From Idea To Product

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Arago TECHNOLOGY

THE TIMES
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Business

Power grid can't cope when the wind blows

Tim Webb

The amount of potential electricity from onshore wind farms that has been allowed to go untapped has more than doubled this year because the grid cannot cope.

Developers have received payments of £19 million not to generate 215 gigawatt hours — enough electricity to supply nearly 50,000 households for a year.

This is equivalent to three 30-megawatt wind farms, costing about £90 million to build, standing idle since the beginning of the year. Last year wind farms were paid not to generate 103GWh.

National Grid makes the payments in return for wind farms not generating electricity, mostly when it is very windy and there is low demand. The payments are recouped by charges on consumers' electricity bills.

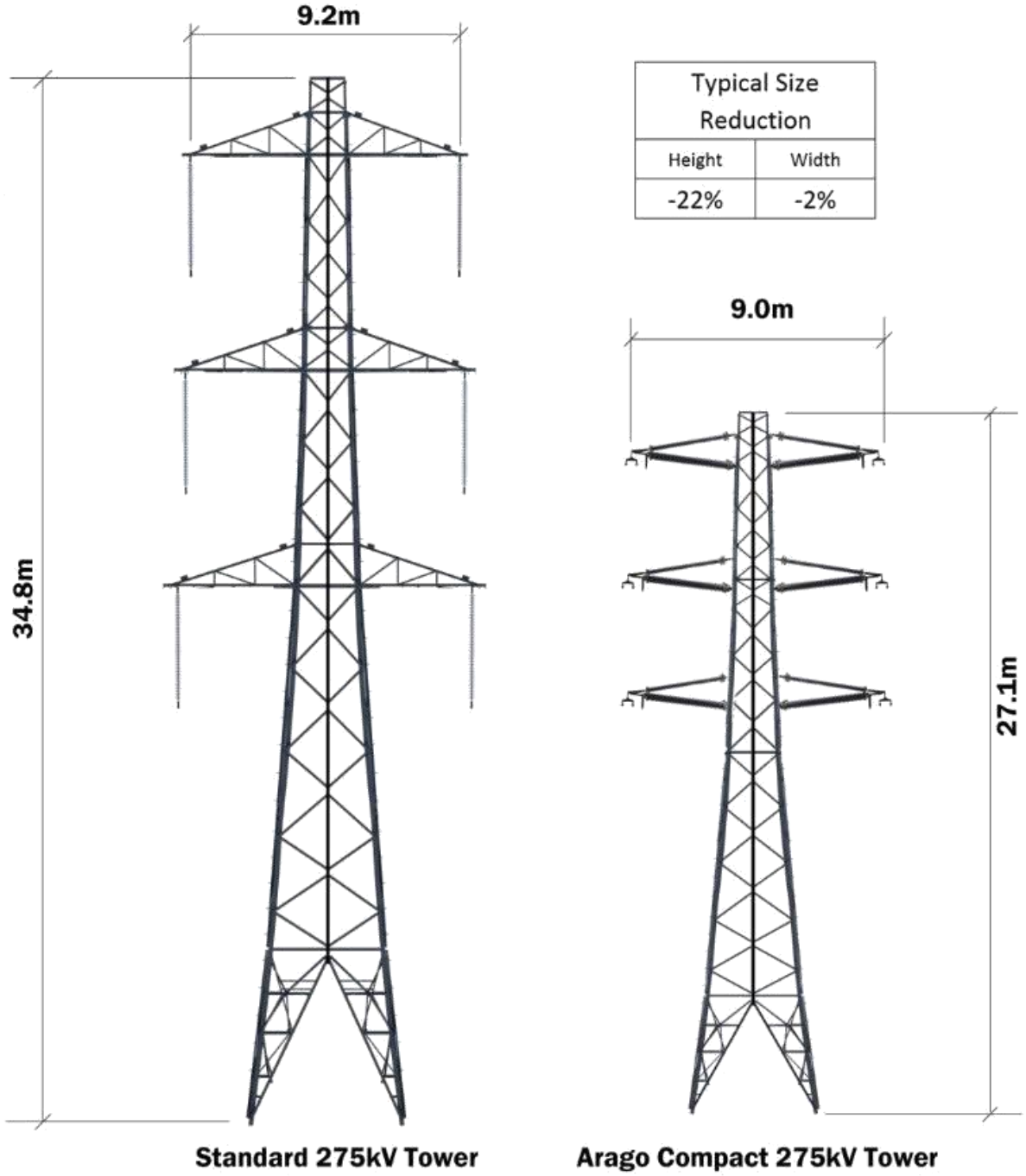
Potential electricity from onshore wind farms is going to waste
DANNY LAWSON/PA

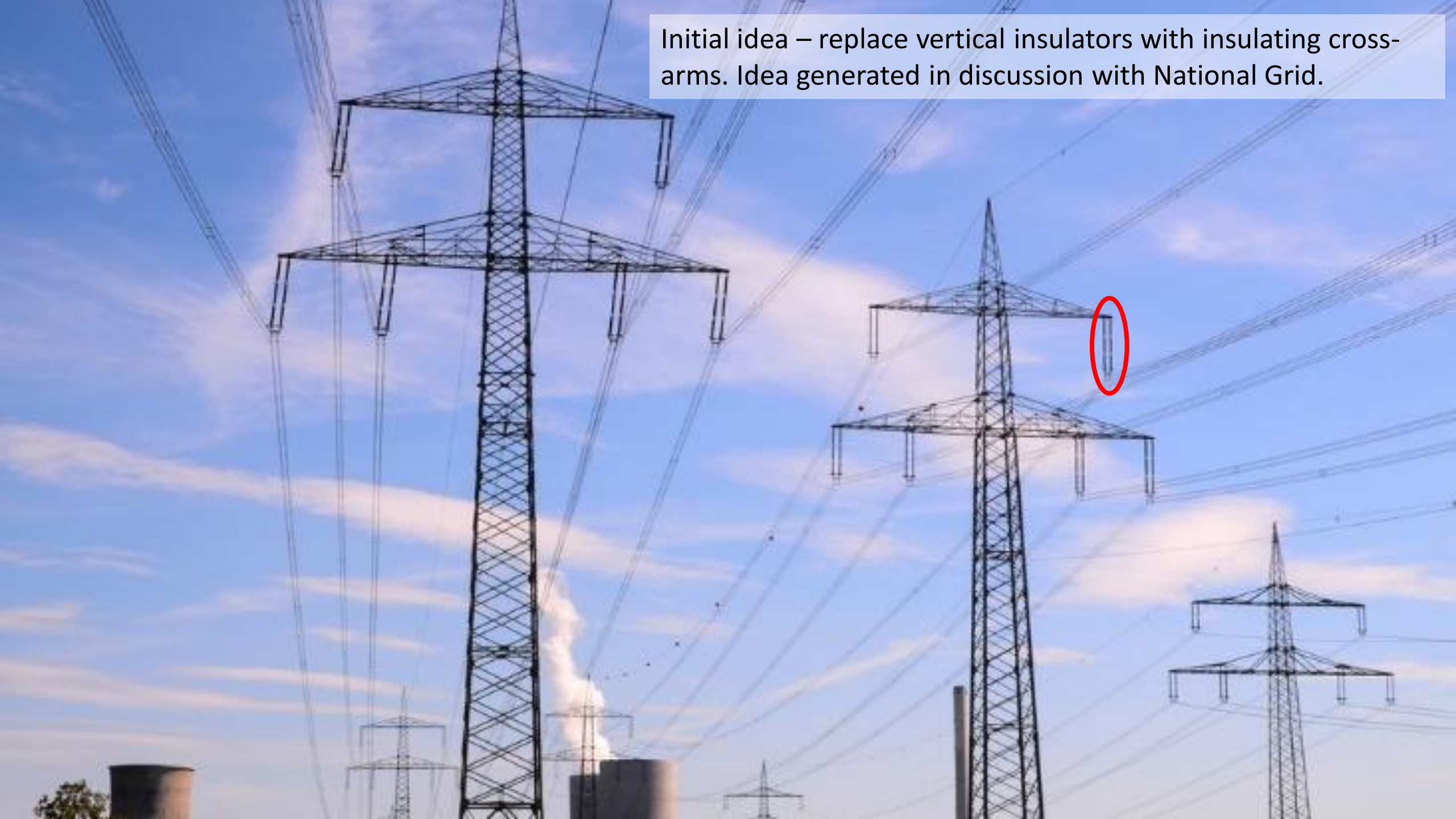
The company blamed very windy weather over the summer for the large amount of potential electricity going to waste. Last weekend alone, £3.9 million was paid to wind farms not to generate.

However, the amount per MWh that wind farms were paid not to generate has fallen significantly. National Grid has tightened rules to reduce the windfall profits that developers can make from these payments after an outcry from consumer groups.

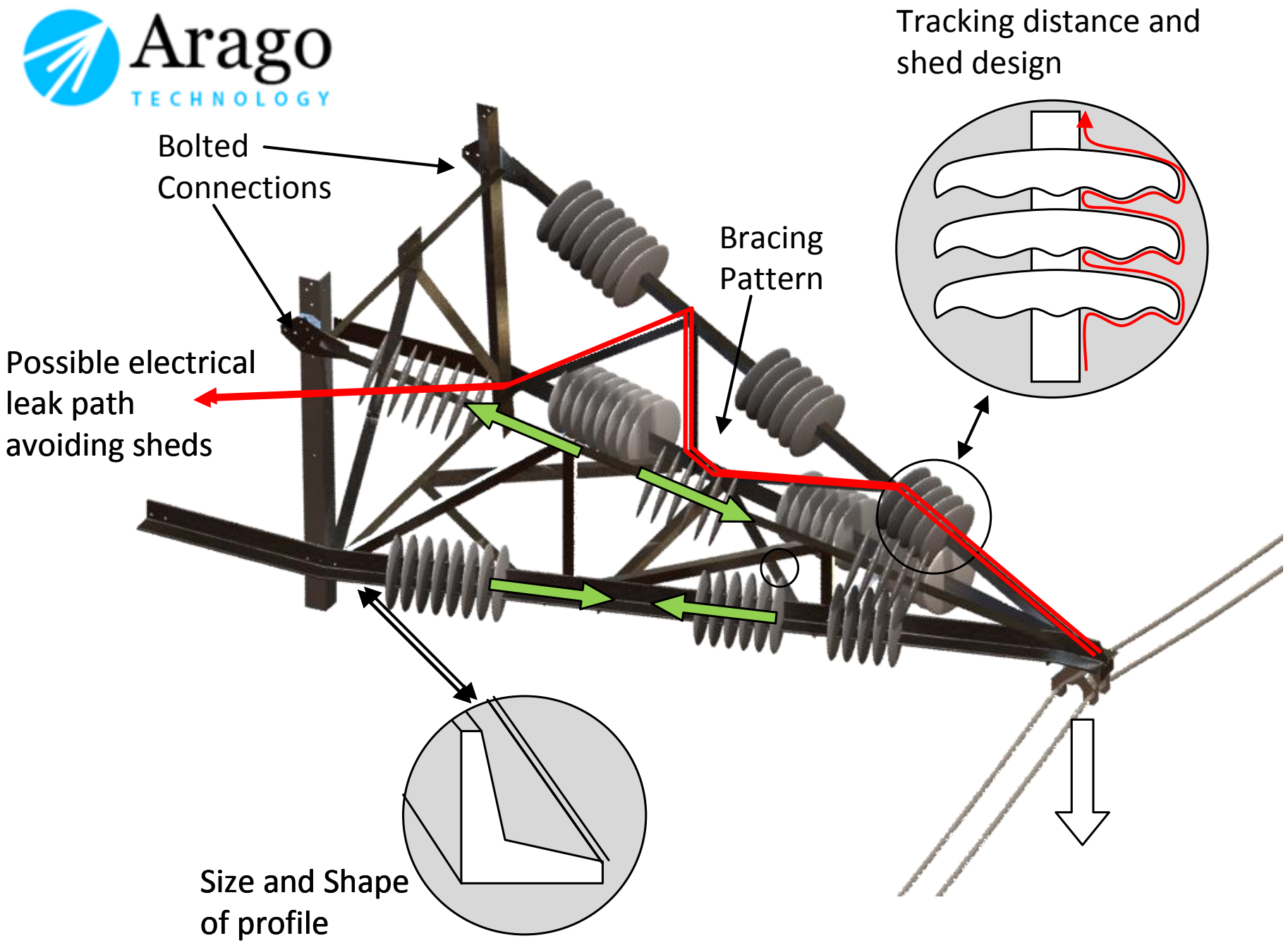
The average payment they receive in addition to the wholesale price of electricity (about £50 per MWh) this year is £89 per MWh, compared with £130 last year and £218 in 2011.

John Constable, director of the Renewable Energy Foundation, a think-tank that is critical of the cost of wind farms, said: "National Grid is struggling to deal with this problem at reasonable cost to the consumer, and clearly needs some help from [the industry regulator] Ofgem." ■

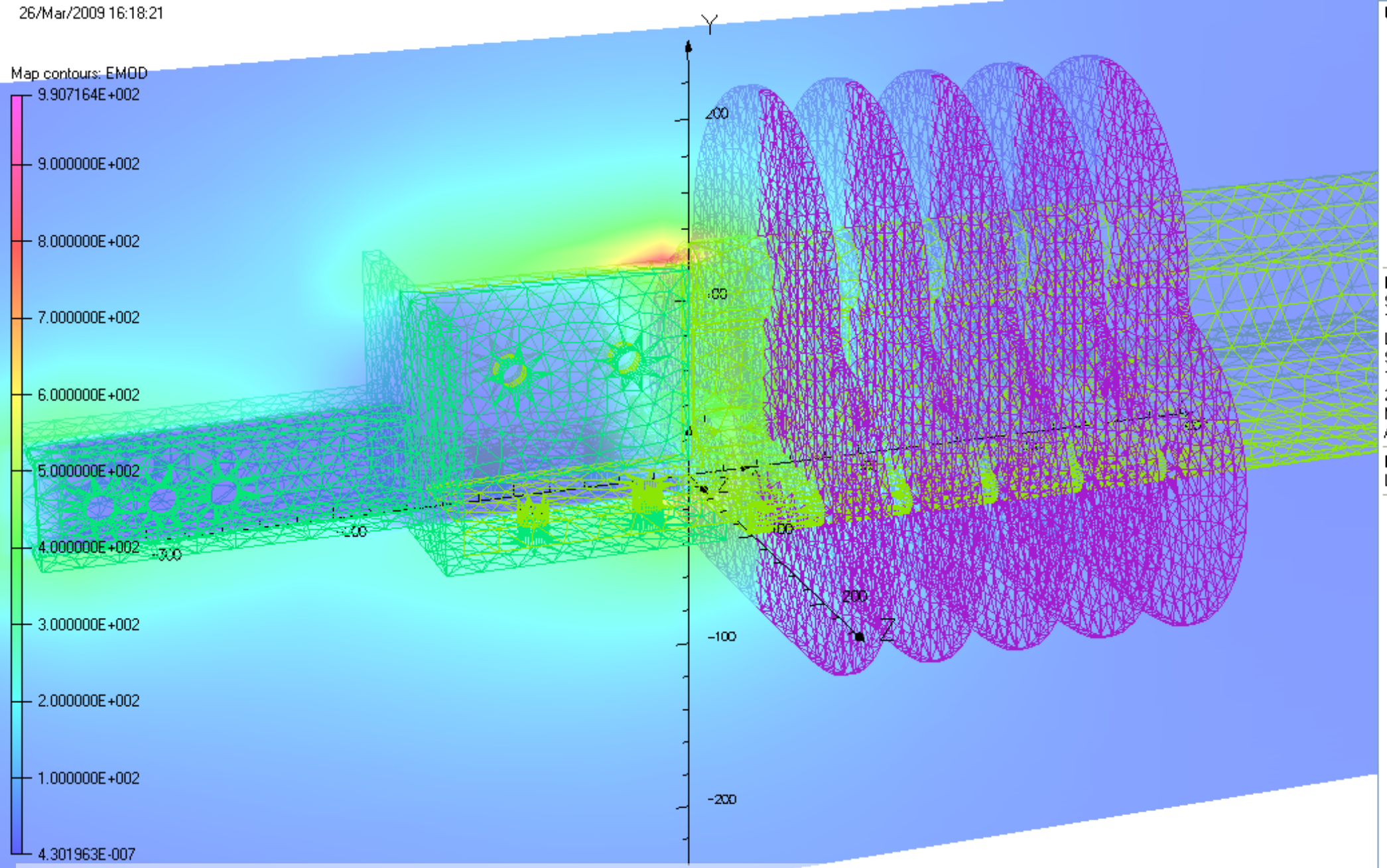




Initial idea – replace vertical insulators with insulating cross-arms. Idea generated in discussion with National Grid.



Brainstorming alternative concepts.



First attempt at computer based design.

Vector Fields
software for electromagnetic design

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First Steps

- A close relationship with an industrial partner – a shared understanding of challenges
- A mix of engineering disciplines – electrical, mechanical and civil.
- Research background and key skills relevant to invention
- First stage relatively low cost and quick

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(54) **SUPPORT TOWERS, INSULATING CROSS-ARMS AND INSULATING MEMBERS FOR HIGH VOLTAGE POWER NETWORKS**

STÜTZTÜRME, ISOLIERSTRAVERSEN UND ISOLIERELEMENTE FÜR HOCHSPANNUNGSSTROMNETZE

PYLÔNES DE SUPPORT, TRAVERSES ISOLANTES ET ÉLÉMENTS ISOLANTS POUR RÉSEAUX ÉLECTRIQUES HAUTE TENSION

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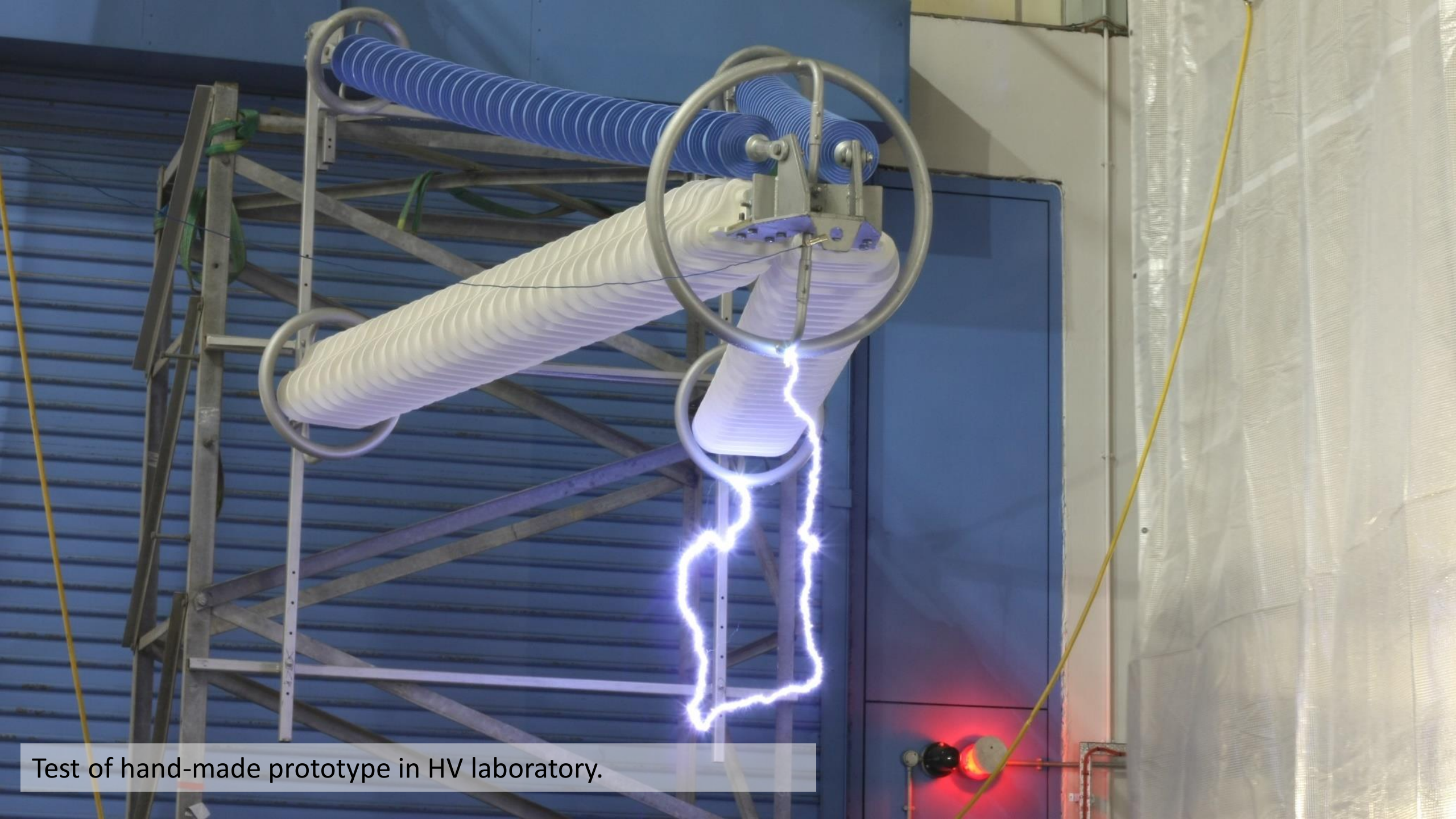

Test of hand-made prototype in HV laboratory.

First field installation on overhead line in Scotland.

Scaling-Up

- Continued close relationships with industrial partner.
- Significant requirement for extra investment as full scale prototypes developed.
- Funds from industry leveraged with internal University funding – share in business to University.
- Increasing patent and legal costs.

OVERHEAD LINES
REQUIREMENTS
SOLUTIONS
REFERENCES

REFERENCES

THE FASCINATION OF SOLUTIONS

Commercialisation

- Significant time developing complete commercial proposition and forming links with manufacturer.

- Challenges maintaining cash flow to cover costs associated with patent liabilities and staff effort

- Require committed funders and patience

Summary

- Generation of idea driven by existing research relationships and open communications.
- Initial prototyping straightforward to deliver using existing facilities.
- Increased costs as prototypes generated put pressure on business – must have funders who understand nature of industry.
- In sectors such as power, patience is needed – the industry can be conservative and change takes time.