

**This newsletter summarizes an interview of Danny Price, Co-Founder and CEO of Frontier Economics with Dr. Robert Barr AM and Jasmin Diab from Nuclear for Australia, 7<sup>th</sup> Jan 2025. The interview involves a comparison of the 100% renewables AEMO Integrated Systems Plan [1] with two reports by Frontier Economics [2,3] that combine renewables and nuclear energy. The interview can be found at: <https://www.youtube.com/watch?v=8vqdTORIf2U>**

**This interview runs for 1.24hrs and this summary captures key comments by Danny Price, to provide a quick snapshot, for more details please go to the complete interview.**

### **NATIONAL ELECTRICITY MARKET**

1. You can't run the National Electricity Market (NEM) on intermittent renewables and storage.
2. The grid will be too unstable with 80 to 90% renewables, whereas nuclear stabilizes the grid.
3. Nuclear baseload electricity runs 24/7 so a relatively small capacity provides vast energy.
4. Carbon Capture and Storage (CCS) cost and life of plant are less favourable than nuclear.
5. Nuclear and CCS provide inertia of turbines that provide frequency control the system needs.
6. Coal plants need to close before 2050, so it makes sense to switch to nuclear.

### **PUBLIC ISSUES**

1. Public are sick of being told their prices are going up because they use too much electricity.
2. The reason for price increases is the added cost of renewables, transmission and storage.
3. Excessive renewables have caused a \$1,000 increase instead of a \$275 saving for homes.
4. Rooftop solar doesn't provide energy self-sufficiency due to continuous overcast days.
5. When the sun shines there is excess energy on the system that needs to be stored or spilled.
6. Rooftop solar spillage comes at a cost to the NEM and to household power bills in NSW.
7. The government is now subsidizing household batteries and expecting EVs to use this energy.
8. With the Step Change model, rooftop solar & batteries will add a further \$40,000 per home.
9. Customers then make an uneconomical investment to compensate for less grid reliability.
10. Prices to consumers can be pushed down, but Danny Price doesn't believe it will happen.

### **ENERGY MARKET**

1. Cost increases are a function of how the NEM operates, with price reflecting scarcity.
2. Prices change from -\$1,000/MWh to +\$17,000/MWh in the world's most volatile market.
3. Generators plant costs need to be recovered through this spot pricing mechanism.
4. As a result, the NEM no longer operates efficiently, but market agencies need to reform it.
5. At critical times Australian households must cut usage to avoid blackouts.
6. The situation is worsened as thermal generators can't startup and shut down rapidly.

### **CSIRO AND THE GENCOST REPORT**

1. The CSIRO GenCost Report [4] provided costings for individual energy types.

2. This data was incorporated into the AEMO Integrated System Plan (ISP) [1].
3. GenCost then added firming, but it wasn't integrated and produced misleading results.
4. The ISP incorporated complex modelling with all energy sources and demand volatility
5. The ISP treated firming as a separate energy source in the system so it could be optimized.
6. Frontier Economics also included firming in the same way as the ISP.

#### **AEMO AND THE INTEGRATED SYSTEM PLAN**

1. AEMO have not been able to accurately predict the NEM electricity demand, year-on-year.
2. There was a discrepancy in modelling \$122 billion using present values and not real costs.
3. AEMO Step Change modelling is radical, with the electrification of everything possible.
4. AEMO Green Energy modelling is impractical with unrealistic economic growth and exports.

#### **FRONTIER ECONOMICS MODELLING**

1. Danny adopted the AEMO ISP model, plus nuclear and optimized based on least cost.
2. The model incorporated 54% renewables and 38% nuclear to reduce costs to households.
3. Conservative nuclear costs of \$10,000/kW for construction and \$30/MWh for operation.
4. \$30/MWh allows \$6/MWh for fuel, \$24/MWh to operation, decommission & fuel disposal.
5. A cost efficiency increase of 1% p/a is conservative based on KEPCO savings figures.
6. Savings are achieved with a fleet of similar reactors, to optimize training and resources.
7. The project was amortized over 50 years, this could be increased to 60 to 80 years.
8. Firming using batteries and backup gas generators were modelled as separate elements.
9. Both Step Change and Progressive models were analysed with C2N staged changes.
10. Modelling was based on realistic coal power station closures from 2036, onward.
11. A baseline was also established regarding the baseload needed to maintain stability.
12. Coal closures are based on operator preferences and maintaining 65% of baseload.
13. Excess energy spill from renewables is included in the Frontier Economics models.
14. Step Change and Progressive models are both around 25% cheaper with 38% nuclear.
15. 100% Renewables emissions drop due to coal closures, but isn't net-zero with gas firming.
16. With nuclear emissions are less from 2045 onwards with less reliance on gas turbines.
17. Nuclear is cheaper as it runs 24/7, with less storage, gas and transmission lines.

#### **RENEWABLES AND STORAGE ISSUES**

1. The NEM can't run on renewables and storage because of the sheer quantity of energy.
2. A lack of grid diversity and no wind days for the NEM exceed storage capabilities.

#### **WESTERN AUSTRALIA**

1. In Western Australia the SWIS is isolated and doesn't have the redundancy of the NEM.
2. The SWIS needs to build in more resilience than the more diverse NEM.
3. Currently the SWIS has excessive spill due to high solar and wind, making it unstable.

### **DISCUSSION**

1. Household power bills will drop with nuclear, however cost billing differs due to the NEM.
2. France with 70% nuclear, and Ontario Canada have lower electricity costs than Australia.
3. The construction period can be reduced, in Bangladesh for instance it was 5 years.
4. Australia has a further advantage that it is very seismically stable.
5. Australia has engineering capabilities to run complex projects and expertise from ANSTO.
6. Cost savings with nuclear are around 25% with 44% if Progressive and nuclear are used.
7. US DOE 2024 are consistent with Frontier Economics for California with nuclear savings.
8. Nuclear needs \$14 billion for transmission, 100% renewables transmission is \$66 billion.

### **IMMEDIATE ACTION**

1. For bill relief to consumers, stop spending money on the network, immediately.
2. Change the wholesale energy operator mechanism to deliver gains.
3. Replan to reduce transmission and distribution systems with a more efficient grid.
4. Reassess Snowy 2.0, Hume Link and West Link, and their cost blowouts.
5. Cut government subsidies for roof-top solar that is now uneconomical.
6. Do not provide household battery subsidizes, to further distort the NEM.
7. Run models with actual reactor types installed, say APR1400s in sequence.
8. The AEMO ISP excluded rooftop solar and batteries, include for more realistic modelling.

[1]<https://aemo.com.au/-/media/files/major-publications/isp/2024/2024-integrated-system-plan-isp.pdf?la=en>

[2] [https://www.frontier-economics.com.au/wp-content/uploads/2024/11/Report-1-Base-case-report-Nov-14-2024\\_v2.pdf](https://www.frontier-economics.com.au/wp-content/uploads/2024/11/Report-1-Base-case-report-Nov-14-2024_v2.pdf)

[3]<https://www.frontier-economics.com.au/wp-content/uploads/2024/12/Report-2-Nuclear-power-analysis-Final-STC.pdf>

[4] <https://www.csiro.au/en/research/technology-space/energy/Electricity-transition/GenCost>

## NEWSLETTER No.15

Mon 24th March 2025

Frontier Economics Interview  
summary of key points.

