



A fanciful estimate of the greenhouse gas (GHG) emissions associated with the Royal Wedding event on Friday 29 April 2011 of Prince William of Wales and Miss Catherine Middleton

Objective

The Daily Telegraph is seeking information on the following, in relation to the Royal Wedding:

- A rough estimate of the emissions associated with the wedding
- Suggestions on what the Royal Family should be doing to cut emissions

Emissions estimate - results

The results indicate that the activities on the day of the wedding could be responsible for an estimated 2,808 tonnes of carbon dioxide equivalents (CO₂e) in greenhouse gases, for the scope of emissions calculated. Emissions due to travel by crowds lining the streets might amount to another 3,957 tonnes of CO₂e and the Royal Airforce flyover might add another 1.95 tonnes of CO₂e. Details on the emissions per activity covered, are shown in Table 1.

Table 1: Estimated GHG emissions by source.

Activity	Emissions source	Emissions (tCO ₂ e)
Guest travel	Air travel	2,642
Guest travel	Vehicle travel	154
Guest travel	Accommodation	4
Venue receptions	Energy usage	8
Venue receptions	Catering	0.04
Venue receptions	Waste to landfill	0.37
Sub total		2,808
Crowd travel	National rail and Underground	3,957
RAF flyover	Aviation fuel use	1.95
TOTAL		6,767

How does this compare to emissions from other businesses and events?

To put the total into context, the 2010 Soccer World Cup was estimated to generate 2.7 million tonnes of CO₂e¹, whilst the average UK household generates around 5.5 tonnes CO₂e per year².

The estimated emissions from the Royal Wedding are equivalent to the annual emissions from 510 (1,230) average UK households, 325 (723) economy return trips between Auckland New Zealand and London Heathrow or 5 (12) times the annual emissions of Buckingham Palace (based on recent press

¹ <http://gmo-journal.com/index.php/2010/06/04/greening-the-2010-soccer-world-cup-reducing-the-carbon-footprint/>

²

www.pkc.gov.uk/Planning+and+the+environment/Greener+living/Reducing+greenhouse+gases/Greenhouse+gas+emissions.htm



articles rating the energy efficiency of some of London's notable buildings). Figures in brackets include the crowds. Number in brackets relates to the final total emissions including the crowds and flyover.

Emissions from UK businesses that are CEMARS certified on the Achilles carbonReduction Programme range from 3 tonnes to 24 million tonnes of CO₂e.

Assumptions associated with the estimate

It is understood that there will be approximately 1,900 people invited to attend the service at Westminster Abbey, 650 of these will then attend the lunchtime reception at Buckingham Palace, and 300 will attend the evening dinner at Buckingham Palace³. 600,000 people lined the streets for the wedding of Prince Charles and Diana Spencer. With the limited information available, assumptions have been made in order to estimate emissions associated with the event. These assumptions include:

- It is assumed that 25% of the guests are from overseas and have had to travel specifically for the event. It is assumed that the average distance flown by the guests is 11,100 km return⁴, flying business class, and the average vehicle travel is 50 miles.
- It is assumed that the other 75% of the guests are local and have had to travel specifically for the event. It is assumed that the average travelled by these guests is 300 miles⁵, travelling by car.
- It is assumed that guests who have travelled to London will stay in hotel accommodation for a minimum of 2 nights per person.
- It is assumed that the reception venues for lunch and dinner will be in the Buckingham Palace Ballroom, and that the hours of use will be 14 hours total
- It is assumed that Buckingham Palace has a waste minimisation programme in place to reduce organic waste going to landfill
- It is assumed that 400,000 of the crowd travel an average of 40 km return on the underground
- It is assumed that 200,000 of the crowd travel an average of 200 km return on national rail
- It is assumed that there are 7 planes (1 Spitfire, 1 Lancaster, 1 Hurricane, 2 Typhoons, 2 Tornados) in the flyover and that the planes have travelled a round trip of 500 miles from Coningham airbase in Lincolnshire

More assumptions are included in the calculation worksheet.

Emissions accounted for (inclusions) and not accounted for (exclusions)

As with any emissions calculation, particularly for an event, there are various emissions sources that occur but have not been calculated. This is due to the difficulty of estimating the level of activity and/or availability of emission calculation methods. Table 2 below shows what emissions were included and what emissions were excluded from the calculation.

³ www.telegraph.co.uk/news/uknews/royal-wedding/8443755/Royal-wedding-guestlist-who-will-be-attending-on-the-big-day.html (accessed 20/4/11)

⁴ This is the approximate distance for New York to London return

⁵ This is the approximate distance for London to Cardiff return

Table 2: Emissions inclusions and exclusions.

Activity	Emissions source	Included or excluded
Guest travel	Air travel	Included
Guest travel	Vehicle travel	Included
Guest travel	Accommodation	Included
Venue receptions	Energy usage	Included
Venue receptions	Catering	Included
Venue receptions	Waste	Included
General public attending the process and/or other wedding related events	Energy use from transport – public transport assumed	Included separately
RAF flyover from Coningham	Aviation fuel use	Included separately
Ceremony	Procession and associated services such as police (helicopter surveillance, horses used by mounted Horse Guards and police, extra vehicles etc), security, logistics	Excluded
Venue receptions	Freight e.g. of gifts, special equipment, etc	Excluded
Ceremony	Wedding merchandise manufactured to commemorate the event	Excluded
Venue receptions, ceremonies	Pre-event organisation activities	Excluded
Venue receptions, ceremonies	Printing and paper use associated with invites, name places, etc.	Excluded
Media attendance from all over the world	Air and vehicle travel, freight of equipment, accommodation	Excluded

What the Royal Family can be doing to cut emissions

As with all events, opportunities to minimise emissions need to be investigated early in the planning process. A lot of opportunities are available in relation to procurement, but are difficult to quantify in terms of emissions saved. Suppliers that hold a reputable greenhouse gas management and reduction certification claim, such as CEMARS⁶, will be able to provide more accurate emissions information and provide confidence that they are a ‘low emission’ supplier. Table 3 shows examples of what could be done to minimise emissions.

Table 3: Options for minimising emissions.

Activity	Emissions source	Examples of options for minimising emissions
Guest travel	Air travel	Send invites out early so that guests can integrate other activities into their visit, therefore maximising the productivity of their travel. Some airlines have more modern, fuel efficient fleets so these could be preferred choice where available.
Guest travel	Vehicle travel	Encourage guests to travel in low emission vehicles Organise guest pickup buses, and/or car pool

⁶ www.achilles.com/en/global/buyer-services/evaluate/carbon-footprint-programme/Overview/



Activity	Emissions source	Examples of options for minimising emissions
		options
Guest travel	Accommodation	Inform guests on what hotels are considered to be low emissions or have environmentally responsible credentials
Venue receptions	Energy usage	Ensure Palace has implemented as many energy management options as possible via it's building management system
Venue receptions	Catering	Set criteria on the menu in relation to the emissions impact of the food being chosen for consumption e.g. locally sourced, recyclable packaging etc Ensure the catering company has emissions management policies in place
Venue receptions	Waste	Ensure there is appropriate waste management systems in place for minimising waste disposal Extra food can be donated to the city mission or similar
General public attending the process and/or other wedding related events	Energy use from transport	Join local street parties and watch the event live on giant screens.
Ceremony	Procession and associated services such as police, security, logistics	
Venue receptions	Freight e.g. of gifts, special equipment, etc	
Ceremony	Wedding merchandise	Minimise merchandise production and choose low emission options
Venue receptions, ceremonies	Pre-event organisation activities	
Venue receptions, ceremonies	Printing and paper use associated with invites, name places, etc.	Minimise printing by making use of electronic communications Use recycled paper and environmentally friendly inks

DISCLAIMER: The calculations to estimate the greenhouse gas emissions associated with the Royal Wedding are based on information obtained from press articles and on a number of assumptions for the activities taking place on the day of the wedding only. As such, the estimate is highly uncertain. The calculations have been undertaken as a fun exercise and should only be used in that context.

Estimate prepared by the CEMARS team at Landcare Research, New Zealand.

The Certified Emissions Measurement And Reduction Scheme (CEMARS) was developed by Landcare Research, a Crown Research Institute owned by the New Zealand government, and is provided under licence in the United Kingdom by Achilles Information Limited. CEMARS was the first greenhouse gas certification programme in the world to be accredited to the international standard ISO 14065 and has been assessed by the Environment Agency as equivalent to the Carbon Trust Standard. CEMARS provides a robust solution for those entities that wish to develop a plan for emissions measurement,



Landcare Research
Manaaki Whenua



management and reduction and to gain market recognition for their efforts. At a time where voluntary market standards are still being developed and there are a number of carbon claims which are of questionable reliability, CEMARS certification provides assurance to stakeholders that the claims are made against independently generated standards, programmes that have been verified and results that have been independently assured. Landcare Research developed CEMARS to position itself at the forefront of greenhouse gas emissions certification methodologies.