

Can the Grid Deliver?

Elaine Greig

Are we fighting the right fight?



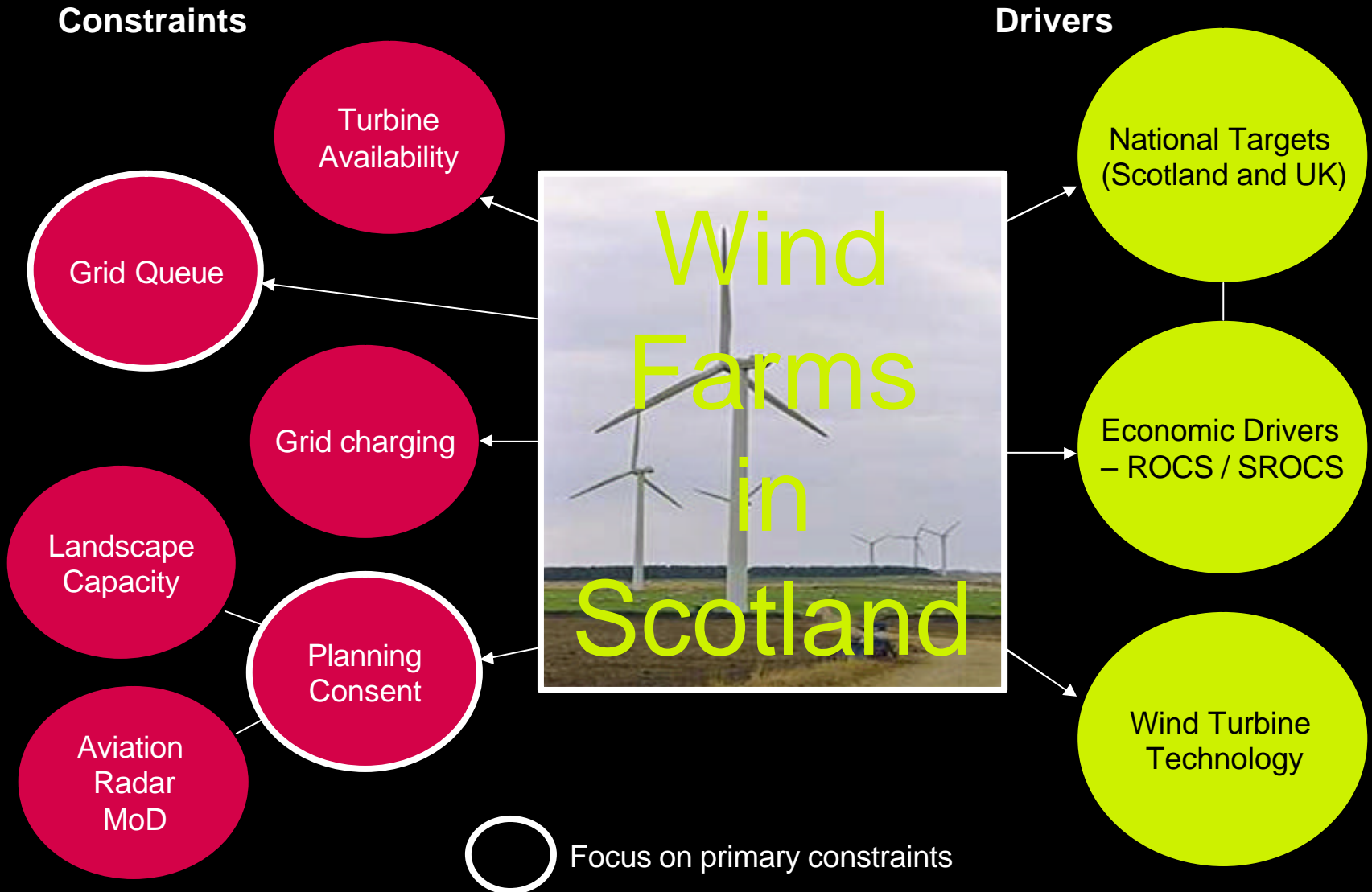
Background:

- For reasons we all know there is a large target for wind farms in Scotland, and the rest of the UK.
- Whether we agree we're on target or not, we should focus efforts on resolving the issues that will have the most significant effect in helping us reach, and exceed, those targets.

The Issue:

- The industry and its institutions have limited resources.
- There are lots of issues, mostly being addressed in parallel.
- This may be leading to a dilution of effectiveness.
- Is grid, and the grid queue, a primary issue?
- I will consider Scotland, the methodology can be similarly applied elsewhere as appropriate.

Drivers versus constraints



The study of constraints

- General acceptance that the effectiveness of the economic drivers is frustrated by the constraints.
- There is much debate about many issues – the primary two are considered to be planning and grid.
- There is no apparent study of correlation between the two.
- BWEA29 confirmed to me that a study of their correlation would be of interest, and potentially use, for our industry.

- The method could equally be applied to other areas, e.g. Cornwall, Wales, offshore, to establish which constraint is key for each area, or for development as a whole.
- Once established, further depth could be studied, e.g. into the secondary constraints: landscape capacity, aviation / radar, turbine supply, grid charges, politics affecting decisions etc.

The analysis



Data (Scotland only):

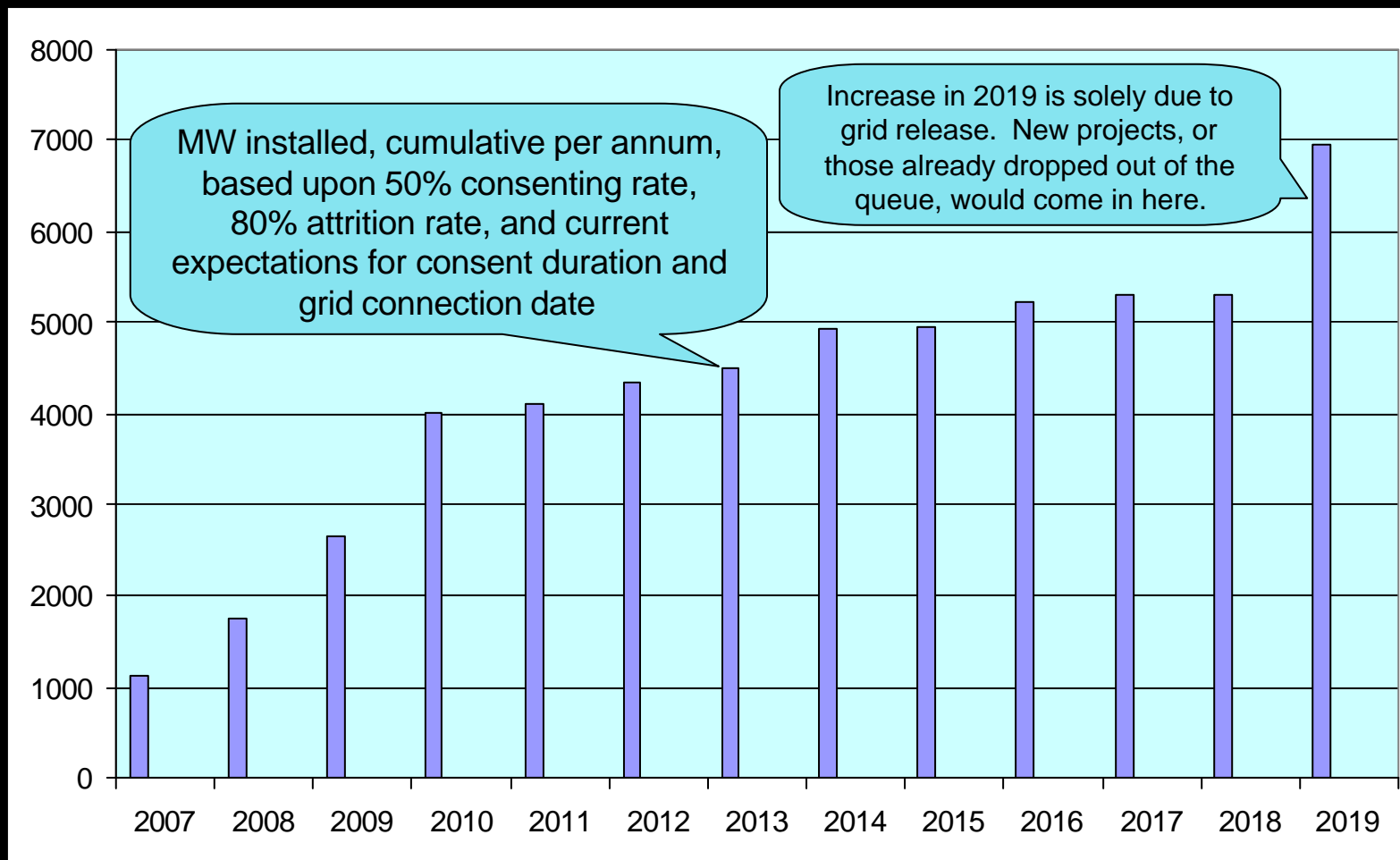
- Gathered data on known grid connected projects >0.05MW: consent application, consent date, grid connection date.
- Sourced data from publicly available sources, starting with SRF database (by permission), ReStats, Country Guardian, Edinburgh Gazette & NGET TEC registers.
- Data gathered to January this year (2008) – then frozen & studied (thus very quickly out of date).

Calculations:

- Developed historic norms and future expectations, with wind farm available at the later of consent plus x years, or grid date.
- Modelled alternate future scenarios assuming consent granted within 9 months, or the grid date equalled the earliest construction date, or both changes made together.
- Calculated using 80% & 50% success rates. Recent SRF figures give 50%, however longer historic assessment gives 80% – usefulness the of results is relative not absolute.

Results – based upon 50% success rates

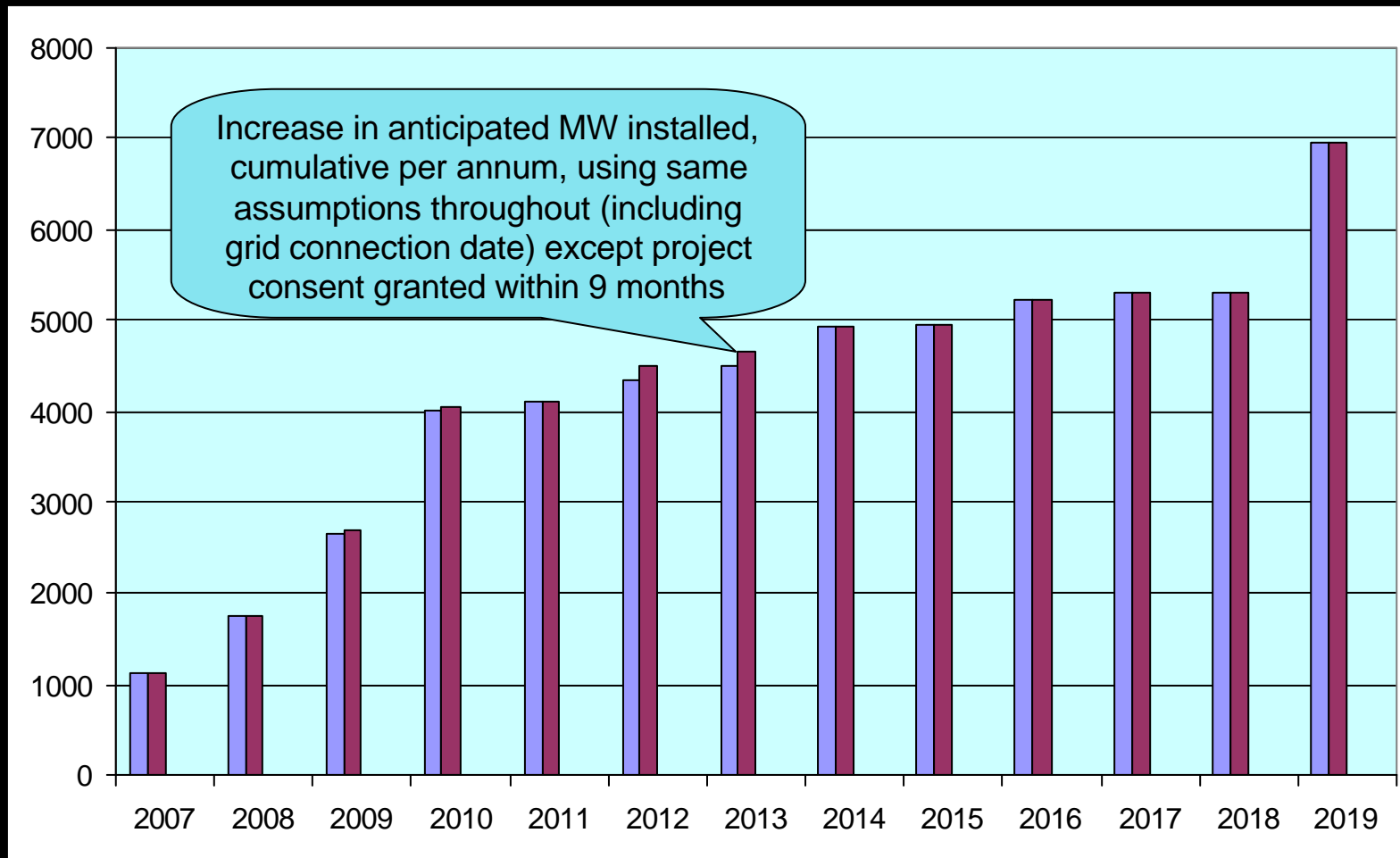
Current expectation of development



Results – based upon 50% success rates

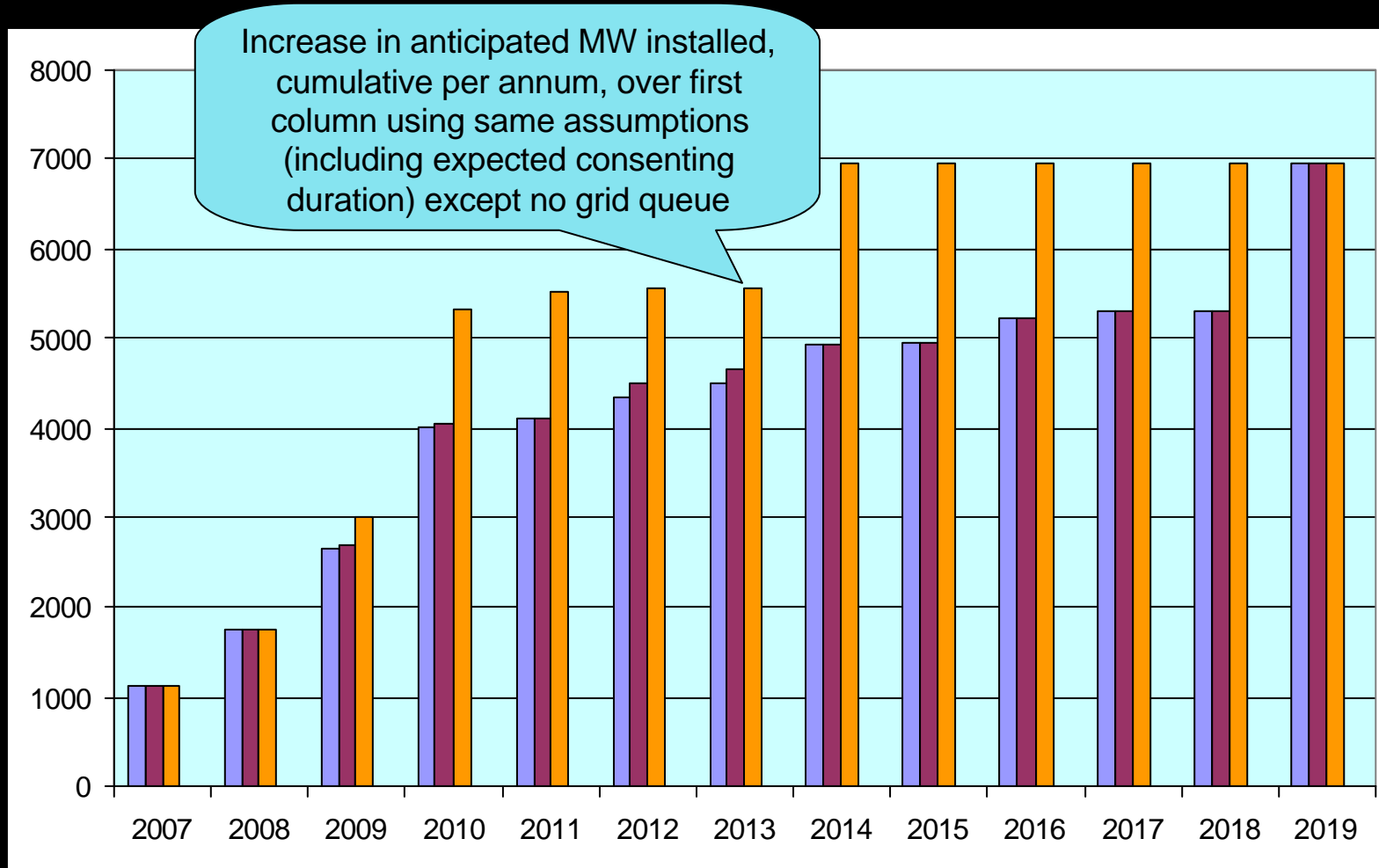


What-if project consents were granted in 9 months?



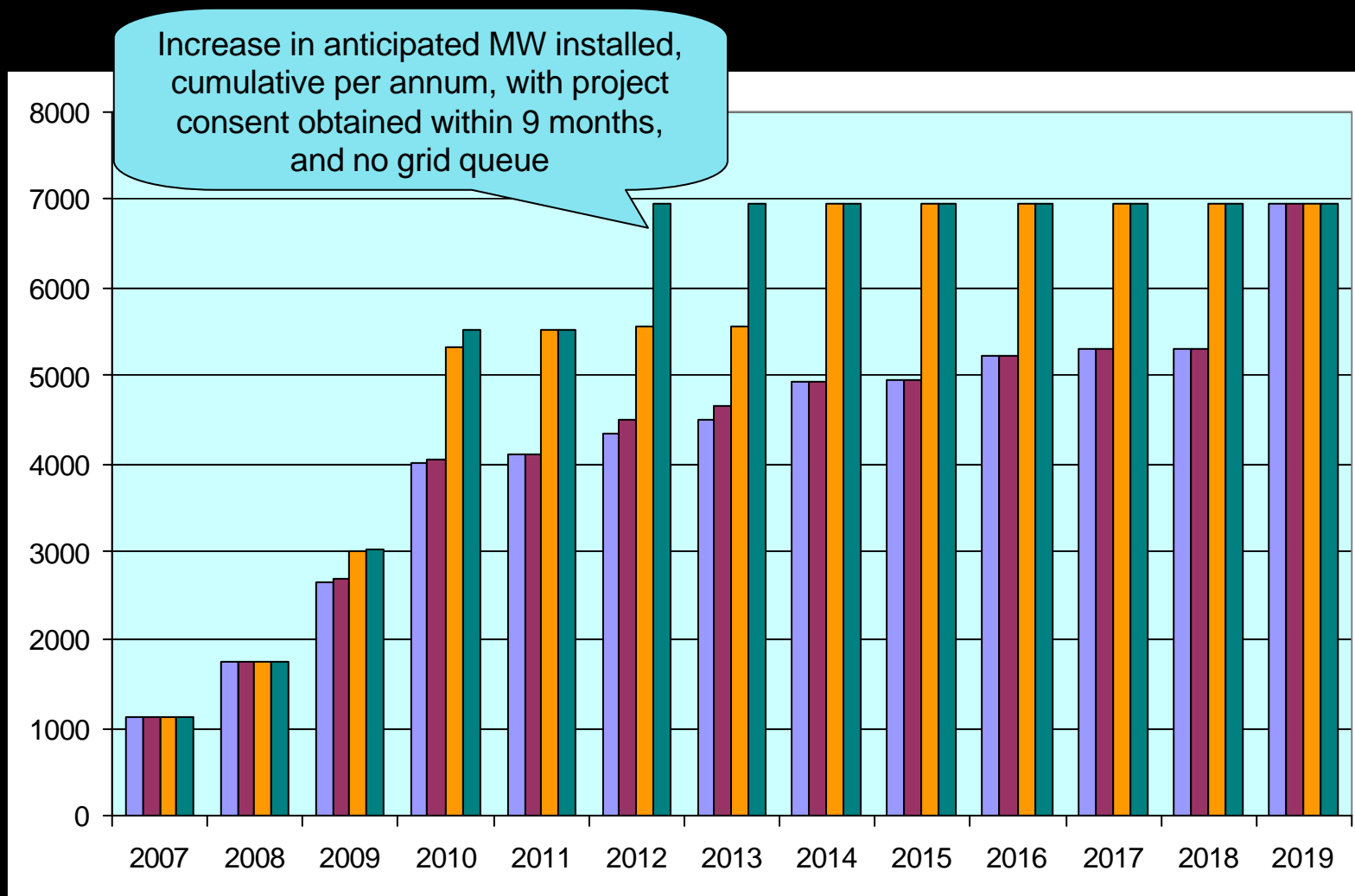
Results – based upon 50% success rates

What-if the grid queue disappeared tomorrow?



Results – based upon 50% success rates

What-if both constraints were lifted?



What have we learnt?

Grid is the biggest constraint to wind farms in Scotland.

- This is useful to know, as it enables us to target this specifically.
- The Scottish 31% by 2011 equates to 5000MW. From the 50% graphs presented, and the more optimistic 80% graphs not presented but selectively tabulated below, Scotland can only meet its specific target if the grid queue is removed.
- (50% by 2020 would be 8000MW if demand was constant).

Scenarios to end of 2010	Actual prediction	Change consent to 9 months only	Remove grid queue alone	Change consent and grid
50% success rate	4000	4050	5330	5510
80% success rate	4540	4600	6460	6760

Eliminating the grid constraint

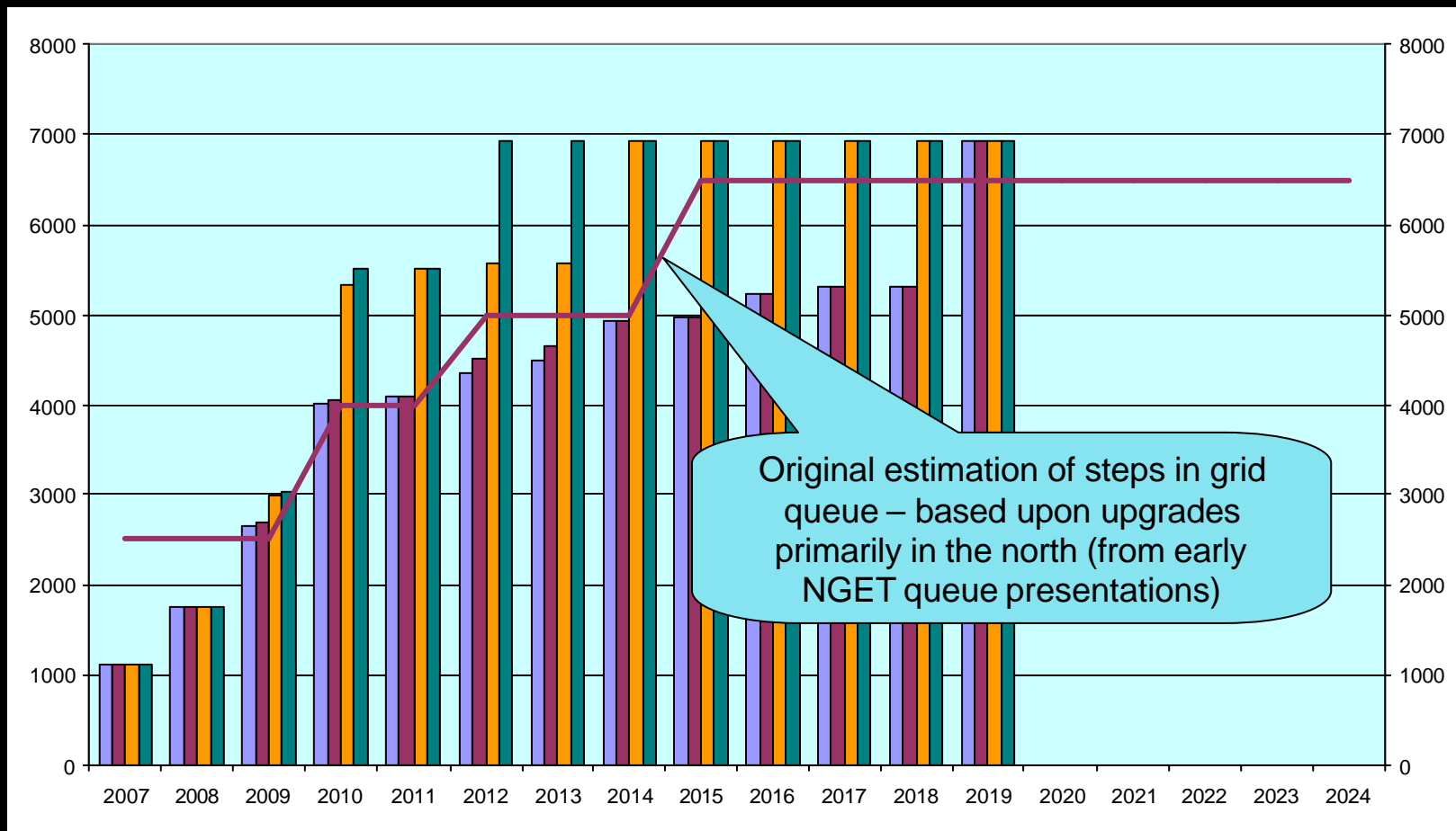
How will capacity be released?

- - by grid companies,
 - Fundamental change – connect and manage.
 - Incremental change – queue juggling.
- - by planners (release Beaulieu-Denny etc.).
- - by circumstance – i.e. other power station closures.

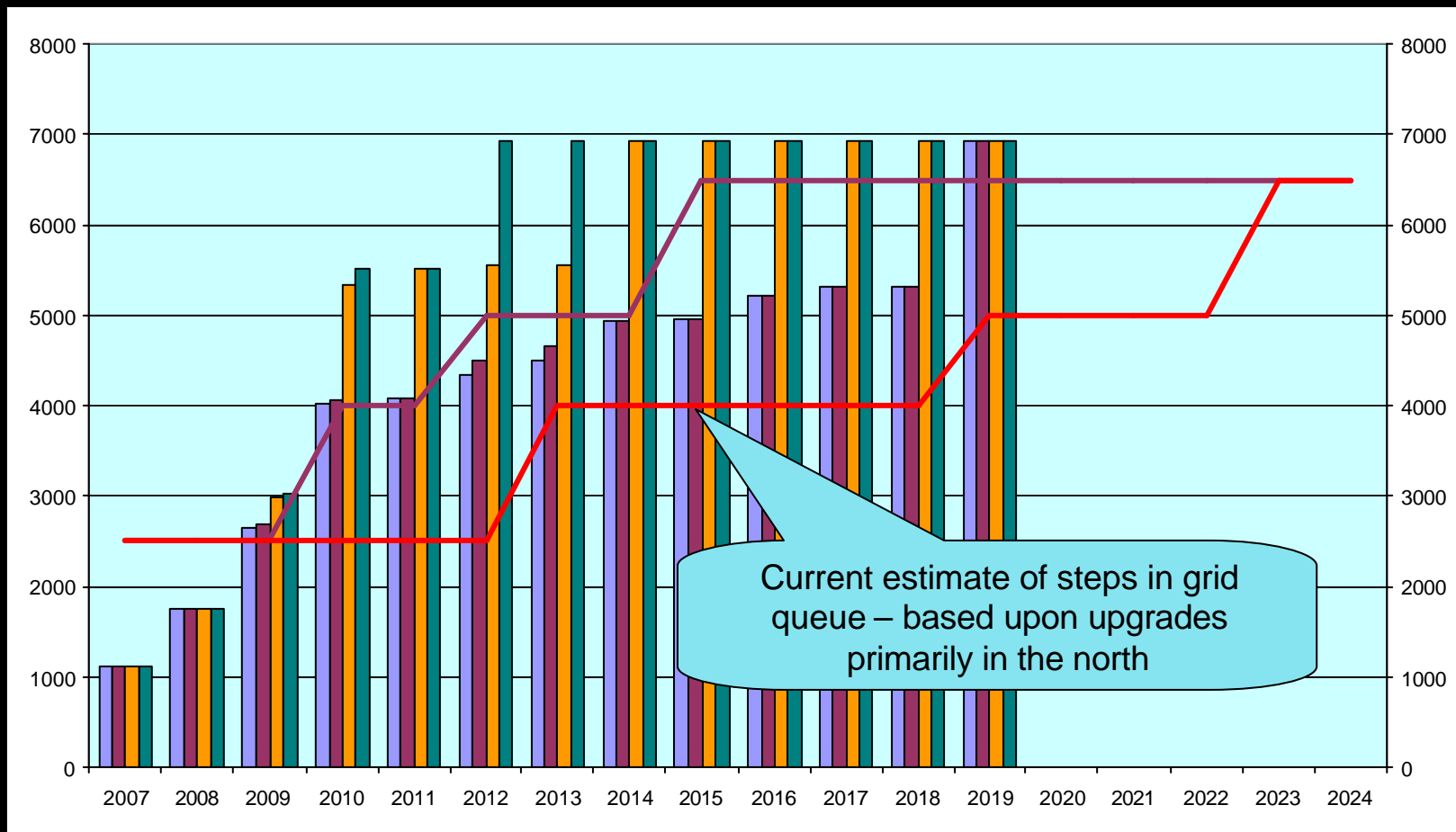
How much capacity is needed?

- See following graphs – very simplistic, indicative only.
- Capacity needed may determine which delivery mechanism is required to deliver it.
- Is the Scottish government assuming in its calculation of the 31% target, which it believes it will meet, that one or more of the above will occur or be successful? We need to make it happen.

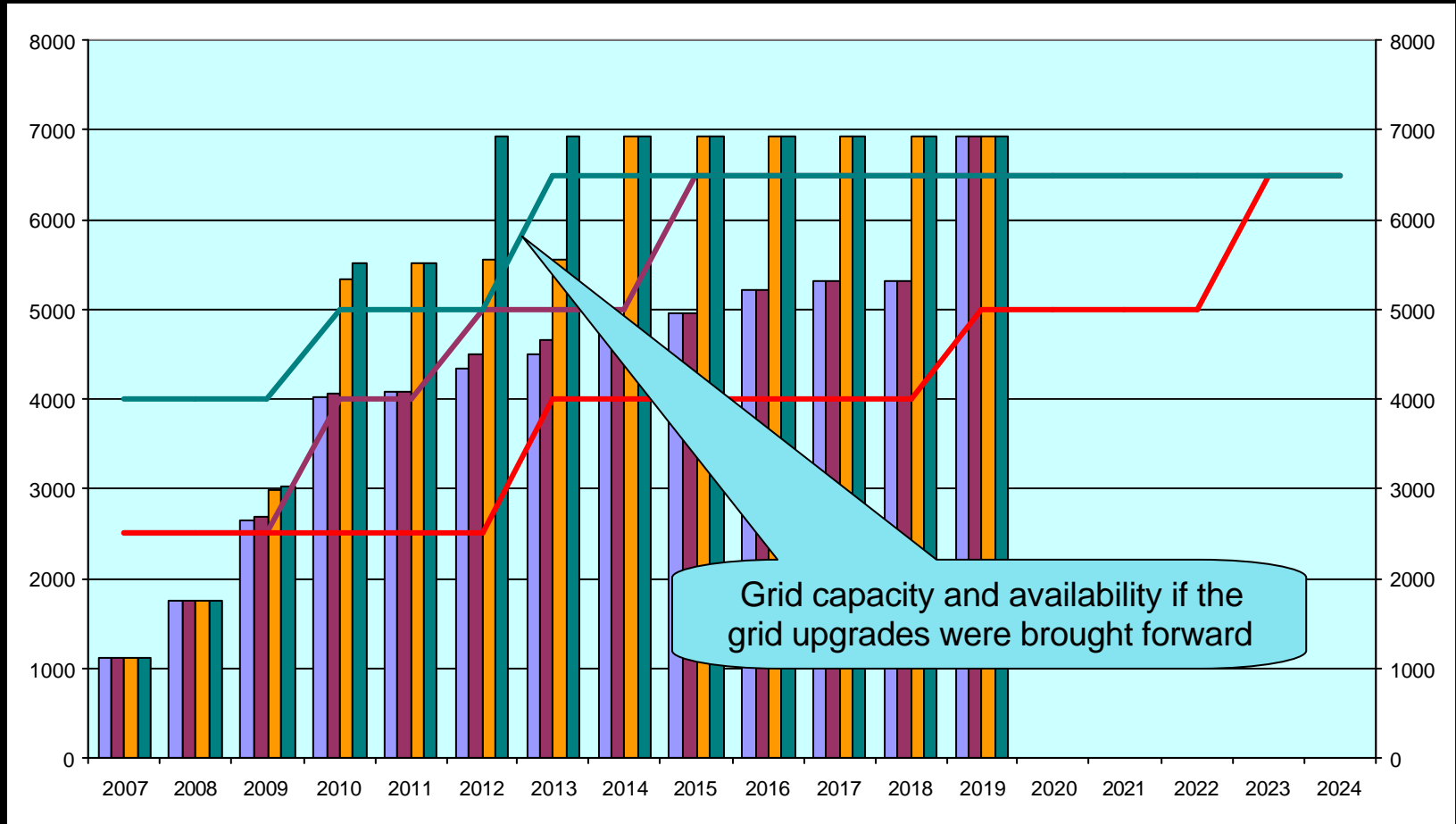
Crude estimate of grid availability



Crude estimate of grid availability



Crude estimate of grid availability



Innovation analysis of organisations

The Grid Companies:

- The graphs show that the capacity required could be delivered by the planned upgrades, with the invest and connect regime.
- If the consents were granted, grid would not need fundamental change. Otherwise fundamental change, to connect and manage, may deliver sufficient capacity on the existing network.
- The innovation cycle is crudely a continuous:
initiation \Rightarrow development \Rightarrow implementation
- Bureaucratic styles of management are appropriate during the initiation and implementation phases, but the development phase requires more flexibility than a strictly regulated industry is set up to allow.
- Fundamental change will therefore be very difficult.
- Incremental change is underway (several CUSC Amendments), but not having the desired effect – yet?
- We are hearing the right noises from Ofgem on TAR, but is it really any different from ARODG and previous incarnations?

Innovation analysis of organisations

Planning:

- The government drive to facilitate major infrastructure projects would enable the grid queue to be released, and thus wind farms to be connected.
(as well as nuclear and other major infrastructure)
- In local government, 'Public inquiries into major projects are attended by construction companies and professional protesters. The transaction costs of participative democracy are too high, so its decisions are neither adaptive nor representative.' (Kay, 2003).
- Thus, unsurprisingly to those involved, this will be very difficult, but inherently possible.

Both grid and planning organisations face problems in their organisational style or economic context, however if both recognise the other has problems, and both try to address the issue of releasing the grid queue, the odds of success are increased significantly, to the benefit of the whole industry.

Do's

- DO focus on removing the key constraint – GRID
- DO try to release the constraint by consenting major infrastructure projects, as well as pursuing grid regulatory changes

Don'ts

- DON'T predict future capacity based upon consents only
- DON'T rely upon the grid companies alone to remove the grid constraint

Study Lessons

- Follow the example of other successful European Countries and study which are the critical issues that need to be addressed
- Focus efforts on major issues and attack from multiple angles
- Enable targeted and coherent policies