Modeling the Diversification Benefit of Transmission Investments in the Presence of Uncorrelated Generation Sources

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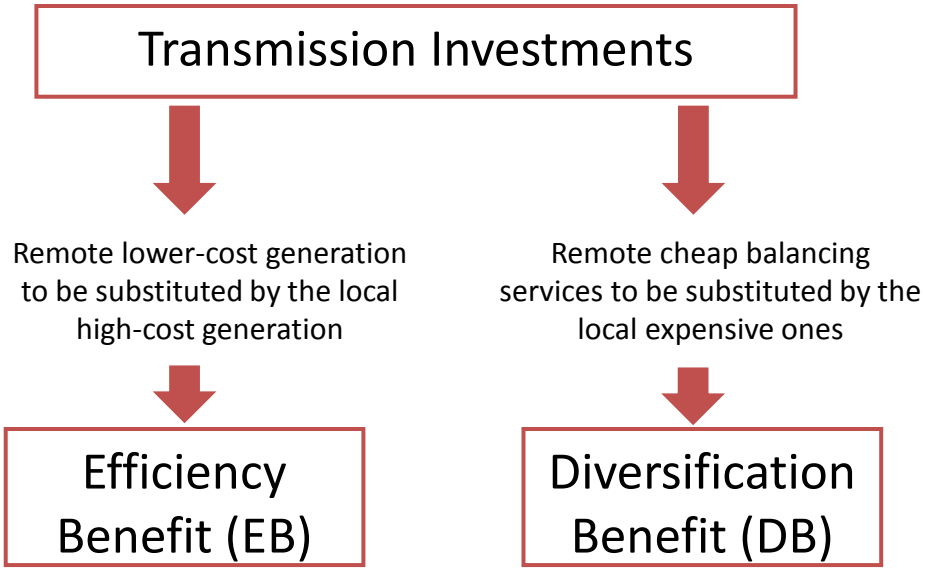
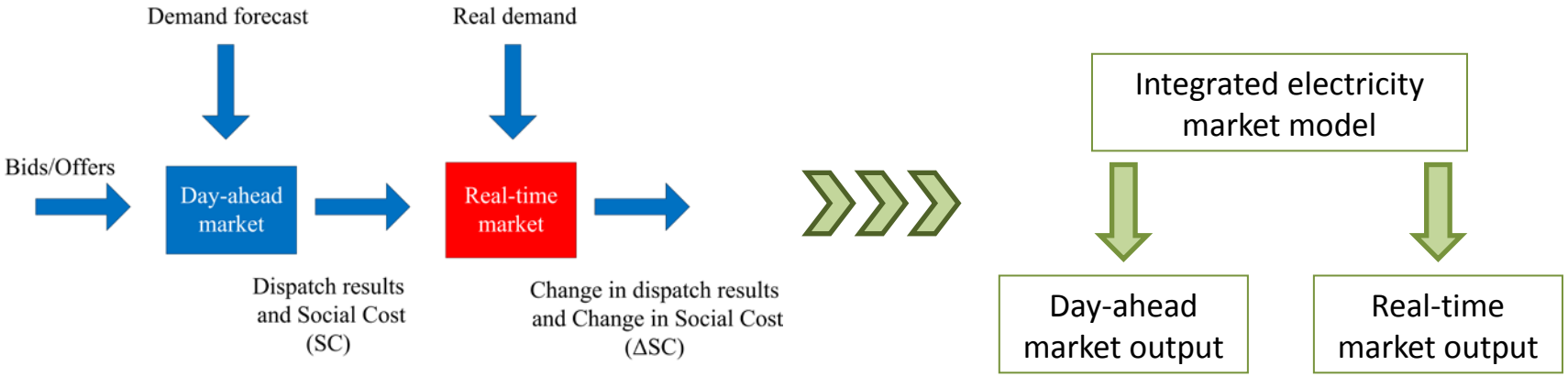
Problem Definition

Increased share of wind power brings fluctuating generation → Demand and cost of procuring balancing services increases → One of the major challenges for the electricity market



- ***Conventional transmission planning*** processes only focuses on ***efficiency benefit***.
- The ***purpose*** of this ***master project*** is to show that ***transmission planning*** processes which ***considers*** the ***diversification benefit***, can help to **reduce** the **cost** associated with **balancing services.**

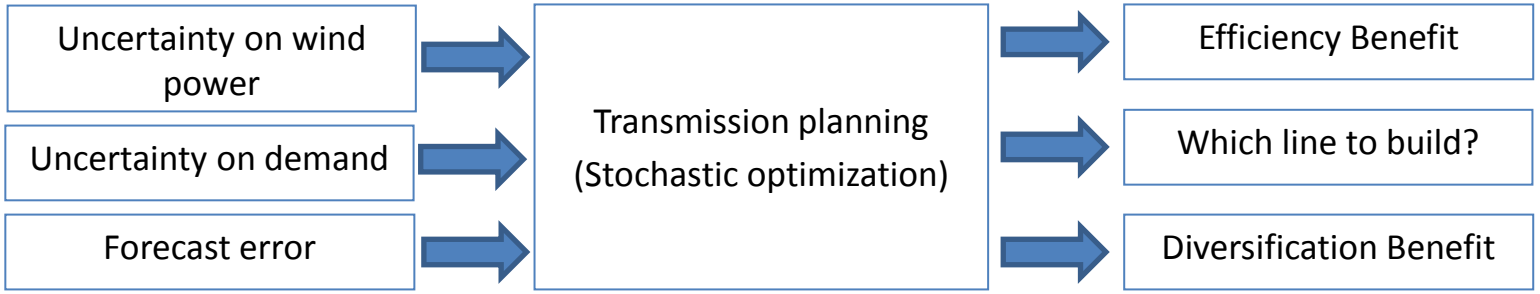
Methodology



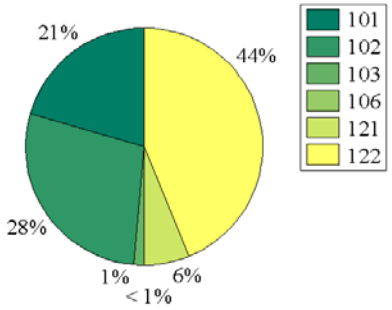
Two-step economic dispatch of the **day-ahead market** and **real-time market** is formulated as **one-shot *linear programming* problem**

Using integrated electricity market ***model***, a ***transmission planning formulation*** is proposed.

Uncertainties in the system are modeled using ***scenarios***

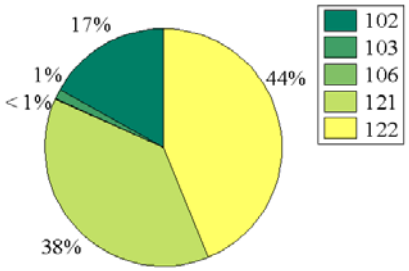


Contribution



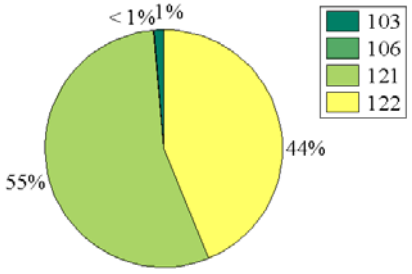
Status que

(A)



Conventional

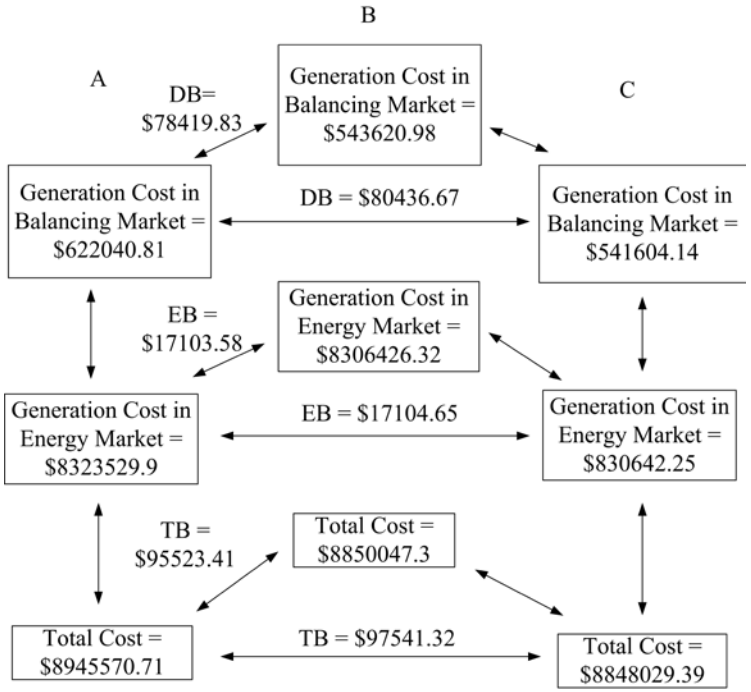
(B)



Proposed

(C)

Balancing services are provided by *lower-cost generator* (121) the most in the *proposed methodology*.



Proposed methodology can ***reduce cost*** of ***wind generation*** to ***society*** (by reducing the balancing cost)

Out of this master thesis two academic papers have been extracted.

- The first one is submitted to POWERTECH conference in France
- The second one is currently under review in the IEEE Transactions on Power Systems.