

As Requested.

General: You cannot just treat 'energy' as a sort of lump issue, and if Governments follow that route they get some very bad, and dangerous answers. We are really talking about a huge range of industrial, technological, political, international, social and moral issues if we want an affordable, reliable and clean energy supply to be part of our future.

Specific to the text:

1. Economic models obsolete – probably, but that's not because they are influenced by marginal tax rates. They are obsolete because of silo thinking throughout the economics disciplines, which place far too much faith in rational economic behaviour and fail to take into account the myriad of outside influences on economic outcomes.

2. 'Economic growth' itself in need of definition and more realistic measure, but certainly not determined by energy alone (which is unlimited in primary form.) – although heavily influenced by the technologies, and discoveries which have enabled raw resources containing energy to be harnessed, processed, marketed in consumable form, and by the sociological – and international - conditions which allow this to take place. Read Hernando de Soto to see how without legally underpinned property ownership and joint stock companies energy utilities cannot work or energy consumption grow.

3. Why does 'bringing in less fertile land' reduce the returns to capital and labour. That aspect of Ricardo long since discredited. Jane Jacobs is far more convincing in explaining how growth began with cities who then expanded agricultural production outside their enclaves to feed their populations – greatly INcreasing returns to both capital and labour.

4. 'In the blink of an eye' coal consumption multiplied 45 times. Actually it took about a century to reach full impetus in the Industrial Revolution.

5. We are 'in the twilight of the fossil fuel age'. Oh really. Oil intensity may be falling and it is possible, but unlikely, that demand for oil world-wide will peak in a few years. But just as possible that demand may merely grow more slowly and we are still looking at 100 mbd of oil (next year's estimate) thirty years hence., although a smaller proportion of total energy consumption by then.

6. What is this about declining quality of oil and gas? Recovery costs may be rising but there is still plenty of cheap-to-extract sweet crude around in Middle East fields, and the offshore and light crudes are often of higher quality. Gas has always had to be 'cleaned' for safe transport and consumption. Not aware of any quality decline as world production rises.

7. Its not that net energy determines the economy. It's the other way round. The economic catallaxy, the sum of all economic activity, including all enterprise, innovation and discovery, determines the sources and supply mix of energy and the pattern of its distribution and consumption. There is no fixed lump of energy supply available at any one time, whether to a society, a nation or the whole globe.

8. Net energy from fossil fuels is not 'collapsing'. It may increase more slowly over the rest of this century as intermittent renewables expand, and their intermittency can be managed through new energy vectors, (hydrogen, ammonia, new battery storage technologies). But, alas, coal is expanding, with new plants being constructed. A long way to go before anything approaching collapse can be identified.

9. If energy is rarely mentioned in economic textbooks why have I got dozens on my shelves. I suppose you could say that water, air, the environment or law and order rarely get

mentioned in economic textbooks. But in intelligent books about the shape of human progress, in all its aspects, they certainly do.

10. Energy 'rarely mentioned in budgets'. I have sat and listened to annual budget statements for well over fifty years, and fuel taxes and energy infrastructure investment have featured in almost every one.

11. Rise of China driven by coal deployment? No, actually driven by the microchip, the revolution in standard production and the old economies of scale and the vast shrinkage in transport costs, plus, of course the full impact of science and innovation and the upgrading in Chinese populations' education. Expanding energy production followed. No single aspect would have advanced without all the others – the basic flaw in this article which fails to reflect this.

12. Changes of paradigm don't occur because they are 'needed' or authorised by Government action. We all know that. They are innovation-, discovery- and marketing ingenuity-driven. Ordaining paradigm shifts in history have nearly always led to disaster.

13. The choice between lower taxation and innovation in energy production and consumption is completely false. Both enterprise and new energy developments are essential and depend on each other. High taxation does deter and constrain. Even the Chinese have discovered that!

14. The plug for fusion may be right, but it is ingenuity and persistent research in the right conditions for these things which is going to get us there. Latest estimates, getting more hopeful, are about twenty years away before any hope of commercial flows. And government choices in choosing 'winners' can go disastrously wrong. Look at fast-breeder reactors and look now at current fondness for large-sale EPRs, all faulty, years behind time, massively over budget. Probably should be superseded by SMRs and new nuclear technology.

15. Tony Blair's triple education cry is a classic example of over-specialised focus leading to bad outcomes. As a result we got overloaded universities, with several of them now losing their way, and totally inadequate investment in vocational training, skills and apprenticeships. He failed to see that many other things needed to be taken into account.

I could go on. But much the biggest howler is to assume that all the problems of providing reliable, affordable and clean energy for generations to come can be delivered by a national government just focussing on 'energy issues' and having something called an energy policy. Energy in varying forms of course enters into everything, but everything enters into, and shapes, the supply of, and demand for, usable energy flows – from the design of a house to the operation of a nuclear power station the other side of the world, from local planning to climate destruction, from wars to connectivity – and to all the intensely complicated and interwoven global supply chains that will underpin energy production and distribution of all kinds.

Mr Syed is a brilliant columnist but all energy-related issues are fiendishly complex and need to be addressed and treated piece by different piece, and fitted cleverly and holistically into the framework of a wider and evolving cosmos.