



University of
Nottingham

UK | CHINA | MALAYSIA

Energy and Carbon Management

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Nottingham in Numbers



- **5 campuses, 5 Faculties** across **3 countries** and **2 continents**
- **43,893** high-calibre students worldwide
 - **11,000** students studying for University of Nottingham degrees in Asia
 - **24,455** UK Undergraduates **8,743** UK Postgraduates
- **9000** staff world-wide
- **£1.1bn** of annual economic impact in the UK
- **18,000** jobs supported by University activity
- **£650m** annual income
- **£100 – £200m live capital programme**
- **£186m** in research awards 2014/15
- **60%** of research income linked to industry



We're Quite Big ...

- We own 543 hectares of real estate in the UK (which is three times bigger than Monaco and 8.5 times the size of Disneyland Florida)
- On UK campuses, we have 34,700 students and 9,300 staff. A combined total that is greater than the entire population of Lichtenstein
- 25% of staff commute on foot or by bike while 60% of student do (2017 Travel Survey)





3 UK Campuses – 2 campuses in Asia



Campus	Hectares	Acres
University Park	120.8	298.4
King's Meadow	6.6	16.3
Jubilee Campus	26.8	66.2
Sutton Bonington	253.5	626.5
Other	232.2	573.7
Total UK	639.9	1581.1
Malaysia	44.9	110.9
China	59.1	146.1
Total	743.9	1838.1



Embedding Sustainability in to University Strategy



The top document is the 'Sustainability Strategy 2015-2020'. It features a cover image of a lake with a building in the distance and a row of wooden kayaks in the foreground. The text on the cover includes:
The University of Nottingham
UNITED KINGDOM | CHINA | MALAYSIA
Sustainability Strategy 2015-2020
www.nottingham.ac.uk/sustainability
UoNSustainability
@UoNSustain

The bottom document is the 'Global Strategy 2020'. It features a cover image of a green geometric grid pattern. The text on the cover includes:
The University of Nottingham
UNITED KINGDOM | CHINA | MALAYSIA
Global Strategy 2020



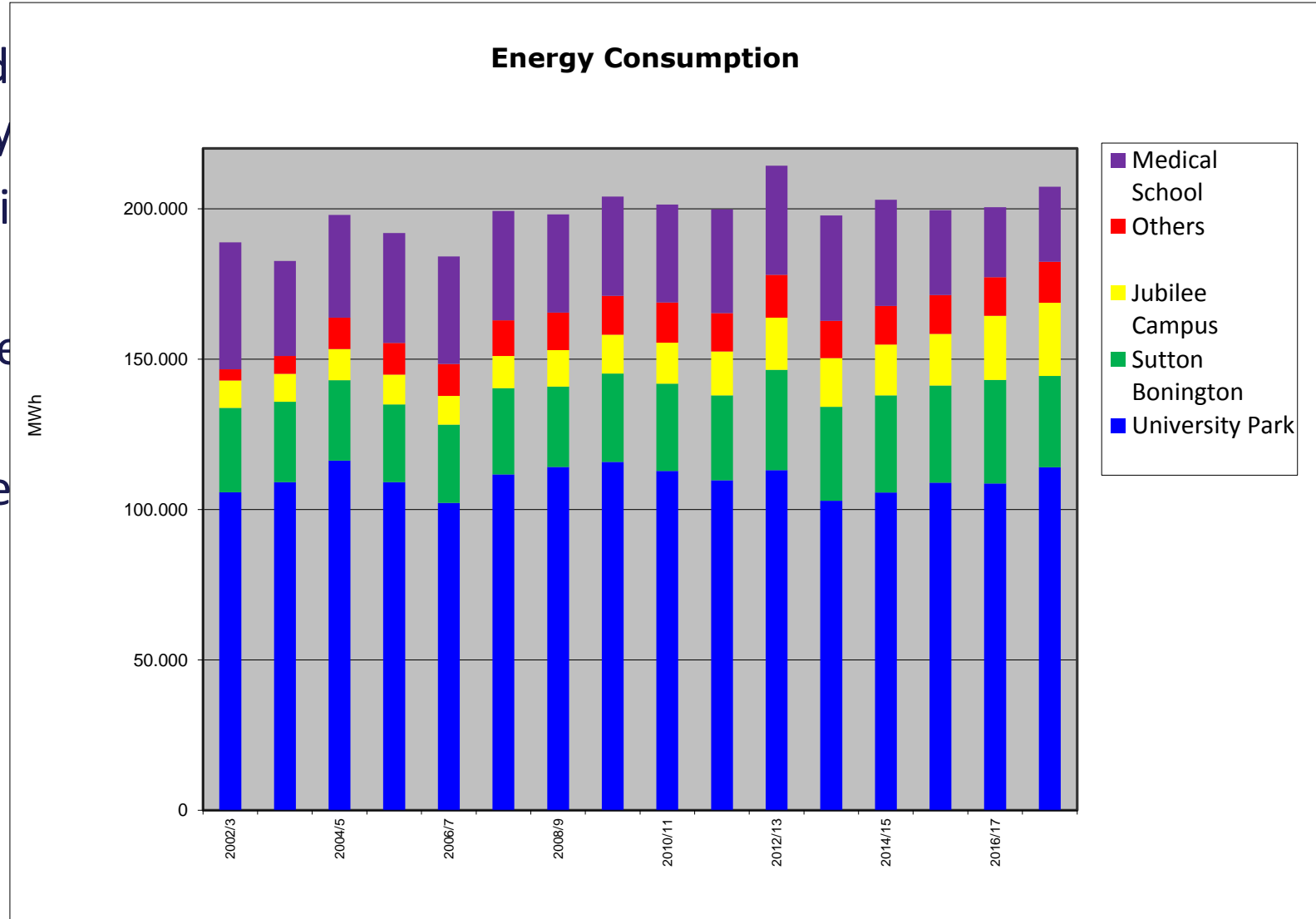


Carbon Management Plan - The Challenge

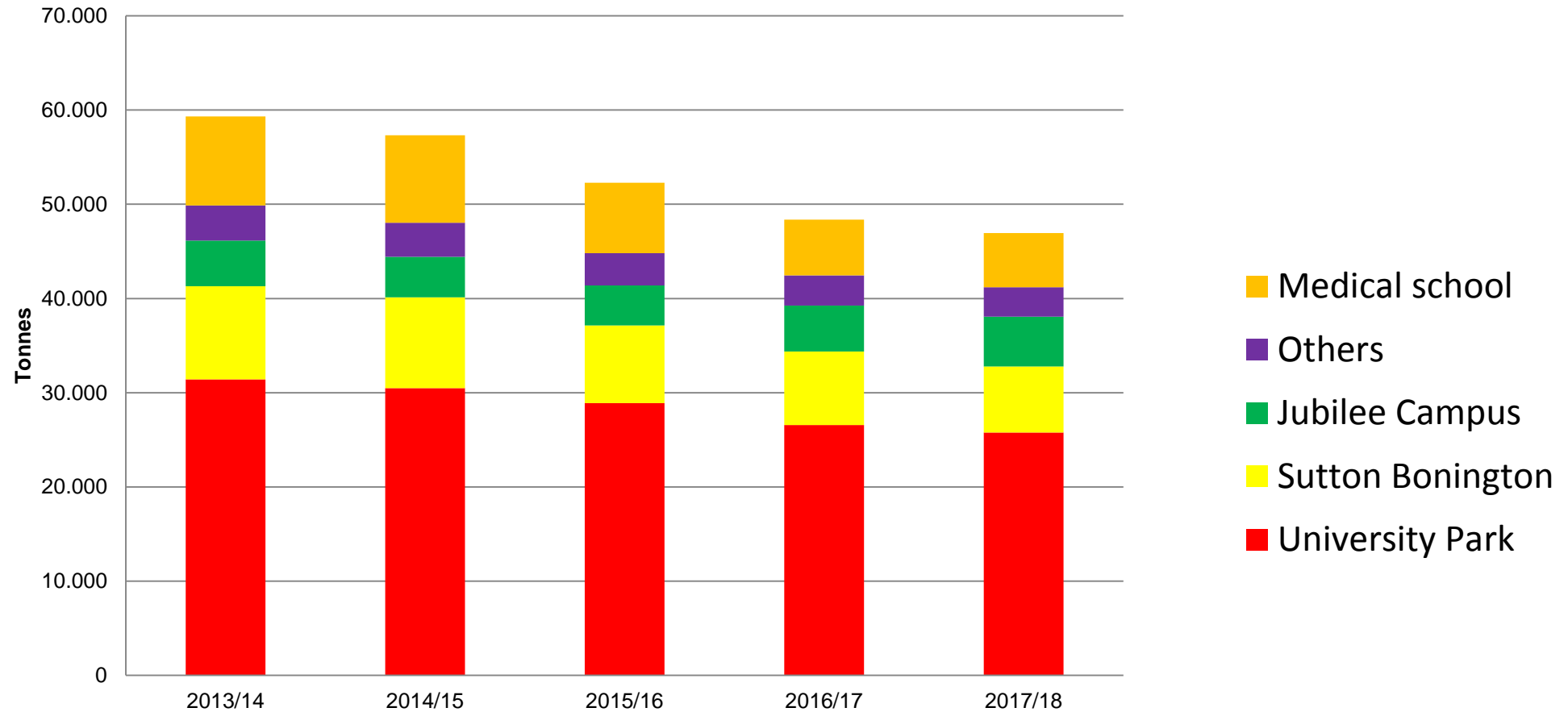
- The University is expanding, more new buildings.
- We have more energy intensive research.
- We all have more electrical devices/ gadgets
- We do more (extended opening hours 24/7!)
- We have greater expectation of our buildings.



- Energy consumption has broadly remained flat over the last 15 years
- Our Estate as grown over 50% in that time.
- We have more energy intensive research activities.
- UK power grid has decarbonised 35% over the last 5 years



Carbon Dioxide Emissions



2009/10 baseline CO2 emissions of 68,000t. 2020 target 41,000t

- **We build to highest levels of BREEAM accreditation / LEED & Passivhaus**
- **Efficiency gains**
 - Plant Replacement- Boilers/chillers/pumps/fans
 - Building Fabric- Walls/Roofs/windows
 - Controls-on/off/ temp and air flow setbacks/ lighting/ Inverters for speed control
 - Fume cupboards (Installation of variable air volume extract system)
- **Generation and larger infrastructure Projects**
 - Combined heat and power
 - Heat networks
 - PV Array
 - High efficiency central chilled water plant
 - Wind Turbine ?
- **Cultural Change & Behaviour**

Building	18/19 kWh	% of Campus
Physics	2,178,628	9.17%
Chemistry	1,711,691	7.20%
Cripps South	1,417,987	5.97%
Bio-Molecular (CBS)	1,298,817	5.47%
Portland Building	1,291,775	5.44%
Life Sciences	1,104,613	4.65%
Pharmacy	1,101,830	4.64%
DRSV	896,504	3.77%
EMCC	780,440	3.28%
Orchard Hotel	765,569	3.22%



- 800kW Combined heat and power plant.
- Total installed cost of £1.35m
- Annual fuel cost saving £260K
- Annual Carbon saving 1,150 t CO₂



Medical School - Replacement chilled water plant



- Installation of high efficiency chilled water plant to replace steam absorption units.
- 3 off units will give an total installed duty of 2MW.
- Total installed cost of £1.45m
- Annual fuel cost saving £276K
- Annual Carbon saving 933 t CO2

Fume Cupboards upgrades - (Variable air volume extract system)



- A standard Fume Cupboard operating 24 hrs a day 7 days a week uses a total of 59198kWh of gas and electricity a year.
- Annual energy cost over £2,000 and 12t CO₂
- Upgrade cost £5,500
- Annual energy cost saving £1120 and 8t CO₂



University Park Main Campus - micro heat networks



Annual fuel cost saving upto £950K

Annual carbon savings up to 2,822 tCO₂

Installed cost up to £10m



Sutton Bonington - Proposed 1MW PV Array

**Annual energy cost saving around £88,000
and 250 t CO₂
Installed cost est. £1.3m**





- Transparent charging of energy costs
- Policies – building opening etc.
- Shared resources - -80 freezers, fume cupboards, etc.
- Agile working





www.nottingham.ac.uk/sustainability



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