IFC International Finance Corporation World Bank Group

GSMA Green Power for Mobile

In partnership with Netherlands

Green Telecoms and Feasibility: A design approach

Green Power for Mobile Working Group - Africa

Dar es Salaam, 12-13 Aug 2014

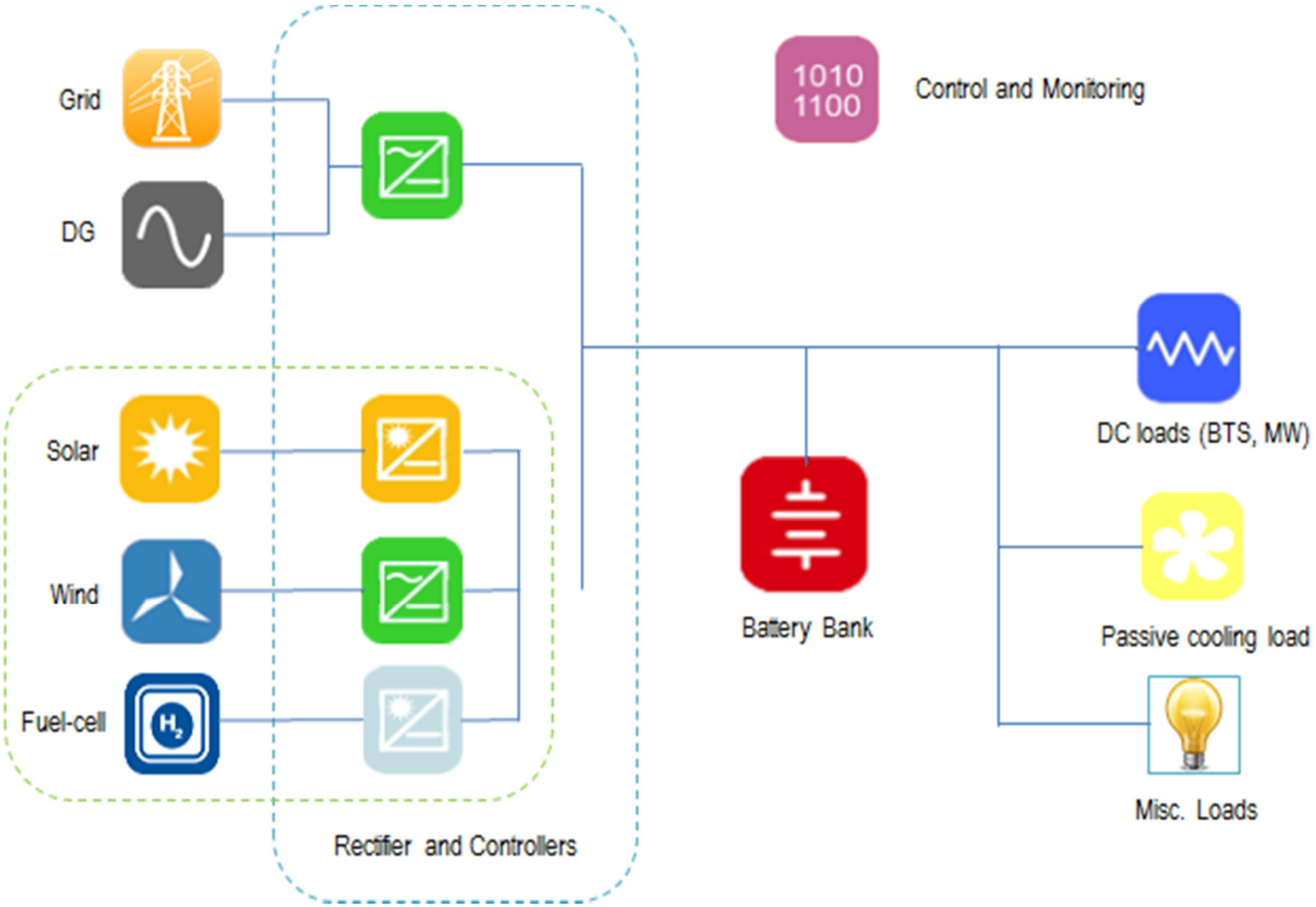
Objective

- ✓ Providing the right design approach, insights and comparison
  - Identifying the right design approach
  - Design parameters and analyse scenarios related to green power feasibility
  - Impact on green power feasibility – both technical and commercial
  - Comparative analysis of various green technology choices



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A typical Telecom Power System and Components



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Context

- Why consider green power for telecoms?
- What are the challenges for powering telecom sites?
- What is the motivation for green power for telecoms?
- Why green power will solve the problems of powering telecoms?

- What is green power?
- Is it only Solar? What other green power alternatives?
- Is energy efficiency also a green power?

- How to go about green power?
- What is the strategy – invest or outsource?
- What are the benefits – financial and operational?

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Green Power Feasibility – Approach and Scenarios

- What are the parameters that affect the feasibility of green power for telecoms?
- How to design and select an optimum alternative energy solution?
- How to analyze the technically and economic feasibility? How do I justify environmental benefits?

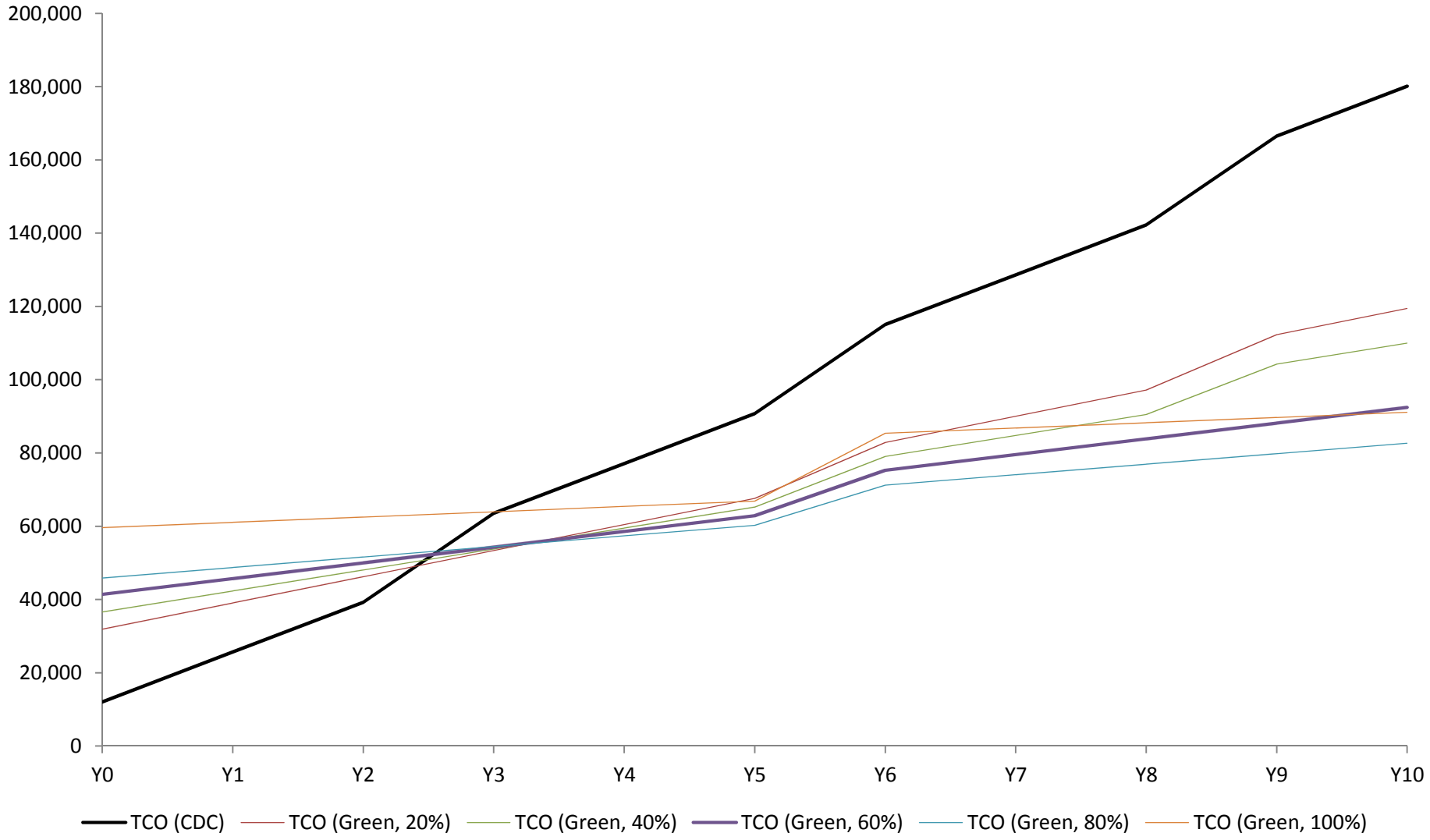
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Parameters to consider and analyse

- Design Parameters
  - Site Load
  - Renewable Resources
  - Energy contribution
  - DG loading and efficiency
  - Battery autonomy and Cycle life
- Commercial Parameters
  - CAPEX
  - Diesel price
  - Financial costs
- Deployment Parameters
  - Space availability
  - Roof top vs. green field

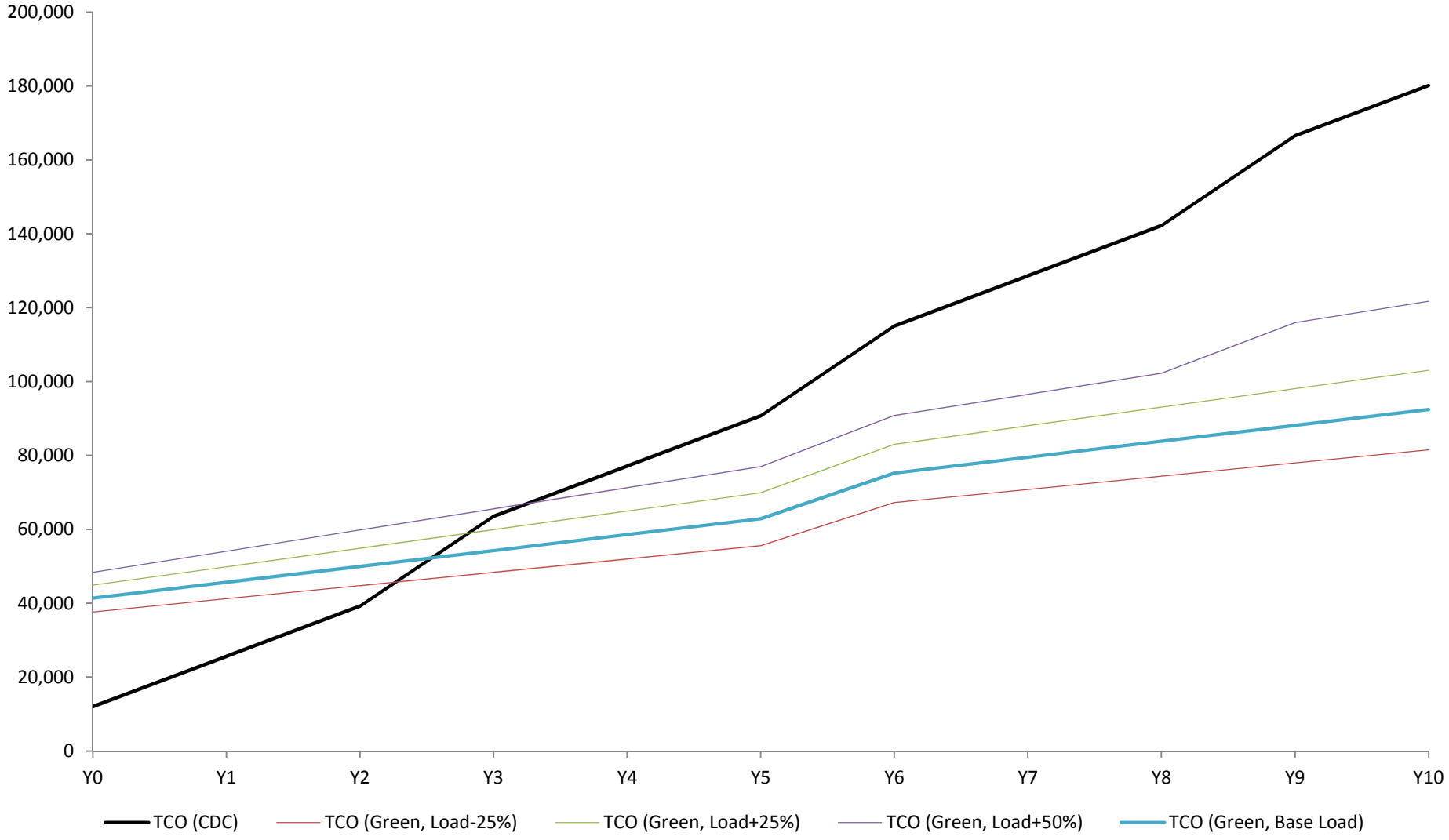
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Feasibility (CDC vs. Green): Varying Green Energy Contribution



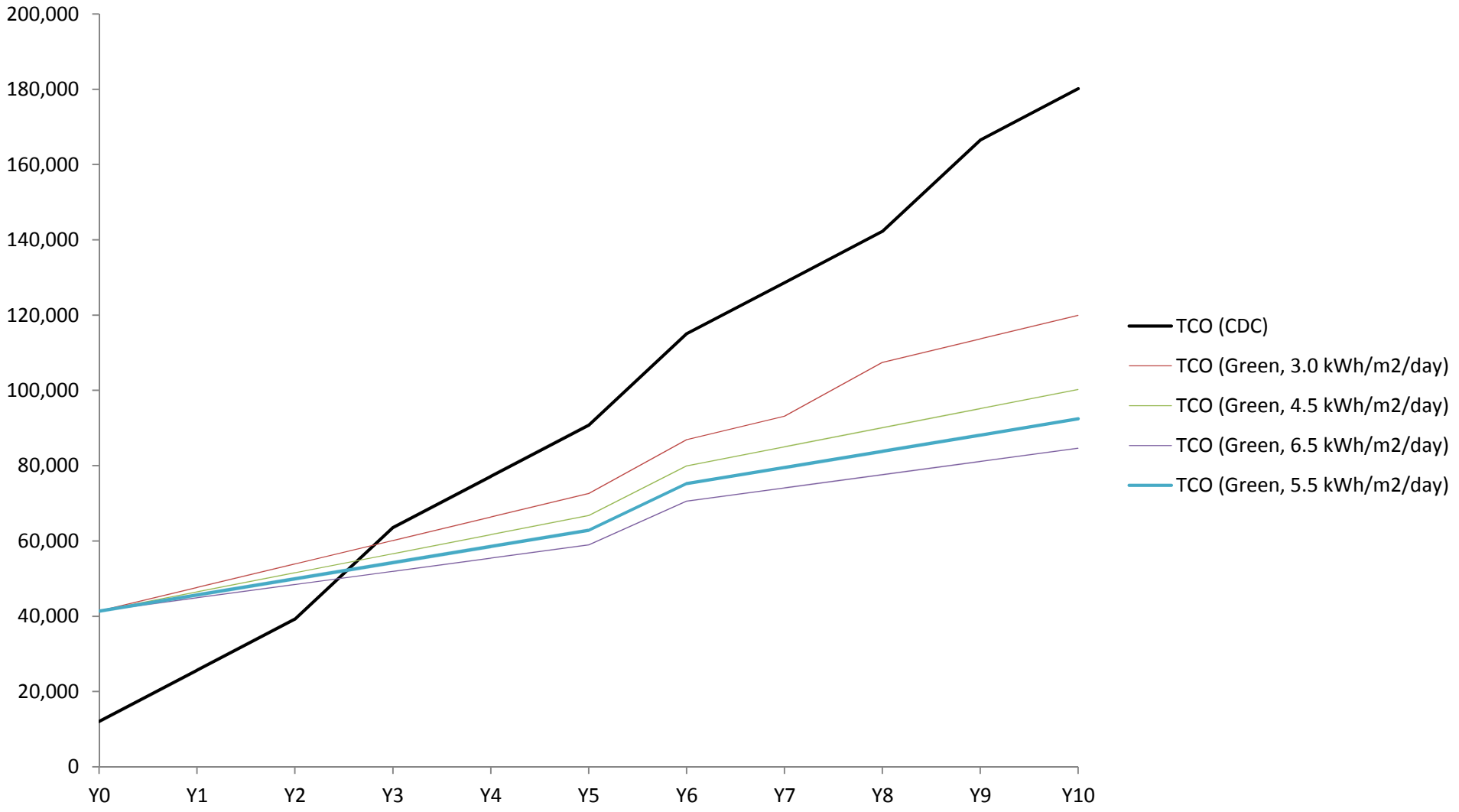
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Feasibility (CDC vs. Green): Change (+/-) in Site Load



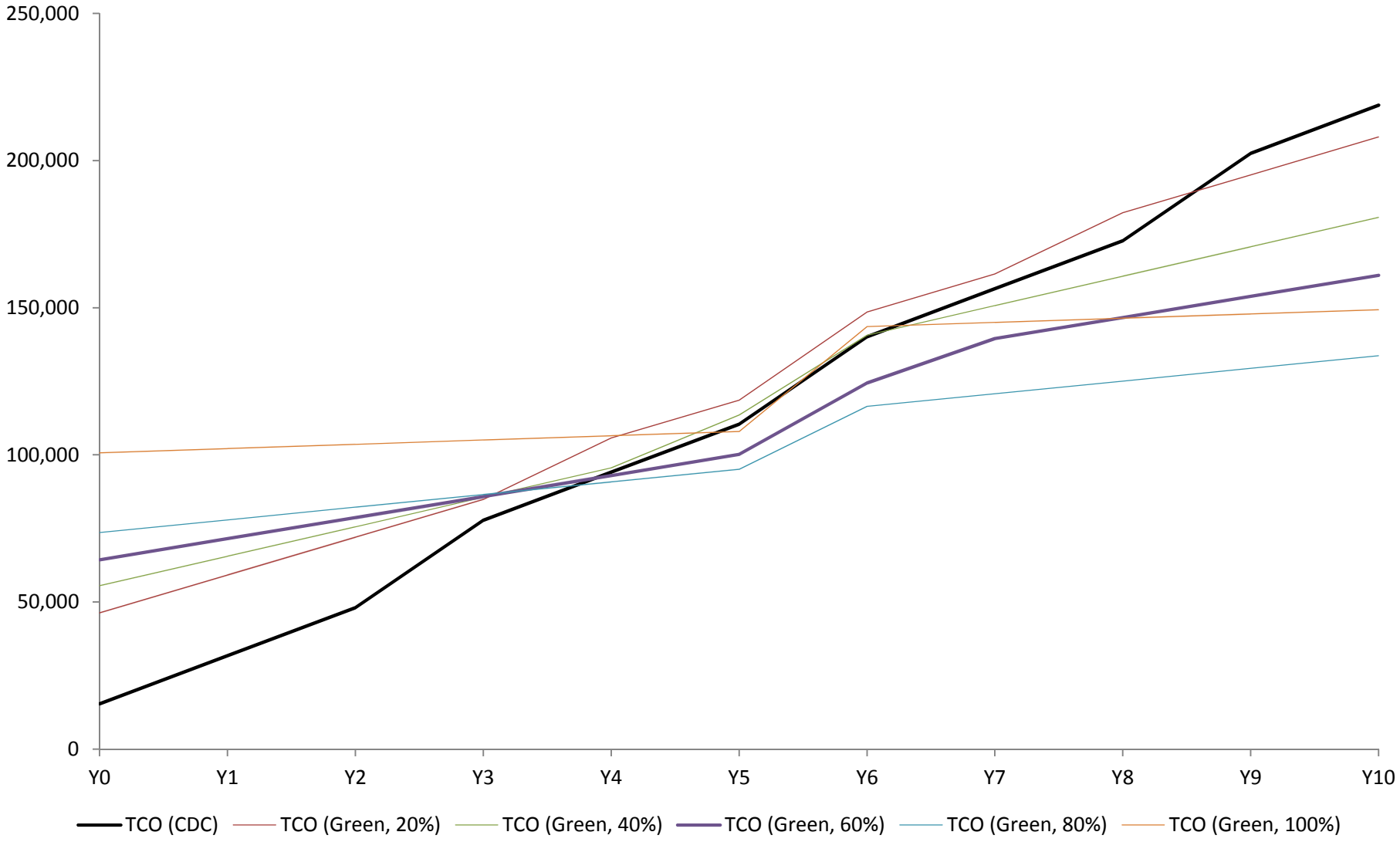
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Feasibility (CDC vs. Green): Varying solar radiation



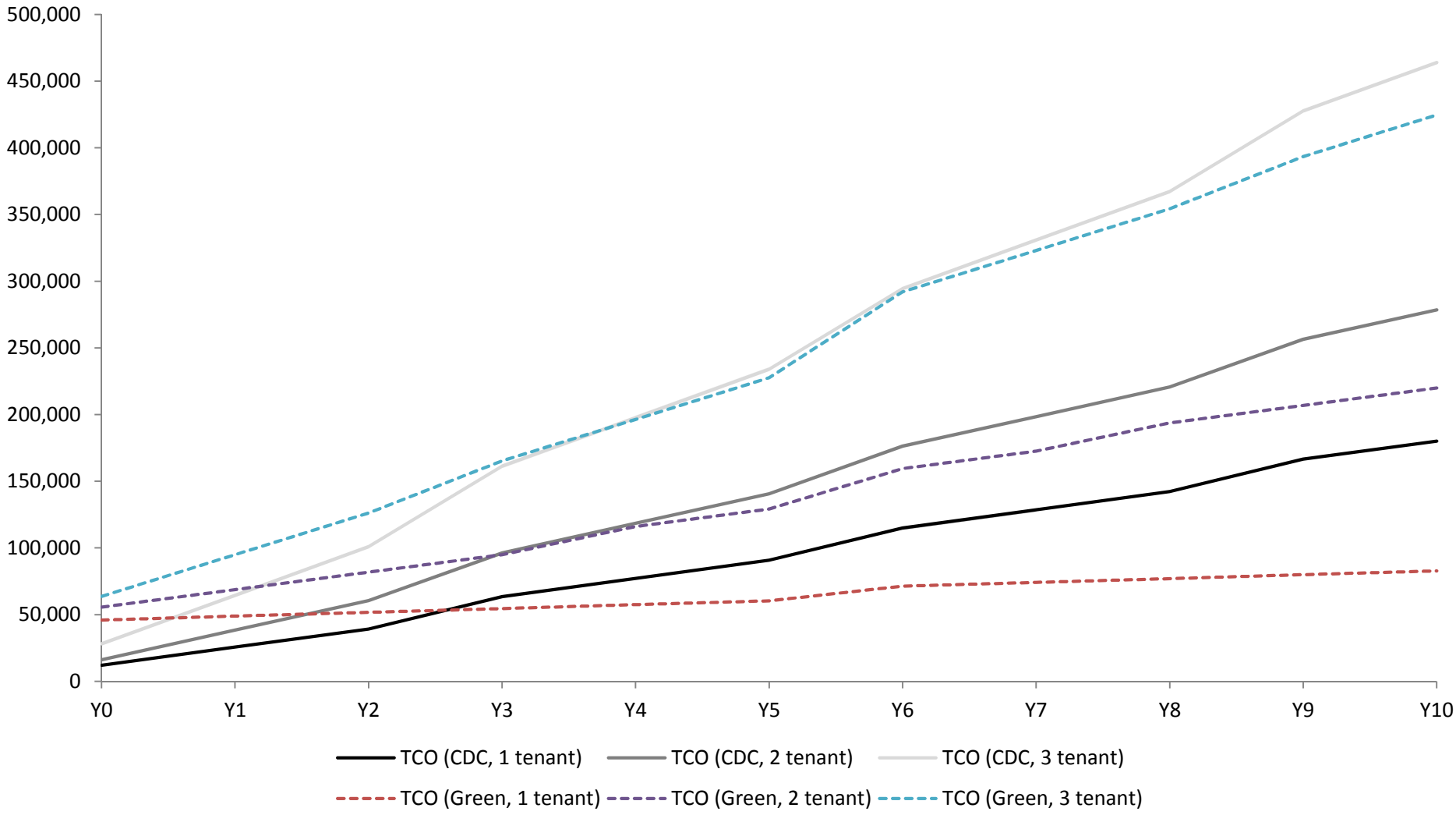
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Multi-tenant Feasibility (CDC vs. Green): Varying green contribution



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Multi-tenant Feasibility (CDC vs. Green): Tenancy scenarios



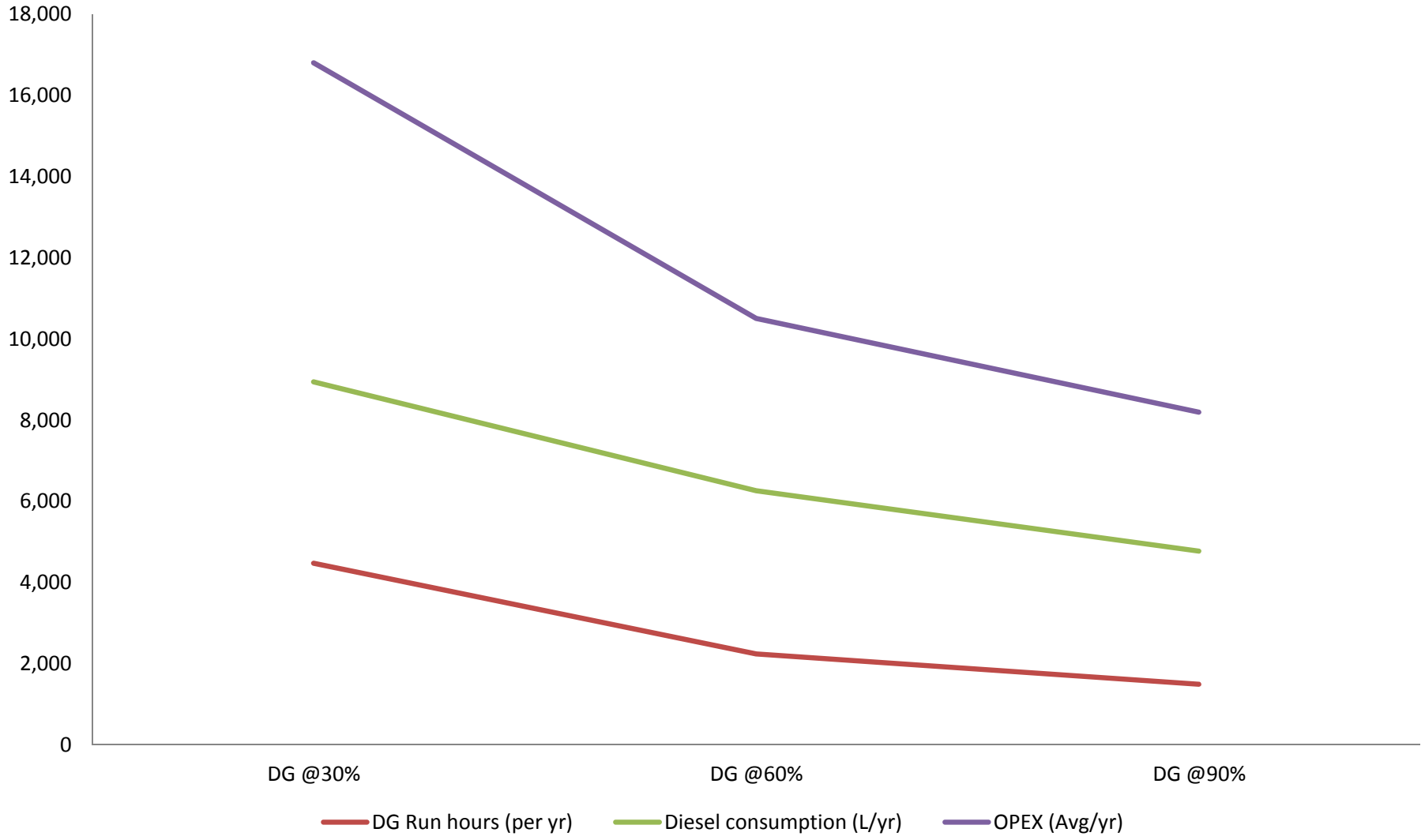
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Design scenarios in summary

- The energy contribution from green power source has a great impact on the overall solution feasibility and selection. A solution with optimum green energy contribution must be chosen considering reasonable tradeoff between long-term TCO, payback period and the CAPEX requirement.
- Sites with lower loads present a better feasibility for green power solutions as compared to sites with higher loads based on similar design assumptions.
- For a given green power design – better the renewable resource availability, higher the green contribution, lower the dependence on diesel power and better the feasibility metrics.
- Green power investments for a Tower Co should have a long term view of at least 5 years and an optimum design selection in order to achieve a lower long-term TCO, lower energy costs, and environment friendly sustainable energy operations.
- The contract tenure with MNOs and the long-term tenancy growth outlook will have a great impact on the investments in green power for a multi-tenant context of a Tower Company.
- The possibility of future grid extension is very critical to consider while taking up a long-term view on investing in green power for telecoms.

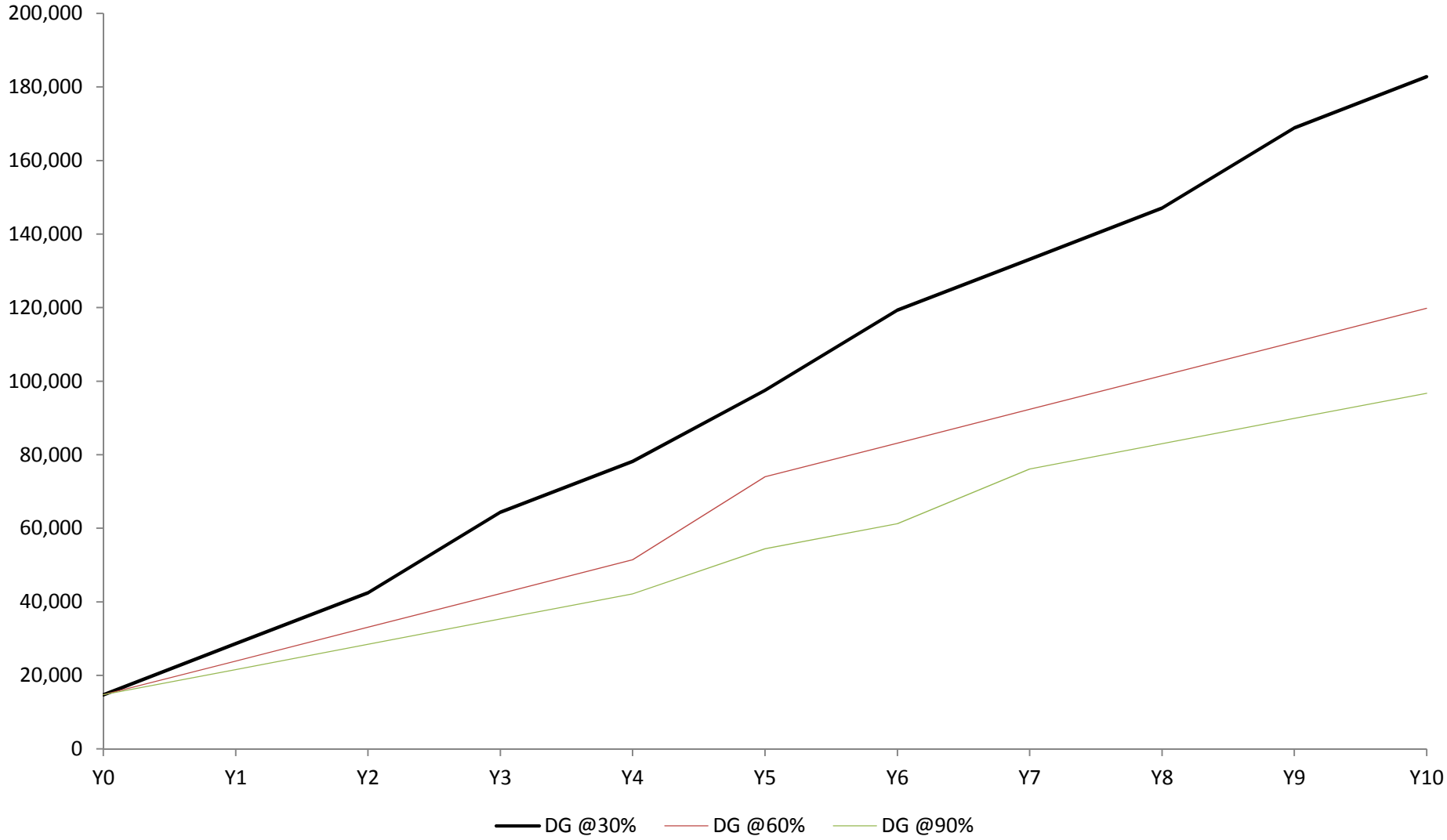
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DG loading and OPEX performance



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DG loading and impact on TCO



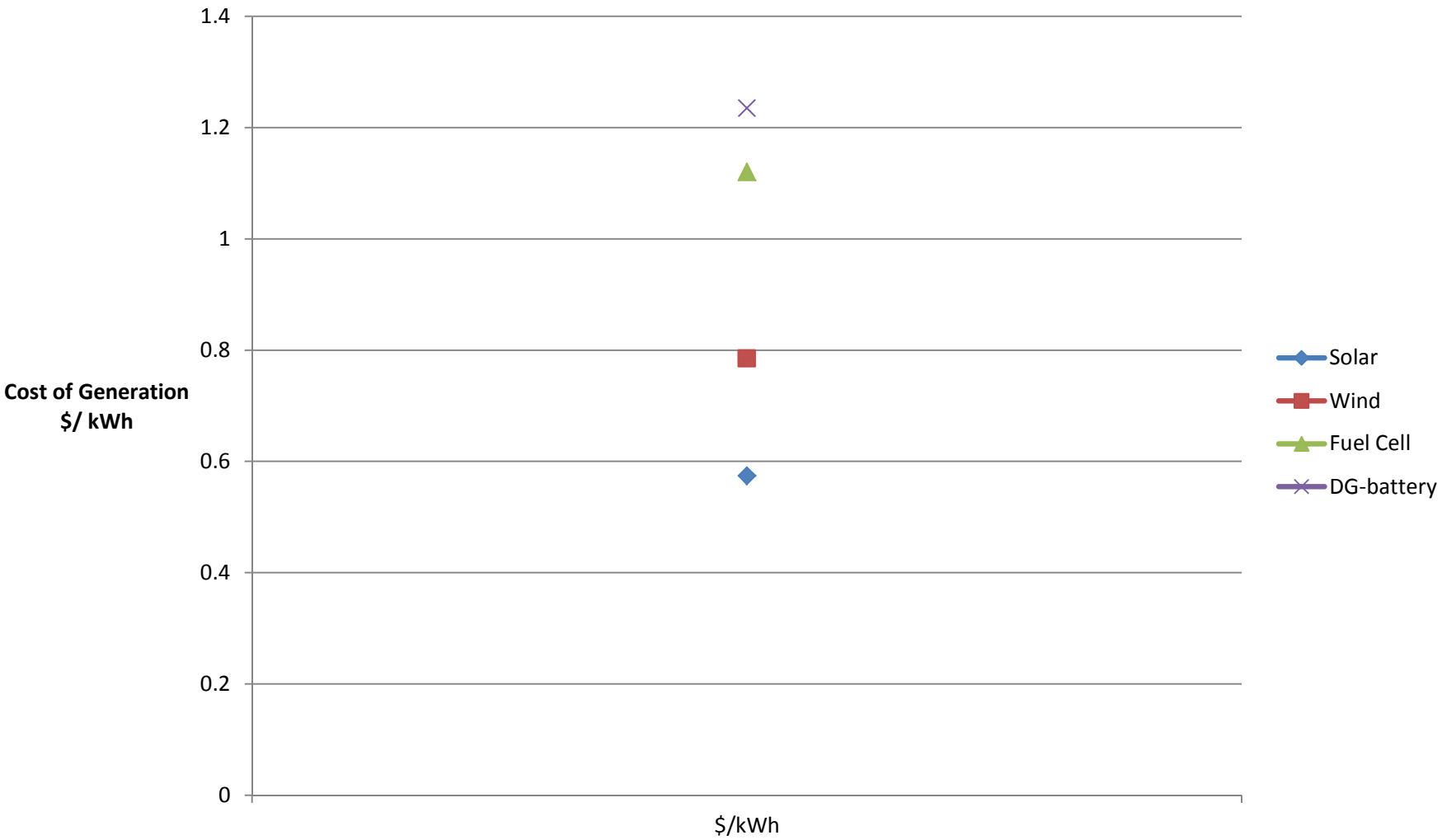
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Comparison of green technologies: Pros and Cons

	Pros	Cons
Solar	➢ Ubiquitously available solar resource ➢ Suitable for distributed power generation ➢ Widely scalable owing to its modular technology ➢ No maintenance cost of solar panels, except for some un-skilled labor cleaning the panels occasionally ➢ Cost-competitiveness compared to other green technology options ➢ Reached commercial scale of adoption for small scale applications	➢ High space requirements for higher capacity deployments ➢ High upfront CAPEX compared traditional diesel based solutions ➢ Theft and vandalism of panels leading to high risk of investment in Solar
Wind	➢ Suitable for small scale distributed power generation ➢ Less space requirement compared to Solar	➢ Low reliability – due to the variability of wind speed; Wind energy costs sensitive to wind resources ➢ Low scalability and High investment ➢ Need tall towers, 20 – 40m for optimum power generation ➢ Reliability of wind products varies widely ➢ High regular maintenance costs
Fuel Cell	➢ Reliable technology ➢ Compact system and requires less space ➢ Suitable for rooftop and urban contexts ➢ Low Maintenance ➢ Low emissions and low noise ➢ Less prone to theft and vandalism	➢ High upfront investment and cost of technology makes less cost-effective green choice ➢ Highly dependent on fuel supply eco-system and logistics; Requires to build fuel reformer plants and supply chain for reliable performance ➢ Low range of capacities for distributed generation
Biomass	➢ Abundant biomass potential ➢ Wide range of plant capacities ➢ High reliability can be achieved with strong supply chain integration ➢ Technology is widely available	➢ Operational complexity ➢ High resource and operations costs ➢ Biomass feed supply challenges and dependence on unreliable supply chain eco-system ➢ Sensitive to cost of inputs due fluctuating feed prices

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Comparison green technologies: Cost of generation ($ / kWh)



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In conclusion

- An optimum design based on right selection of design parameters such as green energy contribution, generation efficiency, load and tenancy, and the availability of renewable resources is essential for choosing the best possible energy solution

- The approach to green power feasibility based on key design and commercial parameters will require a comprehensive design and comparative financial analysis.

- The contribution from green power to overall energy requirement is a key design parameter to optimize the technical design and the associated business case

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Thank You!

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Mobile growth and electricity infrastructure

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