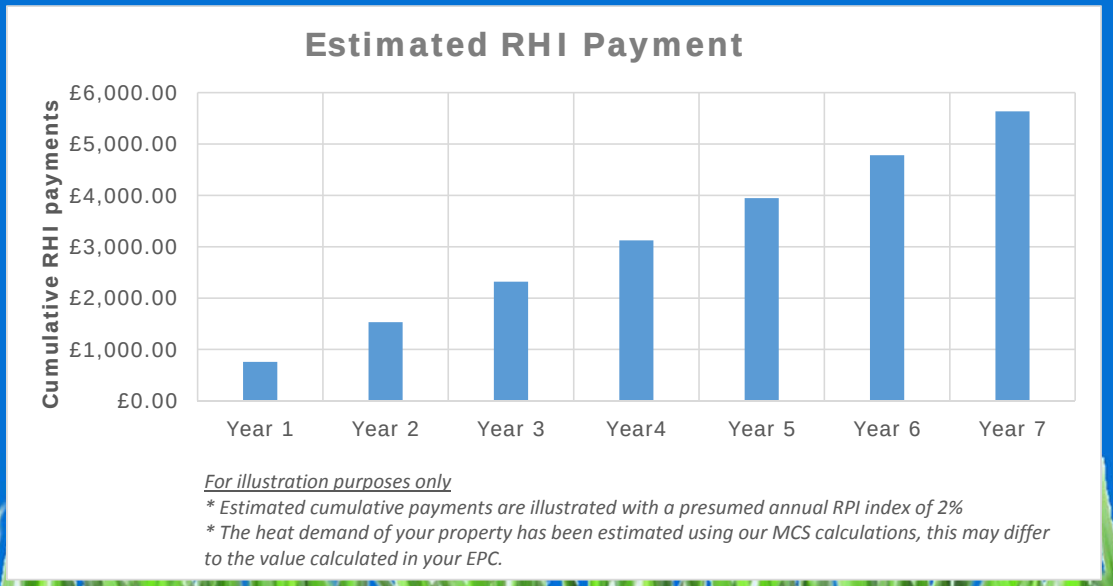
The Renewable Heat Incentive

Air Source – Domestic RHI

Example:
3 bed renovation

Annual kW/hrs = 15,578
SPF = 3

Annual RHI payment = £758
Total RHI payment = £5,636*
(* Index linked)



For illustration purposes only
** Estimated cumulative payments are illustrated with a presumed annual RPI index of 2%*
** The heat demand of your property has been estimated using our MCS calculations, this may differ to the value calculated in your EPC.*

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The Renewable Heat Incentive

Ground Source – Domestic RHI

Ground Source		SPF						
		2.5	2.8	3.1	3.4	3.7	4.1	4.3
Annual kW/hrs	10,000	£1,128.00	£1,208.57	£1,273.55	£1,327.06	£1,371.89	£1,421.46	£1,442.79
	15,000	£1,692.00	£1,812.86	£1,910.32	£1,990.59	£2,057.84	£2,132.20	£2,164.19
	20,000	£2,256.00	£2,417.14	£2,547.10	£2,654.12	£2,743.78	£2,842.93	£2,885.58
	25,000	£2,820.00	£3,021.43	£3,183.87	£3,317.65	£3,429.73	£3,553.66	£3,606.98
	30,000	£3,384.00	£3,625.71	£3,820.65	£3,981.18	£4,115.68	£4,264.39	£4,328.37
	35,000	£3,948.00	£4,230.00	£4,457.42	£4,644.71	£4,801.62	£4,975.12	£5,049.77
	40,000	£4,512.00	£4,834.29	£5,094.19	£5,308.24	£5,487.57	£5,685.85	£5,771.16
	45,000	£5,076.00	£5,438.57	£5,730.97	£5,971.76	£6,173.51	£6,396.59	£6,492.56

Annual RHI payment

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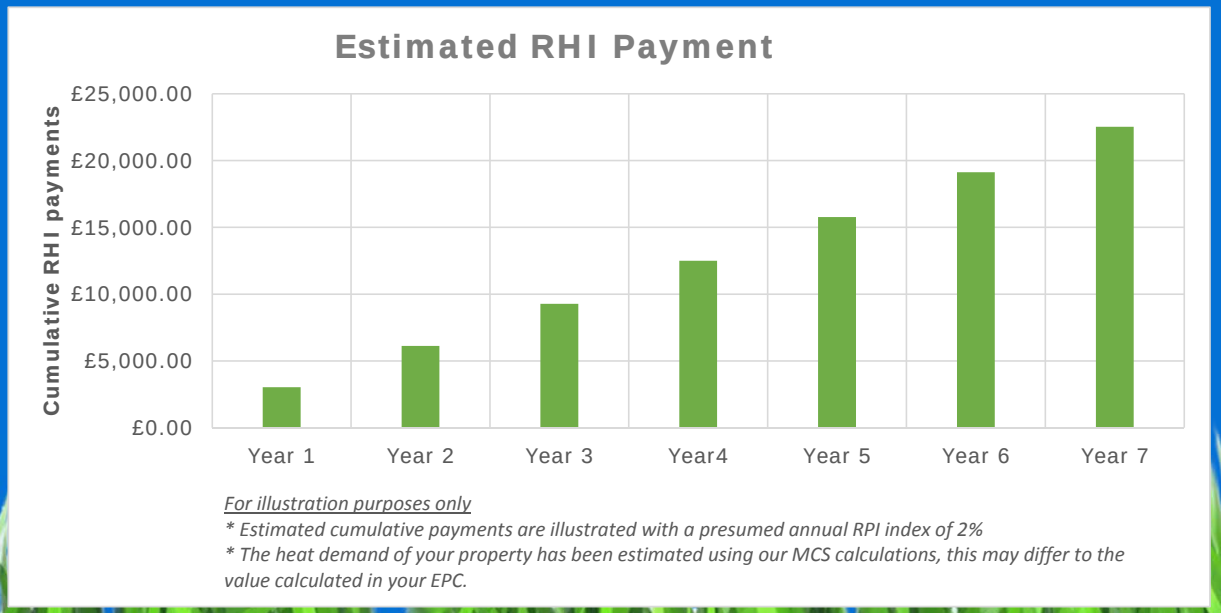
The Renewable Heat Incentive

Ground Source – Domestic RHI

Example:
4 bedroom new build

Annual kW/hrs = 13,454
SPF = 4.1

Annual RHI payment = £1,912
Total RHI payment = £14,217*
(* Index linked)



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The Renewable Heat Incentive

Ground Source – Domestic RHI

Example:
4 bedroom renovation

Annual kW/hrs = 21,327
SPF = 4.1

Annual RHI payment = £3,031
Total RHI payment = £22,537*
(* Index linked)

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Heat pump aftercare

- Careful design and installation ensures reliability
- Weather compensation – user friendly
- In house service engineers
  - Recommended annual service
  - May be required to maintain warranty
- Remote monitoring and control
  - Available with some manufacturers
  - Control your heat pump from your smart phone or tablet
  - Installer login to monitor performance and settings

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Summary

Ground & air source heat Pumps:

- Use renewable energy to produce hot water and heating
- 300% – 400% efficiency
- Lower energy bills (compared to oil, LPG and direct electric)
- Eligible for the commercial and domestic Renewable Heat Incentive

  - Get paid £1,000's back

- Suitable for a range of properties
- Easy to use

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GREEN DEAL APPROVED Installer*

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