

Energy History,
Development and
Sustainability

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History of Energy

- Useful to explore history of energy markets, technologies, prices & institutions
- Helps understand
 - Energy's contributions to socio-economic development
 - Impacts on resource depletion & environmental quality
 - Path dependency and lock-in
- May help map & navigate transitions & pathways
- “A lantern on the stern can help with navigation ahead.”

- *UN World Energy Assessment (2000):*
 - “Life is but a continuous process of energy conversion and transformation.”
 - “The accomplishments of civilisation have been largely achieved through the increasingly efficient and extensive harnessing of various forms of energy to extend human capabilities and ingenuity.”
- *Access to energy gives benefits through energy services*
 - E.g. illumination, transportation, cooked meals, refrigeration, comfortable temperatures
 - Enjoyed by industry, commerce & households.

UK's long energy history gives example of benefits

- 16th-19 century
 - UK moved from traditional agrarian '**organic**' economy
 - Bounded by productivity of scarce land resource
 - And limited **flows** of energy for food, clothing, housing & fuel
 - To a new regime
- Growth and living standards transformed:
 - By exploiting **stock** of mineral (coal)
 - And innovation, steam engine, converting heat to mechanical energy
- With other innovations, drove the mechanisation & urbanisation that led to the industrial revolution

Fig. 1: UK final energy consumption 1500-1800 (TWh)

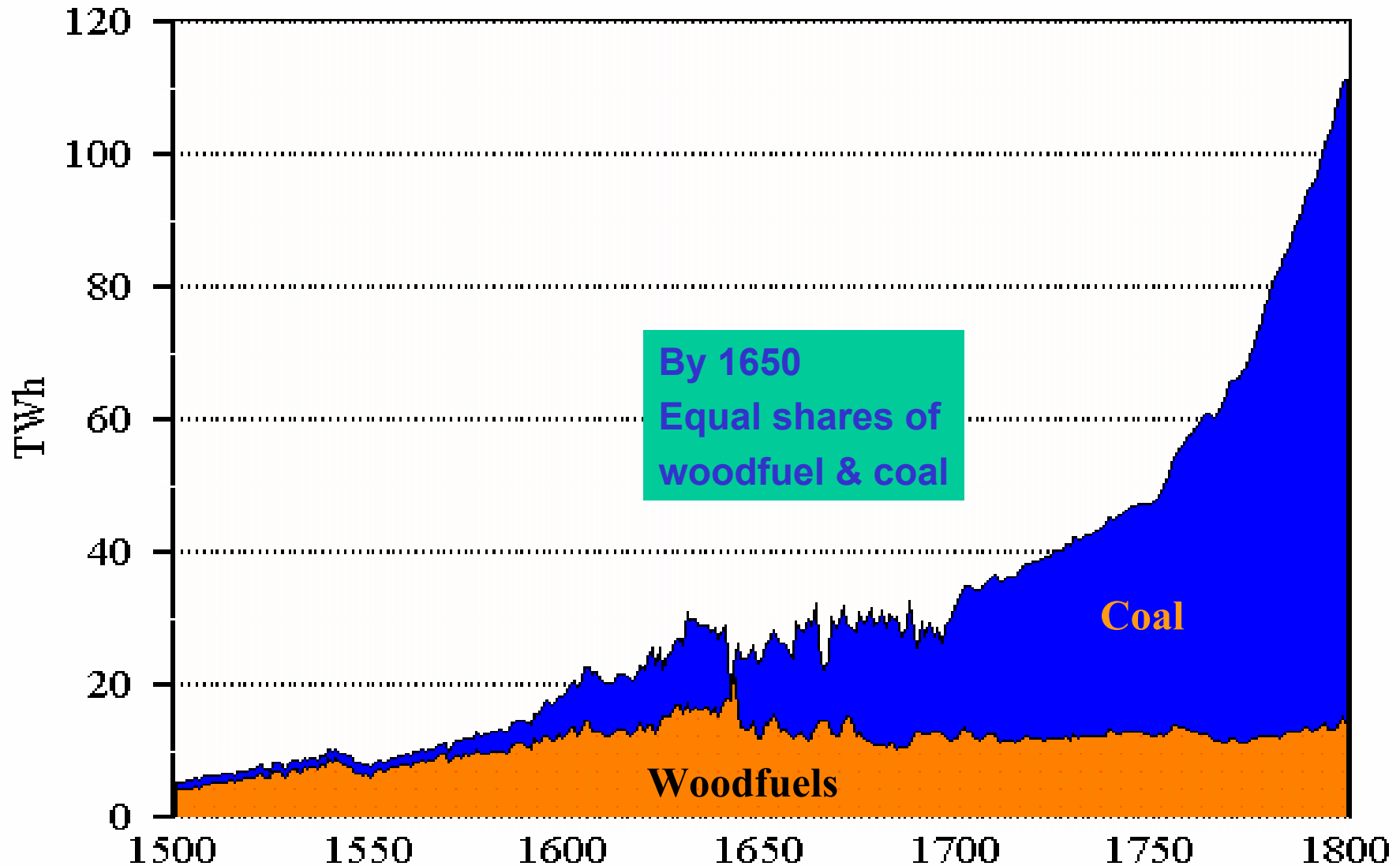


Fig. 2: UK final energy consumption, 1800-2000 (TWh)

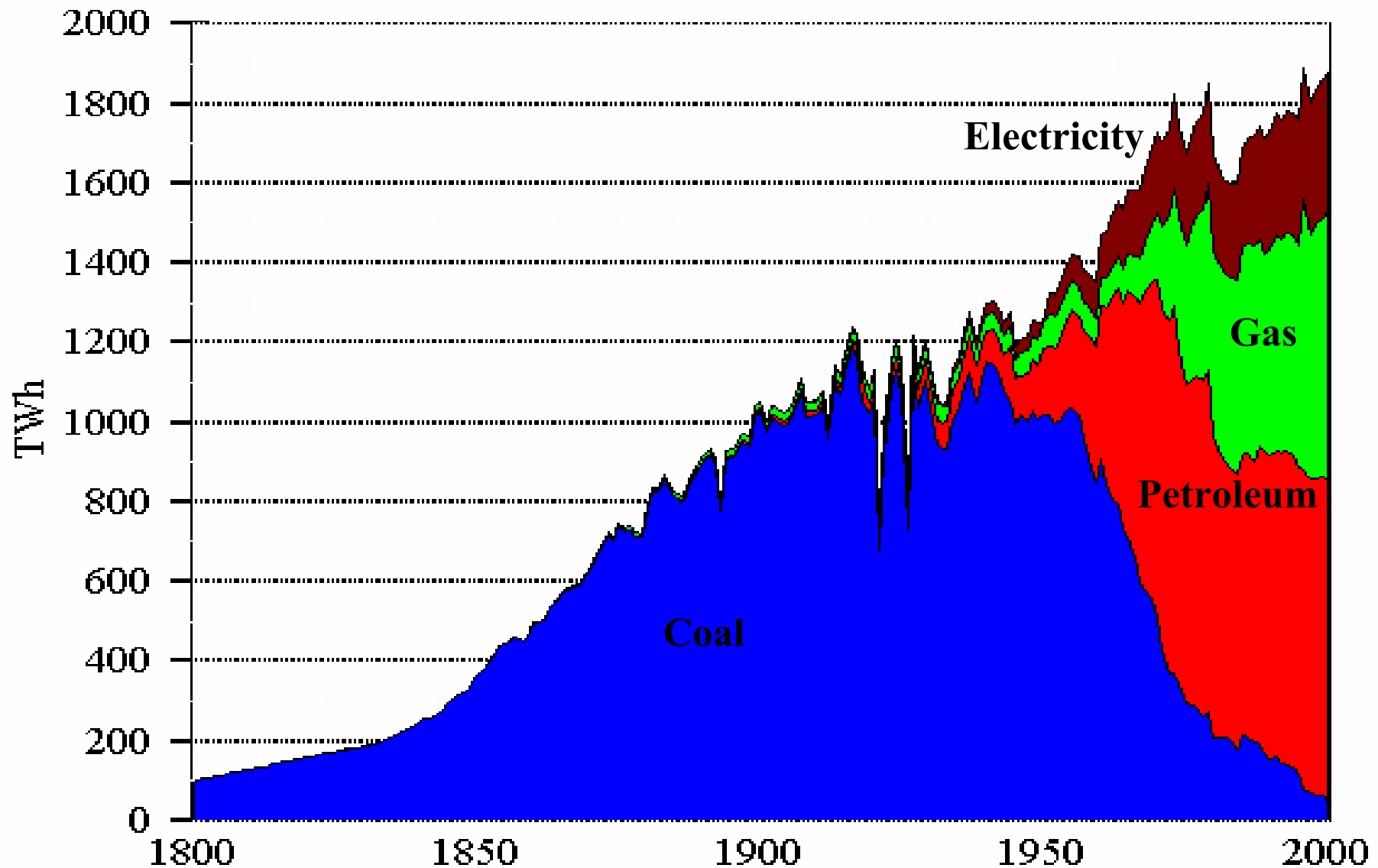


Fig. 3: UK Shares in final user fuel expenditure, 1500-2000

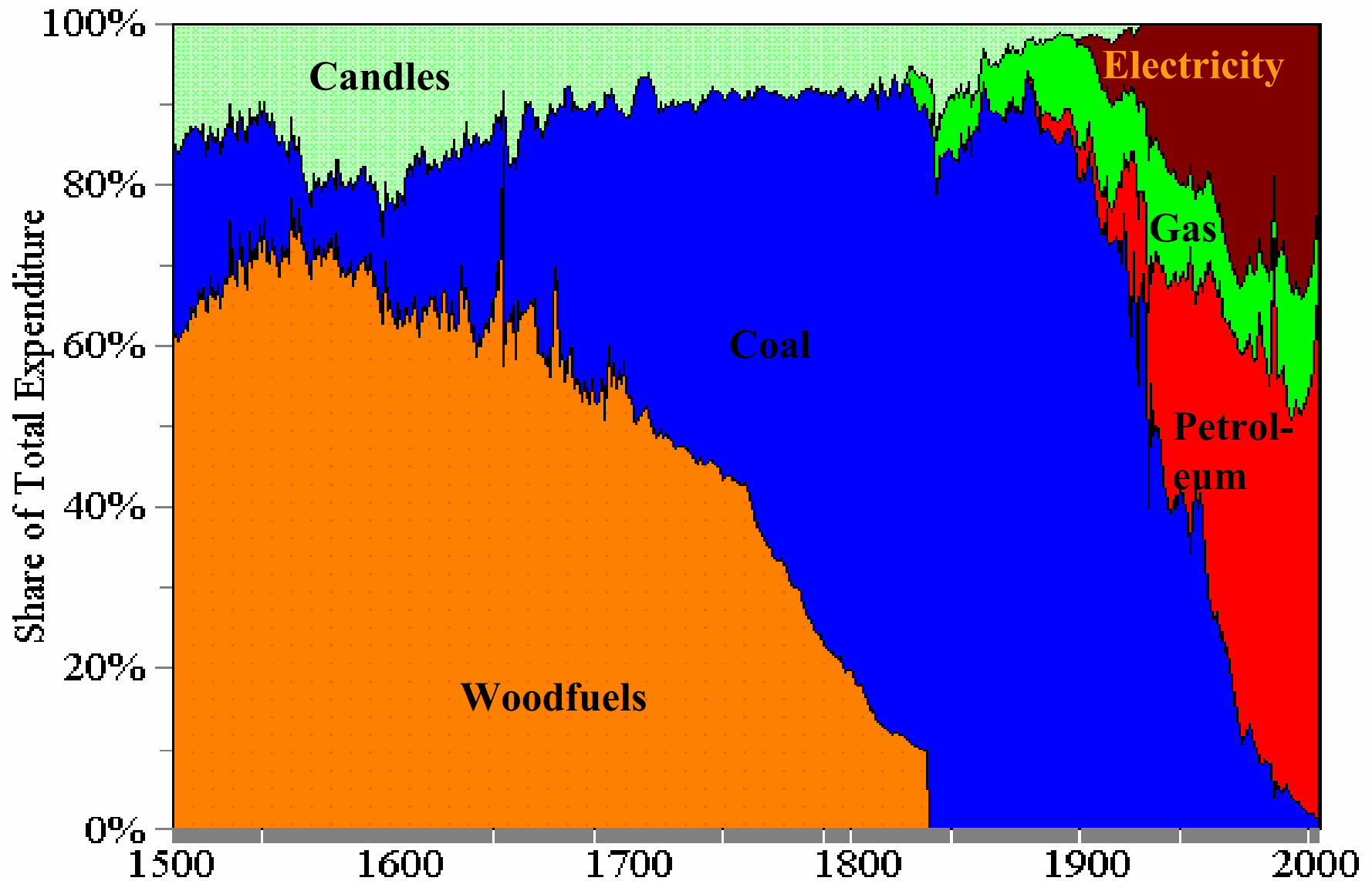


Fig. 4: UK energy intensity - final use energy consumption per unit real GDP, 1500-2000

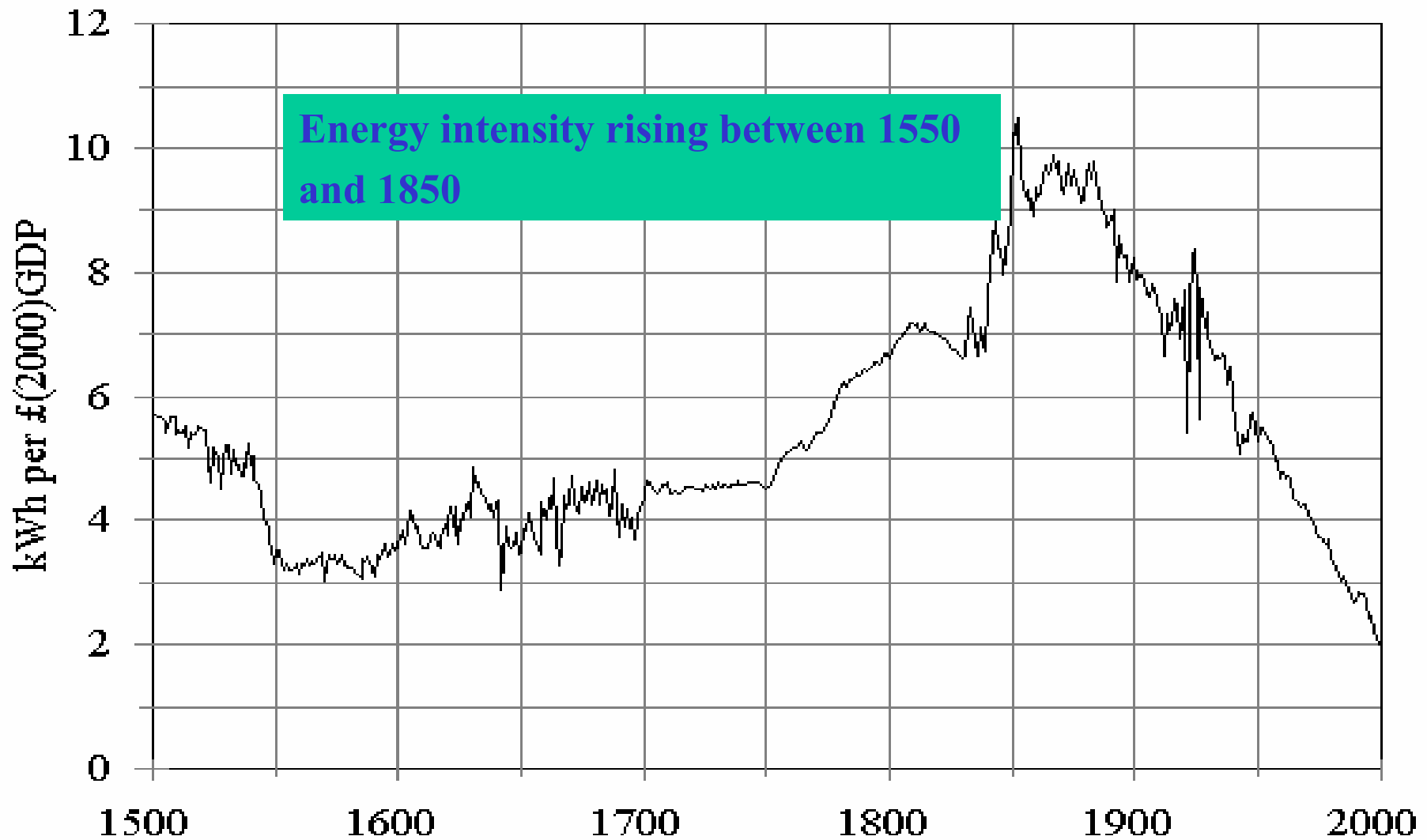


Fig. 5: UK average real 'energy' price series, 1500-2000

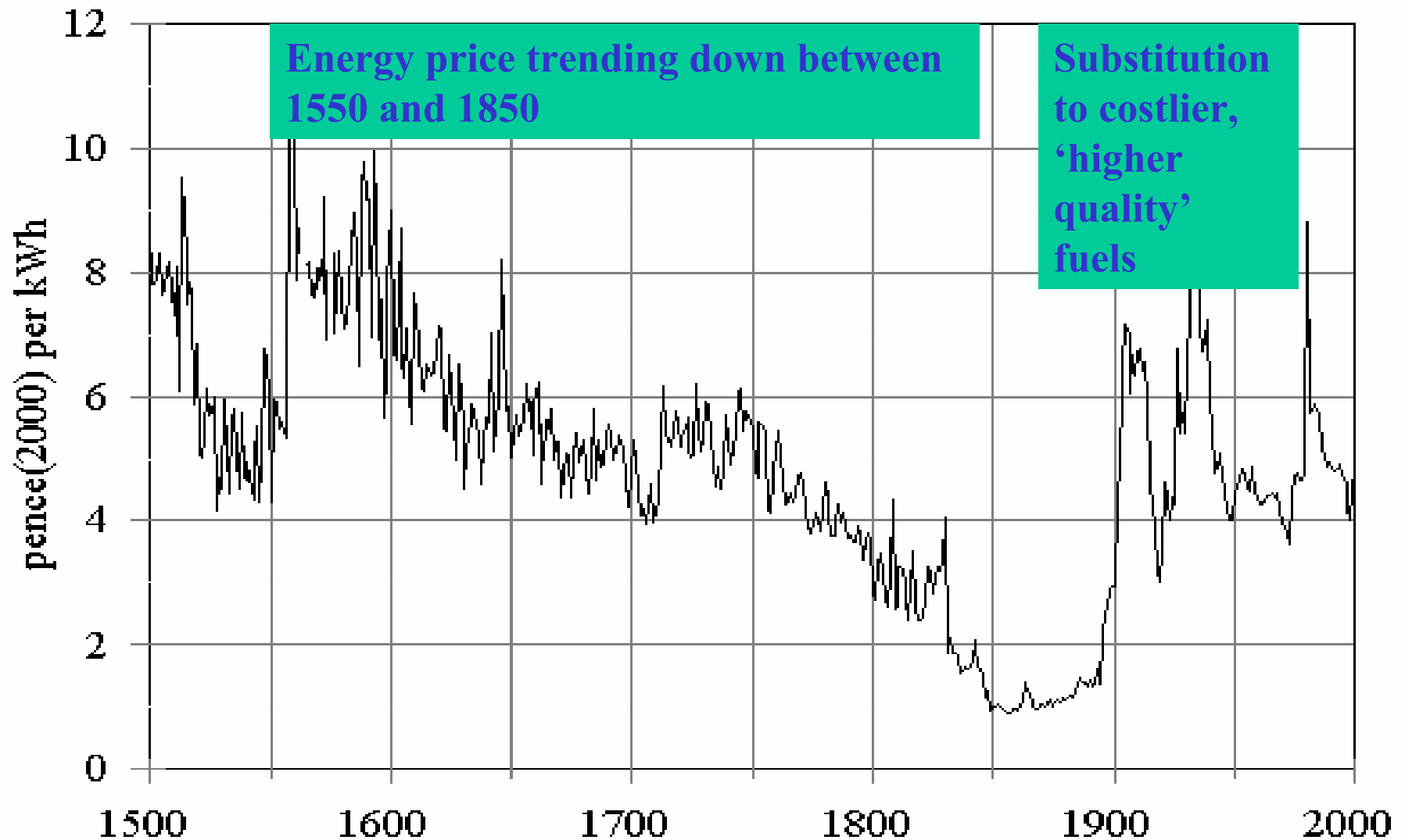
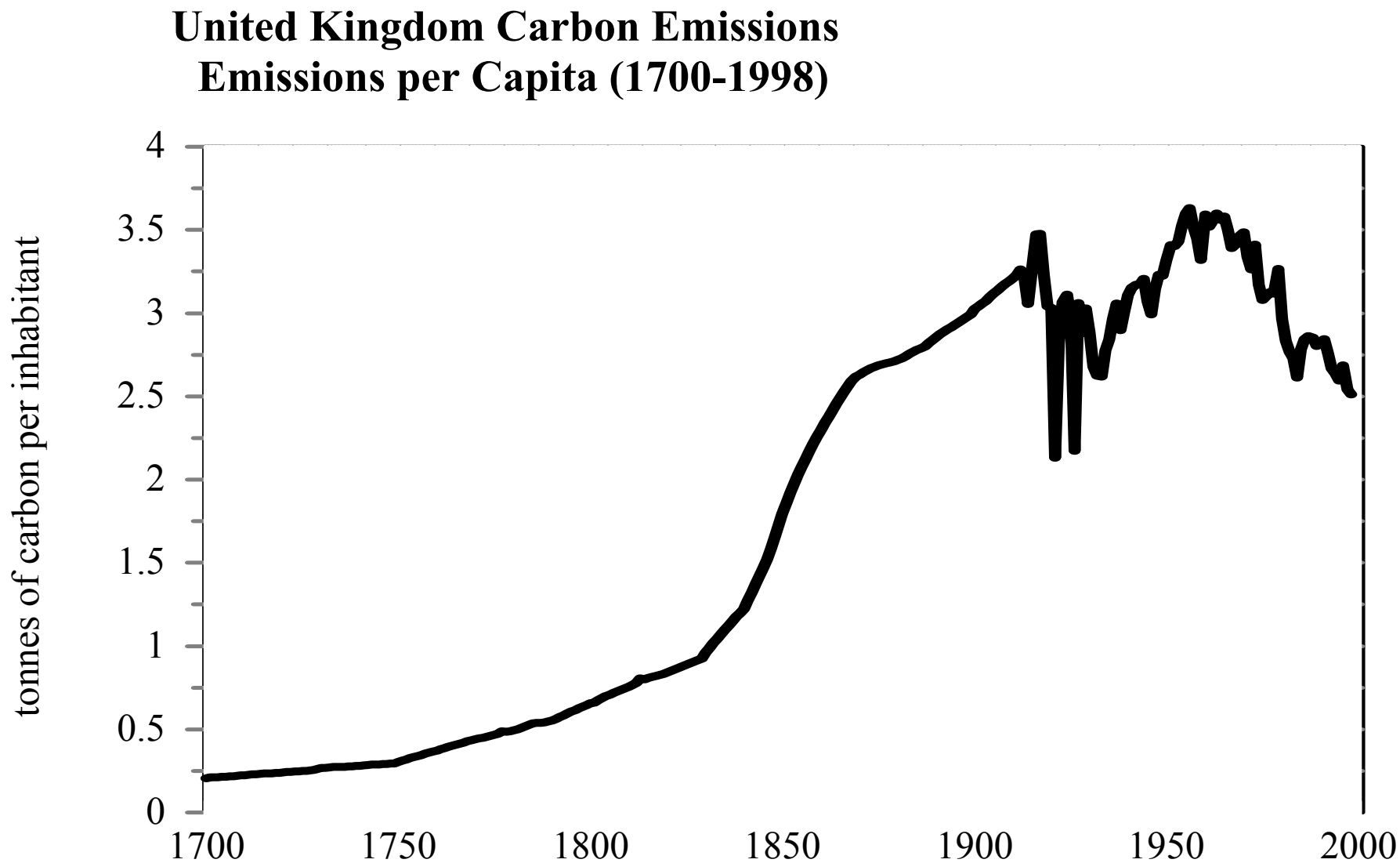


Fig. 6: UK per capita carbon emissions, 1700-1998



Energy, Development and Sustainability

- UK's access to mineral energy resources freed it from limits of an 'organic' economy
 - Enabled industrial revolution & rising living standards
- But environmental externalities not seriously addressed until 20th century
- Today's challenge: in developing world
 - How to assure rising access to **affordable** energy services
 - Via modern fuels, technologies, infrastructures & institutions
 - And innovations in energy service provision
 - Without **damaging** local, regional & global sustainability

Sources

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