



Automating and Quality Controlling Grid Connection Studies



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Electricity networks are seeing an increased influx of grid-scale renewable energy installations



Climate change



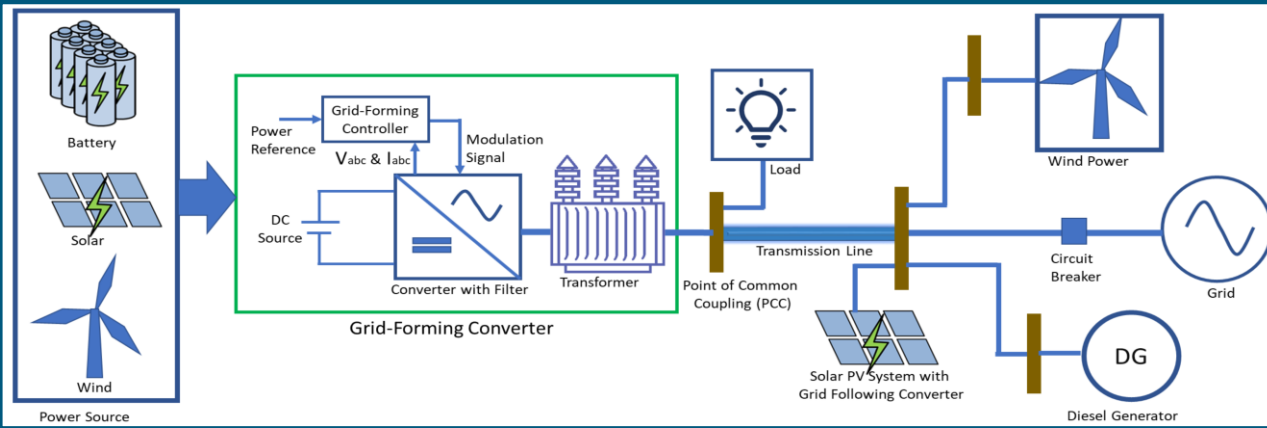
Limited resources



Environment degradation

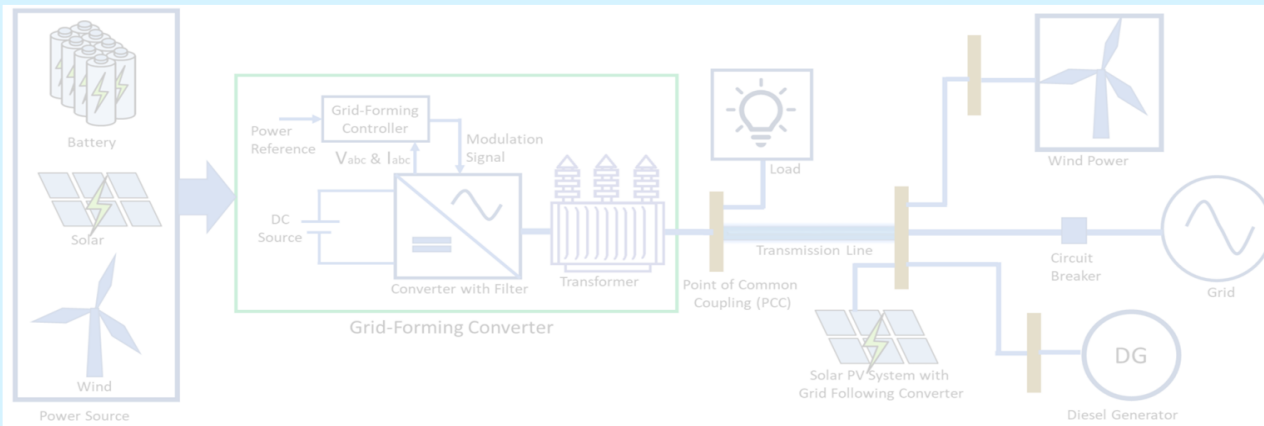
Increased influx of grid-scale renewable energy installations requires addressing many questions to ensure grid reliability

Is the overall system robust and reliable?

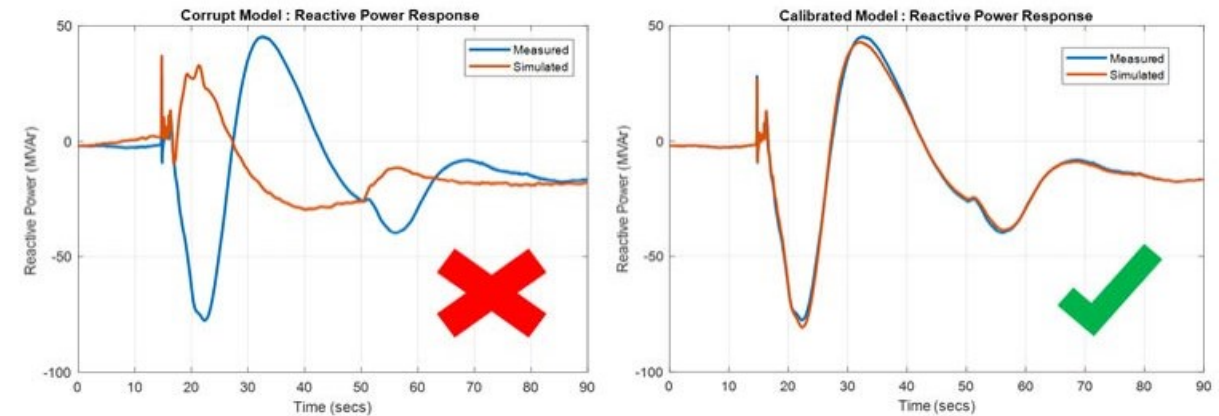


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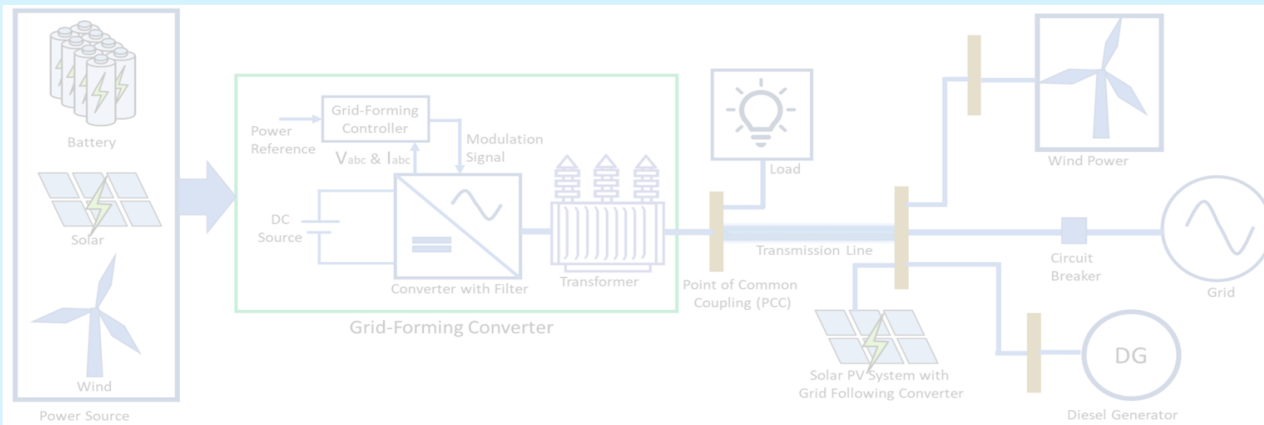


How to validate the asset models are accurate?

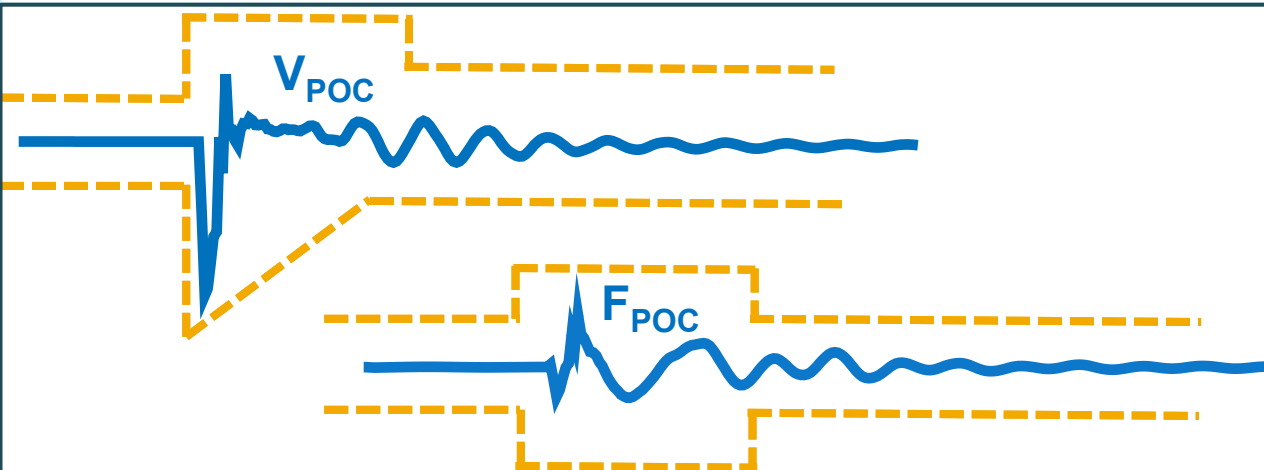
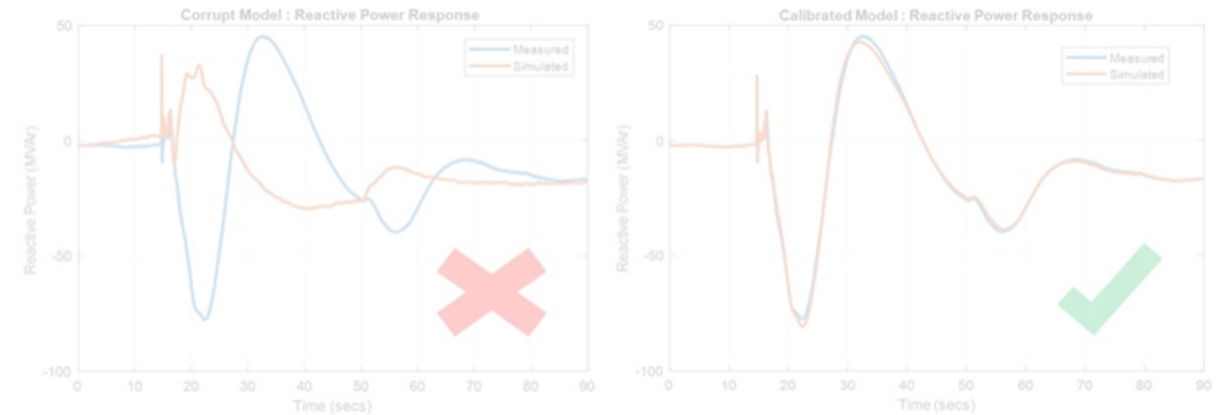


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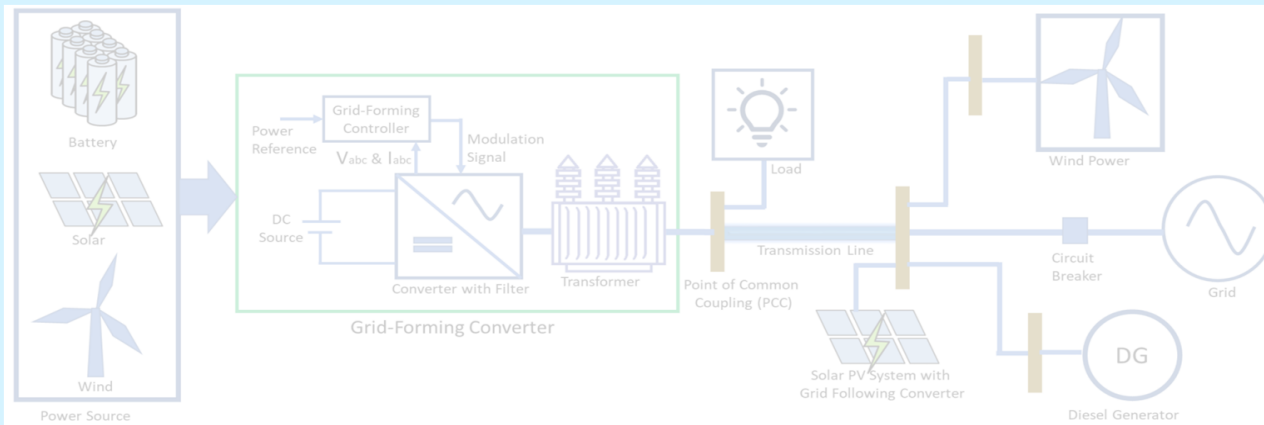
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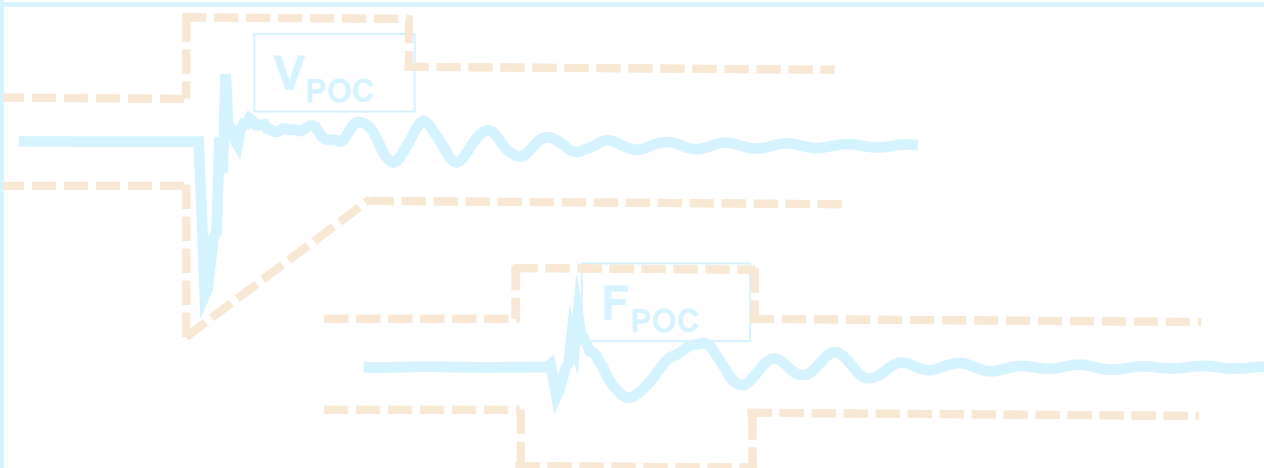
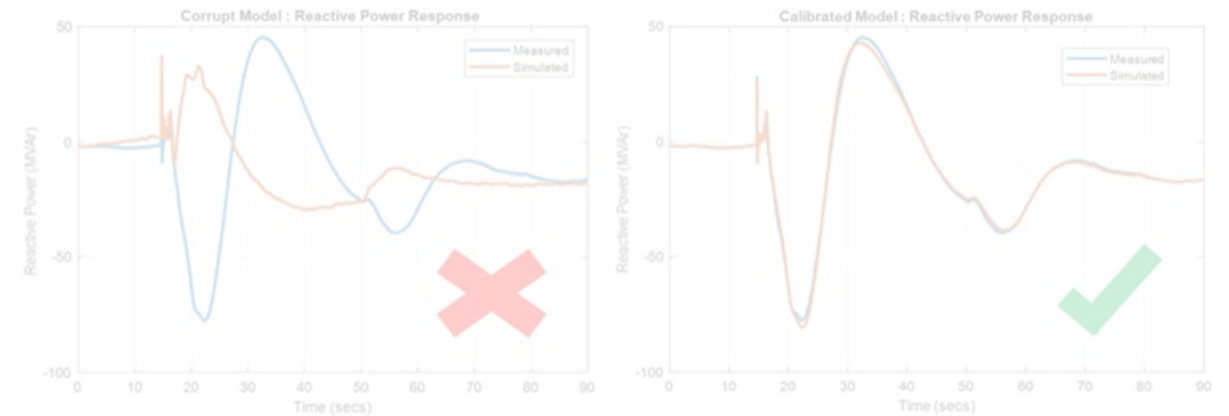
Is the system's behaviour in compliance with grid performance standards (DMAT, GPS, etc.)?

Increased influx of grid-scale renewable energy installations requires addressing many questions to ensure grid reliability

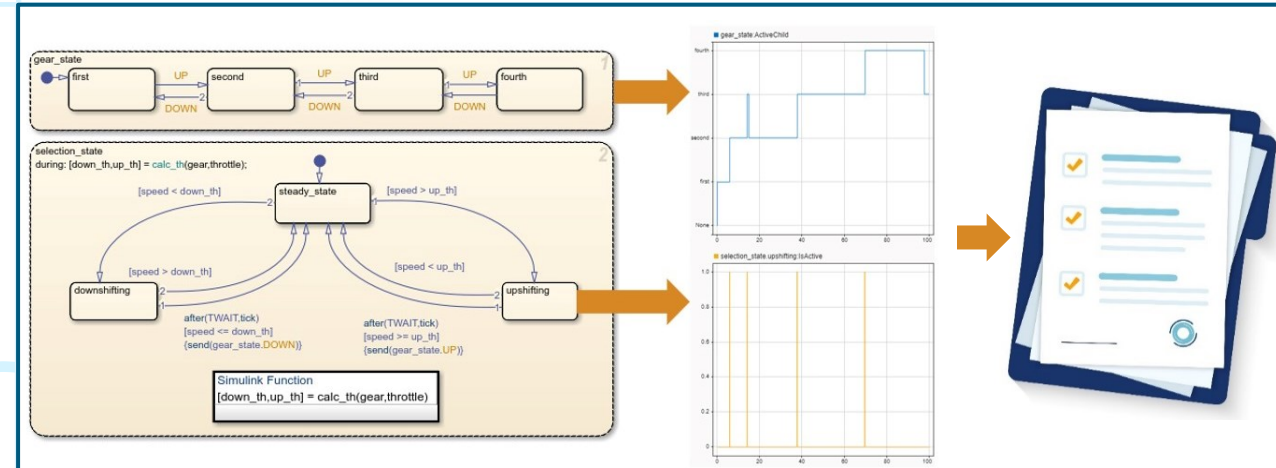
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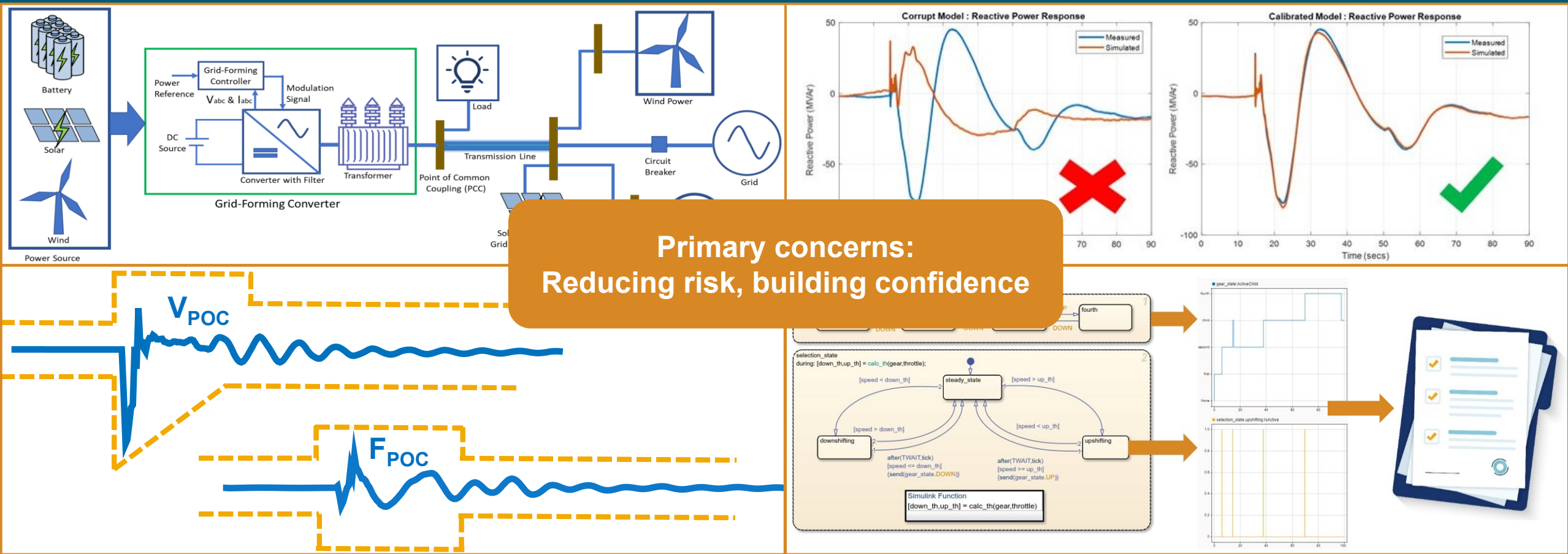


How to automate grid connection studies, performance validation, and documentation?

Increased influx of grid-scale renewable energy installations requires addressing many questions to ensure grid reliability

Is the overall system robust and reliable?

How to validate the asset models are accurate?



Primary concerns:
Reducing risk, building confidence

Is the system's behaviour in compliance with grid performance standards (DMAT, GPS, etc.)?

How to automate grid connection studies, performance validation, and documentation?

AEMO initiatives to address the influx of renewable energy installations

- Dynamic Model Acceptance Test Guidelines (DMAT)
 - Numerical robustness
 - Accuracy
 - Consistency
- Generator Performance Standards (GPS)
 - Site specific requirements (grid strength, SCR)
 - Generator type and size specific requirements
- R0, R1, R2 validation and ongoing compliance studies

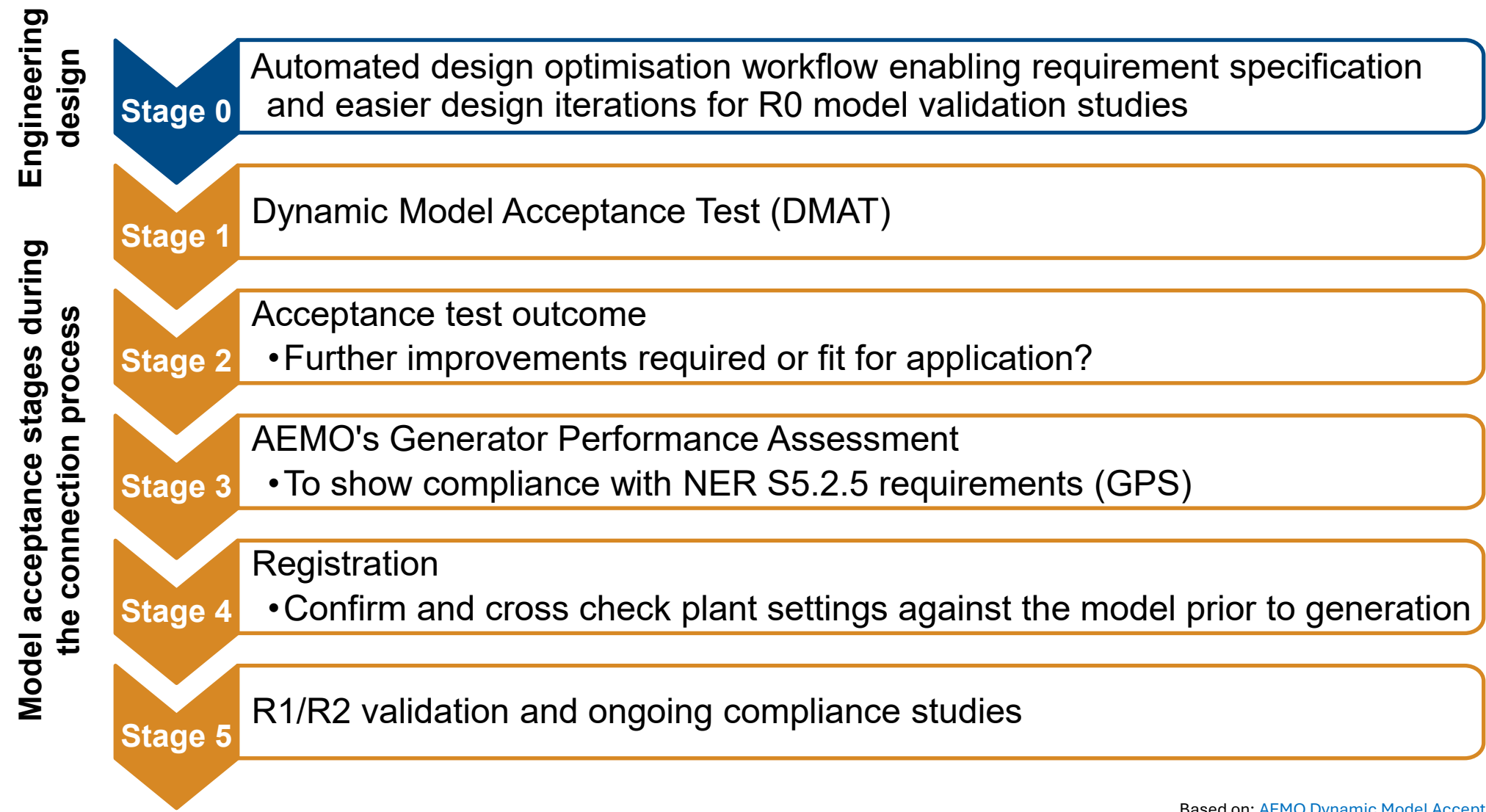
Typical workflows are manual, time-consuming and susceptible to errors.

This underscores the need for an efficient approach to reduced time, effort and resource commitment.

Automated workflow objectives

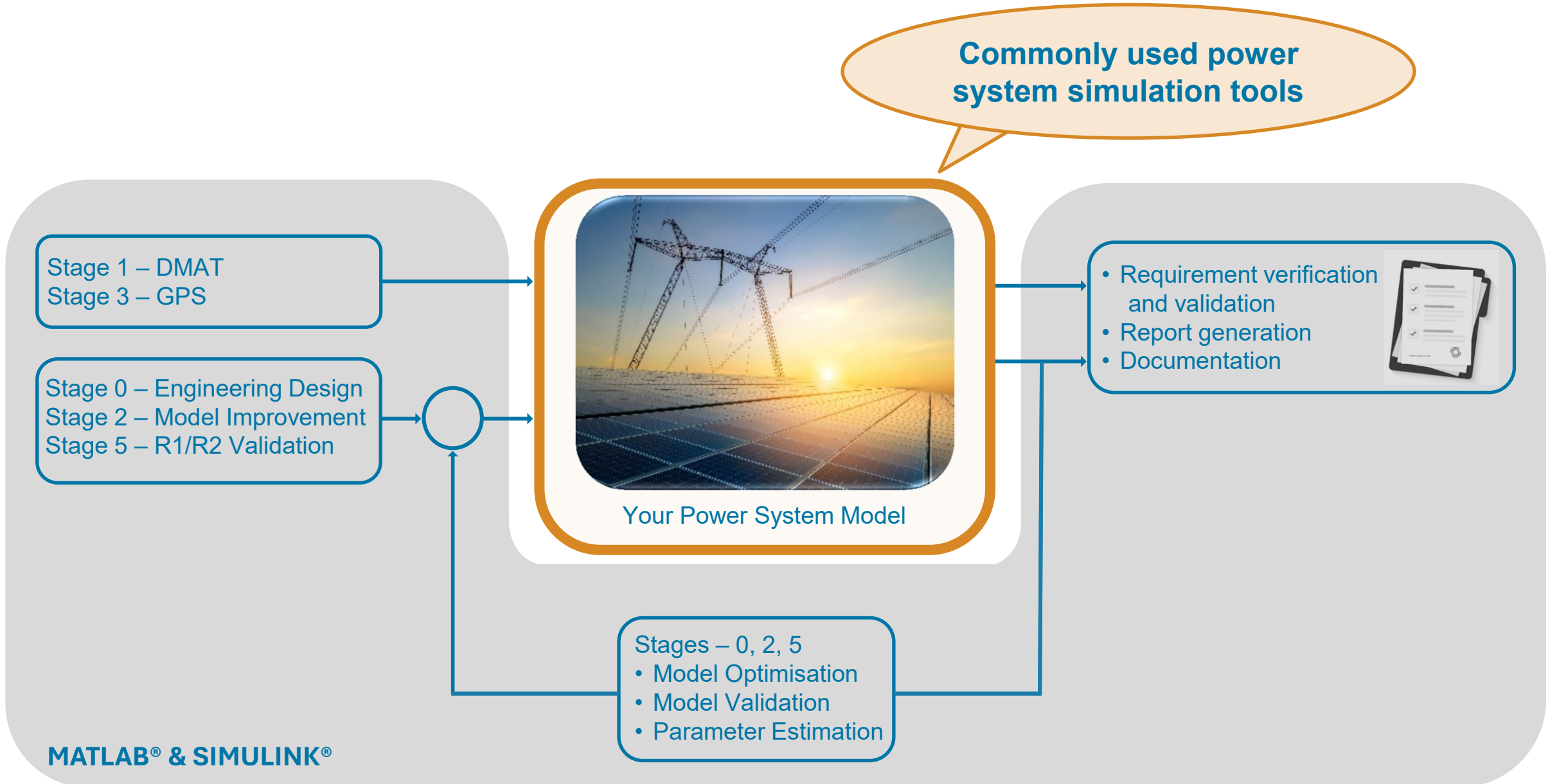
- Support commonly used platforms across the industry
- Automate AEMO DMAT /GPS requirement testing, validation, and documentation
- Automate R0, R1, R2 validation and ongoing compliance studies
 - Model validation studies
 - System response optimisation

Automated workflow to perform AEMO recommended grid-connection studies



Based on: [AEMO Dynamic Model Acceptance Test Guideline](#)

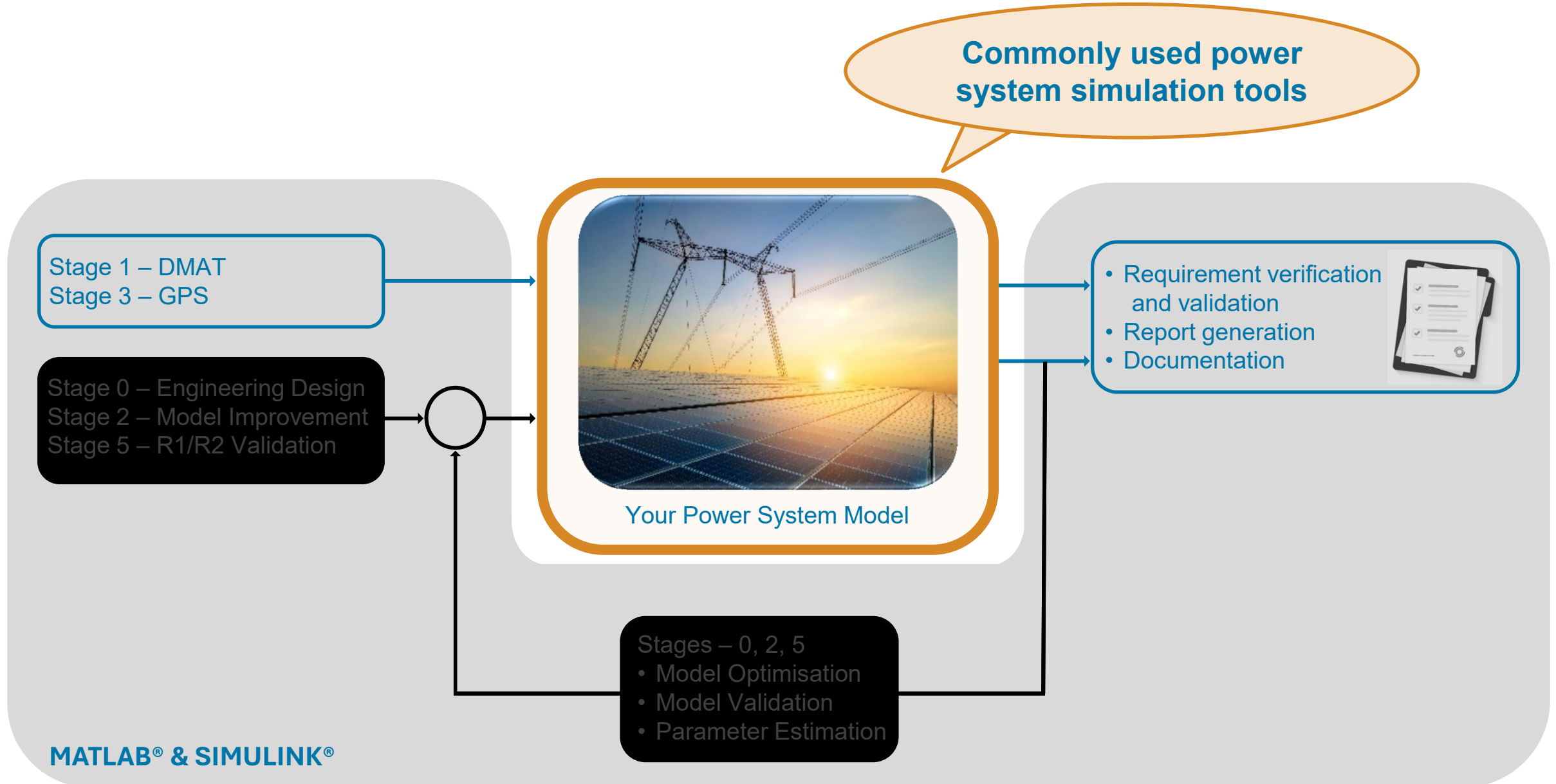
Automated workflow to perform AEMO recommended grid-connection studies



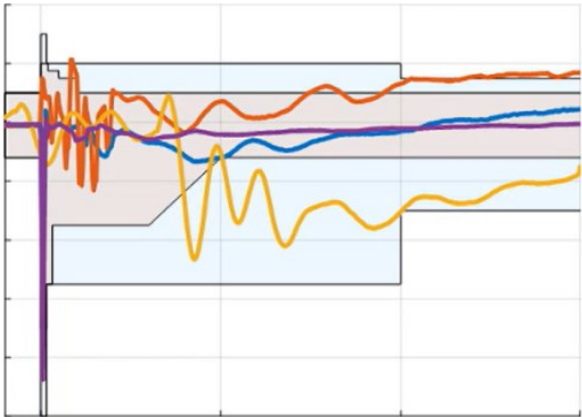
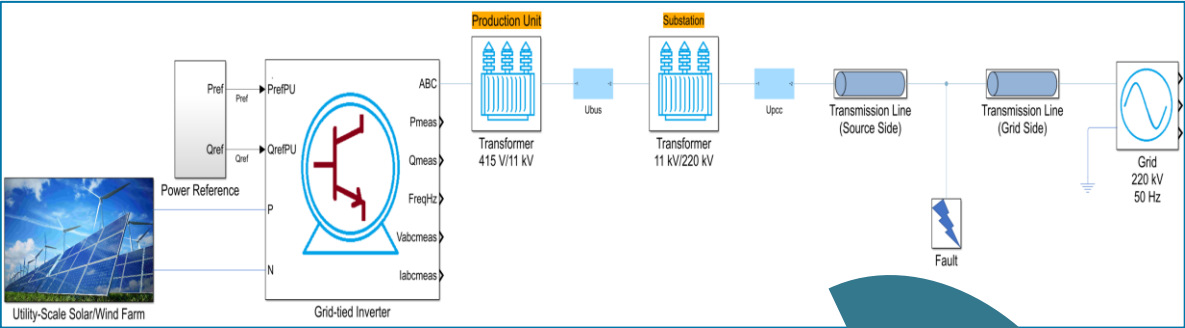
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An automated workflow to perform grid-connection and validation studies



An automated workflow to perform grid-connection and validation studies



Consistently map requirements to model executions

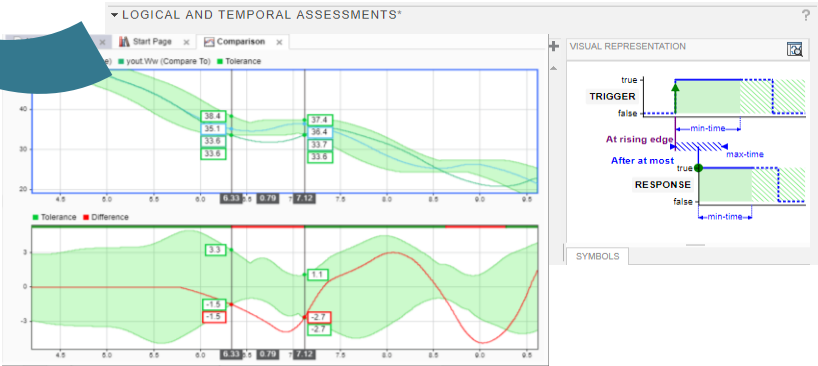


DMAT

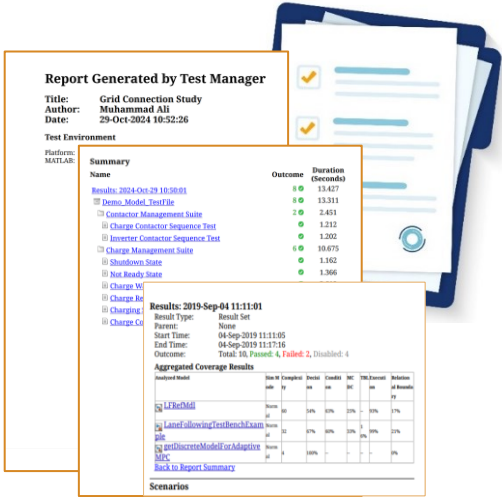


GPS

Automated execution of grid connection and validation scenarios

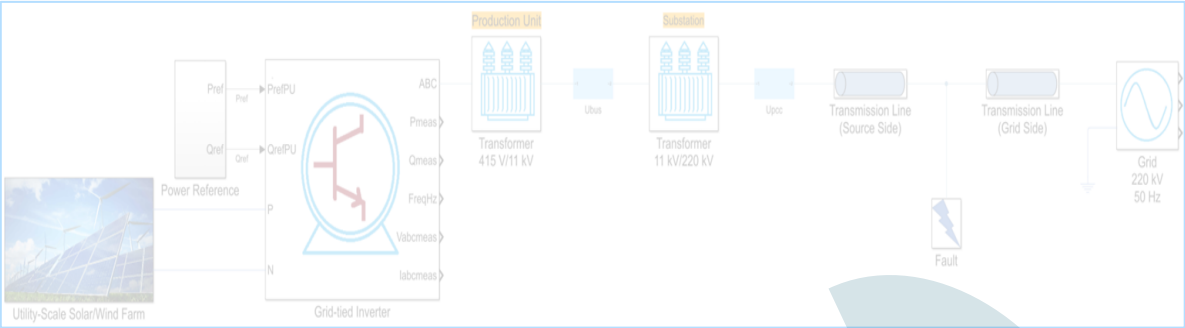


Requirement verification and validation

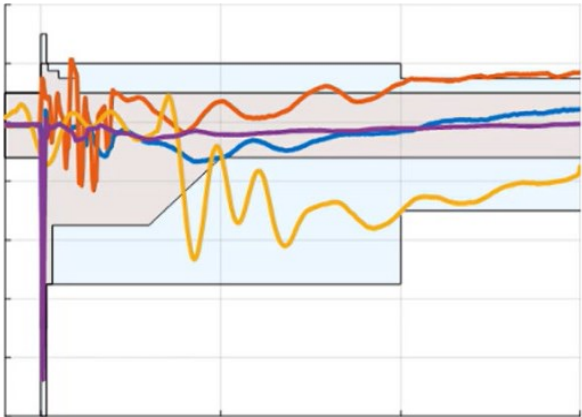


Document the analysis for compliance reporting

An automated workflow to perform grid-connection and validation studies



Automated execution of grid connection and validation scenarios



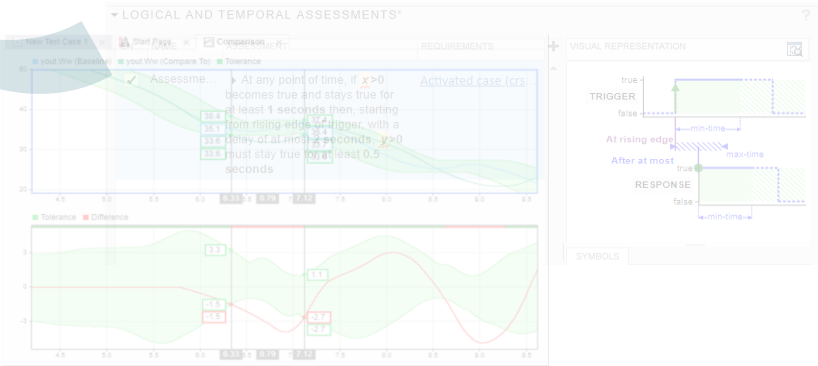
Consistently map requirements to model executions



DMAT



GPS

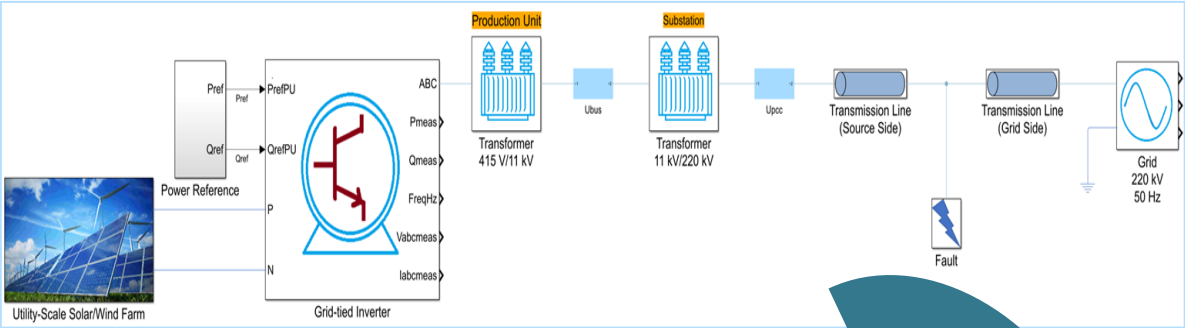


Requirement verification and validation

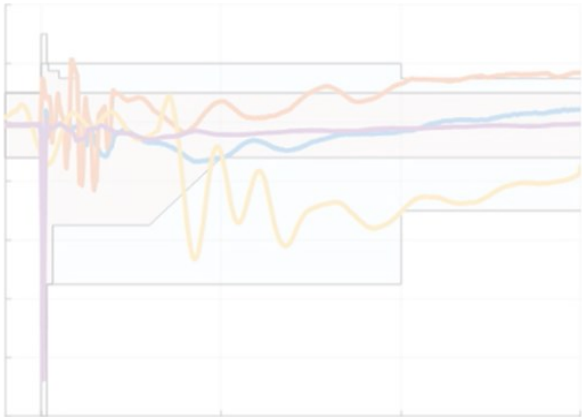


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An automated workflow to perform grid-connection and validation studies



Automated execution of grid connection and validation scenarios



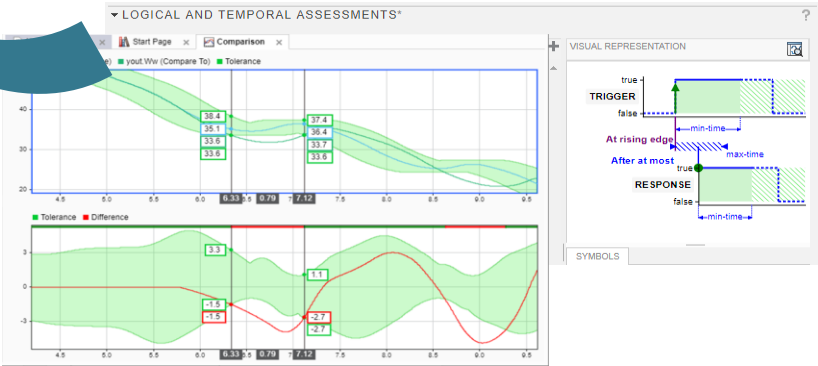
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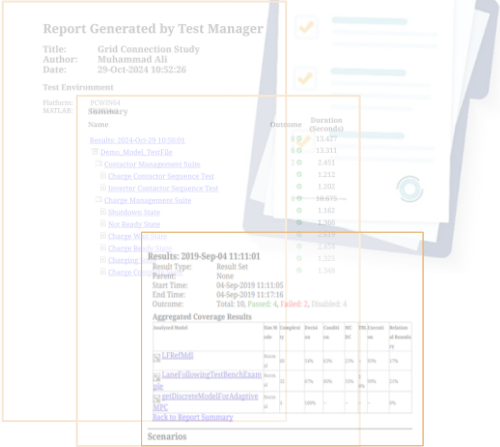
DMAT



GPS

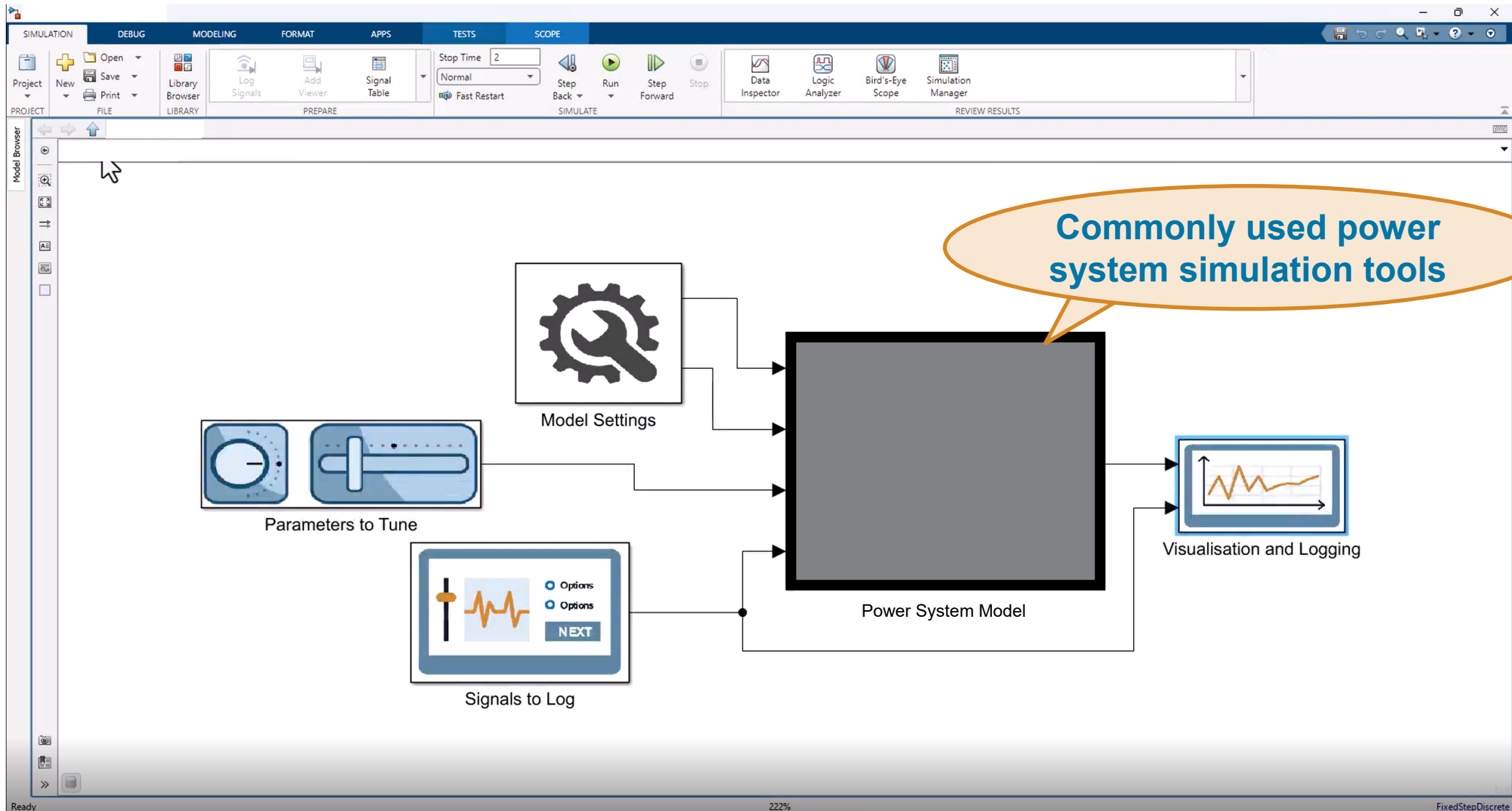


Requirement verification and validation

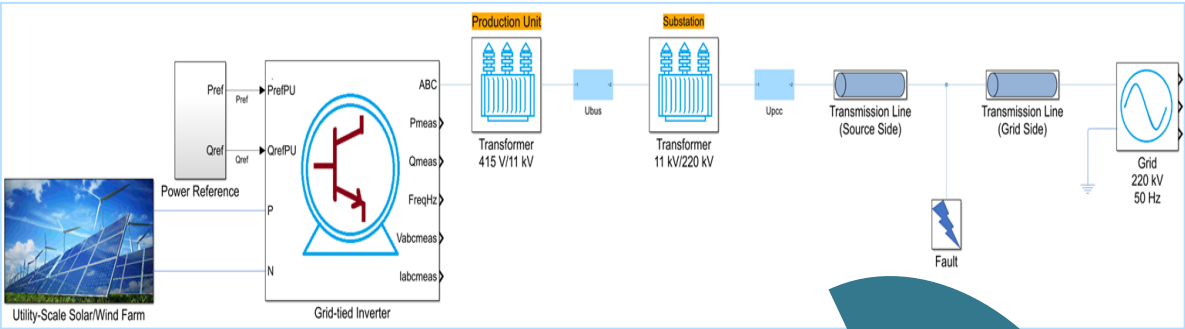


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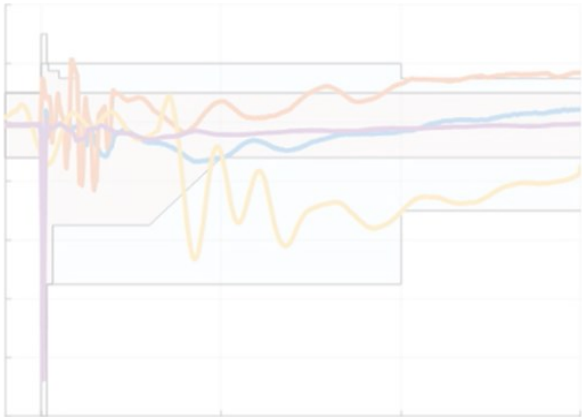
Model and simulate in commonly used power system simulation tools across the industry



An automated workflow to perform grid-connection and validation studies



Automated execution of grid connection and validation scenarios



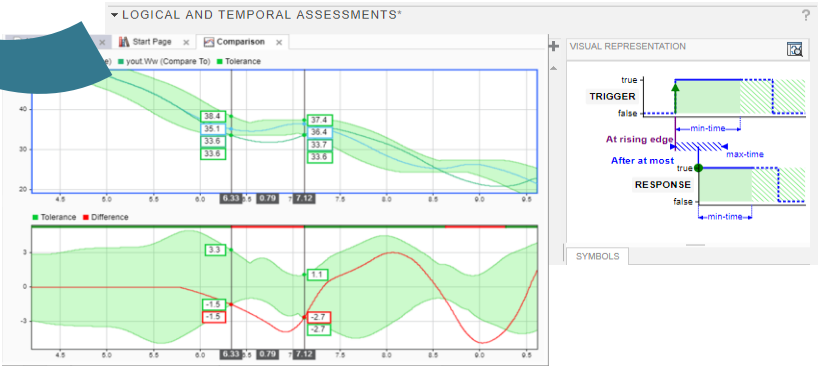
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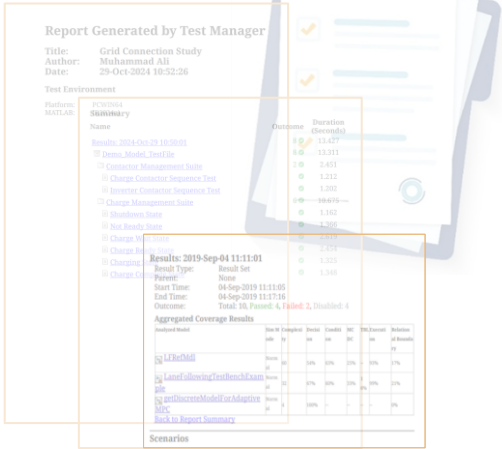
DMAT



GPS



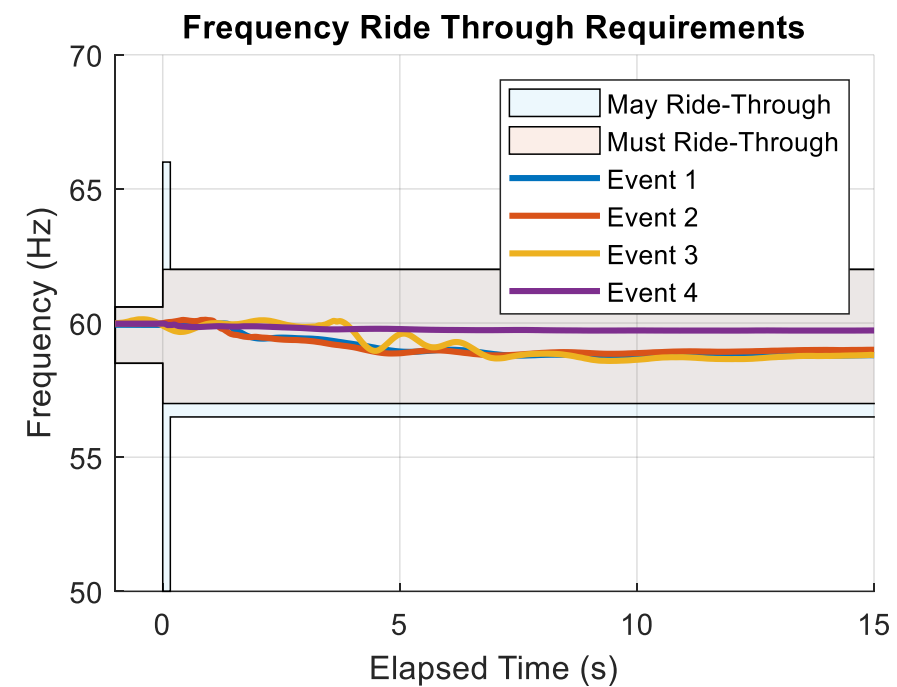
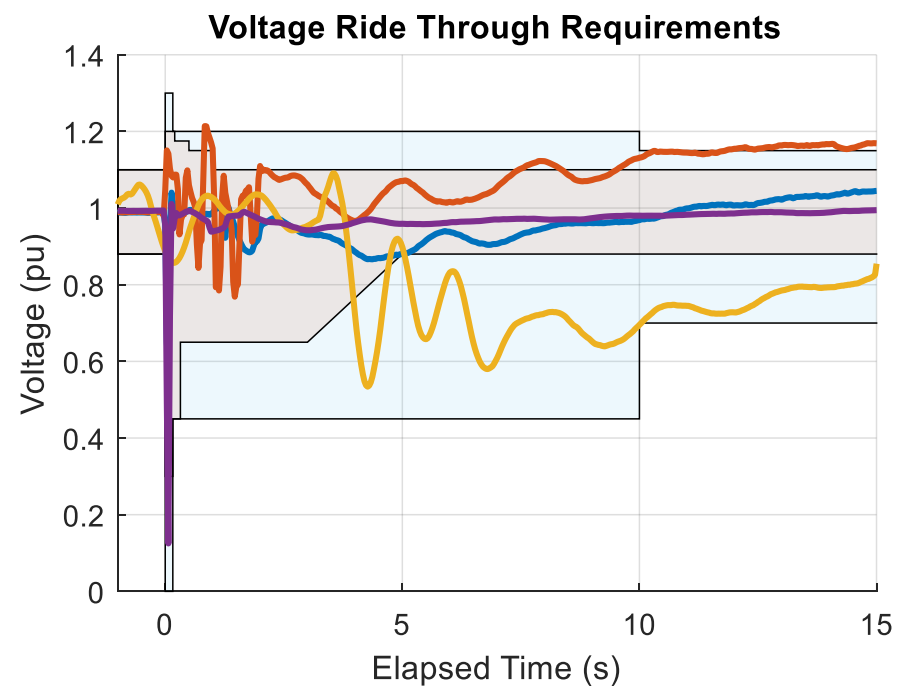
Requirement verification and validation



Document the analysis for compliance reporting

Link and validate performance requirements

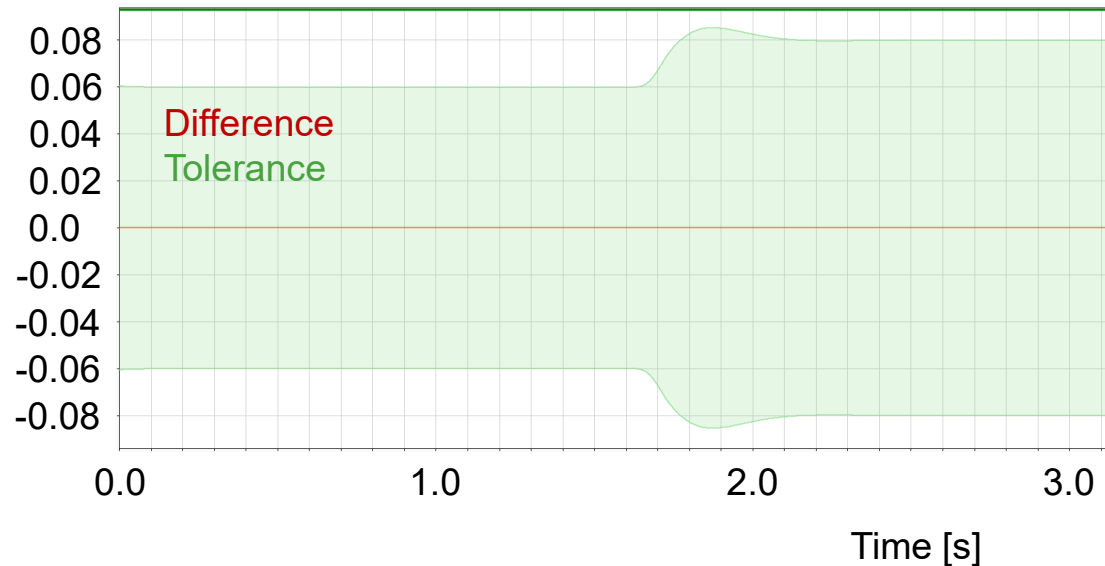
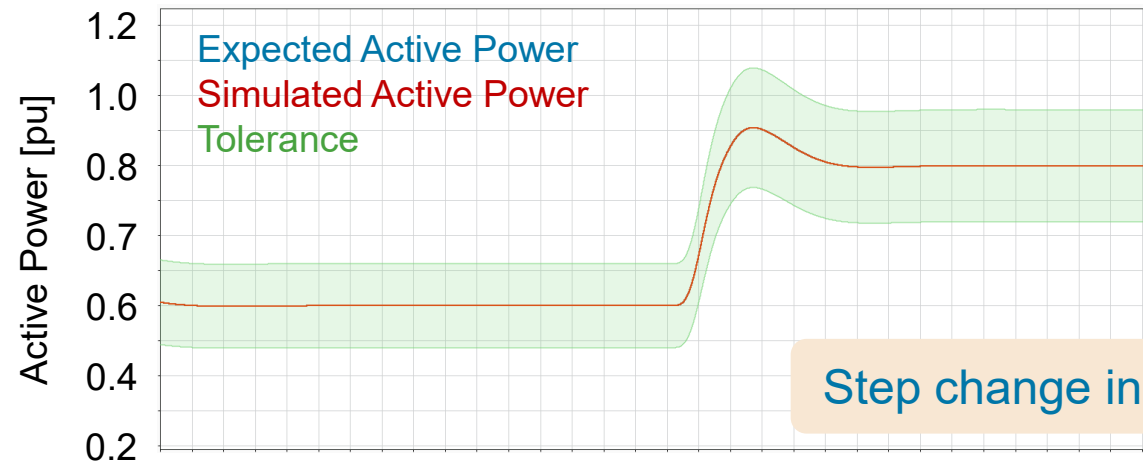
Define bounds on system's response



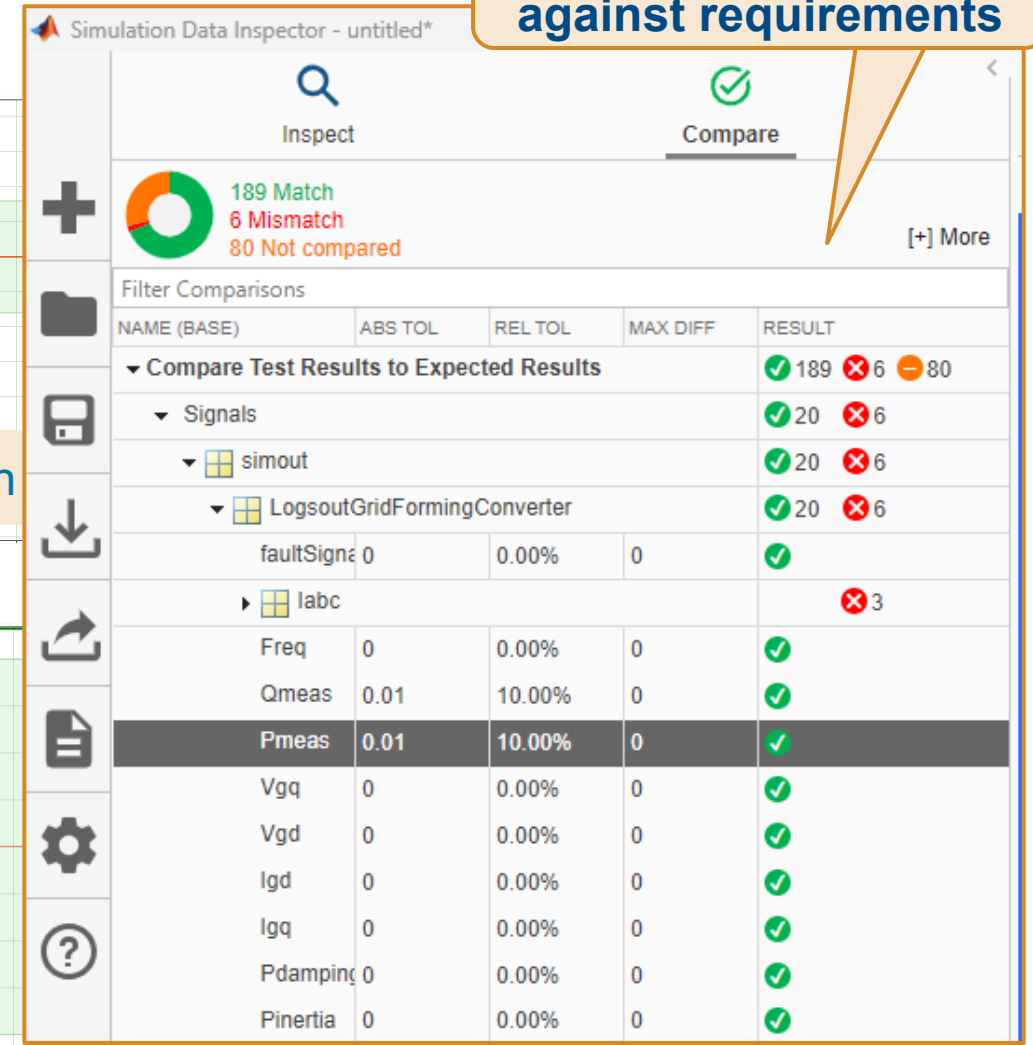
1 Event	2 TripTime	3 TripType	4 MayVoltTrip	5 MayFreqTrip
1	Inf	"None"	Inf	Inf
2	0.8333	"Voltage"	0.8333	Inf
3	10.0021	"Voltage"	4.0009	Inf
4	Inf	"None"	0.0667	Inf

Link and validate performance requirements

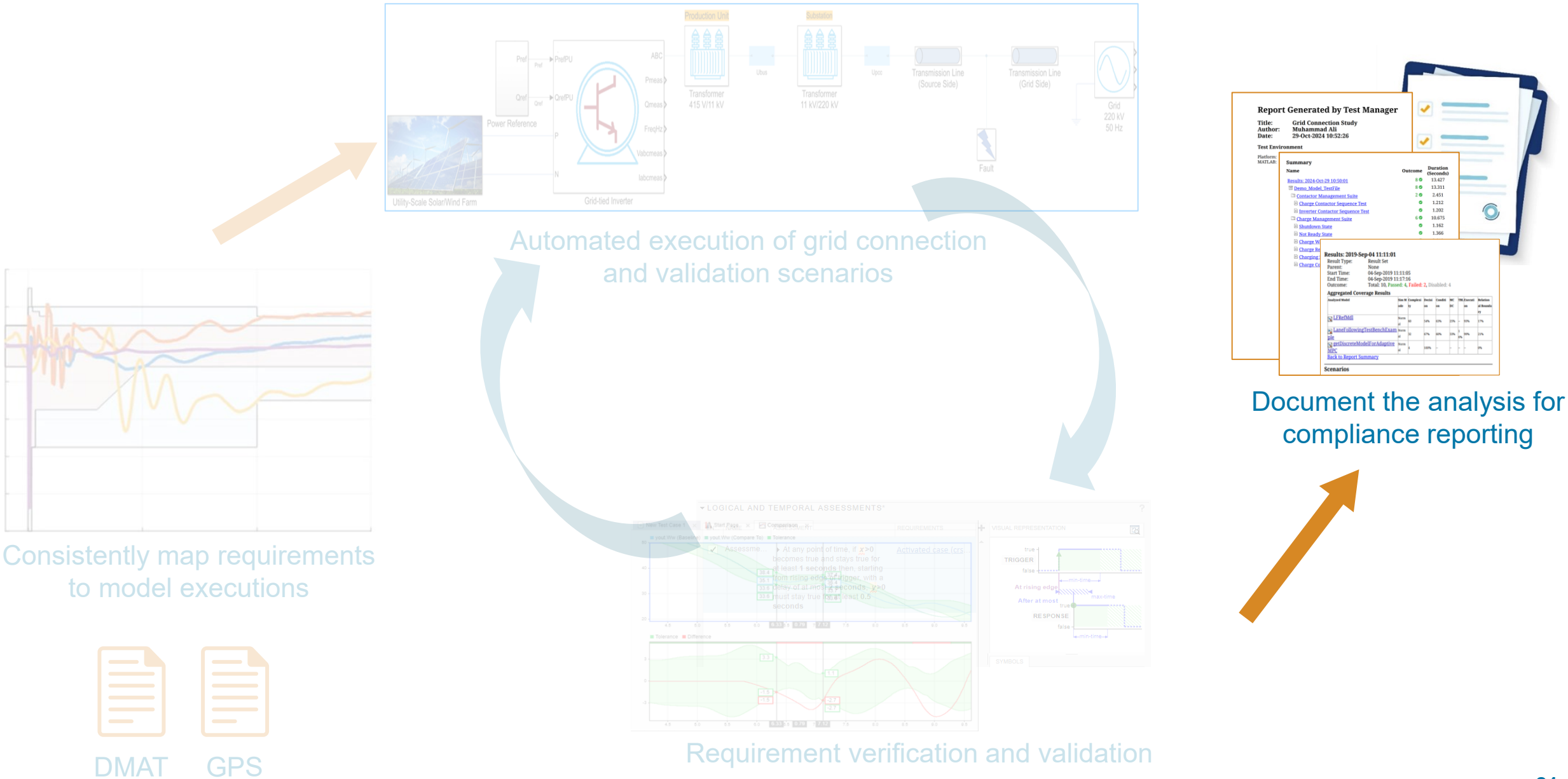
Define tolerance against desired performance



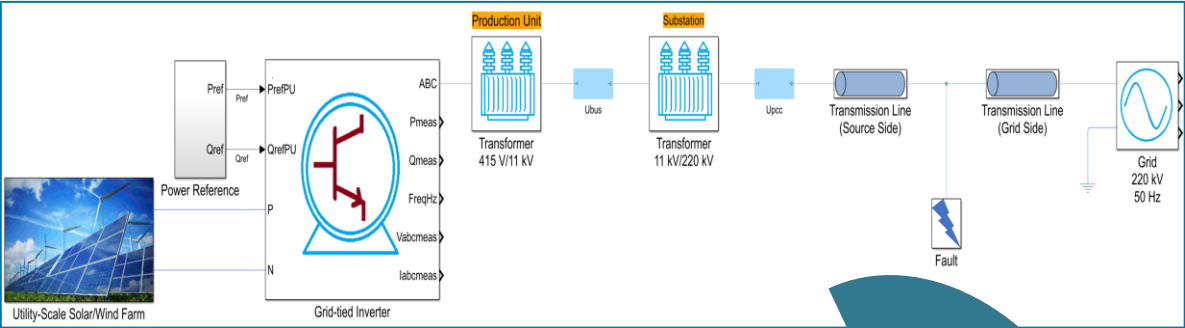
Analyse performance against requirements



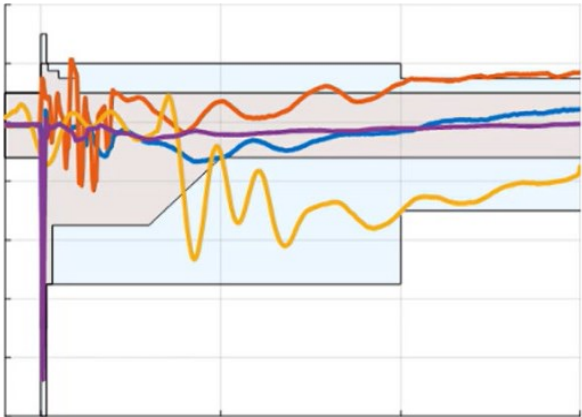
An automated workflow to perform grid-connection and validation studies



An automated workflow to perform grid-connection and validation studies



Automated execution of grid connection and validation scenarios



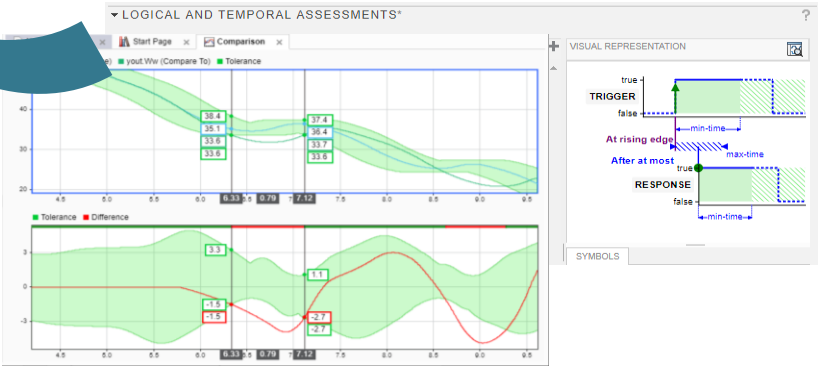
Consistently map requirements to model executions



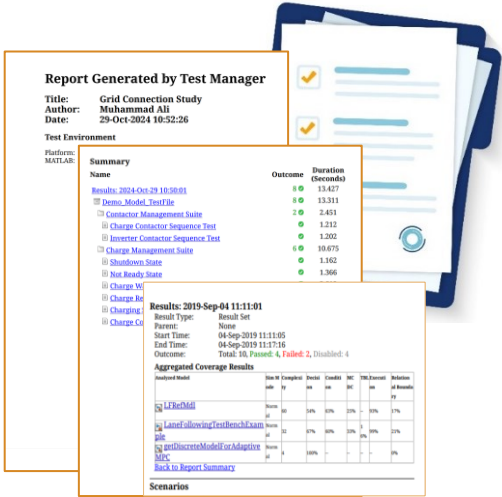
DMAT



GPS

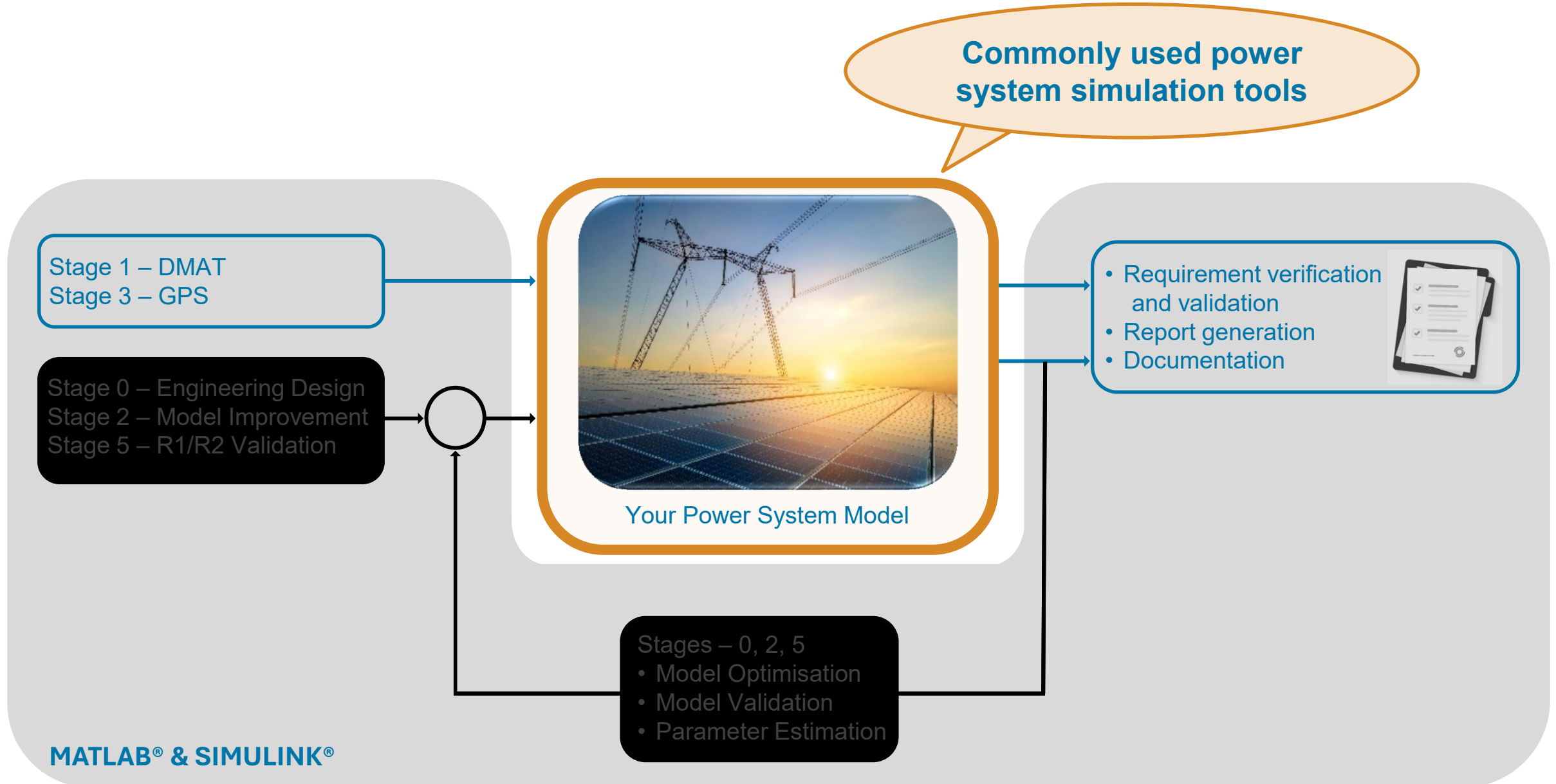


Requirement verification and validation



Document the analysis for compliance reporting

An automated workflow to perform grid-connection and validation studies



Value of automated workflow



Effortlessly comply with AEMO recommended grid-code requirements (DMAT / GPS assessments) using our ready-made templates.



Easily integrate with leading industry modelling tools.



Save time by running assessments in parallel and automated report generation.

Looking to boost productivity in your workflows? Explore our tailored offerings.

- **One-time consulting engagement** to help you get started and tailor the automated workflow to your organisation.
- **Annual licensing** of the MathWorks platform to support and sustain your workflow improvements.
- **Training and enablement support** to upskill your team and ensure rapid adoption of the new workflows.

Aligns with your needs? Contact us.



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