

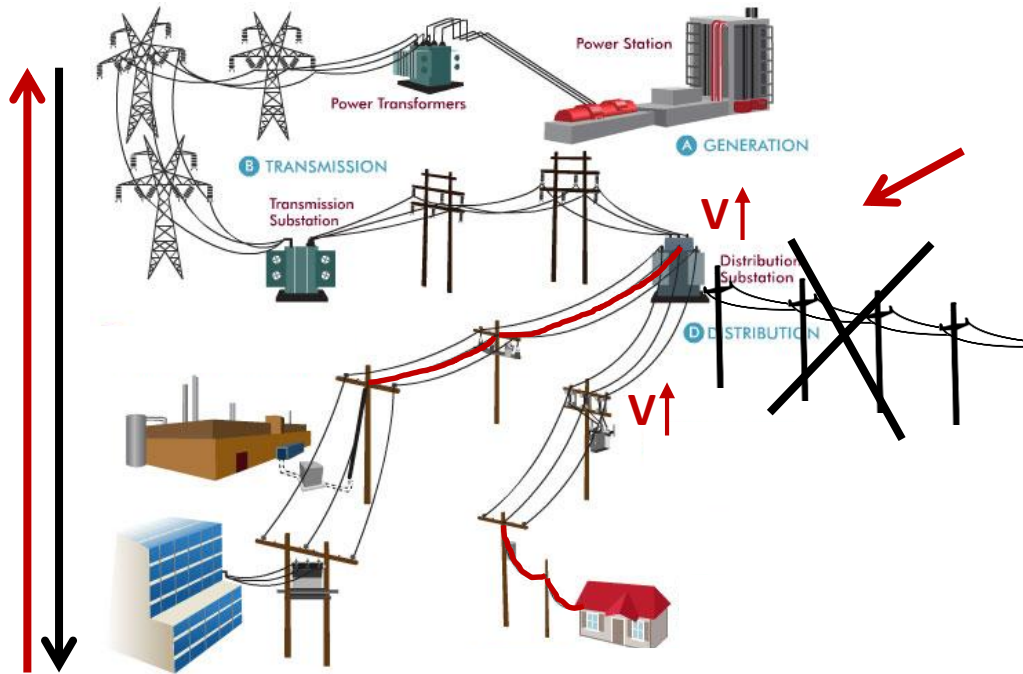
# **Evaluation of new voltage operating strategies for integration of distributed generation into distribution network**

**Milana Plecas<sup>1</sup>, Simon Gill<sup>1</sup>, Ivana Kockar<sup>1</sup>, Ross Anderson<sup>2</sup>**

**<sup>1</sup>University of Strathclyde; <sup>2</sup>SP Energy Networks**

- Possible strategies for operating voltage constrained 11kV feeder
  - The effect of raising the voltage limit
  - The effect of increasing demand
  - The effect of non-firm connection agreement

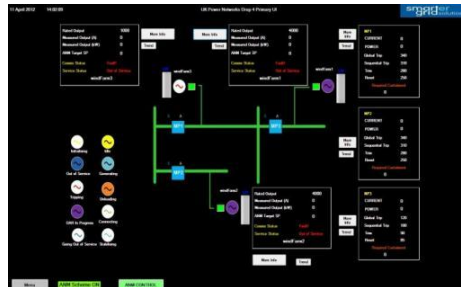
# Transforming power systems



Network Management Issues

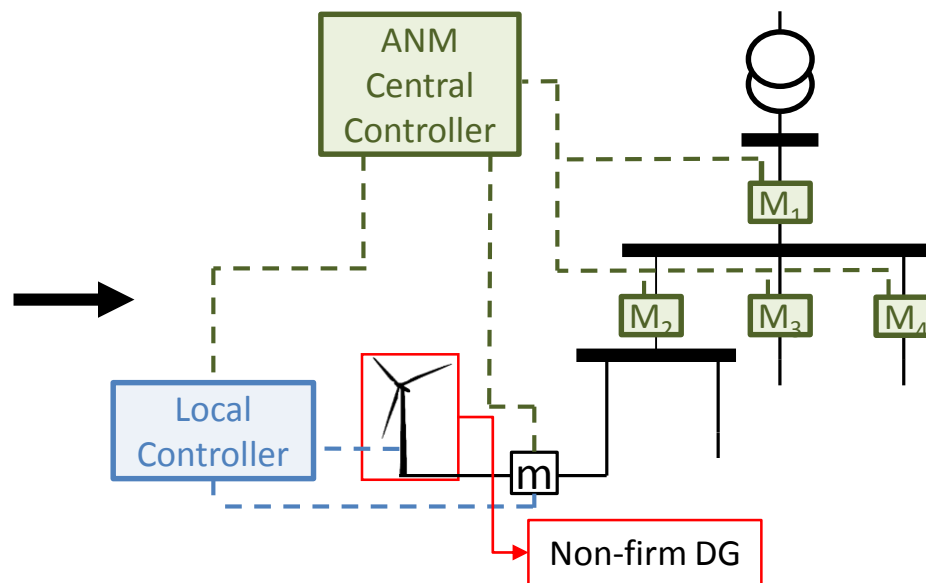
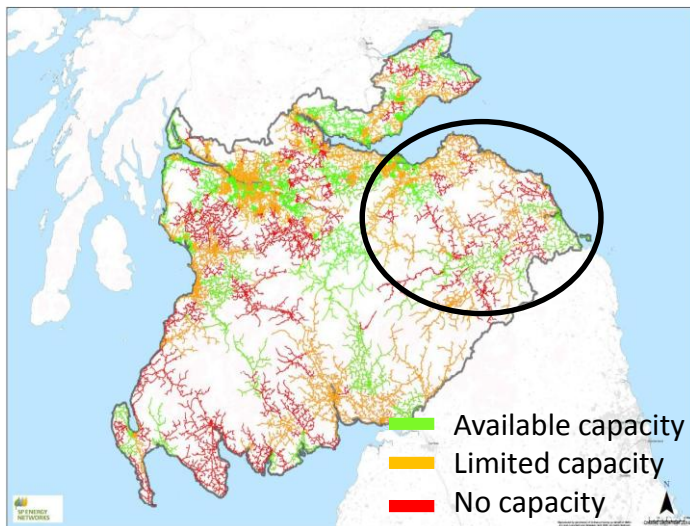


Active Network Management

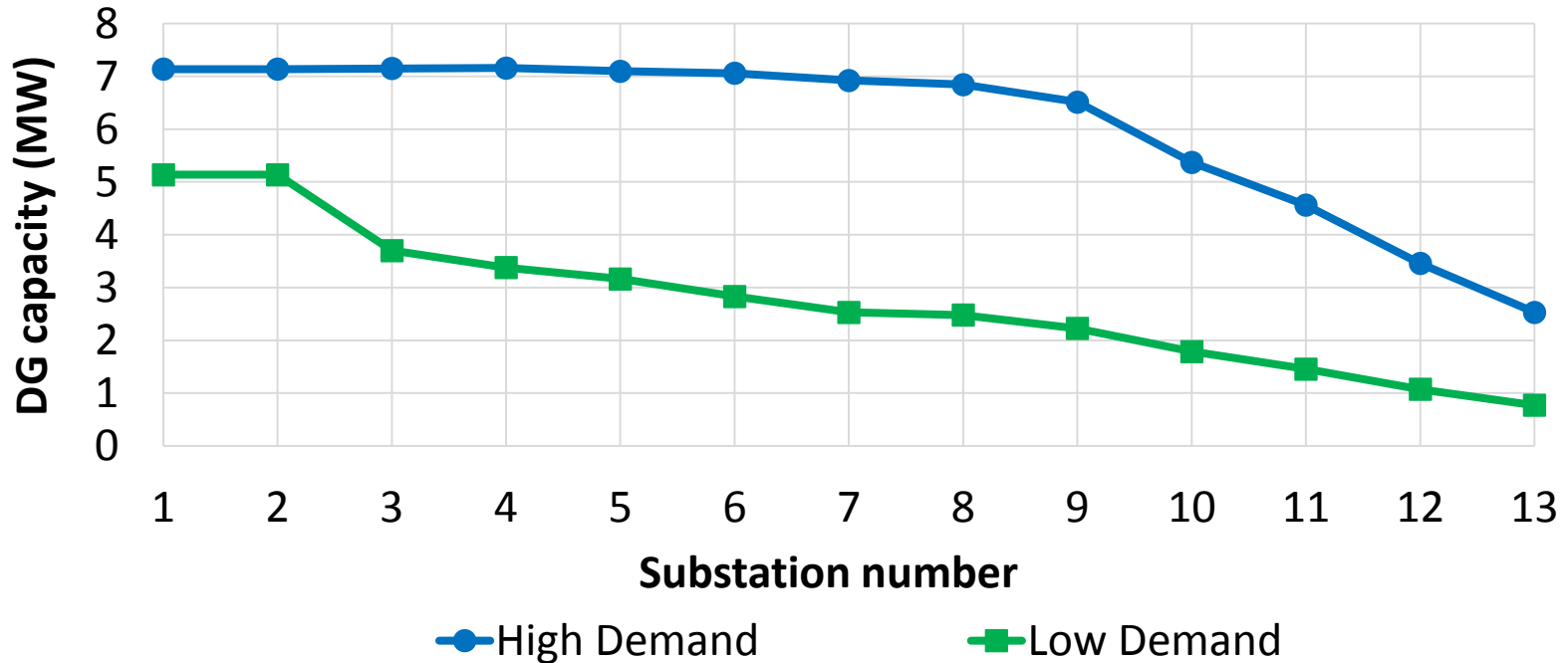
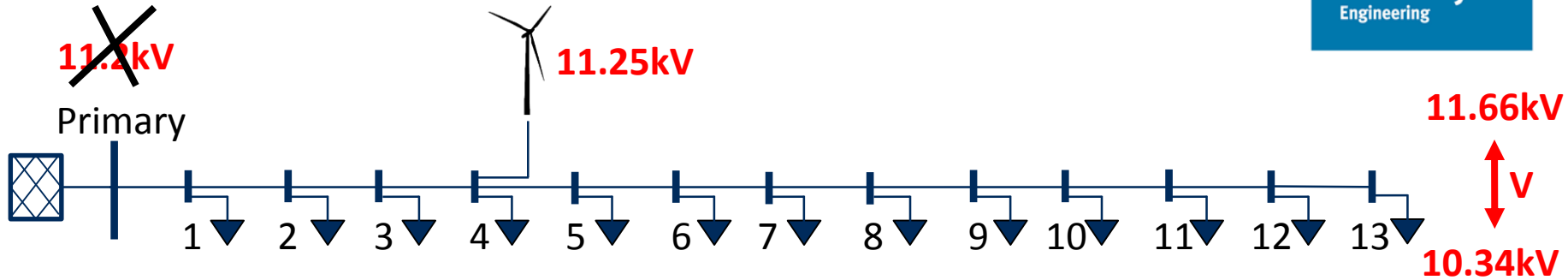


# Accelerating Renewable Connections (ARC)

- Objective
  - Facilitate improved network access to the distribution network to connect renewable generation
- Project partners



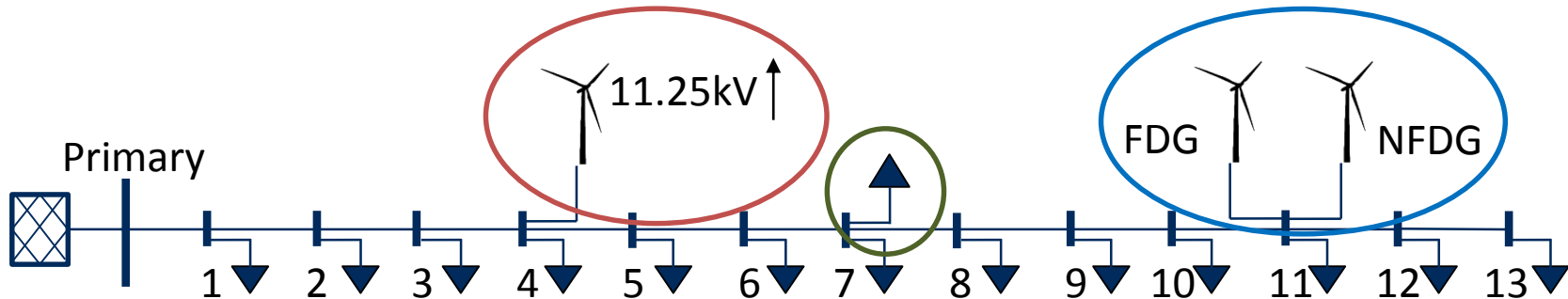
# Existing operating principles for 11kV network



# Possible strategies for operating voltage constrained 11kV feeder

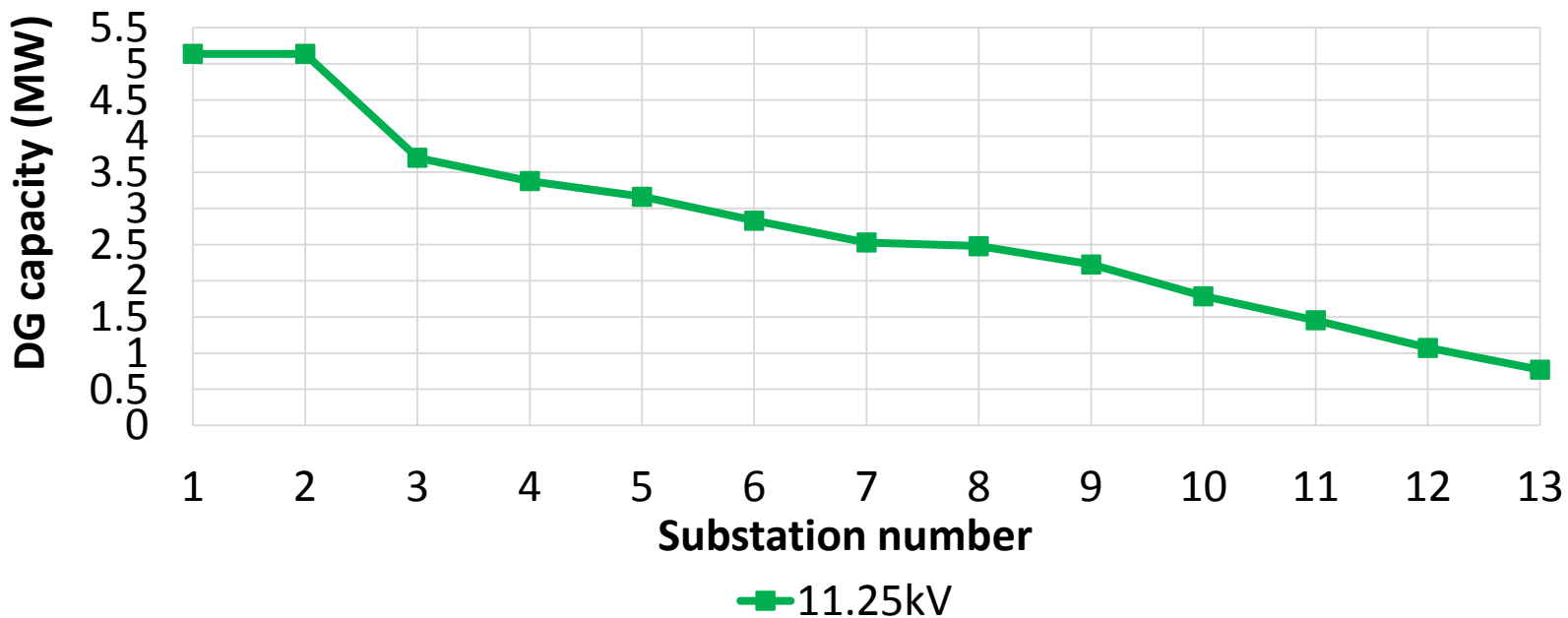
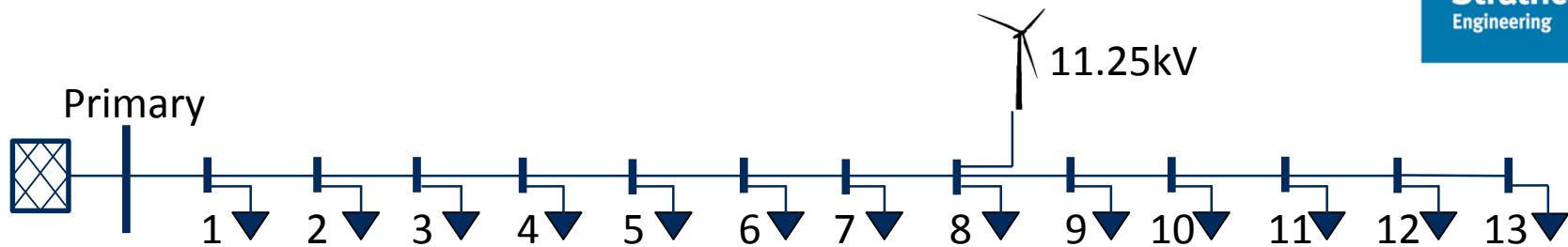
How does the raising the point-of-connection voltage limit affect the capacity for DG?

How much additional non-firm DG capacity can be connected when using non-firm agreements?

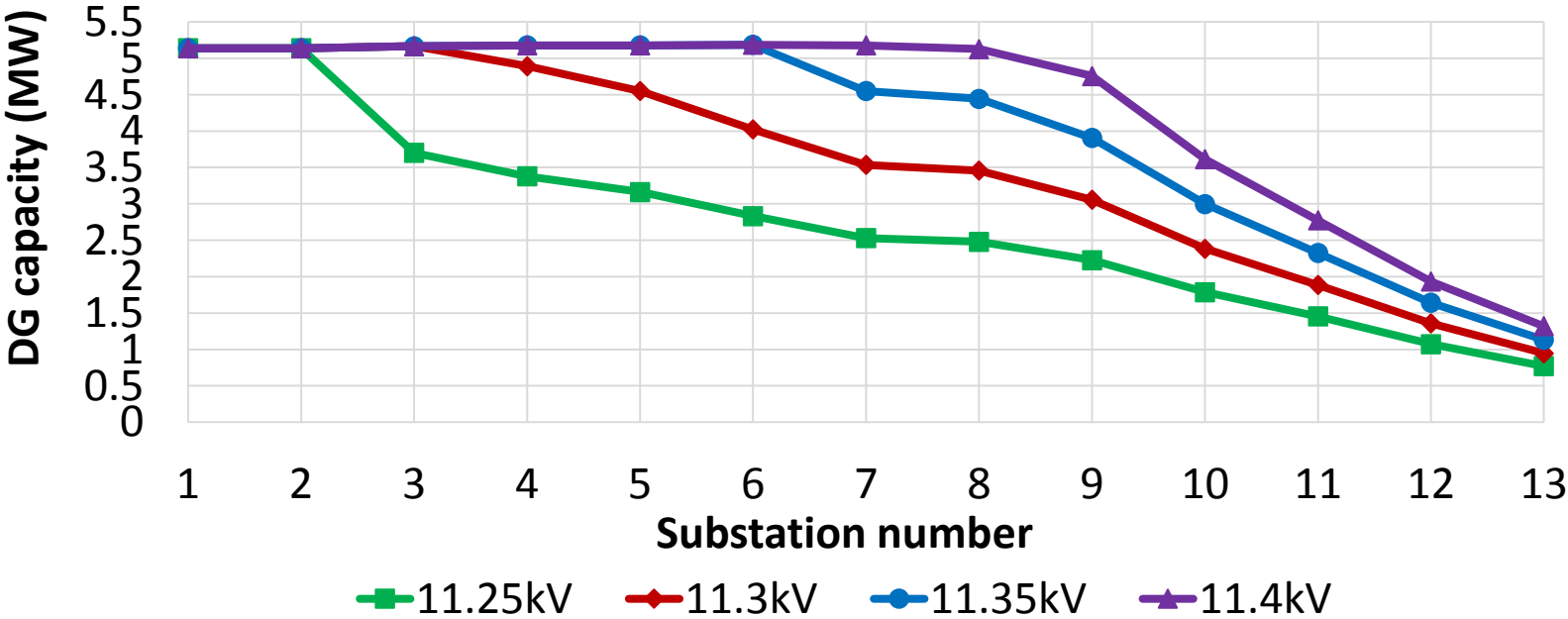
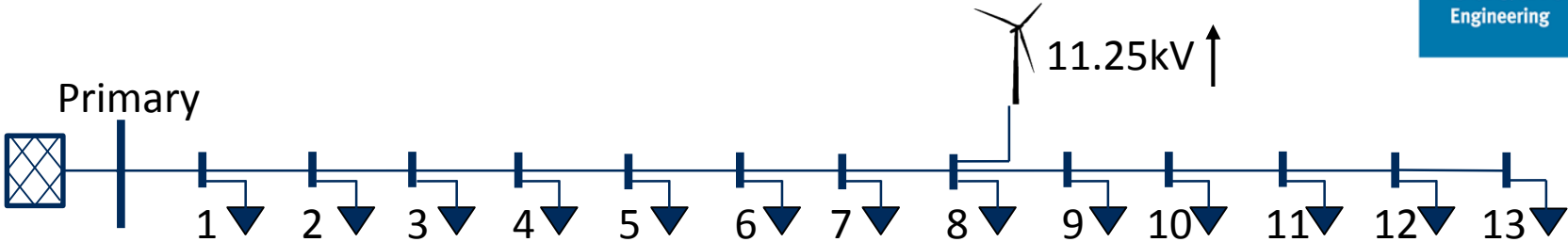


How does the additional demand at one substations affect DG capacity at other substations?

# The effect of raising the voltage limit



# The effect of raising the voltage limit

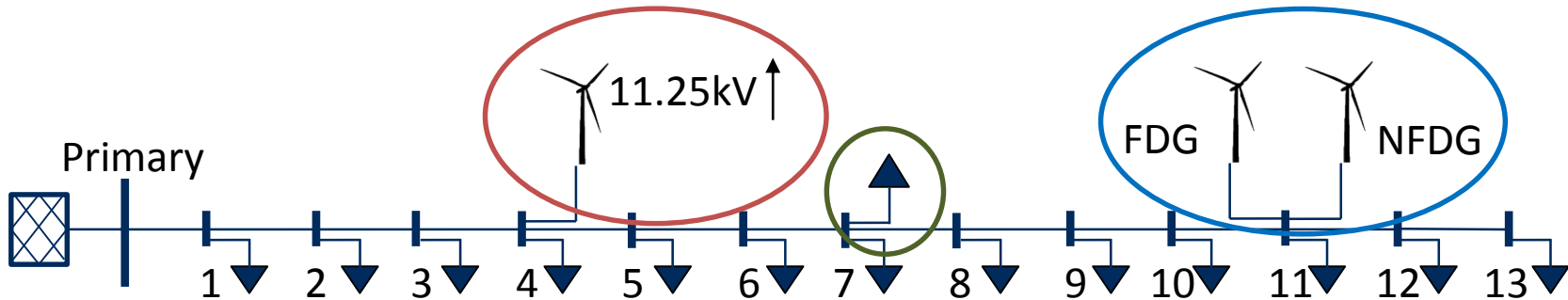




# Possible strategies for operating voltage constrained 11kV feeder

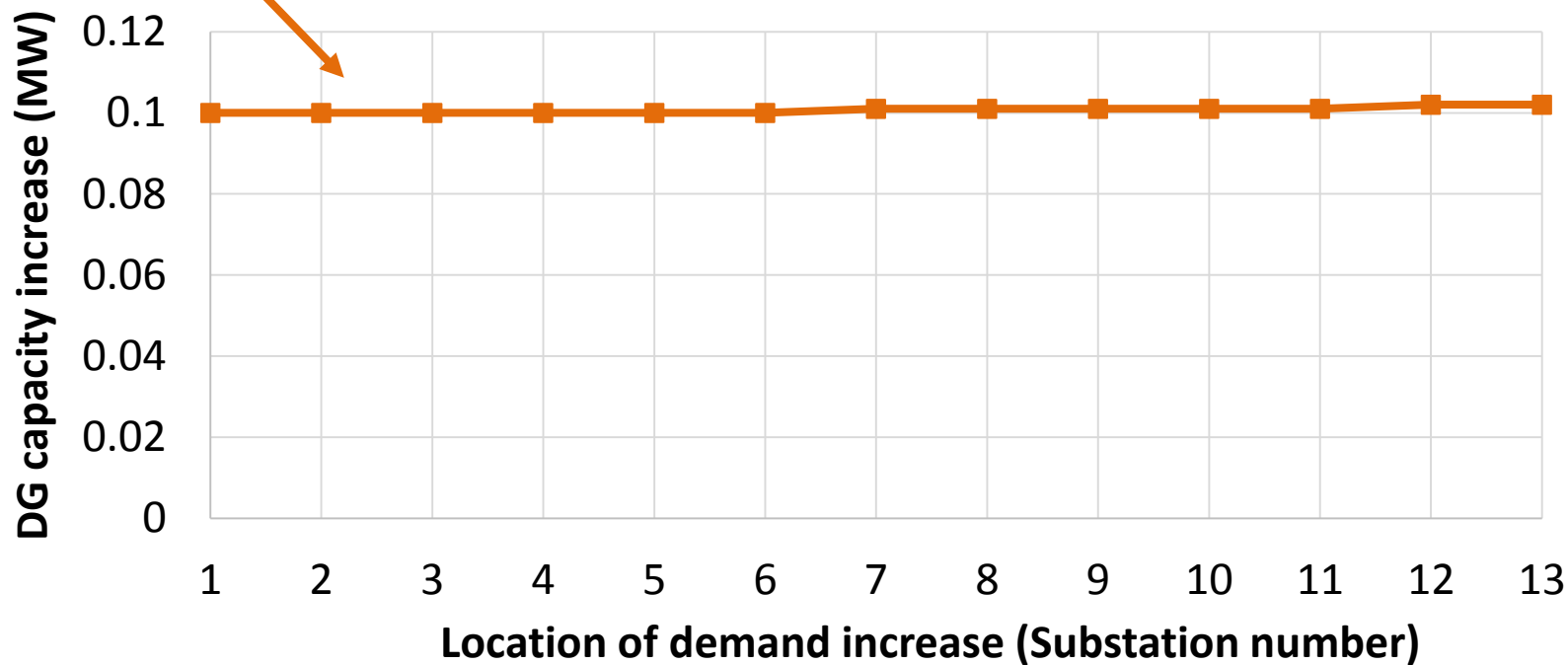
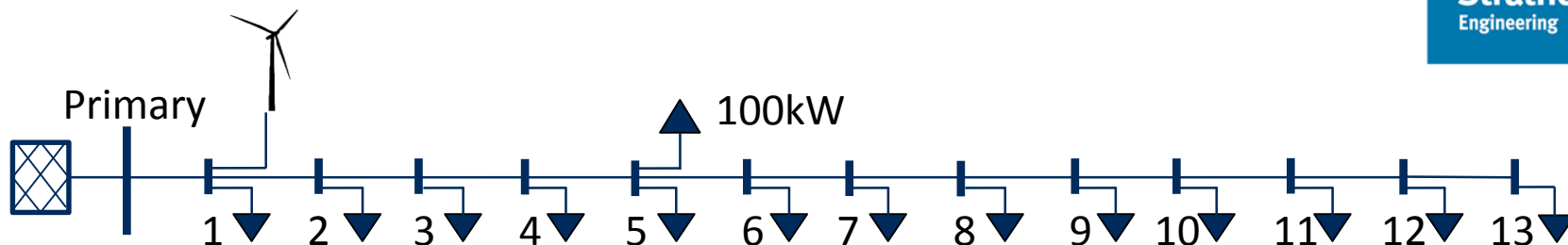
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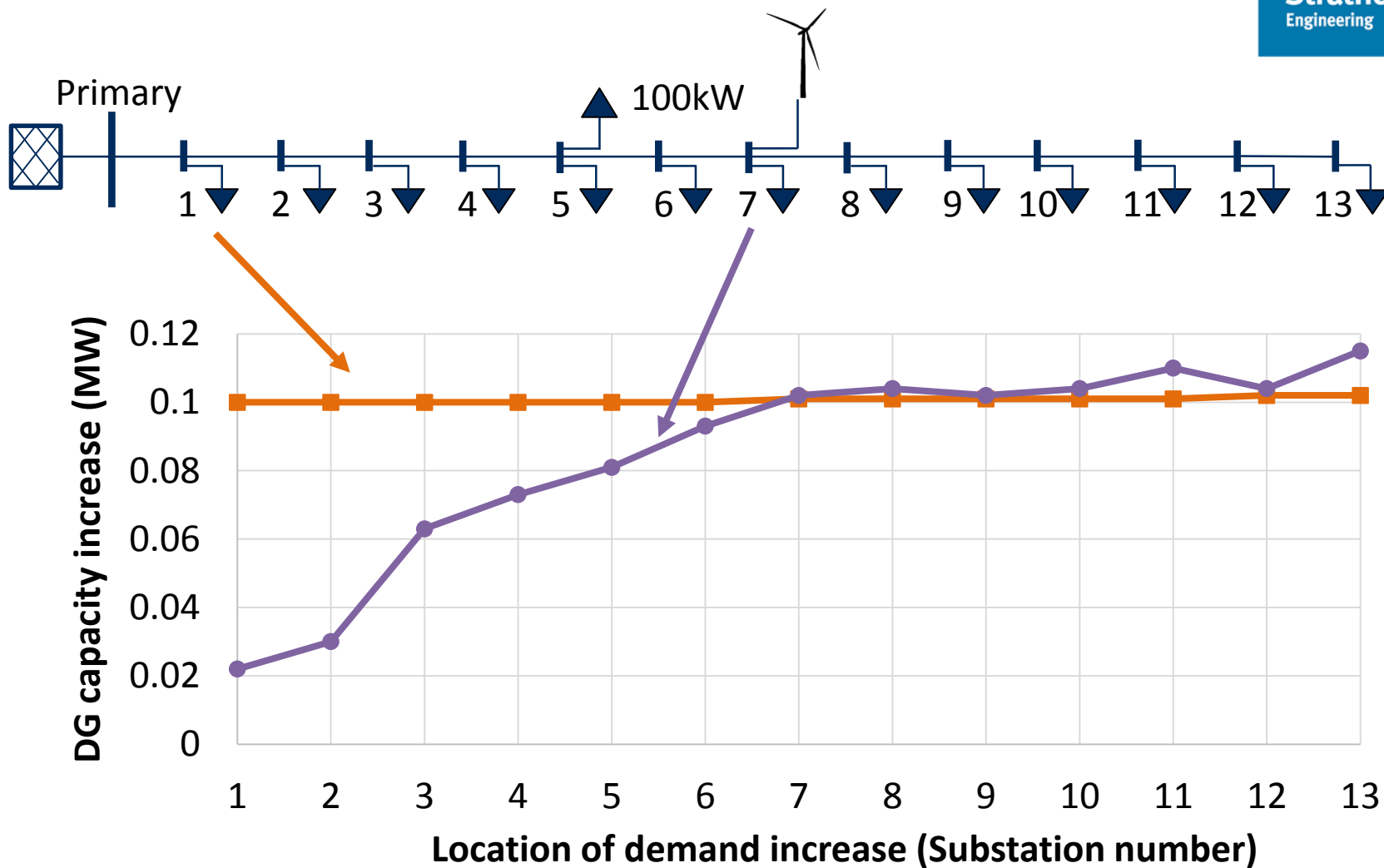


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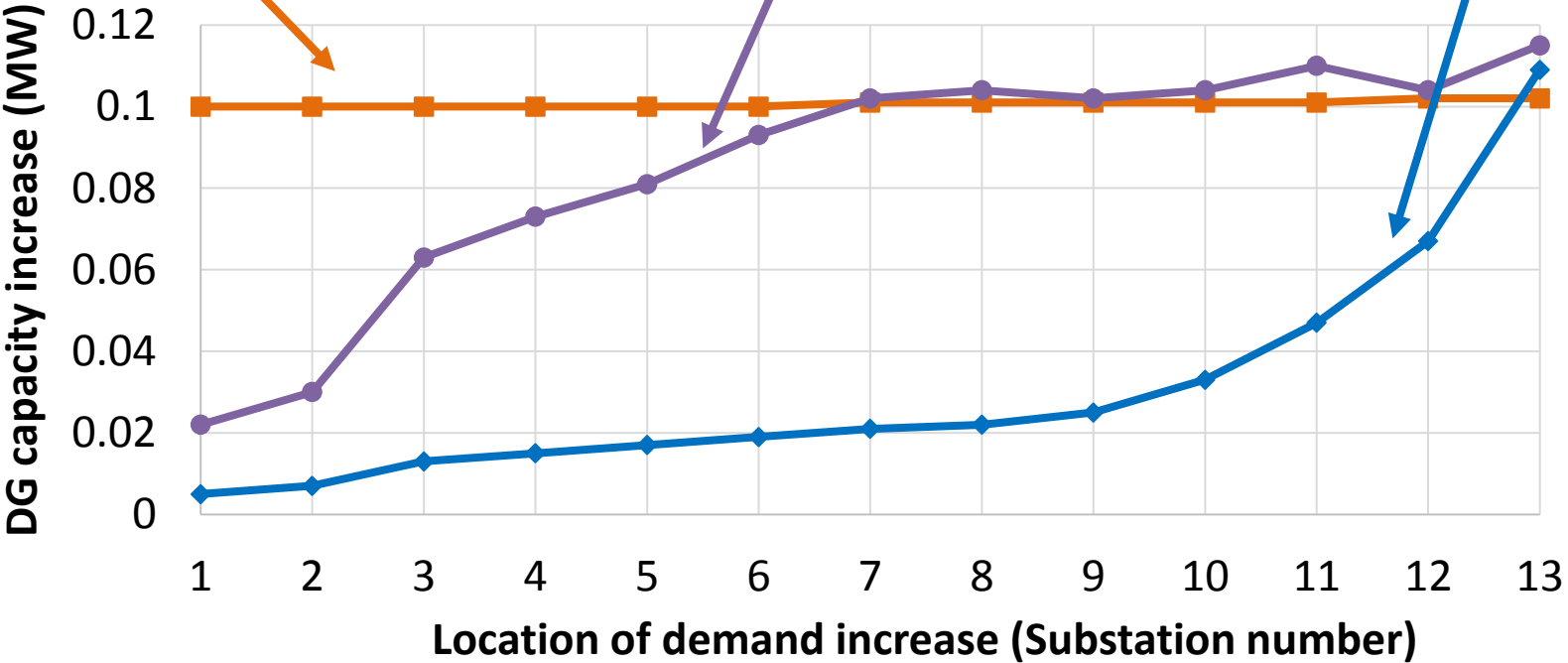
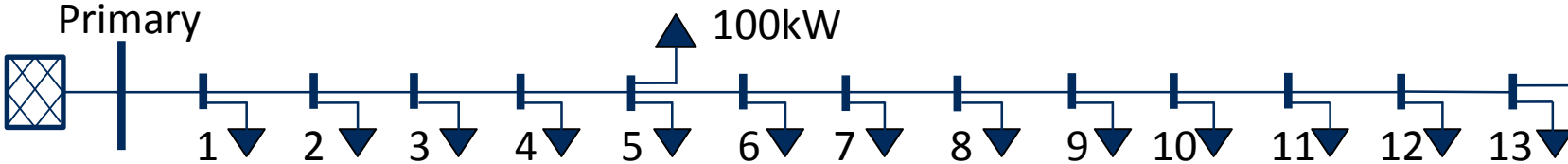
# The effect of increasing demand



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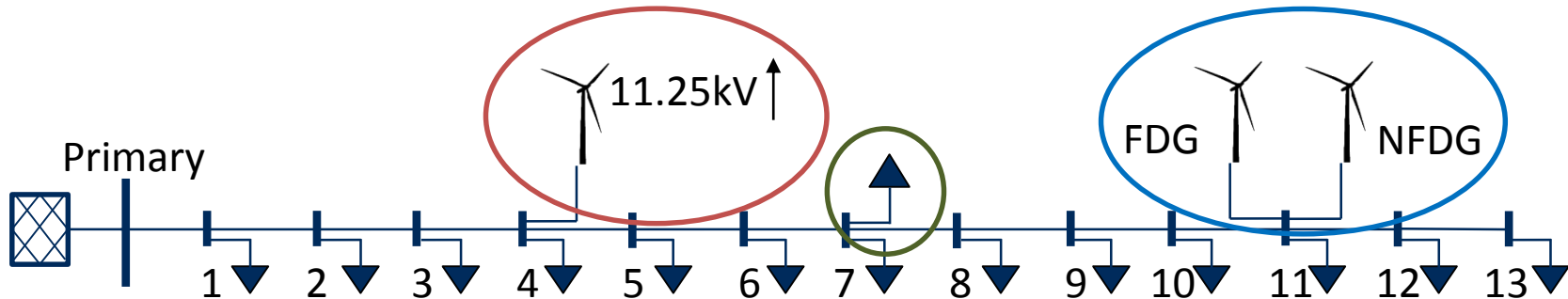
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# Possible strategies for operating voltage constrained 11kV feeder

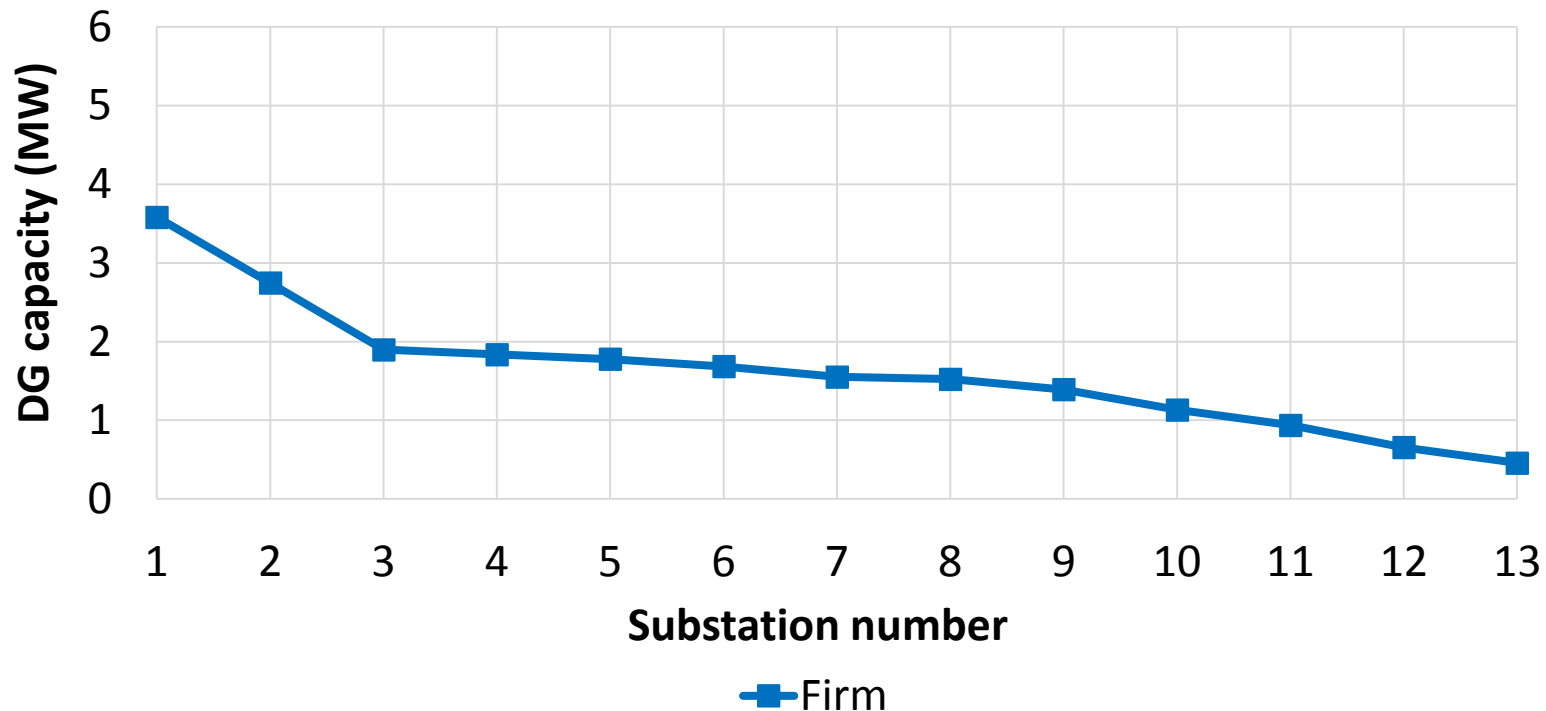
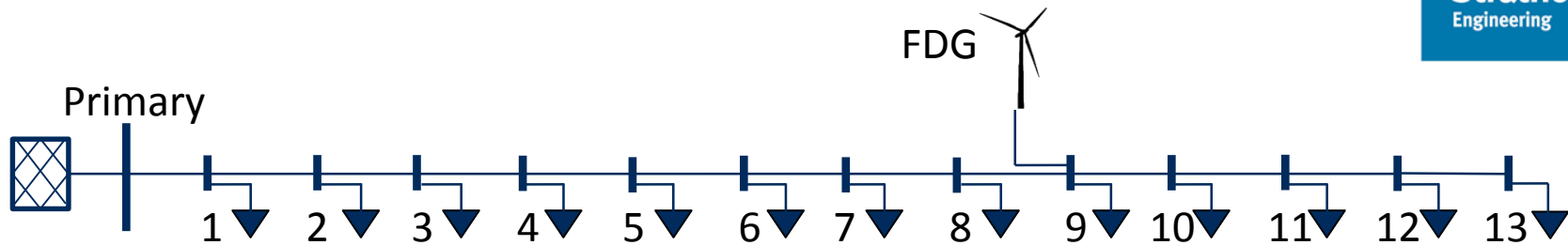
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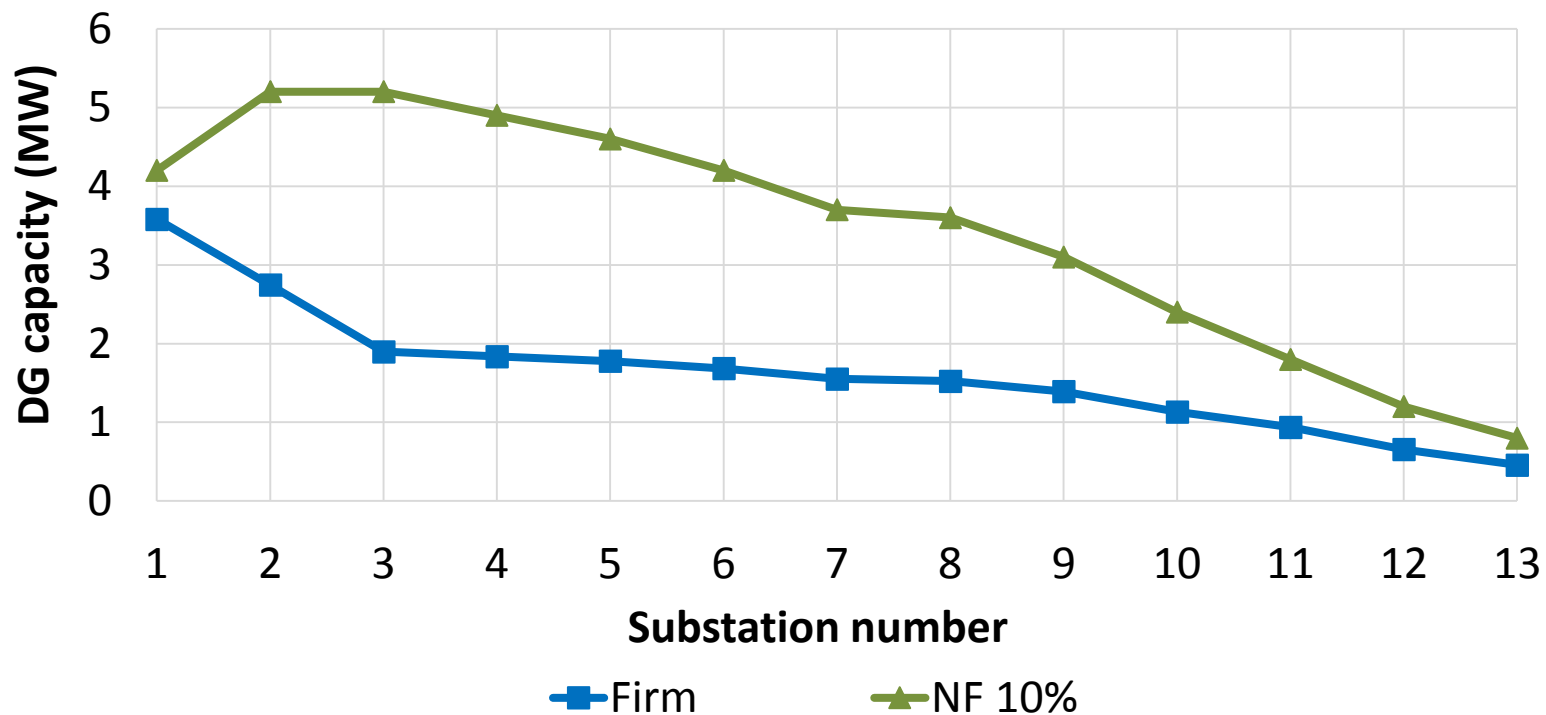
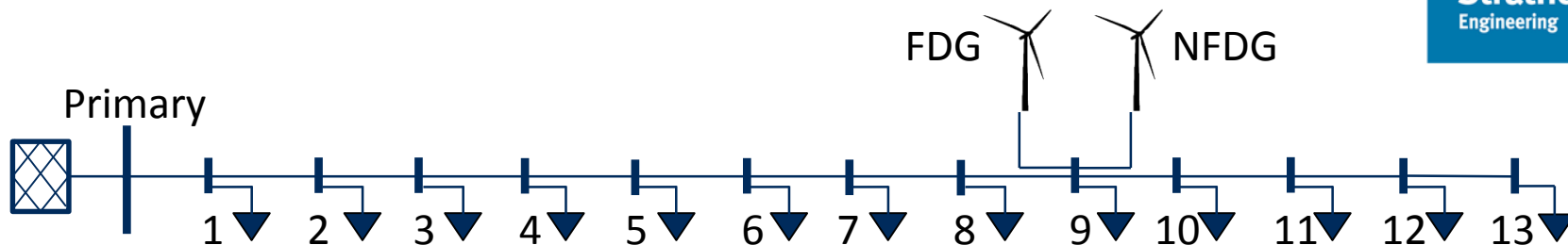


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# The effect of non-firm connection agreement



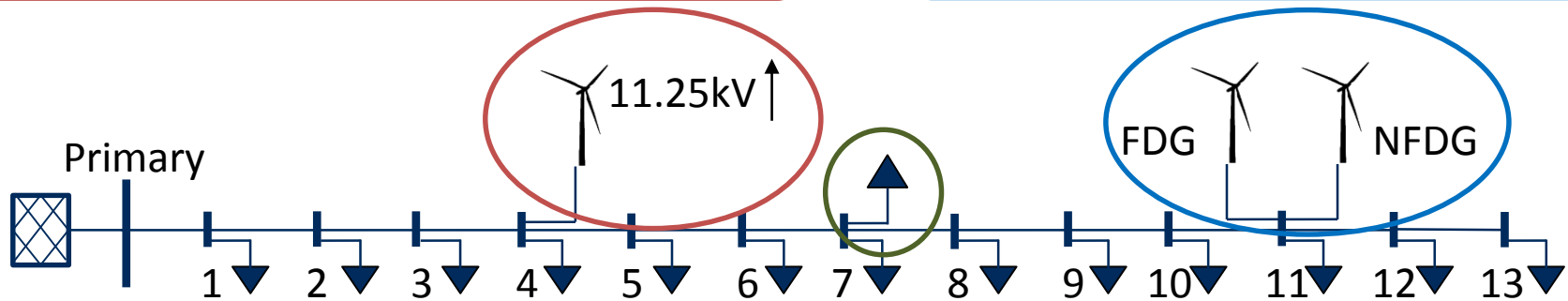
# The effect of non-firm connection agreement



# Conclusions

Greater capacity at any substation that is voltage constrained.

Increase in the capacity in the middle regions of the feeder.



Additional capacity if demand is connected either at the same location or further away from the primary.



**Thank you for listening!**



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