The Approaching US Energy Economic Crisis

Gail Tverberg - IEEE WiSEE - October 11, 2017
Energy consumption and GDP are highly correlated for the world as a whole.
US looks like it might be breaking away from the need for energy to create GDP
US is really dependent upon imports from less “energy efficient” countries

- World is a lot more like China than the US
US is part of a self-organized networked world economy: crisis can occur in many ways.
Seven ways a US energy economic crisis can arise:

1. Oil prices rise too high for consumers.
2. Oil prices fall too low for producers.
3. Wholesale electricity prices fall too low because of distortions caused by intermittent wind and solar.
4. Debt bubble grows under very low interest rates, then collapses.
5. Pension promises cannot be paid.
6. US government cannot collect enough taxes.
7. Persistent internet hacking limits its use.
1. Oil prices rise too high for consumers

- This is what Peak Oilers have warned about
1. Oil prices rise too high for consumers (cont.)

Theory says oil price can increase—but our pocketbooks disagree
Governments “counteract” high oil prices with low interest rates

- Helps make goods like cars and homes more affordable

- Economy becomes adapted to a given combination of oil prices and interest rates
  - Example: Air fare set on current oil price
  - Monarch Air in Britain failed recently, when pound fell relative to dollar, raising Monarch’s oil price

- Now, “too high” prices might be $60 or $70 per barrel
2. Oil prices fall too low for producers

- This is a major issue today
  - Doesn’t result in immediate collapse; collapse comes later
Growing wage disparity makes it harder for workers to buy goods that use oil

49.7% went to bottom 90% in 2016.

Growing wage disparity makes home and auto ownership more difficult for the “90%”

- Directly and indirectly reduces oil consumption
  - *Affordability* is the basic issue

3. Wholesale electricity prices fall too low because of distortions by wind and solar

- We hear that intermittent wind and solar will save the earth

- In fact, they are a huge problem for electrical systems
  - Don’t provide electricity 24/7/365
  - Need to pay someone else for backup
  - Or need to buy battery backup
  - Or need to greatly overbuild system, and only use the portion required

- US is now proposing subsidies for coal and nuclear
  - Without subsidy, other providers go bankrupt
Problem is negative and too low rates caused by intermittent generation

Chart by Paul-Frederik Bach  
4. Debt bubble grows under very low interest rates, then collapses.

- An economy grows under the “right” conditions
  - Rapidly growing supply of cheap-to-produce energy “works”
  - Produces lots of jobs that pay well
  - Worker productivity seems to rise
    - But it is really the increased leveraging of better “tools” and more energy supply that is producing more goods and services

- Growing debt at low interest rates can “sort of” work around problem of higher-cost energy supplies
  - Example: Price of house rises
  - Lower interest rate, more debt makes house affordable
4. Debt bubble grows under very low interest rates, then collapses (cont.)

- Interest rates have been falling since 1981
  - Have run out of room to fall further

- Other problems—rising cost of oil extraction; falling profitability; growing wage inequality
5. Pension promises cannot be paid

- Problem occurs when “resources extracted” start to decline

**Scenario 1: Underlying Financial System**

- 2010
- 2020
- 2030
- 2040

**Scenario 2: More Likely Actual Growth Pattern**

- 2010
- 2020
- 2030
- 2040
Result is likely to be similar to musical chairs

- Do current workers or pension holders get the available goods and services?
6. US government cannot collect enough taxes

- CBO put up this forecast of deficit in January 2017
6. US government cannot collect enough taxes (cont.)

- Congressional Budget Office forecast considers
  - Tax structure without changes
  - Known commitments, including Social Security and Medicare

- Forecast is for a huge increase in debt, if taxes left the same

- Since forecast was prepared in January 2017, situation looks worse
  - Cost of three hurricanes
  - Proposed tax cut will cut revenue; probably not raise wages
7. Persistent hacking limits the use of the internet

- Many businesses use the internet extensively
  - Banks for transferring funds
  - Stock exchanges for buying and selling stock
  - Electricity providers for controlling flow of electricity
  - Lenders verifying income of those applying for loans

- Hacking is becoming a bigger and bigger problem

- Networked system becomes very dependent on internet

- What do we do if it becomes too insecure?
Obviously, this list is not exhaustive

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