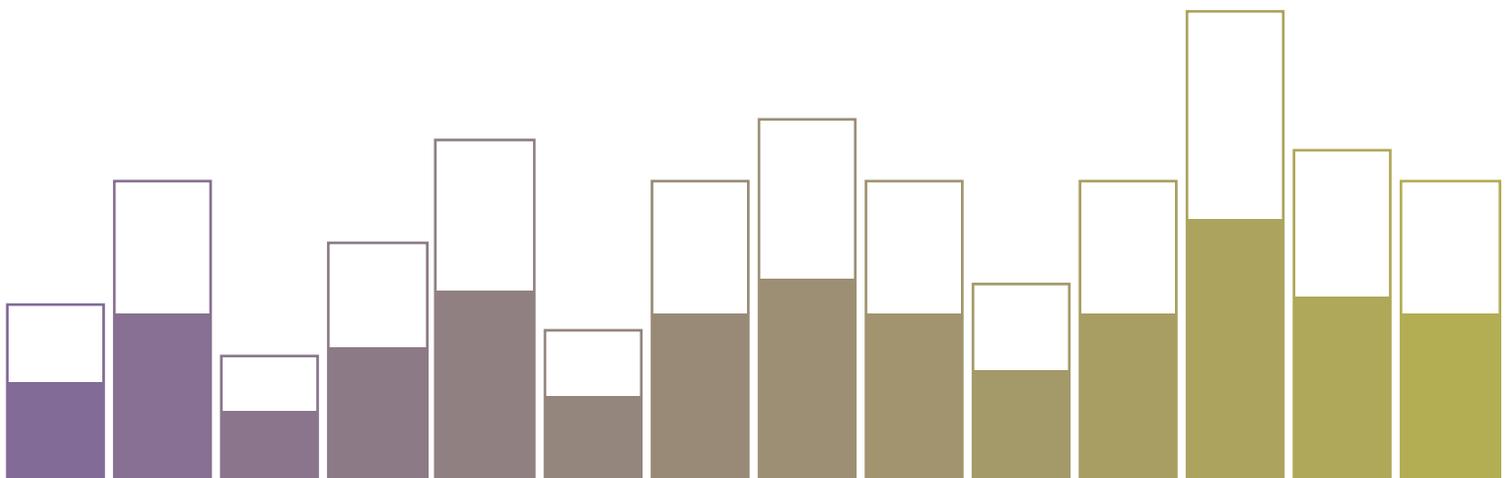


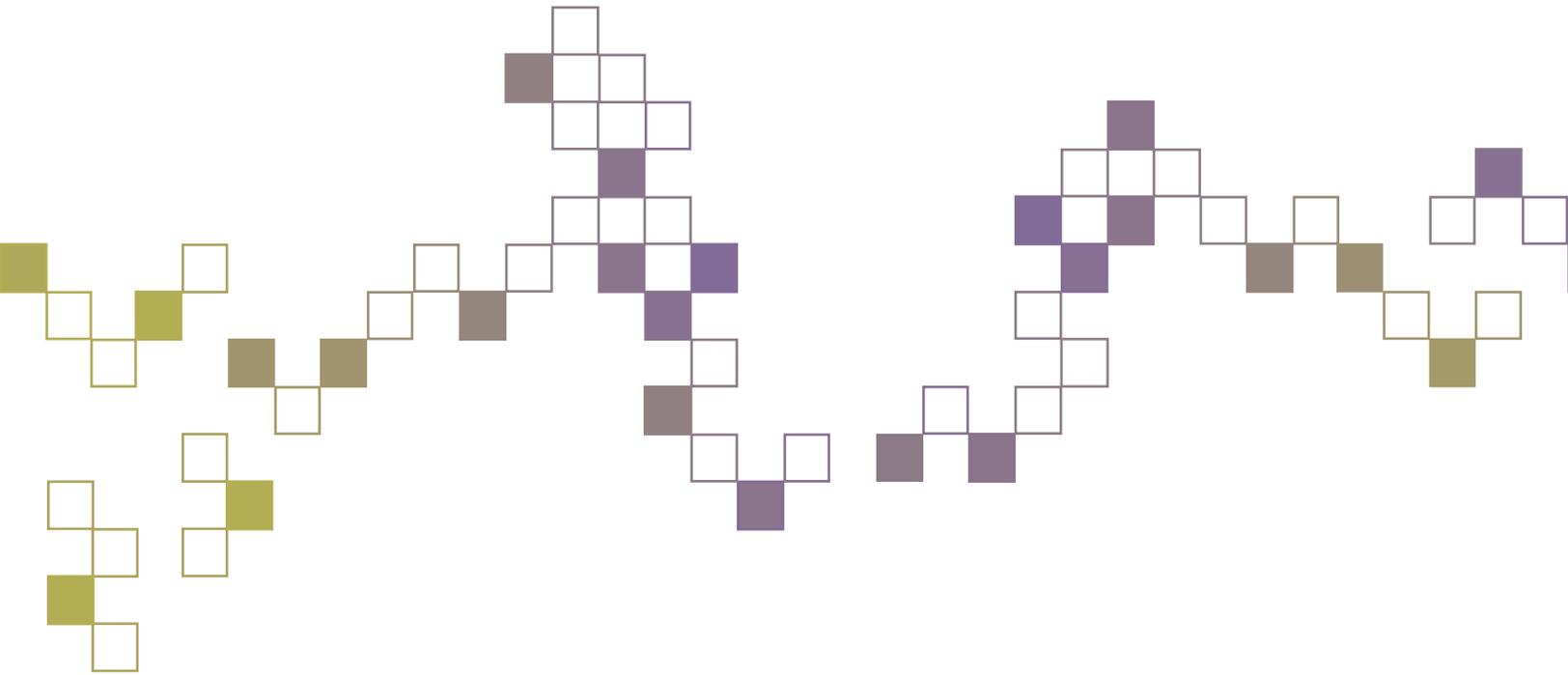
# Why Engineering Simulation is Critical for Breakthrough Energy Innovation



# 1 Introduction

Breakthrough Energy Innovation requires ambition and urgency. Developments will come in the areas of renewable energy production and improving energy efficiency in the industrial and transportation sectors. However, many products in these sectors are already highly tuned for their function. Consequently, higher fidelity understanding of product behavior is required to identify additional incremental improvements. For more disruptive innovation, a very wide design trade space becomes necessary as products are often more complex, do not have a history of operational experience, and function in different environments that include design variables outside of the traditional product's boundaries.

To address these challenges, companies are turning to simulation. It's a solution that allows designers to get deeper insight into product performance and consider hundreds, if not thousands, of design iterations.



## 2 | Delivering Breakthrough Products

To achieve these breakthroughs, companies are facing increasingly difficult challenges:

### Top Pressures

	Products are becoming more complex	Limited development resources	Products operate in varying % complex environments	Lack of tolerance for design flaws
ENERGY	36%	33%	41%	28%
TRANSPORT	45%	36%	35%	19%
INDUSTRIAL	35%	39%	40%	23%

n = 298  
Aberdeen Group, 2013

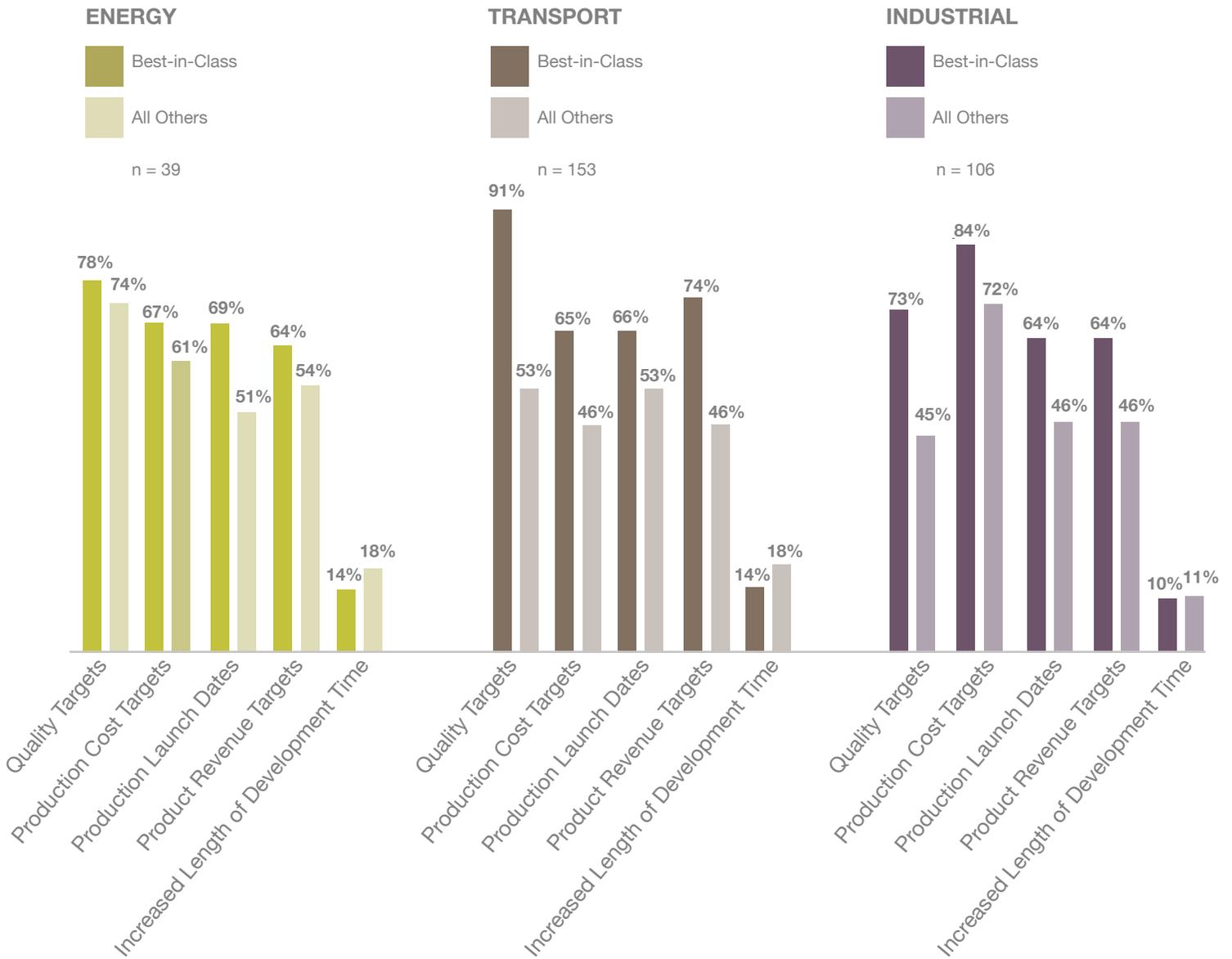
These challenges are another expression of higher functionality and increased complexity. Whether the product is operating in different environments, or needing to differentiate itself, the method of overcoming these challenges is by adding complexity. The use of simulation as a means of addressing the challenges of increased product complexity and improving reliability is the solution.

Companies need a new way to understand product behavior, a method that will position them as a leader and successful innovator in their field.

# 3 Defining the Best-in-Class

To identify best practices for product development, Aberdeen measured survey participants' ability to meet their product goals and overall profit margins on new products. Aberdeen categorized respondents as Best-in-Class (top 20% of aggregate performers) or All Others (bottom 80% of aggregate performers).

## Profit Margins



Aberdeen Group, 2013

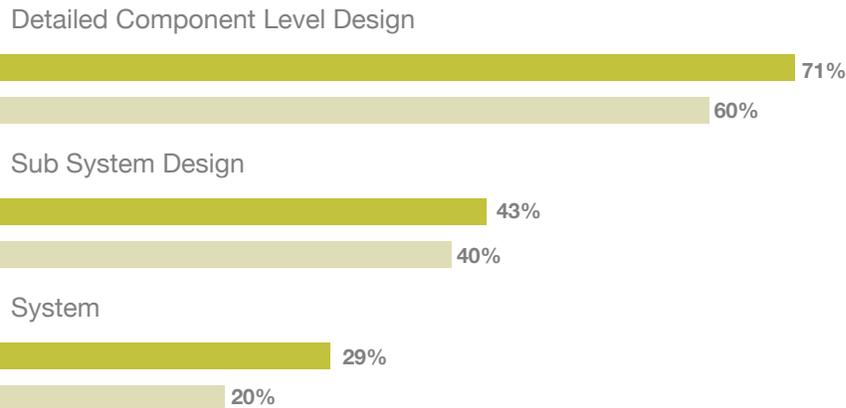
# 4 | Industry Benefits

Companies wanting to take innovative energy product development to the next level should use solutions that aid in enabling the functionality necessary for product, performance and power efficiency. The easiest way to do so is to use a technology solution that allows design engineers to meet these performance targets while meeting schedule deadlines.

## Where is Simulation Used in the Design Process?

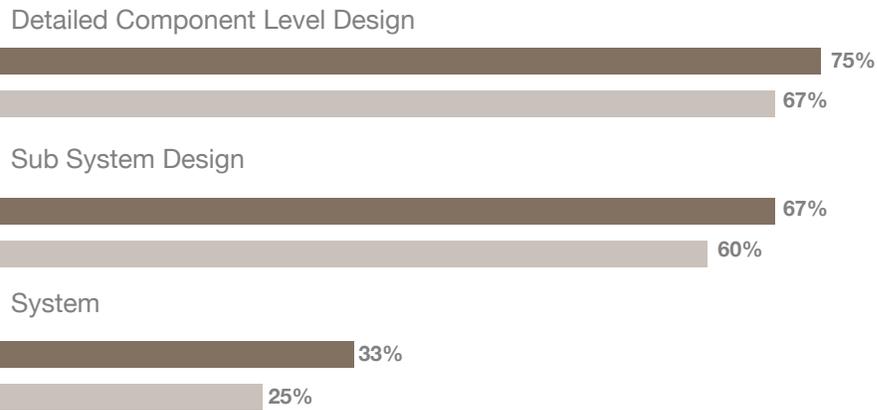
### ENERGY

Best-in-Class  
All Others  
n = 39



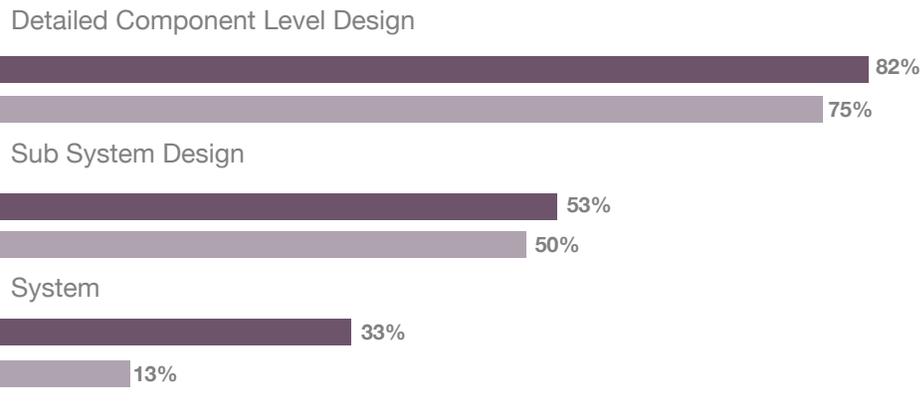
### TRANSPORT

Best-in-Class  
All Others  
n = 153



### INDUSTRIAL

Best-in-Class  
All Others  
n = 106



Aberdeen Group, 2013

# 5 | Industry Benefits

When comparing simulation at the sub-system level, one correlation comes to light. Transport Leaders simulate more at the sub-system level than leaders in energy (56% more likely) or leaders in industrial equipment (26% more likely). Why is this worthy of noting? Transport Leaders are more likely to meet their quality and revenue targets than compared to Energy Leaders) or Industrial Equipment Leaders.

Industry leaders who deliver on quality and revenue targets are more likely to use simulation at the subsystem and system level, not just at the component level.

## How are Targets Being Met?



Aberdeen Group, 2013

# 6 | Conclusion

For Best-in-Class companies, simulation-driven development is a key part of the processes for designing breakthrough energy innovation products. **What distinguishes them from their peers?** They use simulation at all stages of development and as a common language between functional groups. Below are some key steps to keep in mind:

- ▼ **Leverage the power of simulation** from ideation through product development. Getting the most out of simulation means creating a process that uses simulation in the early design phase as well as in troubleshooting or post-production.
- ▼ **Integrate simulation approaches** from the component to the sub-system and to the system levels. An easy way to do so is by use of a simulation solution, which will provide standardized processes for designing.
- ▼ **Establish a consolidated simulation platform.** This increases cross functional design practices at all stages of development, enables system to component simulation and reduces total cost of ownership of simulation.

Breakthrough energy innovation requires ambition and urgency. Companies can significantly decrease delays to market, minimize compromised quality while reducing their production costs by taking the right steps to effective implementation of simulation in their product development. This requires a systematic approach across the entire enterprise by deploying simulation solution capabilities to equip users to work efficiently and productively.