
True cost of renewables
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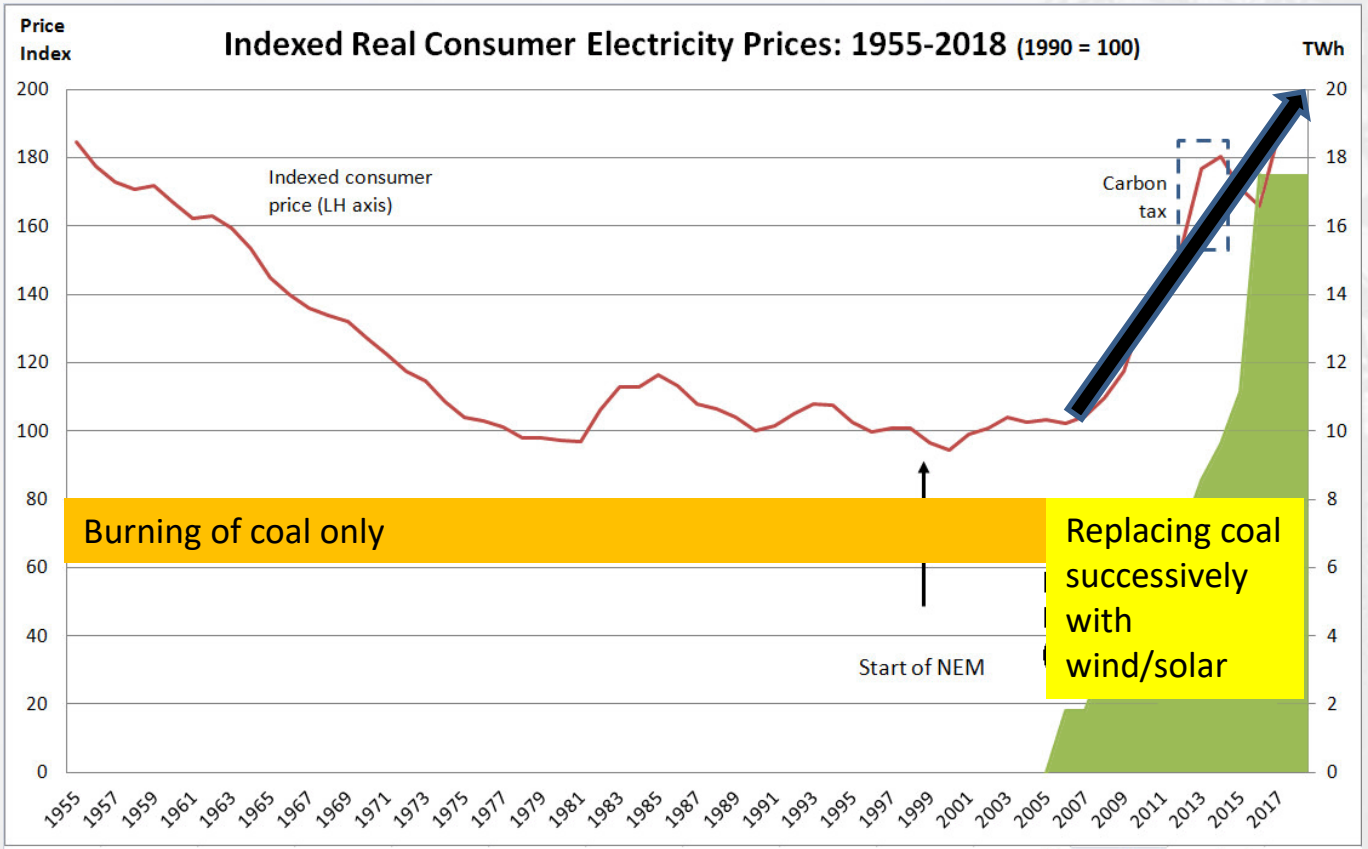
Introduction

- The media is constantly reporting how inexpensive wind and solar produced electricity is.
- However, nothing can be more incorrect
- It turns out that wind and solar produced electricity is extremly expensive

Electricity price in Australia



Sources ***Original: Dr Michael Crawford***

Prices 1955 - 1980: *Electricity in Australia* , prepared for CIGRE by Frank Brady AM (former CEO, Electricity Commission of NSW), 1996

1980 - 2016: ABS 6401.0 Consumer Price Index

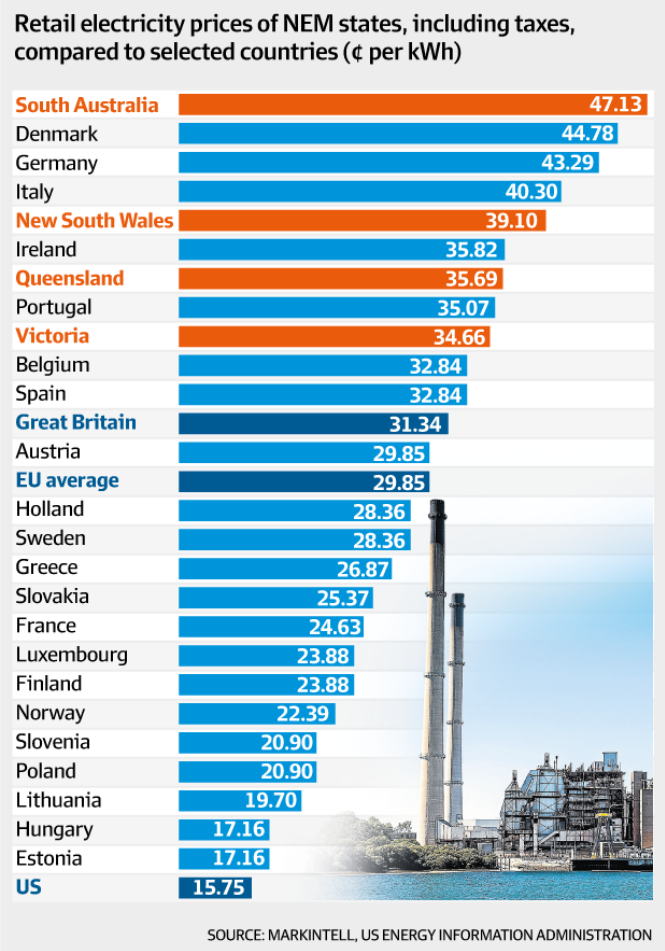
2017 - 2018: Adjustment (15% nominal increase) to take account of price increases announced by major elect distributors in June 2016

Intermittent power generation (Terra Watt hours, TWh) from Figure 4.2 in *Independent Review into the Future of the National Electricity Market*

NEM stands for National Electricity Market

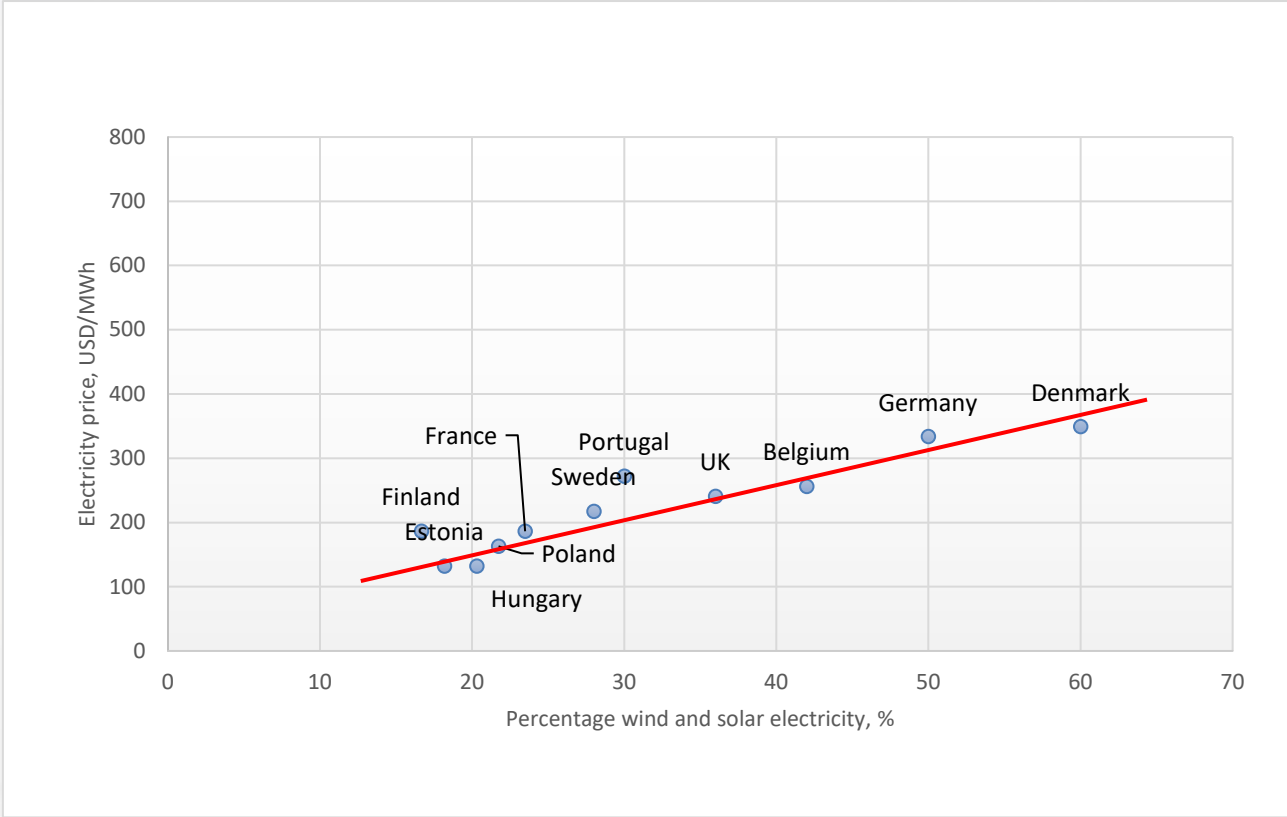
Reference: [Electricity prices fell for forty years in Australia, then renewables came… « JoNova (joannenova.com.au)]

Electricity prices



Reference: [Green Madness: Australia Has Gone From Cheapest To Most Expensive Power - The Global Warming Policy Forum (thegwpf.com)]

Electricity prices



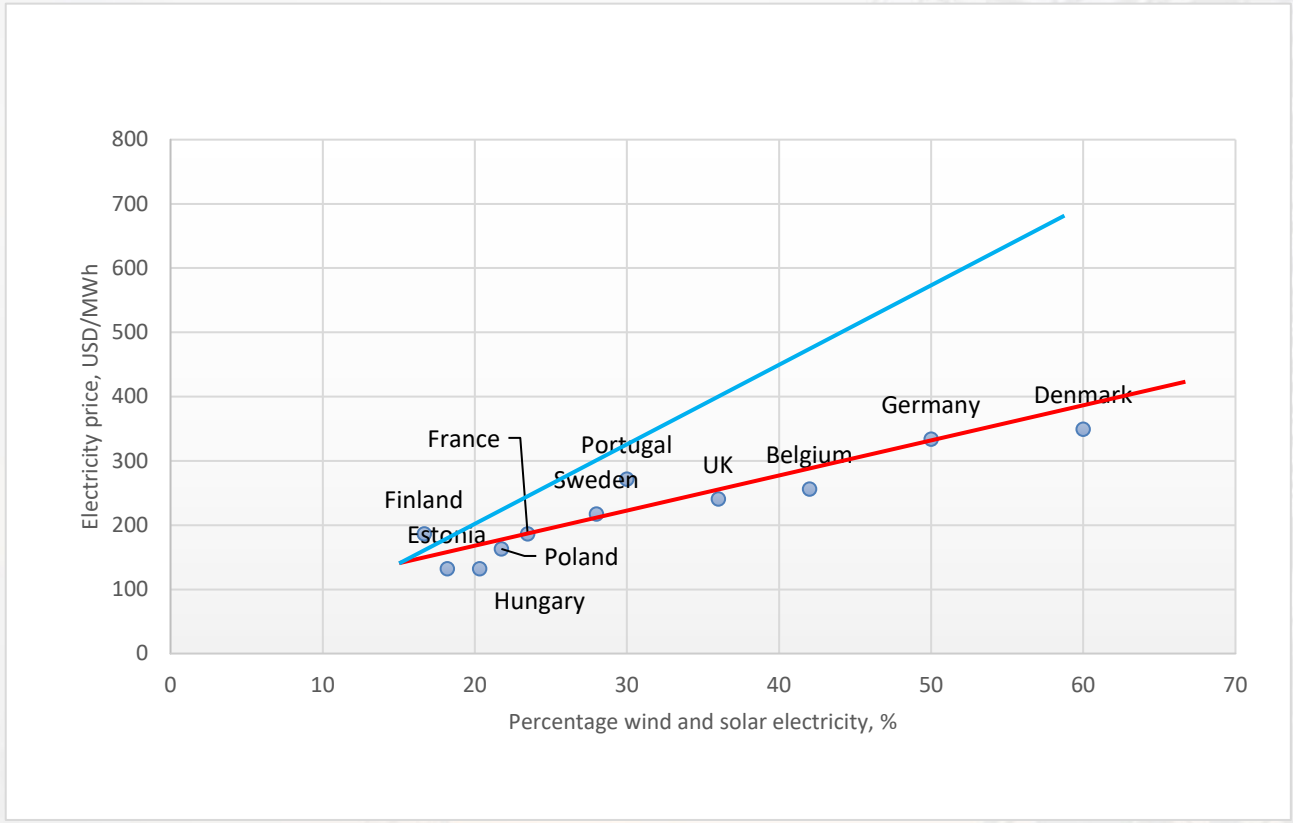
Electricity price for end customer in USD/MWh dependent on percentage of installed wind and solar capacity of total electrical capacity from various sources (nuclear, biomass, hydro, coal, wind and solar) for various countries in Europe

References: Green Madness: Australia Has Gone From Cheapest To Most Expensive Power - The Global Warming Policy Forum (thegwpf.com) and electricityMap | Aktuellt CO_2-utsläpp från elproduktion

True cost of renawables

- Wind and solar are very expensive. The true cost of solar and wind (that is currently not done) has to include:
  1. Back-up costs:
     1. cost originating from “temporal” deviation between generation and demand.
        1. Includes cost of gas turbines/natural gas, batteries, decline in conventional power utilisation, increased ramping and cycling.
  2. Interconnection costs:
     1. costs originating from “spatial” deviation between generation of variable renewable energy (VRE) and power demand, includes grid/ interconnections management costs, and balancing costs.
  3. Environmental costs:
     1. costs related to the space required for VRE crop land, forests, effected bird and animal life, changing wind and local climate, noise pollution, etc.
     2. higher recycling costs of vast amount of wastes from VRE

Electricity prices



Impact of high electricity prices

- Higher electricity prices have a negative impact on jobs and economic growth:
  - from 2020 to 2040, cumulative job losses in the U.S. range from 18.5 million to 31.3 million and
  - national GDP cumulatively declines by $2.8 trillion to $5.4 trillion.

Cumulative Impacts of 10% and 25% Higher Electricity Prices, 2020–2040

	Employment	GDP (2015$)	Disposable Income
Rural America	7.6 million to 12.9 million jobs lost	$1 trillion to $1.9 trillion reduction	$479 to $1028 lost per capita
Rest of U.S.	11 million to 18.4 million jobs lost	$1.8 trillion to $3.5 trillion reduction	$323 to $681 lost per capita
Total U.S.	18.5 million to 31.3 million jobs lost	$2.8 trillion to $5.4 trillion reduction	Not calculated

Gross domestic product (**GDP**) is a monetary measure of the market value of all the final goods and services produced in a specific time period

Source: IER calculations of NRECA data, http://www.nreca.coop/wp-content/uploads/2015/07/Affordable-Electricity-Rural-Americas-Economic-Lifeline.pdf

Conclusions

- Data both from Australia and Europe shows that replacing conventional electricity generation from e.g. nuclear, hydro, coal with wind/solar will increase the electricity price dramatically
- The consequnces of higher electricity price are:
  - The loss of jobs (especially in key industries like manufacturing and agriculture)
  - Decline in GDP
  - Families would see a sharp drop in disposable income
    - Families would be left with fewer resources to save or spend on basic necessities like food, housing, and healthcare.

About Peter Rudling

- Mr. Peter Rudling was a senior consulting specialist at Vattenfall, the largest Swedish nuclear power company. Earlier he has also been a Specialist of Nuclear Fuel Materials at ABB Atom (now Westinghouse) and a Project Manager at Electric Power Research Institute (EPRI) in CA, USA.
- More information about Peter, please click here.

References

- Electricity prices fell for forty years in Australia, then renewables came… « JoNova (joannenova.com.au)
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