UK Renewable energy

1990-2020

The dataset

The dataset is comprehensive, covering 17 different sources individually, and includes total consumption figures. Moreover, it provides insights into the overall energy consumption from primary fuels, presenting a valuable metric - the percentage of consumption from renewables. The unit energy in this dataset are measured in of oil equivalent (mtoe), where 1 mtoe is equivalent to 42 petajoules, (42 x 10^15 J).

Cross-boundary adjustment includes use by UK residents abroad and excludes foreign residents in UK territory. It applies to bioethanol and biodiesel. All figures are reported to 3 decimal places. Total figures are based on raw data and therefore may not sum due to rounding.

Primary KPI's

01

Renewable Energy Consumption Growth Rate

02

Top 5 renewable energy sources in 2020

03

Individual Renewable Energy Source Contributions

Data exploration

PostgreSQL was used to execute explorative analysis of the energy trends that was imported from a CSV format. The link below are directed to SQL queries used for retrieving necessary data:

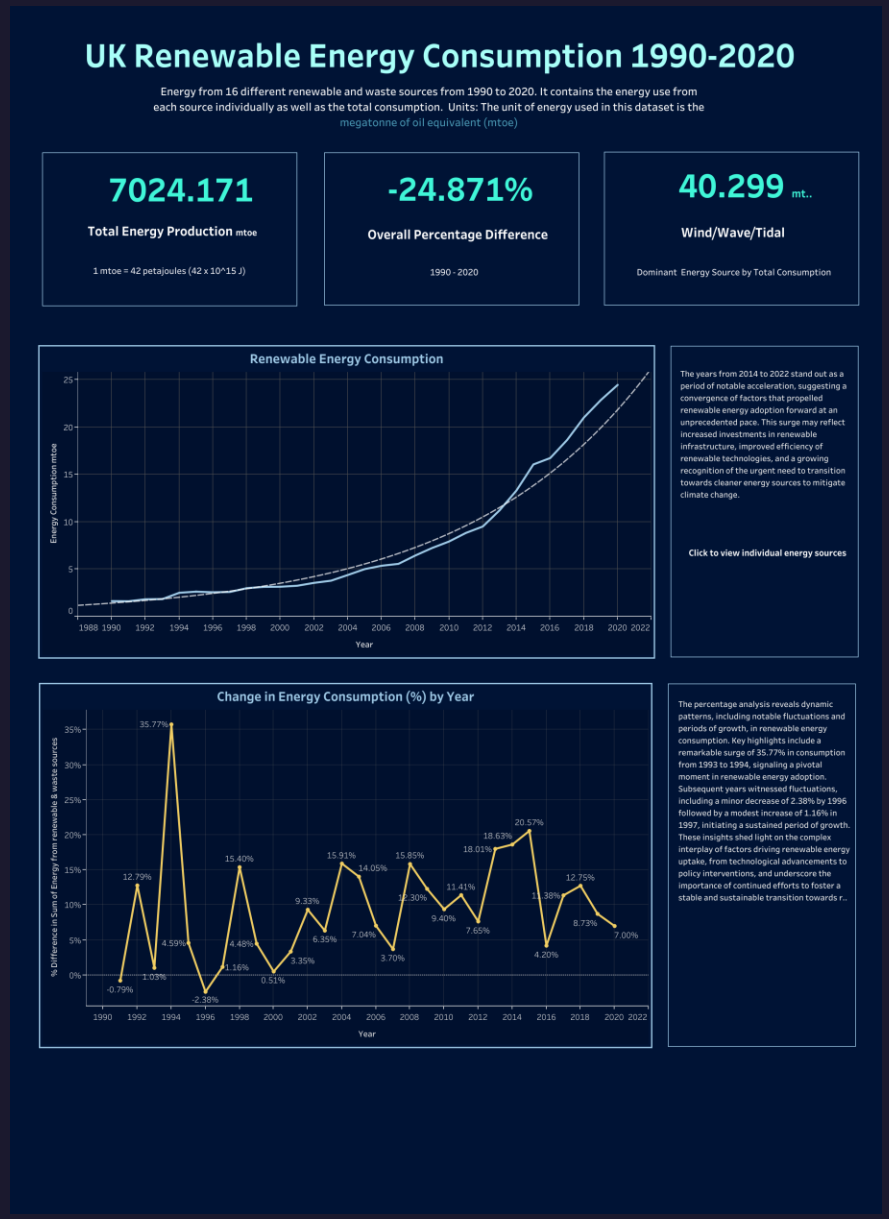
https://github.com/Koa1207/Uk-Renewable-Energy-1990-2020.git

Dashboard

The finished dashboard consists of visualizations and filters that simplifies navigation for the end users through the history of the energy source trends.

Click the link below to interact with the dashboard:

https://public.tableau.com/views/UKRenewableenergyconsumption1990-2020/Dashboard1?:language=en-GB&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

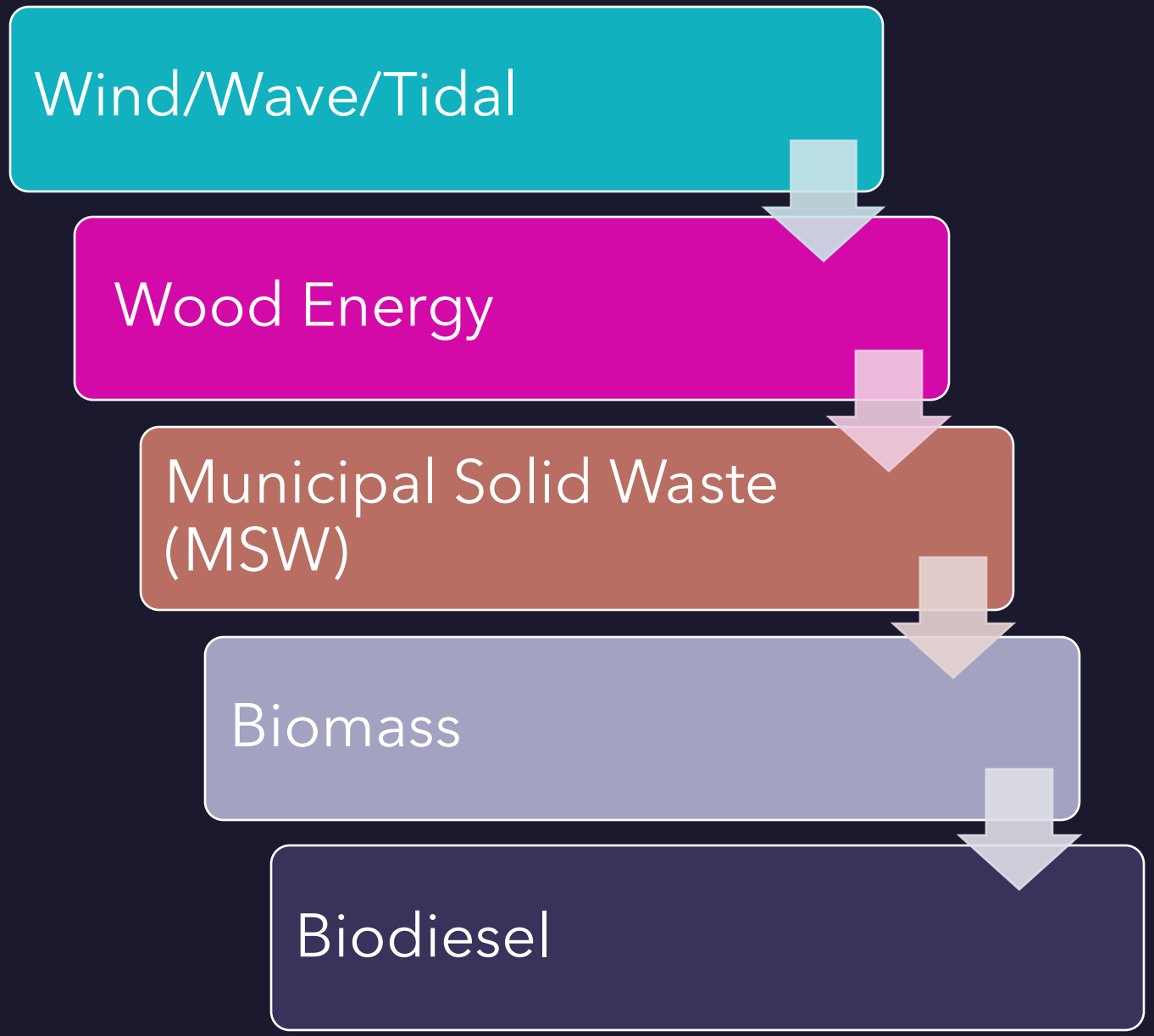


Renewable Energy growth rate

One insightful observation from the passage is that renewable energy adoption has experienced an unprecedented acceleration in recent years. This rise can be attributed to numerous factors, including increased investments in renewable infrastructure, improved efficiency of renewable technologies, and a growing awareness of the urgent need to transition towards cleaner energy sources to mitigate climate change. The passage highlights the importance of renewable energy in addressing climate change and suggests that continued investment in renewable infrastructure and technology is necessary to sustain this momentum. The percentage change over the years, unequivocally reveals dynamic patterns, including notable fluctuations and periods of growth, in renewable energy consumption.

It highlights a remarkable surge of 35% in consumption from 1993 to 1994, which unquestionably demonstrates a pivotal moment in renewable energy adoption. Subsequent years have witnessed fluctuations, including a minor decrease of 2.38% by 1996, followed by a modest increase of 1.1% in 1997, initiating a sustained period of growth. These insights shed light on the complex interplay of factors driving renewable energy uptake, from technological advancements to policy interventions. They underscore the importance of continued efforts to foster a stable and sustainable transition towards renewable energy sources, without any doubt.

Top 5 Energy Sources 2020



Wind/Wave/Tidal

The collective growth trajectory of wind, wave, and tidal energy sources exemplifies a remarkable evolution from peripheral contributors to vital components within the renewable energy spectrum. With a modest contribution of 0.001 units in 1990, the sources burgeoned to a substantial 6.481 units by 2020. Such exponential growth underscores a profound commitment to harnessing natural forces for sustainable energy generation by escalated investments and technological advancements in these sectors.

Wind/Wave/Tidal Recommendations

Enhance Research and Development (R&D): Focus on technological advancements in turbine efficiency and durability for both wind and wave energy. Support R&D in tidal energy technologies to increase efficiency and reduce costs.

Increase Investment in Offshore Wind Farms: Given the substantial growth from 0.001 units in 1990 to 6.481 units in 2020, continued investment in offshore wind farms can harness stronger and more consistent wind resources.

Wood Energy

Wood Energy: While historically significant, wood energy exhibited a relatively stable presence throughout the period. Within the bandwidth of 1.108 to 3.367 units from 1990 to 2020, Wood's consistent contribution underscores its enduring role as a renewable energy source, reflecting a sustained usage for energy production.

Wood Energy Recommendations

Sustainable Forest Management: Promote practices that ensure the sustainable harvesting and replanting of wood resources to maintain a stable supply without depleting forests.

Modernization of Wood Energy Systems: Upgrade wood-burning technologies to improve efficiency and reduce emissions. Support the development of combined heat and power (CHP) systems utilizing wood energy.

Local and Community-based Projects: Encourage small-scale, community-based wood energy projects to provide local energy solutions and reduce transportation emissions.

Municipal solid waste and biomass

Municipal solid waste (MSW) escalated from a modest 0.065 units in 1990 to a substantial 2.469 units by 2020, indicative of advancements in waste-to-energy technologies and refined waste management practices.

Similarly, Biomass encompassed diverse organic materials and mirrored a parallel upward trend, ascending from 0.074 units in 1990 to a peak of 2.121 units in 2019, marginally receding to 2.469 units by 2020. This trend underscores the efficacy of leveraging organic resources to augment the renewable energy matrix.

Municipal solid waste Recommendations

Expand

Expand Waste-to-Energy Facilities: Increase the number and capacity of waste-to-energy plants to manage the rising volumes of municipal solid waste and convert more waste into energy.

Improve

Improve Waste Segregation and Collection: Implement advanced waste segregation and collection systems to ensure that organic waste suitable for energy generation is efficiently separated.

Educate

Public Awareness Campaigns: Educate the public about the benefits of waste-to-energy projects and the importance of proper waste segregation.

Biomass Recommendations

Diversify Biomass Sources: Encourage the use of diverse biomass sources such as agricultural residues, algae, and dedicated energy crops to ensure a stable and sustainable supply.

Enhance Biomass Conversion Technologies: Invest in advanced biomass conversion technologies like gasification and anaerobic digestion to improve the efficiency and output of biomass energy.

Incentives for Biomass Projects: Provide financial incentives and subsidies to support the development of biomass energy projects, especially in rural areas where biomass resources are abundant.

Biodiesel

Biodiesel production has grown steadily with some fluctuations, reflecting the complex nature of the biofuel industry. Starting from a negligible level in the early 1990s, biodiesel production reached 0.359 units by 2020. This growth shows the increasing interest in alternative fuels and sustainable transportation. The industry's path highlights the various challenges and opportunities in developing biofuel technologies.

Biodiesel Recommendations

Support

- Support R&D in Biodiesel Production: Invest in research to improve the efficiency of biodiesel production processes and the development of advanced biofuels that can compete with traditional diesel.

Expand

- Expand Feedstock Diversity: Encourage the use of non-food feedstocks, such as waste oils and algae, to produce biodiesel and reduce competition with food resources.

Promote

- Promote Biodiesel Blending: Implement policies that promote the blending of biodiesel with conventional diesel to increase its adoption and market penetration.

General Recommendations

Policy and Regulatory Support: Advocate for supportive policies, regulations, and incentives that promote renewable energy projects, reduce bureaucratic hurdles, and provide financial support for innovation.

Public-Private Partnerships: Foster collaborations between governments, private sector, and research institutions to pool resources, share knowledge, and drive large-scale renewable energy projects.

Education and Workforce Training: Develop education and training programs to build a skilled workforce capable of supporting the renewable energy industry's growth and technological advancements.

International Collaboration: Engage in international cooperation to share best practices, technologies, and strategies for renewable energy development and to leverage global advancements in the sector.