

GDS in the Gate 3 connection process

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Topics Presented

- Key Attributes of Gate 3
- GDS in Gate 3 - why and how
- Gate 3 Flowchart
- Transmission Node Assignments
- Shallow Connection Methods
- Connection Offer Processing
- Worked Example
- Summary



Key Attributes

Based on CER draft direction

- 3000+MW renewables
- Conventional Generation
- Connection nodes decided first
- GDS derived transmission network
- ITC Programme to assess Firm Access
- Offers commence in Autumn 2009



GDS and Gate 3



GDS and Gate 3 – Why use it

- Best informed projection of requirements to cater for all changes to the system over the next 15-20 years
- Minimise risk of sub-optimal reinforcements in offers (and therefore changes to offers)
- Caters for fuel variable and fuel stored generation mix - viable generation portfolio
 - Poor mix = more reinforcement = delay to generators

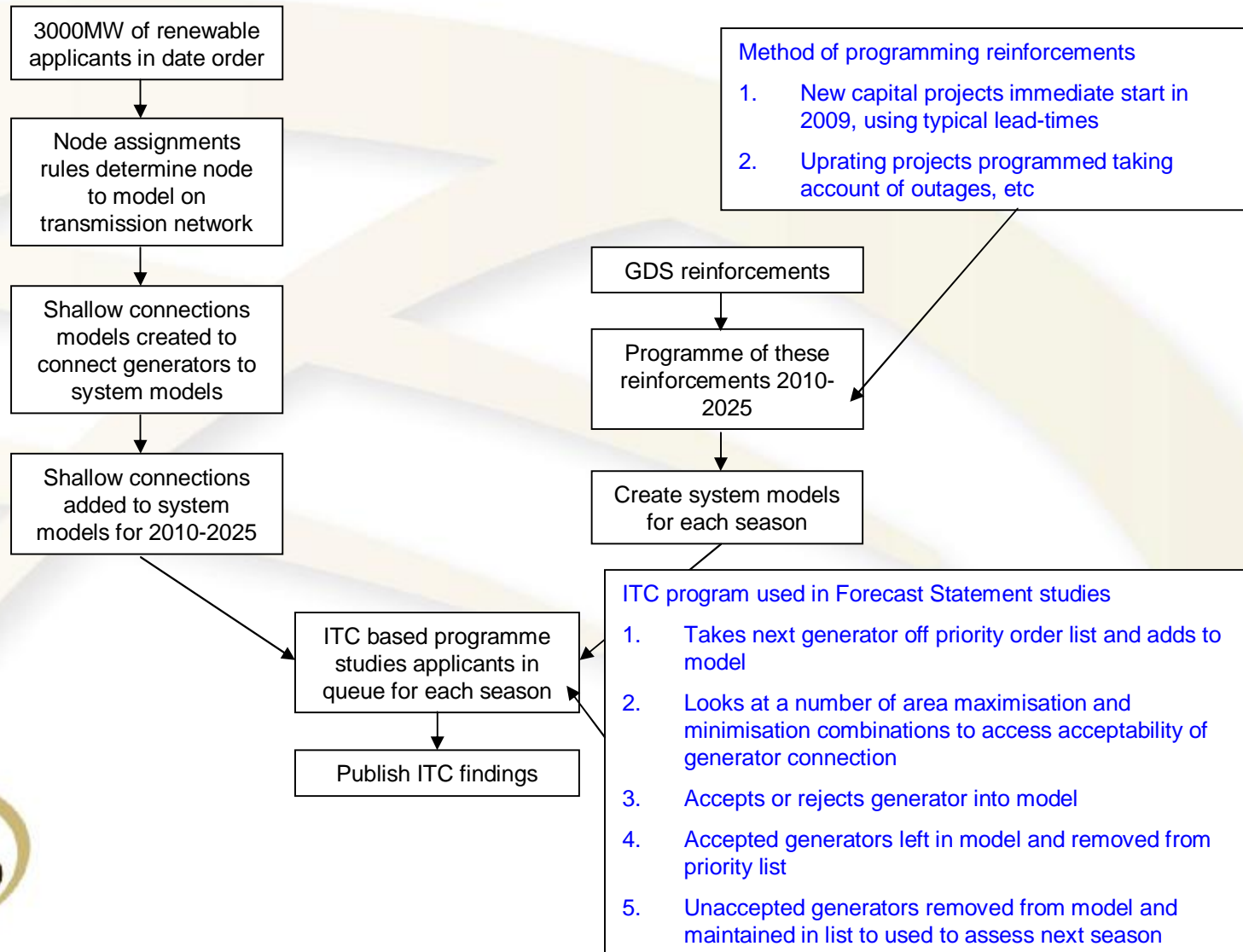


GDS and Gate 3 – How it is used

- GDS used to derive an expected network from 2010 to 2025
- System models built for each season
- Incremental Transfer Capability (ITC) Programme will assess applications for firm access using this network
- Priorities of network projects can be revised depending on ITC results
- Worked example of ITC later



Gate 3 Flowchart – Step 1



Transmission Node Assignments



Rules for transmission node assignments

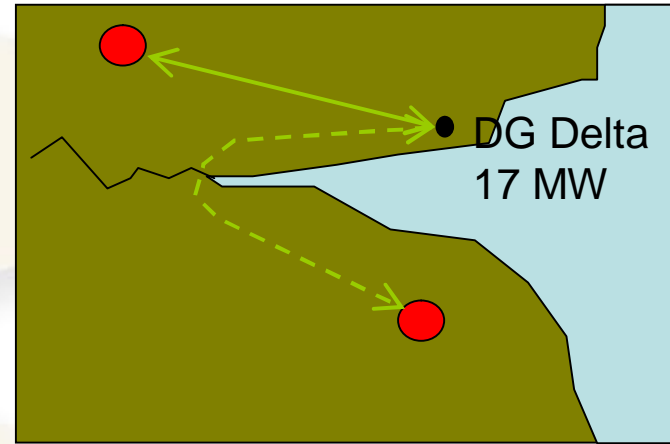
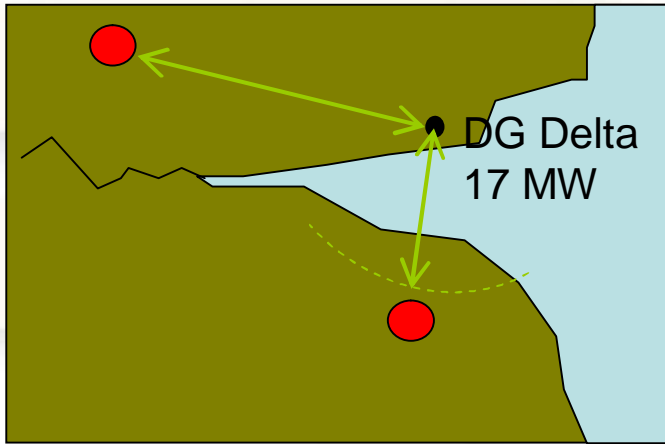
- Rules devised to provide as much transparency as possible to applicants
- Used as the initial assignment for purposes of running the ITC Programme
- Concentration of applicants $<40\text{MW}$ – System Operators may declare a new 38kV node
- Concentration of applicants $\geq 40\text{MW}$ and $\leq 177\text{MW}$ – SO's may declare a new 110kV node (or 2 if $>177\text{MW}$ & $< 200\text{MW}$)
- Concentration of applicants $\geq 200\text{MW}$ – System Operators may declare a new 220kV node
- Transmission connection nodes chosen will not be changed.



Rules for transmission node assumptions

<i>Application Capacity [MW]</i>	<i>Rule</i>
	<i>Assumed connection</i>
$\leq 5\text{MW}$	nearest 38kV node
$> 5\text{MW}$ and $\leq 10\text{MW}$	nearest 38kV or 110kV node
$> 10\text{MW}$ and $\leq 40\text{MW}$	nearest 110kV node
$> 40\text{MW}$	New 110kV metered connection (station)
$> 200\text{MW}$	New 220kV metered connection (station)

Rules – Definition of nearest



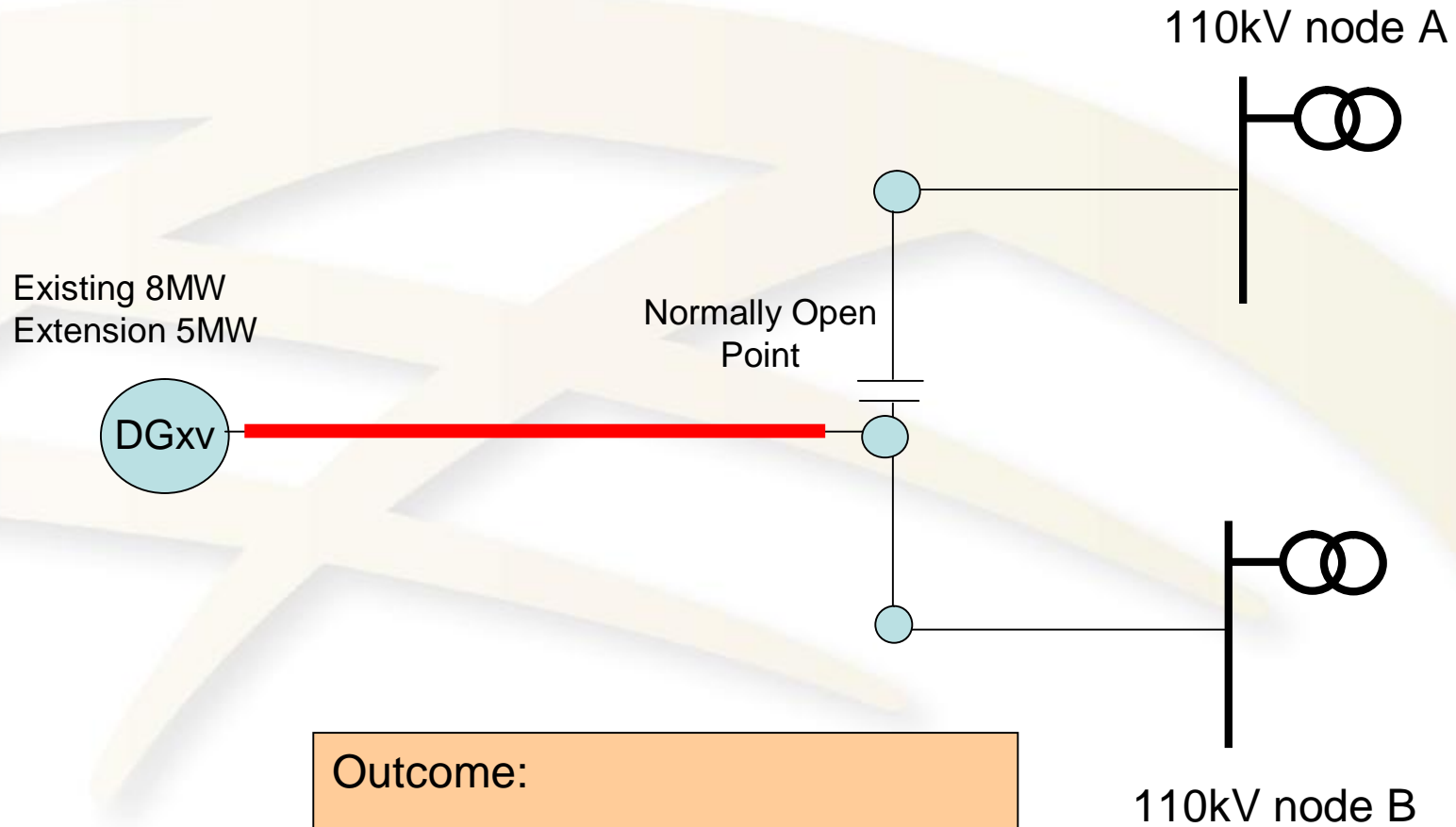
- Point to point distance compared except when water body greater than 150m in between
- Water bodies greater 150m - Go around water body until crossing less than 150m can be found

Transmission node assignments - extensions

- Extensions defined by:
 - Same co-ordinates
 - Ownership by same person or legal entity
- If application is on the end of line/cable either dedicated or shared with another then proposed treatment as follows:
 - If the extension(s) can be accommodated on that line/cable then node will be assigned on the basis of the present normal feeding arrangements
 - If the extension(s) **cannot** be accommodated on that line/cable then the new total MEC will be taken and existing rules applied



Example: dedicated line/cable adequate

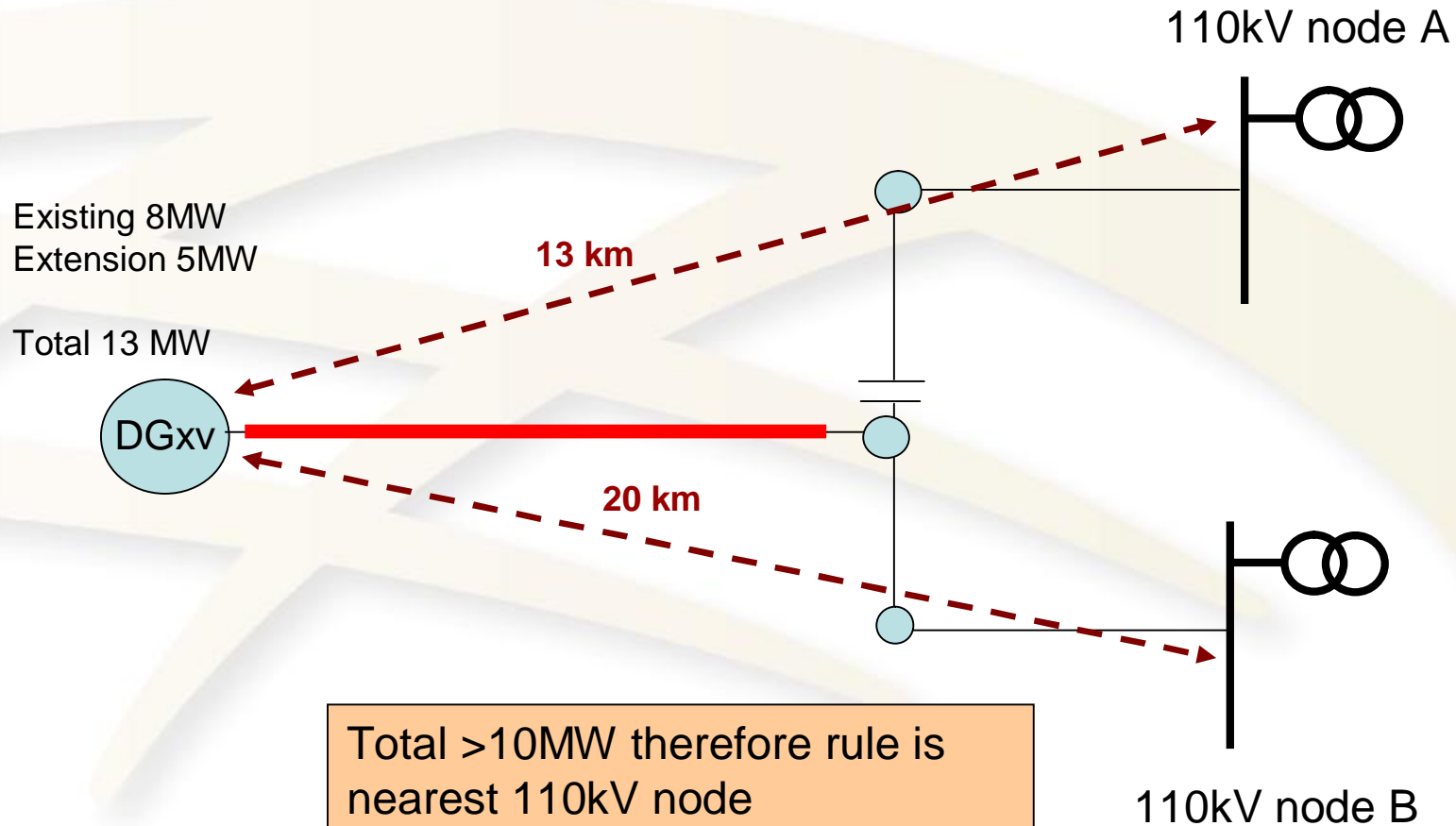


Outcome:

DG xv assigned to 110kV node B



Example: dedicated line/cable inadequate



Total >10MW therefore rule is nearest 110kV node

Outcome:

DG xv assigned to 110kV node A

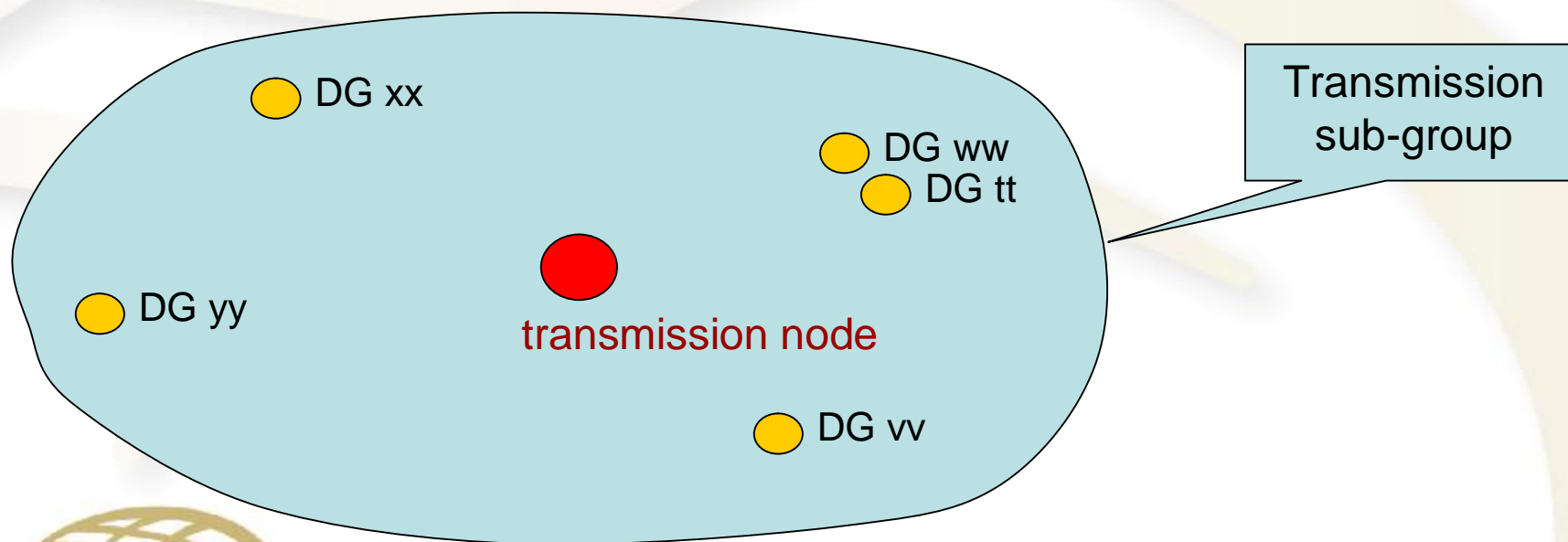


Shallow connection methods



Shallow connection methods

- Once transmission node assignments are made, transmission sub-groups will be formed around the transmission nodes



Shallow connection methods

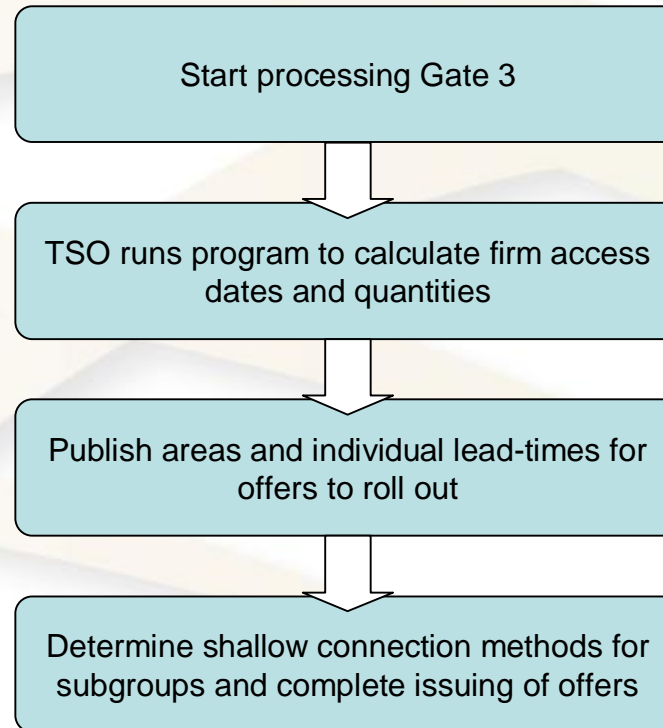
- Transmission sub-group will ultimately be fed from the assigned transmission node
- System Operators will offer on basis of LCTA for the entire transmission sub-group
- Actual connection methods may change for longer term system planning reasons



Connection Offer Processing



Process – High level



Procedure – High level

Start processing Gate 3

- Prior start of Gate 3
 - *Gate 3 Rules Confirmed in Final CER Direction*
 - *GDS study completed*
 - *Applicant transmission node determined – Rules*
 - *Commence shallow connection studies*
 - *Applicants can reduce MEC or increase turbine sizes by up to combined maximum 4MW*
 - *Gate 3 Industry Liaison Group*
 - *Transmission Nodes published after Final CER Direction (est Q4 2008)*



Process – High level

TSO runs program to calculate firm access dates and quantities

- ITC Programme run and firm access dates and quantities identified
- Technical Review
- CER endorse that results meet policy objectives
- Estimated Q2 2009



Process – High level

Publish areas and individual lead-times for offers to roll out

- Applicants firm access dates and quantities provided
- As a general rule Offer issue estimated dates will take account of earliest application date order for the sub group
- Applicants estimated Offer issue date published (estimated end Q2 2009)
- System Operators engage with applicants



Process – High level

Determine shallow connection methods for subgroups and issue offers

- Offers compiled based on:
 - Connection method determined for the sub-group
 - Published CER approved standard costs
 - Charging principles of Joint Charging Paper (February 2007)
- Offers will comprise firm and non-firm options as appropriate:
 - Non-firm access - completion of all shallow and distribution deep works.
 - Firm access - from ITC Programme firm access



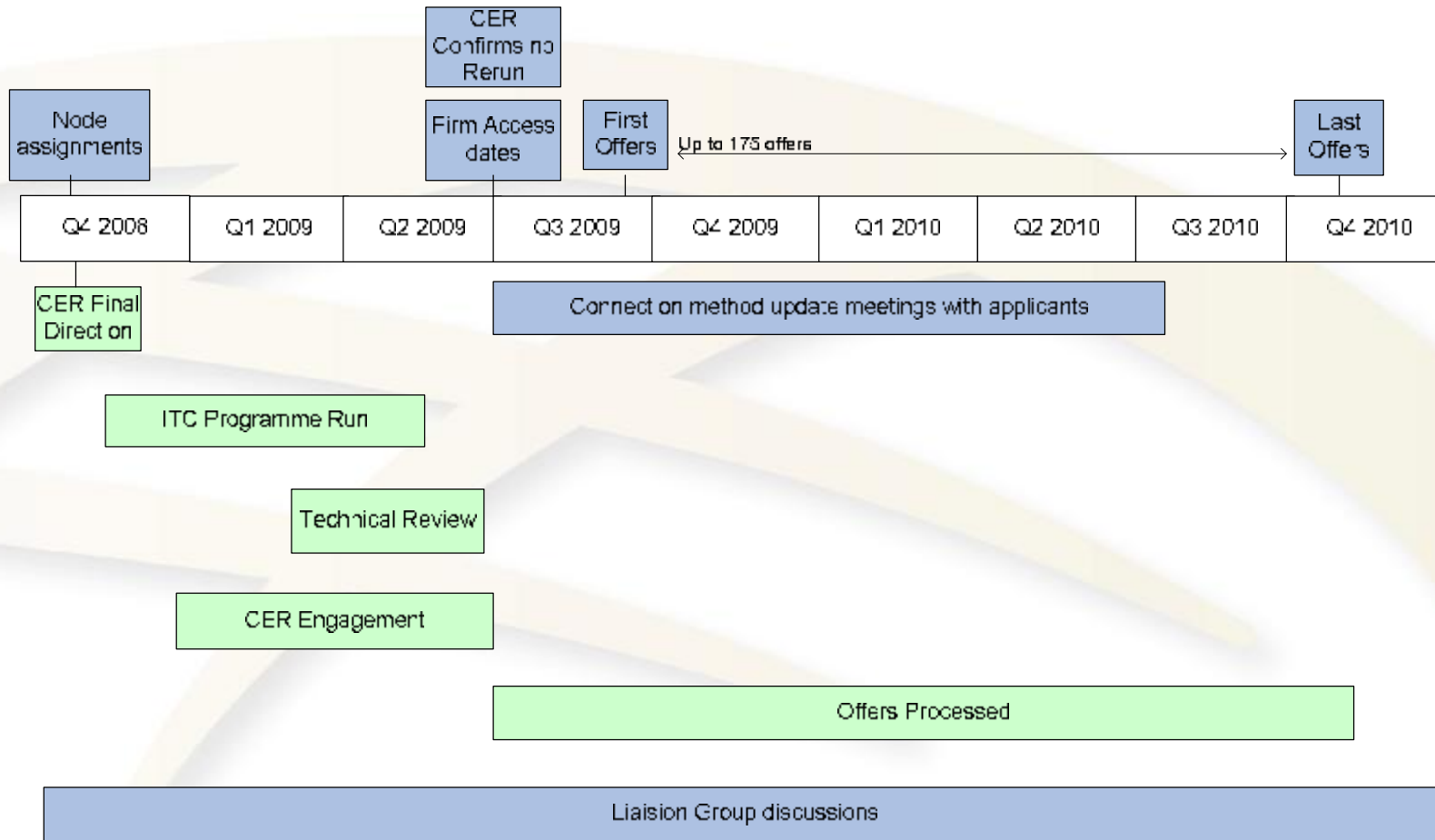
Process – High level

Determine shallow connection methods for subgroups and issue offers

- Constraints estimates provided (non-firm)
- Offers predicted to commence in Q3 2009 and completed in Q4 2010
- Modification to offers post Gate 3 unless they do not interfere with issuing of other offers



Process – High level

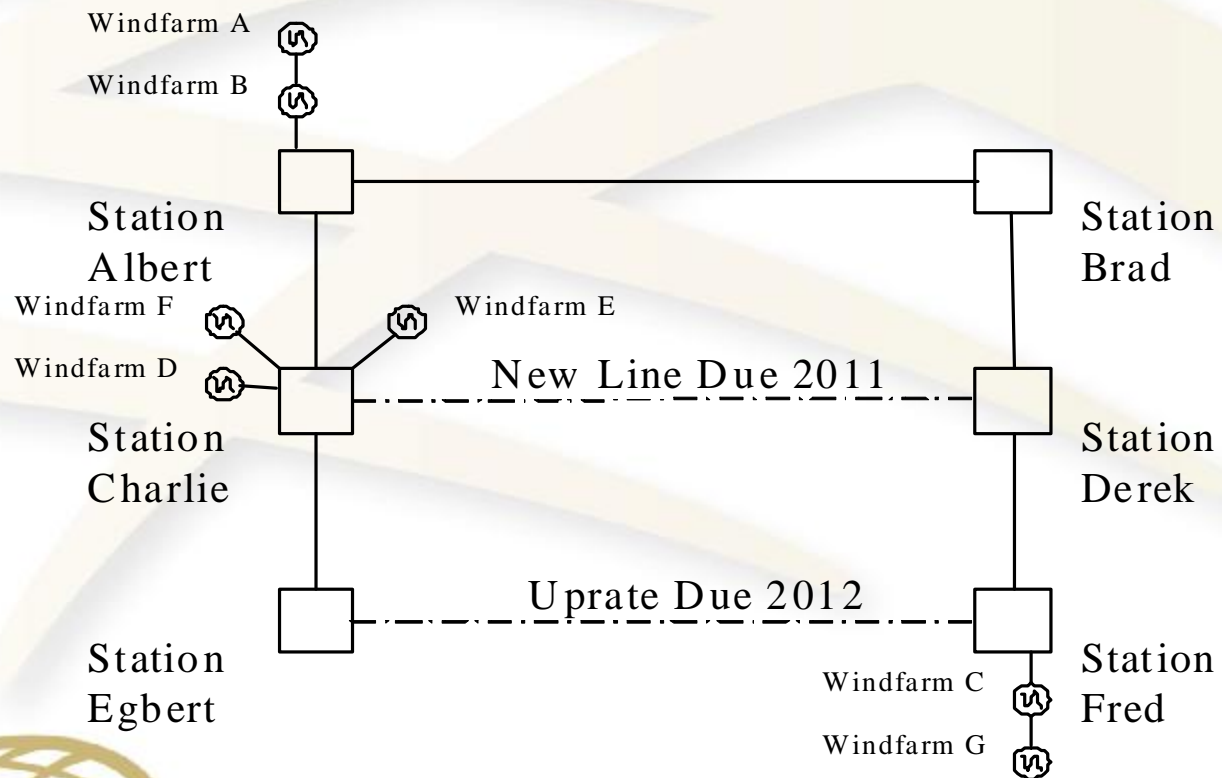


Worked Example using ITC Programme



Example – Network

Years 2011-2013



Detail of Example

- Applications received for network in 2011-13

Name	MW size	Date of application	Est Shallow connection point
Windfarm A	10	01/01/2004	Station Albert
Windfarm D	20	01/04/2004	Station Charlie
Windfarm E	15	01/05/2004	Station Charlie
Windfarm B	5	01/01/2005	Station Albert
Windfarm F	5	01/06/2005	Station Charlie
Windfarm G	2	01/07/2005	Station Fred
Windfarm C	7	01/03/2006	Station Fred



Detail of Example – acceptable generation

Study results for 2011

- ‘Spare’ capacity not calculated by the program
- Program adds generators sequentially, accepting or rejecting each in turn
- 2011 - network has ‘spare’ capacity which in this example equates to:
 - » Station Albert 15MW
 - » Station Charlie 25MW
 - » Station Fred 25MW
- Date order: Windfarm A (10MW) in Station Albert added
- Capacity in 2011 now becomes:
 - » Station Albert 5MW
 - » Station Charlie 15MW
 - » Station Fred 15MW
- Next generator in date order, Windfarm D (20MW), is added to Station Charlie – 15MW can be accommodated
- No ‘spare’ capacity in the network - studies for 2011 are completed.



Detail of Example – acceptable generation

Study results for 2012

New 110kV line between stations Charlie and Derek completed in 2011

- 2012 - network has 'spare' capacity which equates to:
 - » Station Albert 15MW
 - » Station Charlie 27MW
 - » Station Fred 27MW
- Windfarms A and D - 2011 connection date therefore already added to the model for this year
- Date order: Remaining Windfarm D (5MW) added to station Charlie - can be accommodated
- Revised 'spare' capacity in 2012 now becomes:
 - » Station Albert 10MW
 - » Station Charlie 22MW
 - » Station Fred 22MW
- Next generator in date order, Windfarm E (15MW) added (station Charlie) - can be accommodated
- Revised 'spare' capacity in 2012 now becomes:
 - » Station Albert 0MW
 - » Station Charlie 7MW
 - » Station Fred 7MW



Detail of Example – acceptable generation

Study results for 2012

- Revised ‘spare’ capacity in 2012 now becomes:
 - » Station Albert 0MW
 - » Station Charlie 7MW
 - » Station Fred 7MW
- Next generator in date order, Windfarm B (5MW), added (station Albert) - cannot be accommodated
- Next generator in date order, Windfarm F (5MW), added (station Charlie) – can be accommodated
- Revised ‘spare’ capacity in 2012 now becomes:
 - » Station Albert 0MW
 - » Station Charlie 2MW
 - » Station Fred 2MW
- Next generator in date order, Windfarm G (2MW) added (to station Fred) – can be accommodated
- No ‘spare’ capacity in the network - studies for 2012 are completed.



Outcome of example

Name	MW size	Date of application	Est Shallow connection point	Connection Date in 2011			Connection Date in 2012			Connection Date in 2013		
				Station Albert	Station Charlie	Station Fred	Station Albert	Station Charlie	Station Fred	Station Albert	Station Charlie	Station Fred
Windfarm A	10	01/01/2004	Station Albert	10								
Windfarm D	20	01/04/2004	Station Charlie		15			5				
Windfarm E	15	01/05/2004	Station Charlie					15				
Windfarm B	5	01/01/2005	Station Albert							5		
Windfarm F	5	01/06/2005	Station Charlie					5				
Windfarm G	2	01/07/2005	Station Fred							2		
Windfarm C	7	01/03/2006	Station Fred									7

Orange = 2011

Yellow = 2012

Green = 2013



Summary



Summary

- Made Available by System Operators to generators:
 - Transmission Connection Node Assignment
 - Firm Access Quantities and Dates
 - Shallow Connection Method
 - Deep Reinforcements Associated
 - Constraints
 - Shallow Connection Method Costs and Lead-times
 - Connection Method Update Meetings
- Required from Generator Applicants:
 - Application data and fees
 - any preferred connection methods
 - expected connection dates
 - contestability option for TSO applicants



Thank you for your attention