ENERGY TRANSITIONS – LESSONS FROM THE GREAT DEPRESSION

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Overview
Recent scholarship has demonstrated that the Great Depression of the 1930s can be understood as a critical period in the transition from coal to oil-based transportation in the United States (Kennedy, 2023). The Depression was part of socio-technological transition from a coal/railroad regime to a regime of hydrocarbons, motor vehicles and electricity. Oil surpassed coal in 1931 – early in the Depression – as the largest energy source for ground transportation in the US. Declining investment in railroads, however, was a major constraint on the US economy, as the main energy delivery system – coal carried by railcars – was weakened.

This paper asks what lessons from the Great Depression might apply to the current energy transition from fossil fuels to renewables.

Methods
The methods employed in the study of the Great Depression are relatively new, having previously been used to analyse the modern US economy (Kennedy, 2022) and Great Britain during the Industrial Revolution (Kennedy 2020a). They entail mapping of energy use to capital stocks and investments in the economy in order to identify the physical processes that underlie growth and change. In particular, these are: i) energy used to build capital assets in the economy; ii) energy required to use capital assets; and iii) physical capital assets and energy itself used in the production, transformation and distribution of energy. At a finer scale, novel energy Sankey diagrams centred around capital stocks help to elucidate capital-energy relationships.

Results
Major energy transitions do not necessarily involve economic depressions. The Great Depression was particularly long and hard due to the hegemonic power that railroads held in the US economy; they accounted for close to a quarter of the non-residential capital stock – and were responsible for delivering about 70% to 75% of the energy supply to the economy. Issues with regulation of railroads were also a factor, in addition to competition from hydrocarbons.

Lessons from the Great Depression are drawn by examining five of its broad characteristics in the context of the current low-carbon transition: i) change of energy carrier; ii) change of transportation mode; iii) sudden discovery of new energy resources; iv) hegemonic control of the energy and transport system; v) and lock-in of socio-technological regime. Current energy systems involve a more diverse group of industries than those of the early 1930s, and the energy transition does not seem to involve a major change of transportation mode. These considerations should, tentatively, reduce the potential for deep depression in the transition to renewables. Perhaps, if anything, there is possibly a risk of moving towards an energy regime that is more hegemonic – with electrical power grids becoming increasingly dominant. This need not be the case, however.

Conclusions
This paper has built upon new methods for understanding how energy transitions can impact the economy at a deep, long-term structural level. Overall, in the absence of sudden discovery of new energy resources – which caused the Great Crash – and without a hegemonic industry controlling the economy – which prolonged the Great Depression – tentatively it seems unlikely that the low-carbon transition will be as economically painful as the Great Depression. Nonetheless, breaking out of the current socio-technological regime will, no doubt, involve some societal disruption.

References
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