



Dispatch Based Transmission Pricing

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Background

Understanding the Project



HVDC Transmission Charge

- ❖ Instead of assessing beneficiaries of the HVDC link, we have proposed a utilisation tariff

- ❖ Explore the effects this charge might have in the New Zealand market
 - Inefficiencies
 - Water values



HVDC Transmission Charge

- ❖ Modelled the tariff under **static** market conditions through vSPD
- ❖ Modelled the tariff under **perfectly competitive** market conditions through DOASA

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Results

- 1. vSPD - static market conditions*
- 2. DOASA - perfectly competitive market conditions*
- 3. Simplified SDP - investigation of water value*

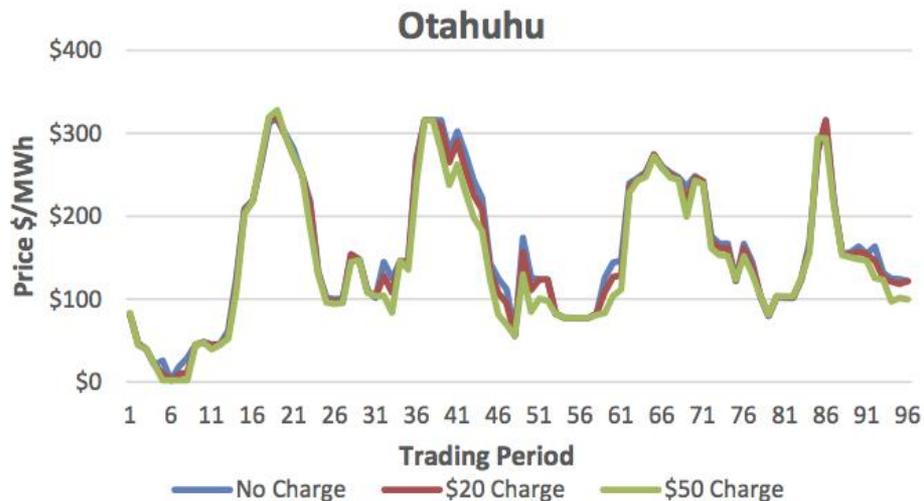


- ❖ In the dry year, 2008, the tariff has almost no effect on efficiency



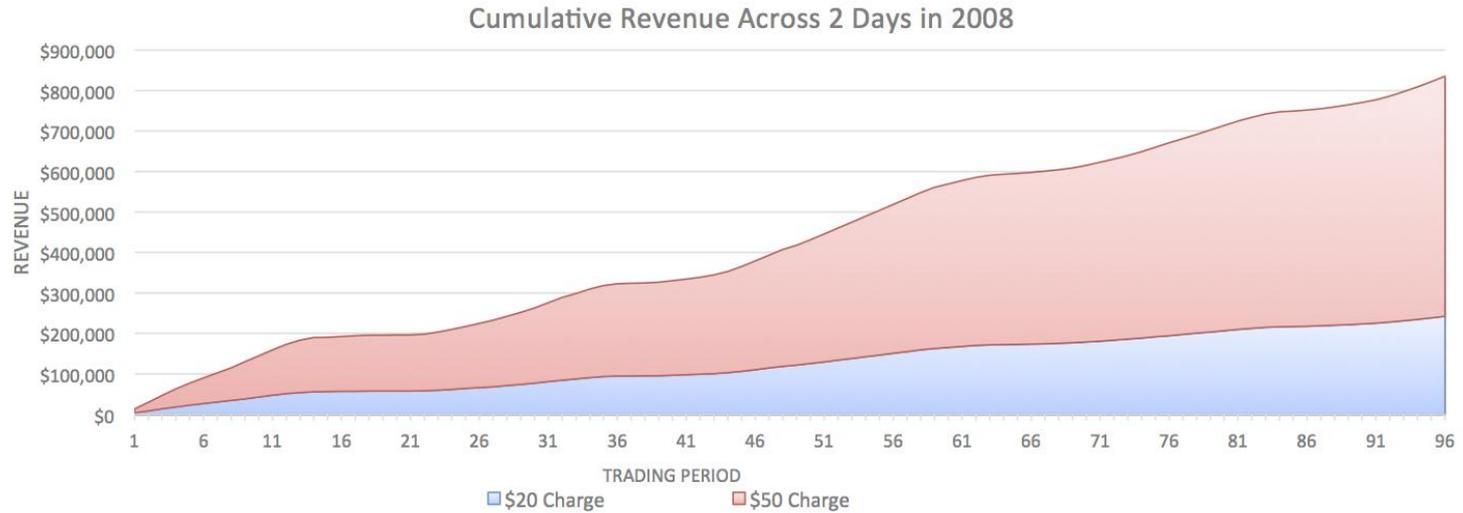


❖ In 2008 the price effects of the tariff are small



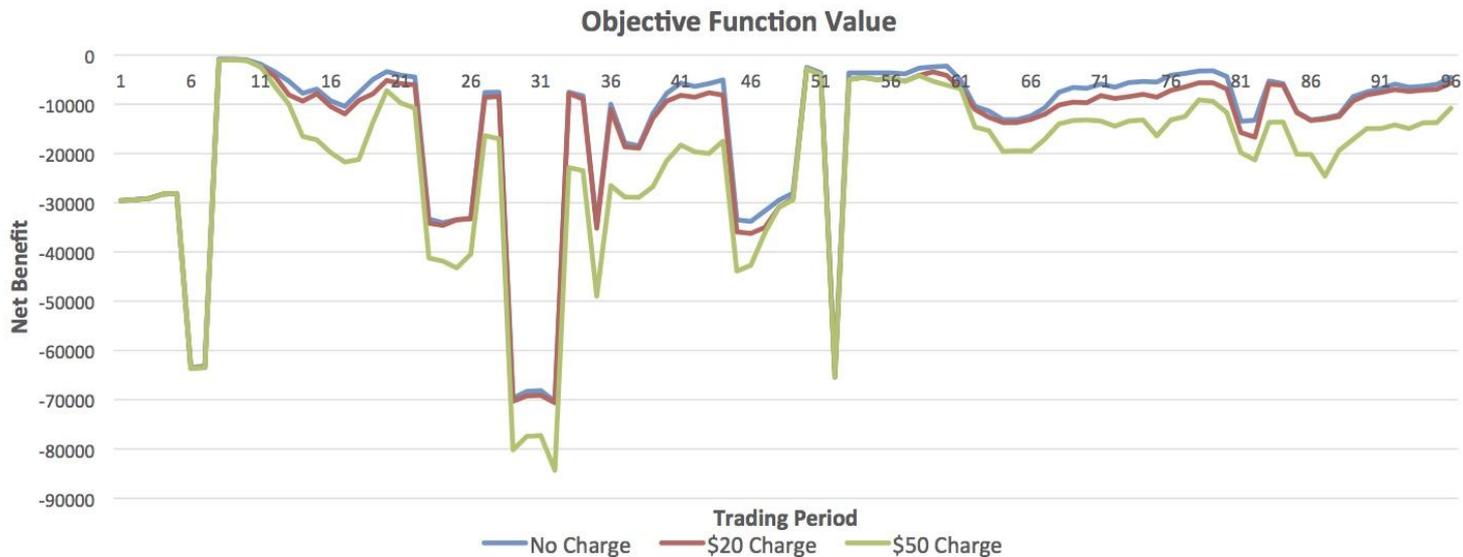


❖ With restricted dispatch, revenue generation for the line isn't an issue in 2008





❖ In the wet year, 2009, the tariff negatively impacts efficiency

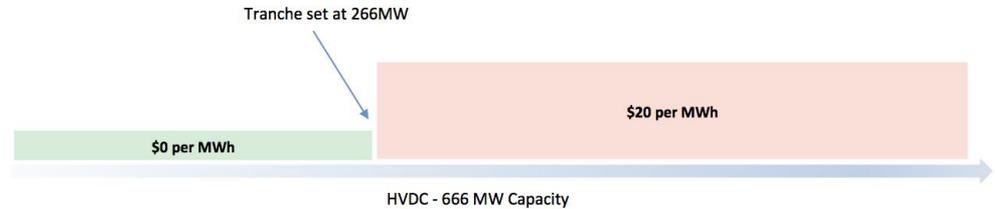


vSPD

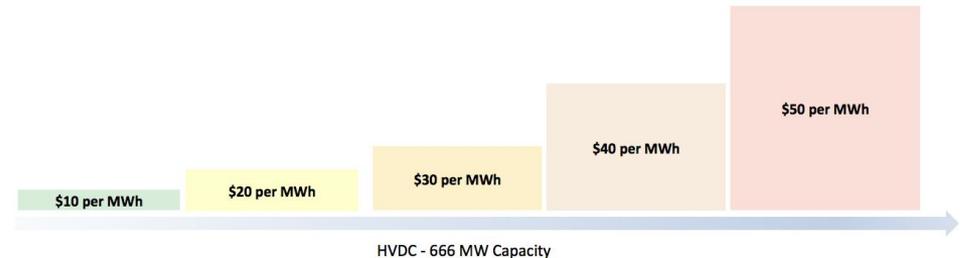
- ❖ How do we fix this?
 - Introduce a tranching tariff model to be used during wet years

❖ Two models:

➤ Two Tranche Model

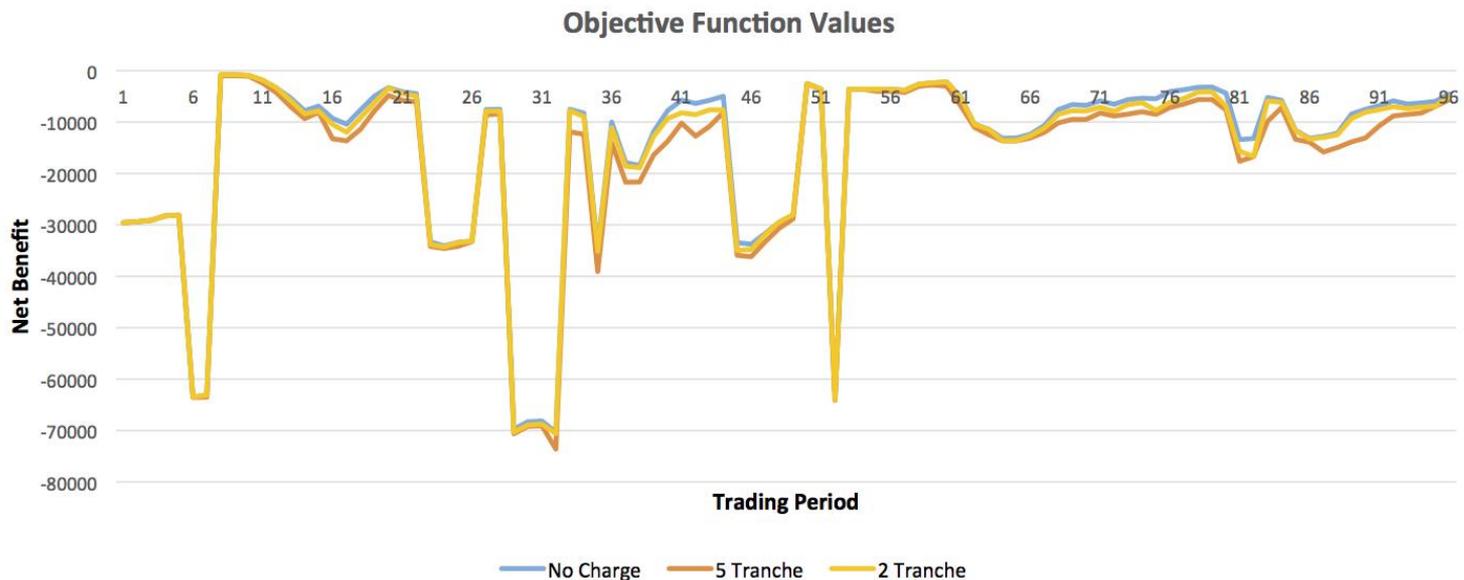


➤ Five Tranche Model



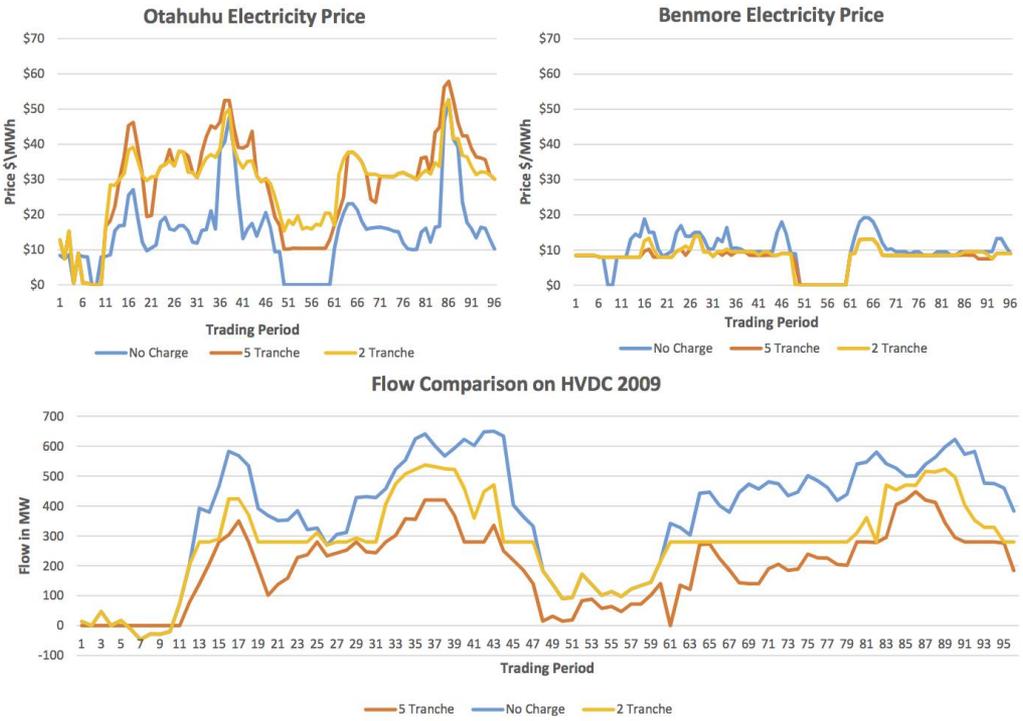


- ❖ With the tranching model, there is an improvement in efficiency loss as shown below



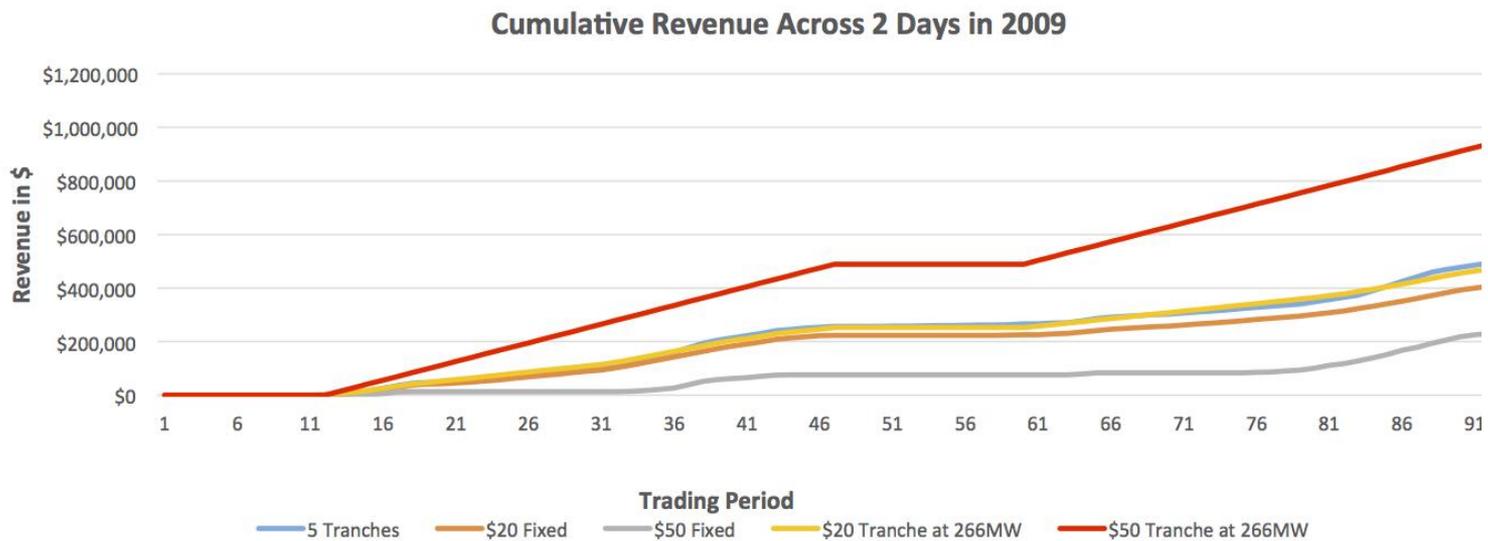


❖ The tranching model also has lesser price impacts than the fixed tariff model





❖ The tranching models also generate sufficient revenue in the wet years





vSPD Conclusion

- ❖ In the dry year, the tariff has very little impact on efficiency in the short-term
- ❖ In the wet year, a fixed tariff isn't suitable and a tranching model should be used
- ❖ It would make sense for the system operator to adapt the tariff model to suit conditions within years



DOASA

- ❖ DOASA is an implementation of the SDDP algorithm for thermo-hydro scheduling in New Zealand
- ❖ Introduced a fixed tariff on the line connecting Benmore and Haywards
- ❖ Investigate in a perfectly competitive market, how the tariff affects water values and efficiency



- ❖ DOASA shows no significant loss of efficiency measured in thermal burn for 2007, 2008 and 2009

- ❖ Investigated water value in a simplified Stochastic Dynamic Programme

- ❖ Simplified SDP shows different water value surface
 - When lakes are at reasonable levels, water values are lower reflecting lower future value
 - Ensures similar dispatch, however wealth transfers result



DOASA and SDP Conclusion

- ❖ In a perfectly competitive market the tariff doesn't induce any long-term inefficiencies
- ❖ Simple SDP characterises how the water value adapts with the tariff
- ❖ By altering the water value surface, hydro offers recalibrate meaning water is used in a similar way



Discussion and Questions