STAKEHOLDER WORKSHOP NO. 3

NETWORK INVESTMENT

FOR REGULATORY PERIOD RP5

20 June 2011

Workshop Agenda

• Utility Regulator Introduction	
• CCNI Introduction	
• T & D NETWORK Background/Context	NIE - Randal Gilbert
• T & D NETWORK Distribution Network	NIE – Gerry Hodgkinson
• TRANSMISSION SYSTEM OPERATOR	SONI – Dick Lewis
• T & D NETWORK Transmission Network	NIE – Gerry Hodgkinson
• RENEWABLES INTEGRATION	NIE – David de Casseres
• CAPITAL INVESTMENT Summary/Key messages	NIE - Randal Gilbert
• Q&A / Discussion	

TRANSMISSION & DISTRIBUTION NETWORK

Background / Context

Randal Gilbert

Manager, Programme Management

Capital Investment Elements

- There are 3 distinct elements to NIE's overall capital investment proposals for RP5
  - Transmission & Distribution Network (BAU)
    - Increased demand for electricity
    - Need to reinforce the network due to loading, voltage support and network security
    - Need to replace assets that have come to the end of their serviceable lives
  - Renewables Integration
    - Development of the network to accommodate connection of renewable generation in response to the governments renewable energy targets for 2020
  - Interconnection
    - Increasing transfer capacity between the electricity networks in NI and RoI
- This presentation deals specifically with Transmission & Distribution Network Capex (excluding connections and smart)
- These are being addressed in other stakeholder workshops

Transmission & Distribution network investment introduction

- The aim of this workshop is to:
  - Provide information on our capital investment proposals for the existing network covering the period 2012 – 2017 and
  - Provide the opportunity to interact on these proposals

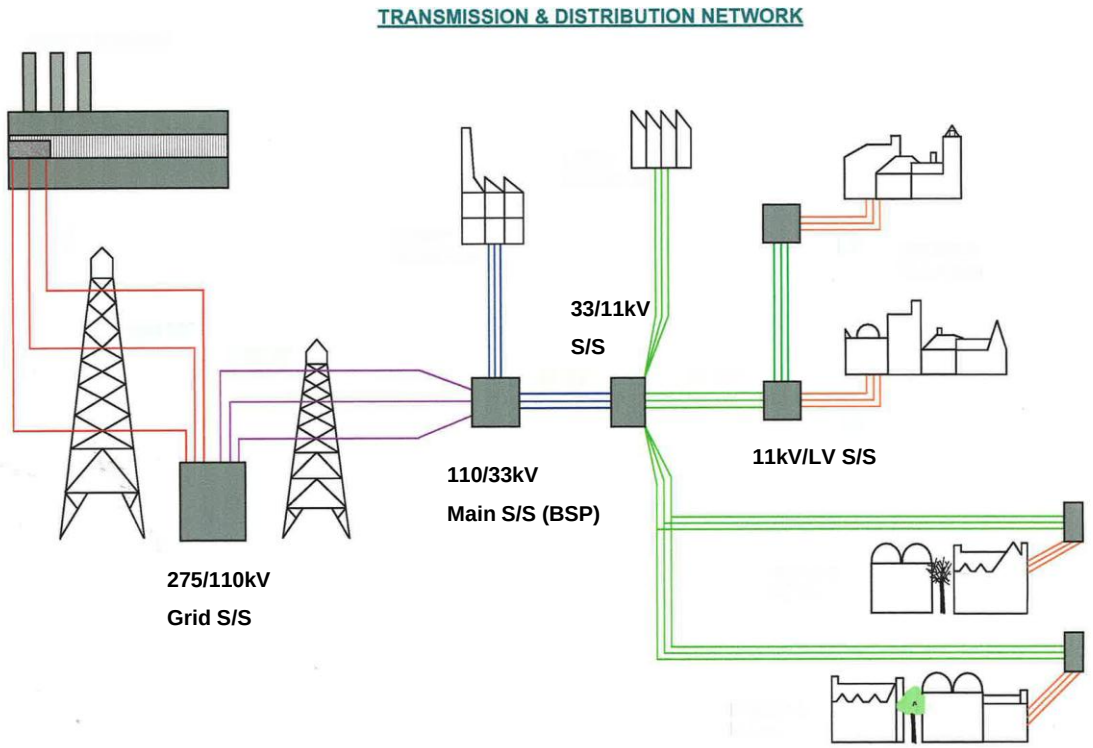
  so you as stakeholders can provide comment to the Utility Regulator

- We aim to:
  - Provide the detail behind our proposal for a £607m expenditure on the existing network
  - Describe the context against which this level of expenditure has been assessed and
  - Describe the process of how this investment requirement was derived
  - Explore each category of investment and describe the drivers behind the investment needs in each

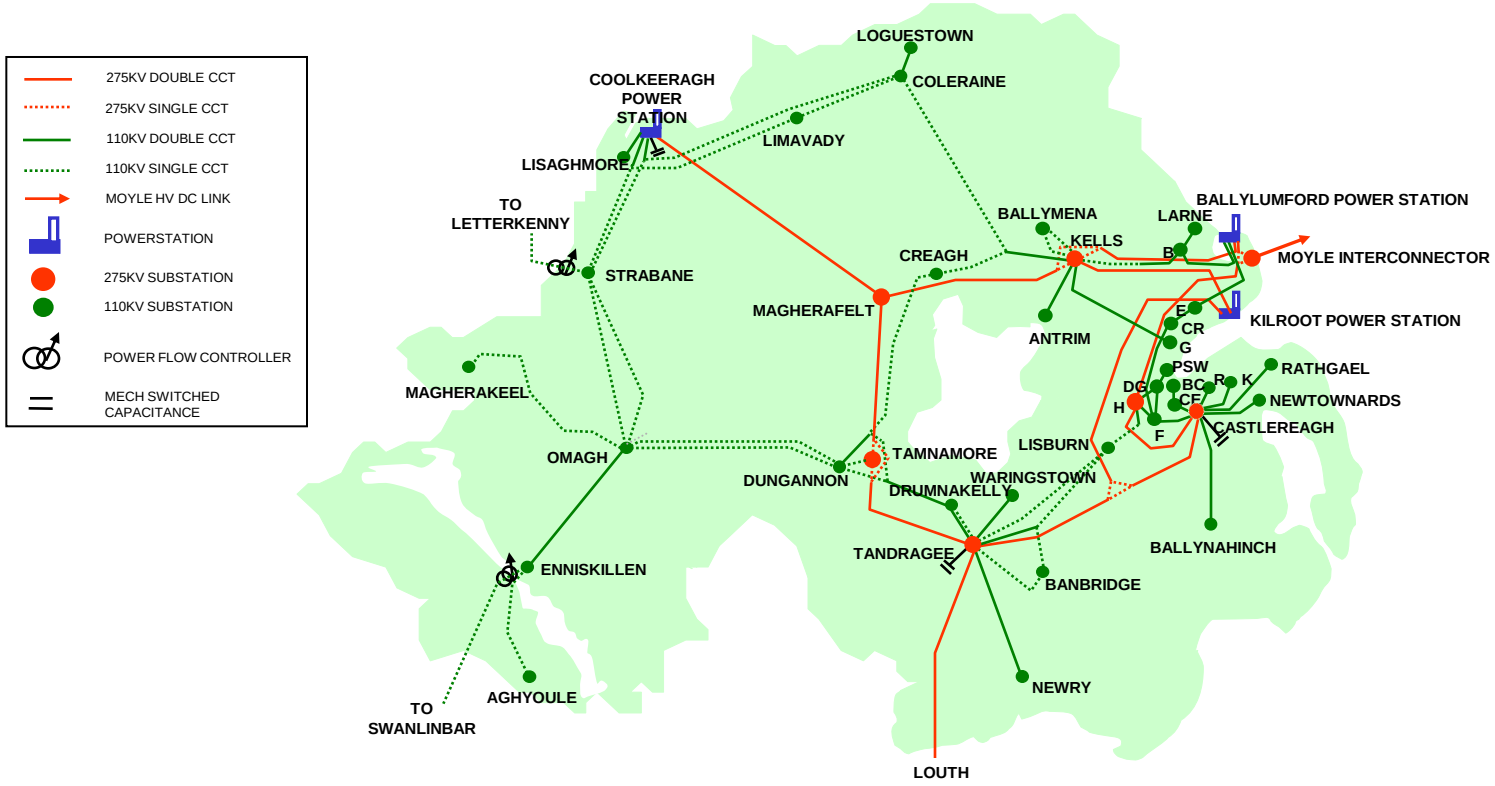
- These proposals constitute NIE's plan required to address the risks on the electricity network and which enables NIE to provide the continued high level of service to customers

Network Overview

- NIE owns the electricity transmission and distribution network through which electricity is supplied to customers in Northern Ireland.

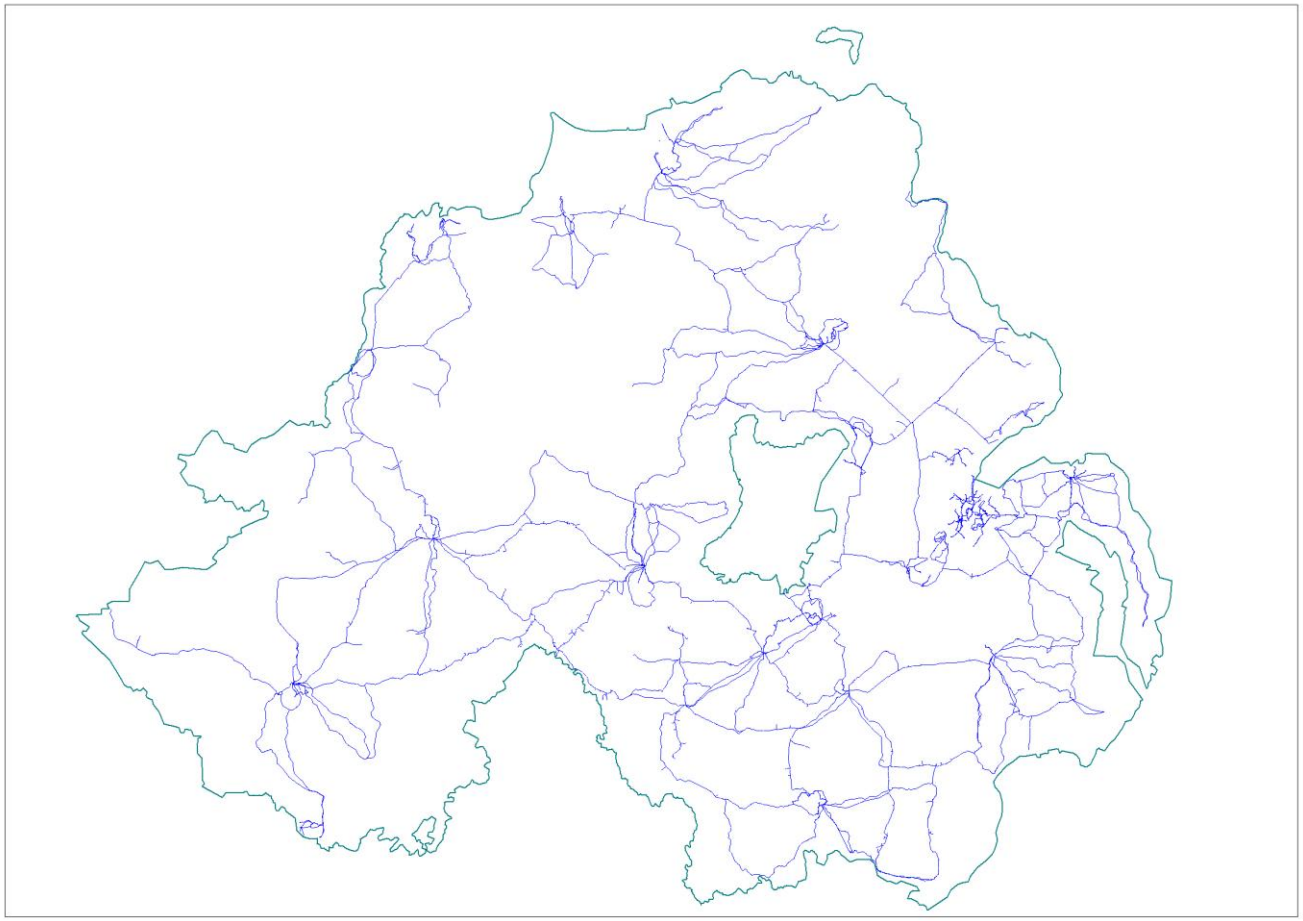


Transmission Network



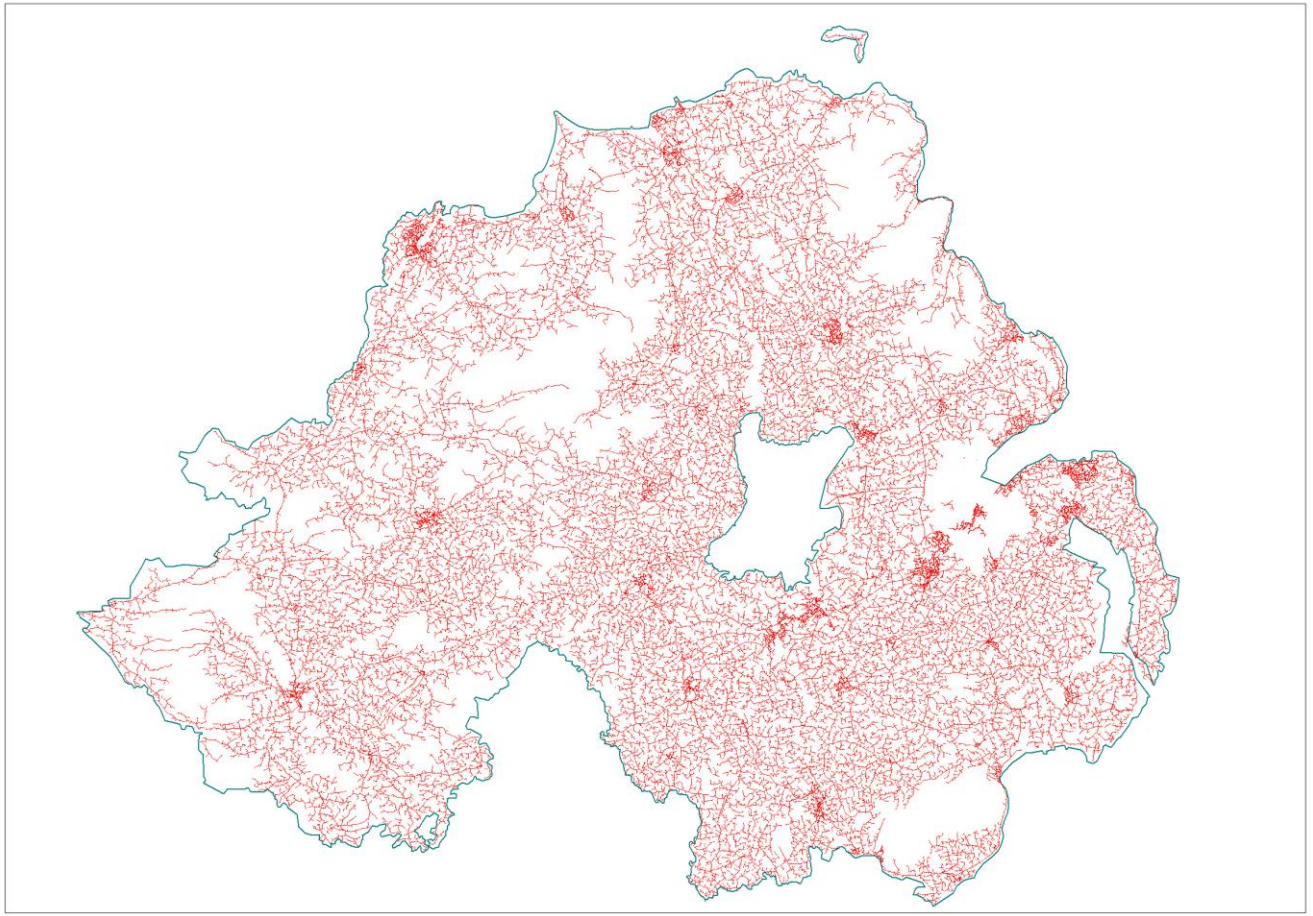
- 3 Large fossil fuel Power Stations (BPS 1213MW, KPS 614MW, CPS 455MW)
- 24 Wind farms (approx 8% of electricity consumed)
- Peak demand Winter 2010 = 1866MW
- 275kV network – 400km overhead, 10 275kV substations
- 110kV network – 924km overhead, 90km cable, 8 110kV substations and 32 110/33kV Bulk Supply Points
- Interconnection: Scotland (Moyle), RoI (275kV D/C Tandragee/Louth, 2 x 110kV Enniskillen and Strabane

33kV Distribution Network



- 3,700 km overhead lines and underground cables
- Supplied from 32 110/33kV Bulk Supply Points
- Supplies 212 33/11kV and 33/6.6kV substations

11kV Distribution Network



- 20,800km overhead lines
- 3,500km underground cables
- 74,000 distribution transformers at 11kV/LV and 6.6kV / LV

Objectives of proposed investment

Responsible stewardship is a mandatory obligation on NIE.

- We invest to:
  - Develop the network to allow new customers to be connected;
  - Accommodate growth in demand for electricity within the existing customer base;
  - Maintain a resilient network providing a reliable supply of electricity;
  - Maintain or improve existing levels of network performance;
  - Maintain a network compliant with legislation which meets safety obligations and environmental standards;
  - Manage the level of age-expired equipment on the network and;
  - Where possible, reduce operating and maintenance costs

Need for Investment

Asset Replacement

- Identified requirement for a 72% increase in asset replacement expenditure during RP5 compared to RP4
  - Continuation of the ramp up of asset replacement activity which commenced in RP4
  - Addresses the increasing numbers of ageing network assets installed from the 1950s through to the 1970s
- Evaluated on the basis of an assessment of:
  - The condition of the assets
  - The risk and consequences of their failure
- Increasing use of 'Smart' technology to allow assets to remain in service for longer and so defer expenditure

Network Development

- Increased requirement for load related expenditure
- During RP4 there has been very limited load related investment
- Investment required to ensure satisfactory voltage levels are maintained
- To provide increased transformer capacity to meet demand and avoid overloading

Need for Investment

IT & Metering

- New challenges for the safe and efficient operation of the network due to increased embedded generation
- A requirement for an enhanced real-time network management system and operational communications network
- Continuation of present levels of new metering activity plus known metering asset replacement requirements

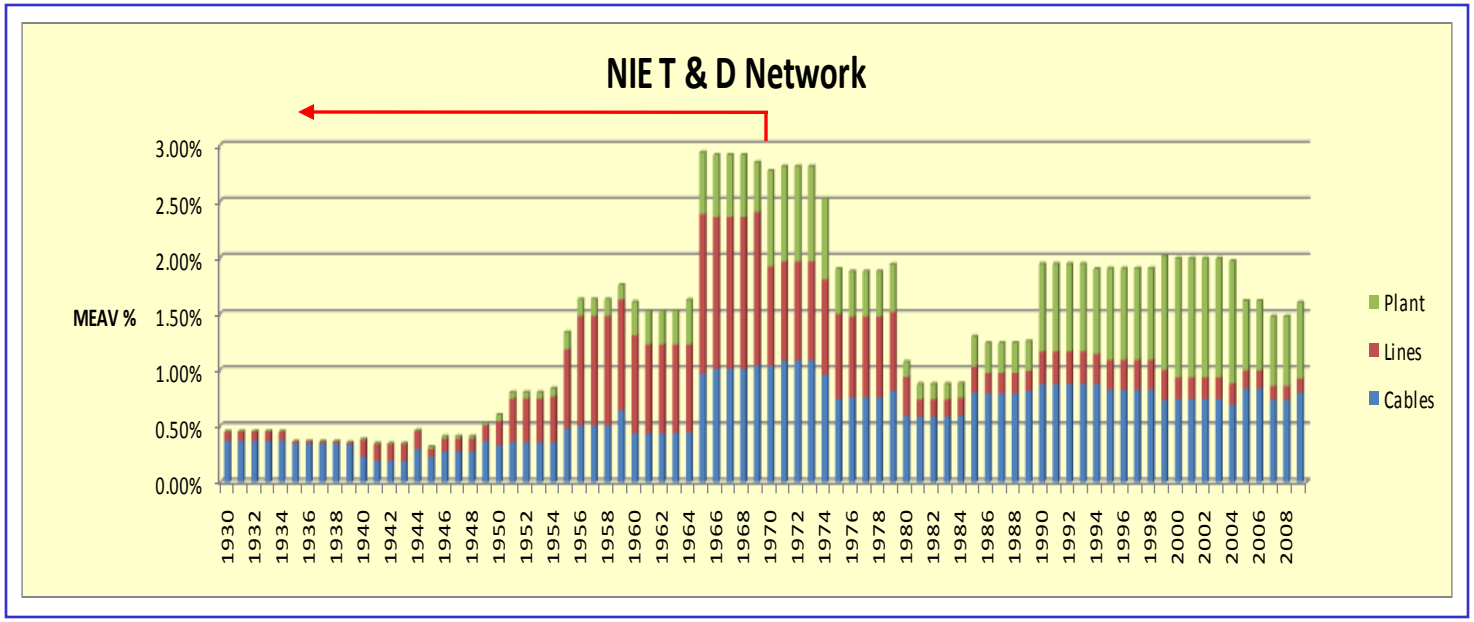
Legislation

- Roads and Street Works legislation and
- Electricity Safety, Quality and Continuity Regulations

Network Performance

- Modest amount of network performance expenditure to improve the quality of supply to some of our rural customers through an continued roll-out of remote control devices

Historical Background



- Peak investment of electrification construction through the 1950s to the 1970s
- Most significant proportional ramp in expenditure in the mid 1960s
- These assets are now 50 plus years old
  - Age itself is not a driver for replacement,
  - Considered with condition information and risk assessment to drive the replacement requirements

Historical Background

RP1 (1992 – 1997)

- Development of the electricity infrastructure by addressing 'capacity holes' in the network
- Establishing new 33/11kV substations and associated circuits

RP2 (1997 – 2002)

- Further development of the network to improve its electrical integrity and to improve security of supply to customers
- Refurbishment of the overhead line network commenced after the major storm of Boxing Day 1998

RP3 (2002 – 2007)

- Focus of investment moved from overhead lines to substation plant
- Level of investment was constrained by a reduction in funding compared to RP2
- At the same time, investment by the distribution companies in GB exhibited an increasing trend

RP4 (2007 – 2012)

- Start of the ramp up our asset replacement programmes to and to increase the overhead line programme to address age and condition issues

Management of Network Risk

- There is a balance between investment and the level of network risk to be managed
- We believe the level of investment we have proposed is required to allow adequate management of network risk
- Any decrease in the level of investment proposed will undoubtedly increase risk
- In particular, the management of aged assets is not an exact science - we can monitor assets and check their condition but can't predict exactly when they will fail
- When some assets fail there can be catastrophic consequences

Network Risks

Public Safety

LV plant serving some 800,000 customers' premises can present a risk to the public due to proximity of the equipment.

HV Plant and overhead lines - the safety risks associated with high voltage plant are primarily confined to those most often in proximity of the equipment, i.e. NIE staff and in some cases contractors. In the case of overhead lines, risk exists to members of the public.

In addition, the network experiences approximately one hundred third party cable strikes per month (90% of these occurring on the low voltage network).

Network Risks

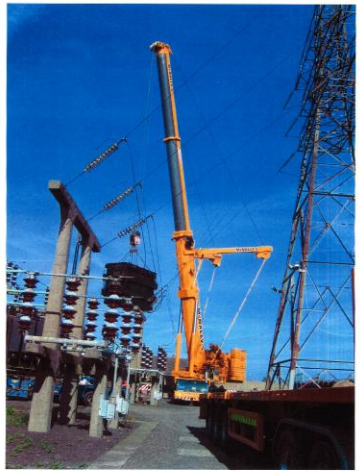
Storm damage

30 March – 2 April 2010 Easter Ice Storm

- Accretion of wet snow on overhead conductors
- Severe mechanical loading of the overhead conductors and poles
- The risk imposed by such weather supports the need for continued investment in overhead line refurbishment

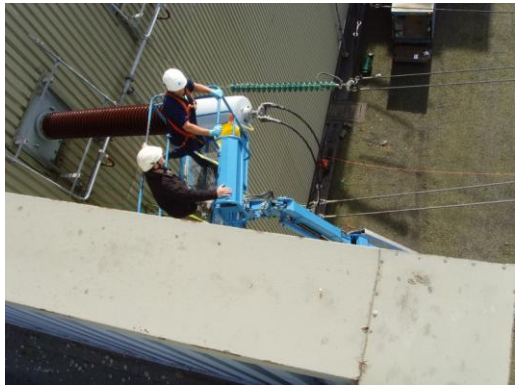
Network Risks

Plant Failures



A catastrophic failure occurred on a 110/33kV transformer due to a bushing failure resulting in irreparable damage to the main winding.

A series of defects associated with transmission wall bushings and transformer bushings were identified as a result of oil leaks and insulation degradation leading to programme of refurbishment/replacement.



An internal failure of a transformer bushing can result in catastrophic failure of transformers as experienced in Castlereagh Grid Substation in 1997.

Network Risks

Plant Failures during RP4

A catastrophic failure of a 110kV transmission oil filled voltage transformer due to moisture ingress resulted in a catastrophic failure of the unit.

The failure resulted in major damage to adjacent switchgear equipment.

Developing the plan

- Investment scenarios
  - **At generic level**
    - Use of condition assessments
    - Risk ranking
    - Network electrical studies
    - Resulting in a ‘Initial Plan’
      - Not constrained by deferral or use of Smart
  - **First iteration**
    - Use of Smart on asset replacement
    - Review of network development
    - Resulted in ‘Reduced plan’
  - **Second iteration**
    - Further deferral
    - Project phasing
    - Resulted in ‘Submission Plan’
    - Protected asset categories where the principal driver is safety

Developing the plan

- Resourcing
  - Workforce renewal will be crucial to delivering RP5 investment
  - Many skills required within the electricity T&D sector are specialist specifically within NIE T&D. Due to the geographic and demographic factors faced we are highly dependant on growing our specialist resource across a range of specialist discipline (power engineers, linesmen, jointers, senior administrators etc)
  - Workforce renewal plan present employment opportunities in Northern Ireland
    - Apprentice recruitment and training
    - Graduate trainee Engineer recruitment and training
    - Power Academy Trainees recruitment and scholarship/training
    - Other external staff recruitment and training
    - Employee up-skilling training

- Benchmarking
  - We have undertaken independent benchmarking of our unit costs for capital delivery
  - We are confident our unit costs are competitive in this sector – our costs were favourable in 83% of the unit costs categories benchmarked

RP5 Investment Plan Summary

	RP4 Plan	RP5' Submission Plan'
	Total £m	Total £m
ASSET REPLACEMENT SUB-TOTAL	**210.4**	**361.7**
Transmission	43.9	107.4
Distribution	166.5	254.2
NETWORK DEVELOPMENT SUB-TOTAL	**43.4**	**90.0**
Transmission	22.8	65.4
Distribution	20.6	24.6
Other (IT, Comms, Metering, Connections)	**110.4**	**155.0**
OVERALL TOTAL	**364.2**	**606.6**

RP4 / RP5

The capital investment plan for RP5 differs from RP4:

- Increase in volumes of asset replacement
  - LV Plant (minipillars, feeder pillars)
  - Secondary 11kV/LV substations and related equipment
  - LV overhead lines (refurbishment, undergrounding and ABC)
  - 110kV switchgear
  - 33/11kV Transformers

- Revised Strategies of asset replacement
  - Distribution 33kV and 11kV overhead line refurbishment

- New strategies
  - Transmission tower refurbishment
  - Cable asset replacement
  - Transformer refurbishment
  - Transmission Buildings
  - LV Switchboards

- Legislation
  - ESQCR
  - RASW

- Increase load related investment
  - Transmission – voltage support schemes, node uprating

TRANSMISSION & DISTRIBUTION NETWORK

Distribution Network

Gerry Hodgkinson

Transmission Planning and Generation Connections Manager

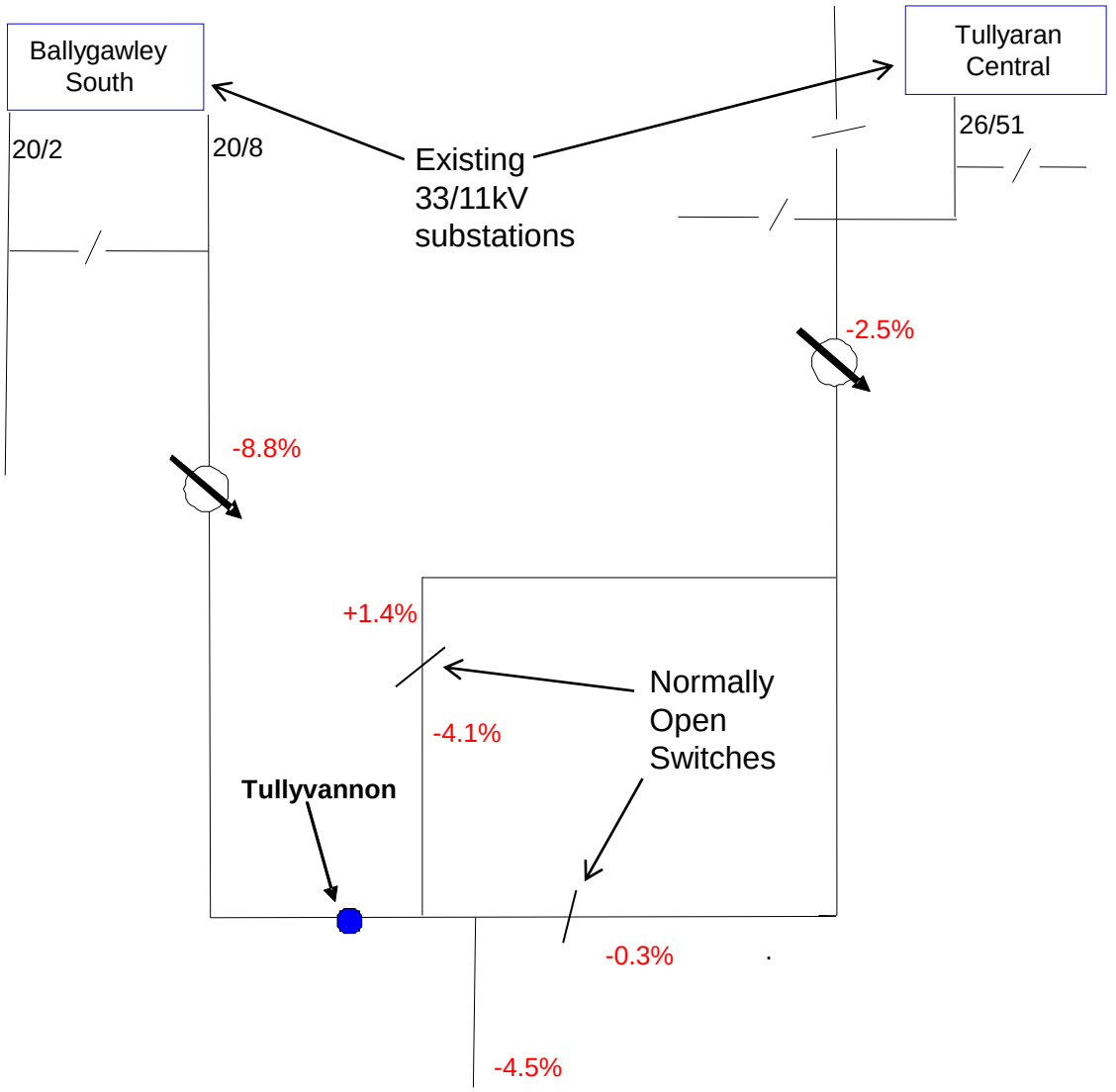
Principal Areas of Investment in the Distribution network in RP5

- Network development
  - 33kV network
  - 11kV network
  - LV network
- Asset Replacement
  - Plant assets
  - Overhead lines
  - Underground Cables
- Network Performance
- IT & metering
- Legislation

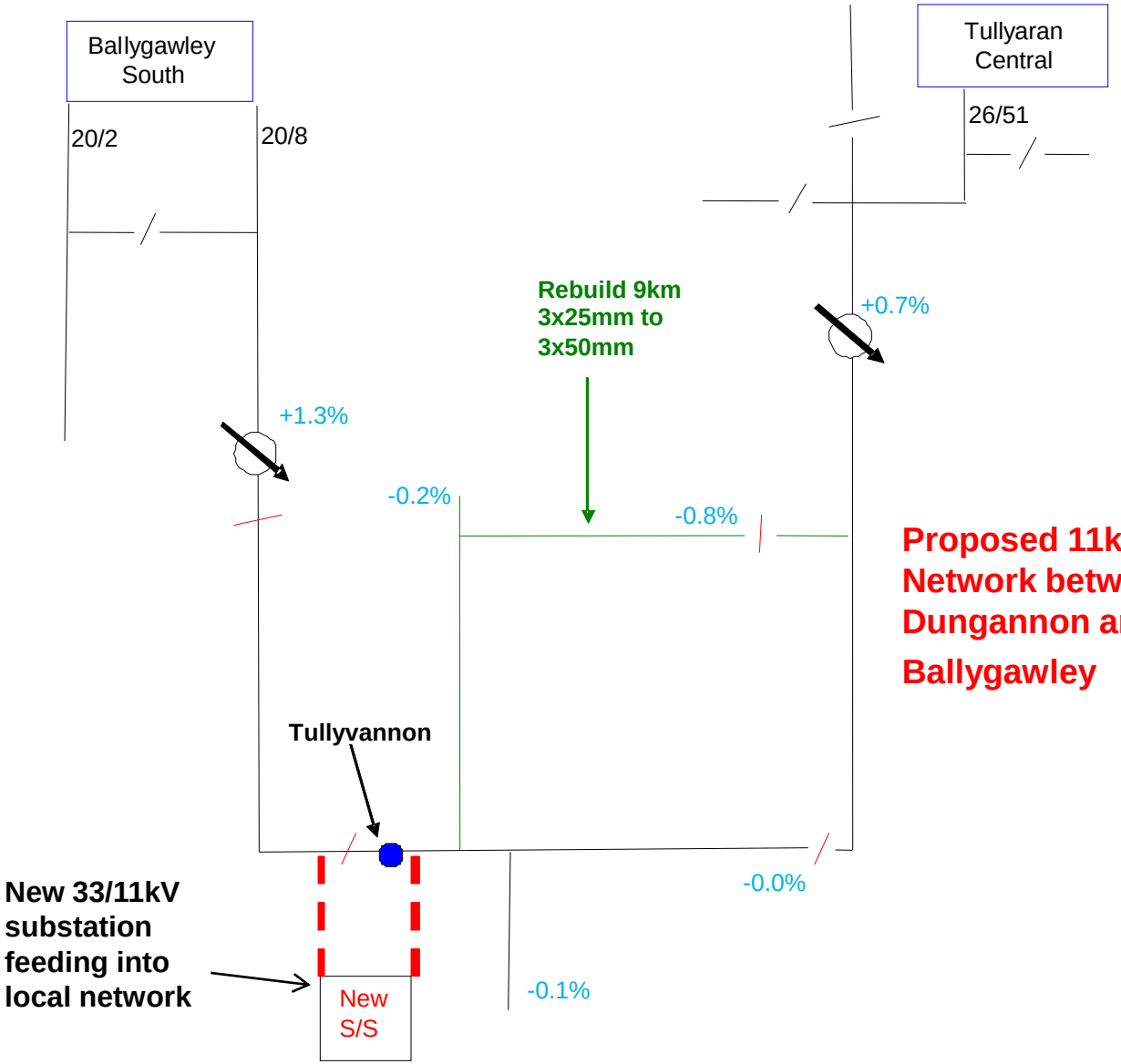
Network Development

- Risks to be managed
  - Thermal ratings of equipment
  - Voltage regulation
  - Fault level
- To minimise investment In RP4 we have sought where possible to manage risk though operational means
  - Improved monitoring of demand
- Approach to RP5 assessment
  - Demand forecast
  - Circuit by circuit analysis of the 33kV network
  - Risk register maintained of the 11kV and LV networks
- Investment in RP5 broadly reflective of RP4 levels of investment

33kV Network Development – Example project 1

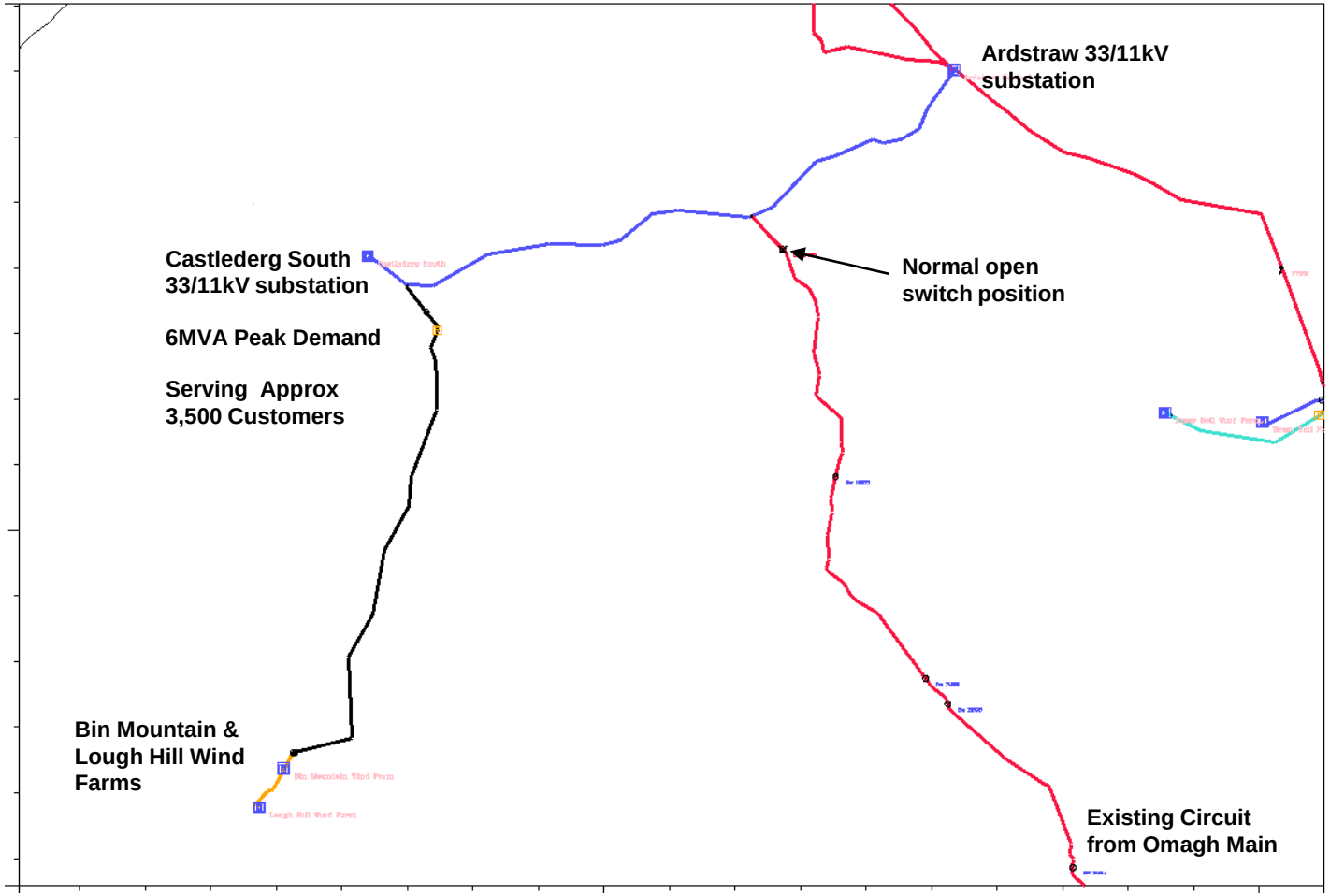


33kV Network Development – Example project 1



Proposed 11kV Network between Dungannon and Ballygawley

33kV Network Development – Example project 2



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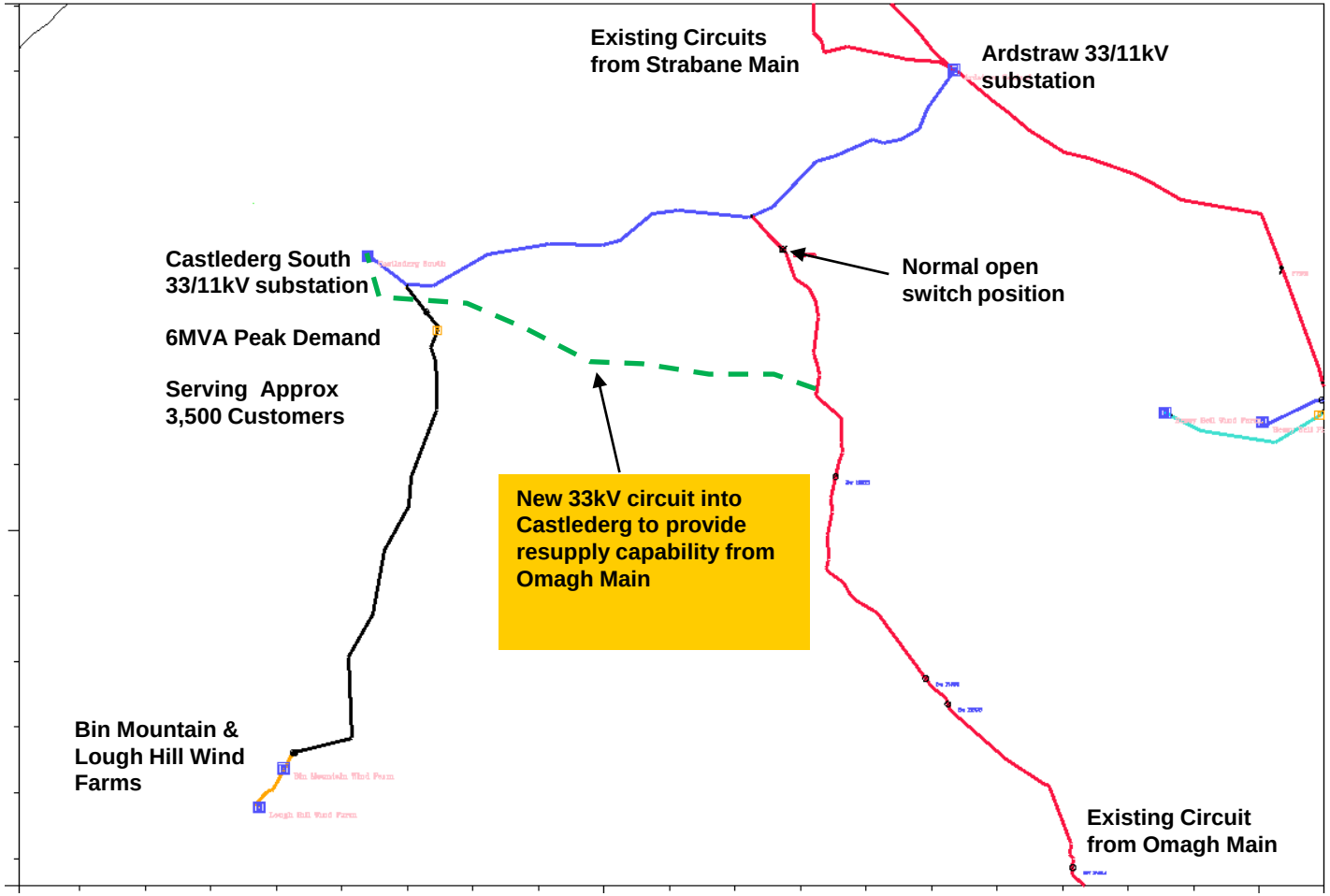
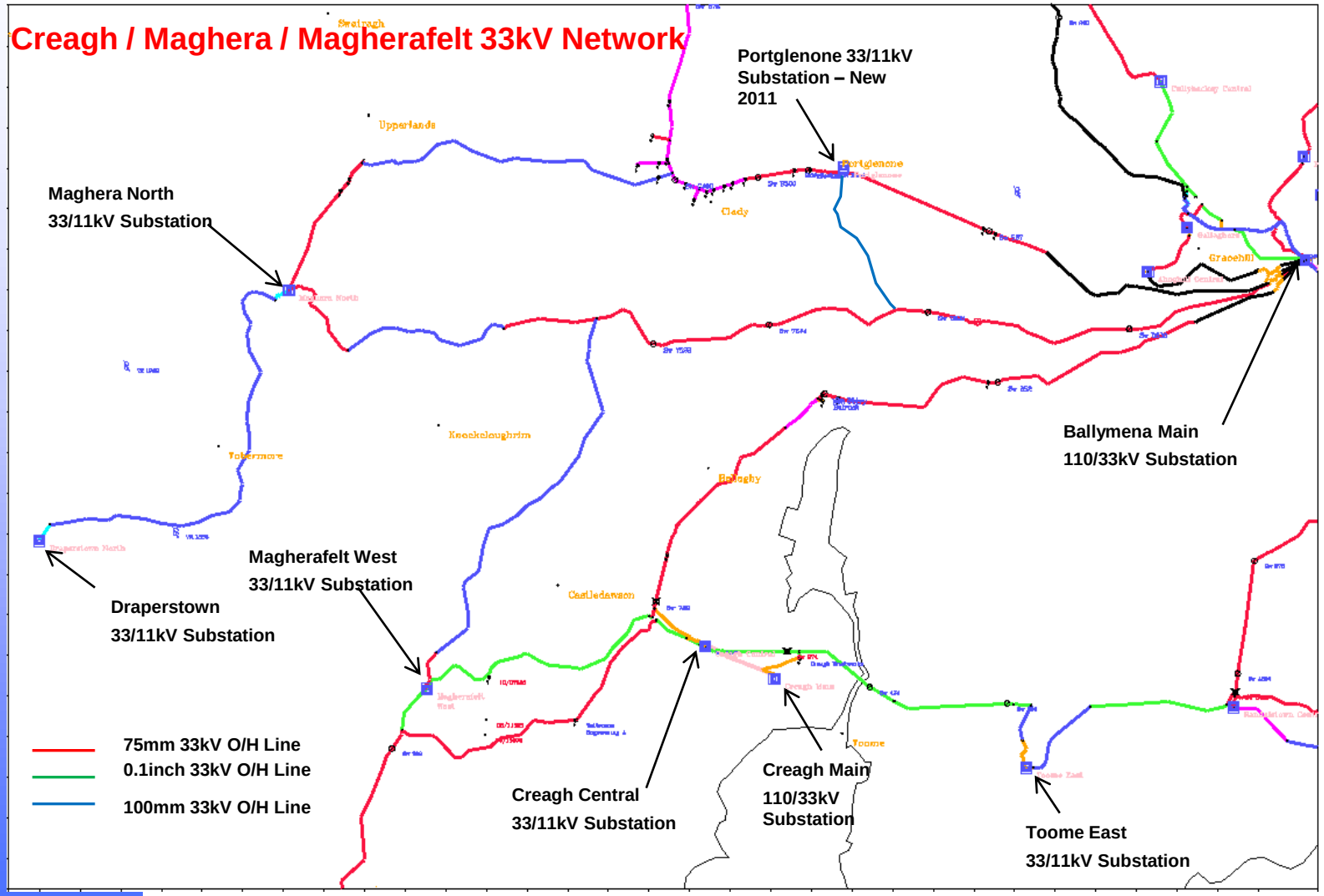


33kV Network Development – Example project 3



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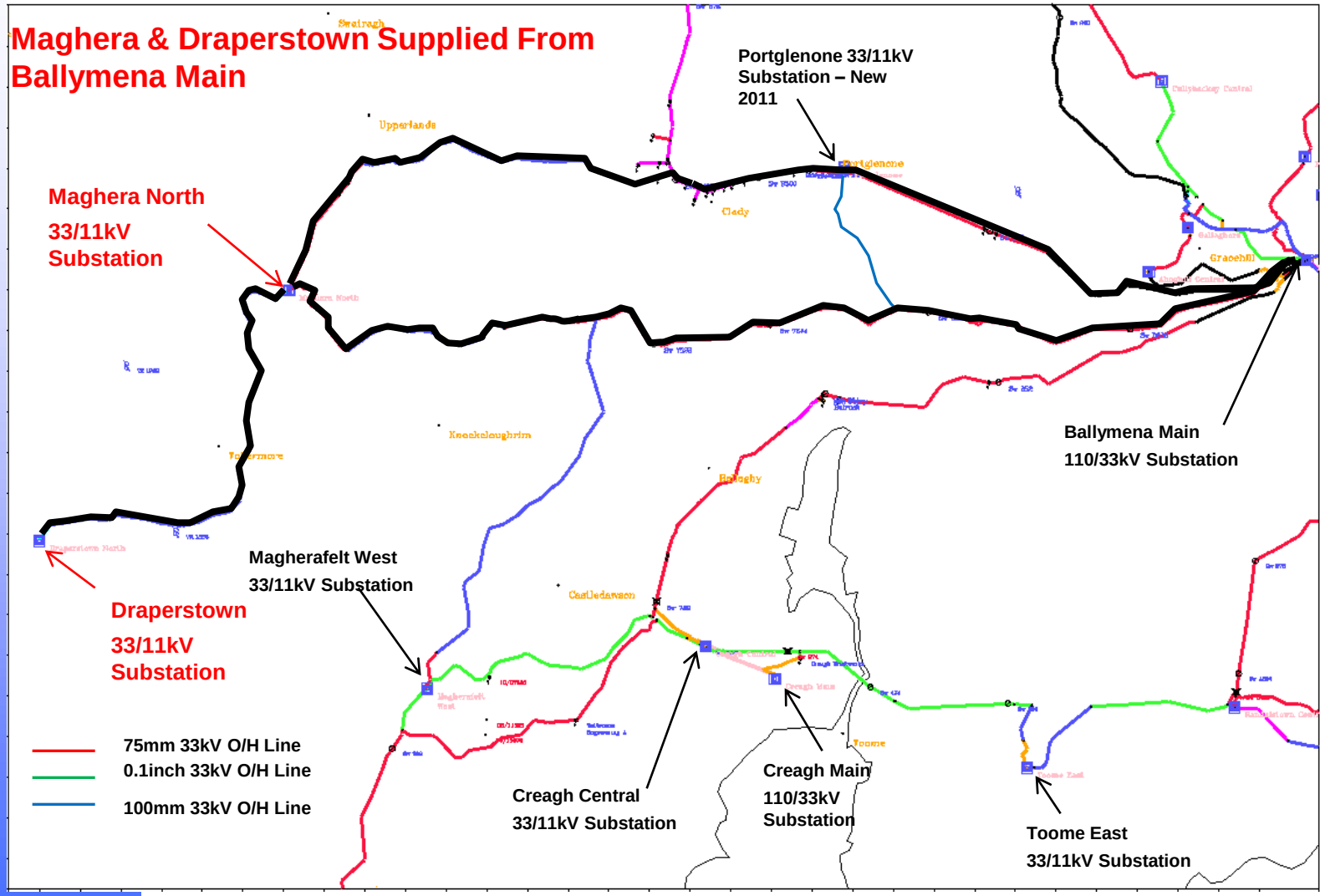

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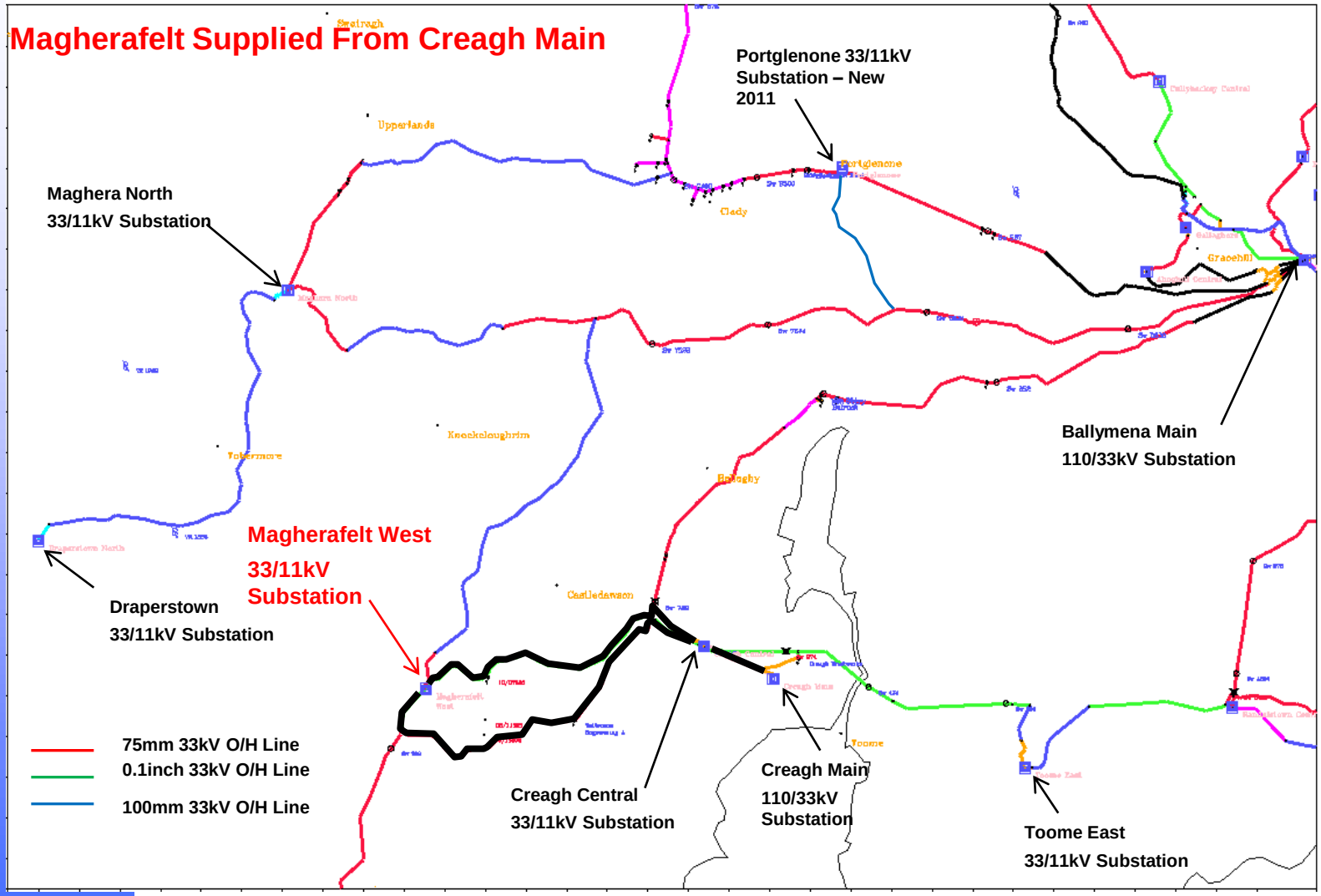

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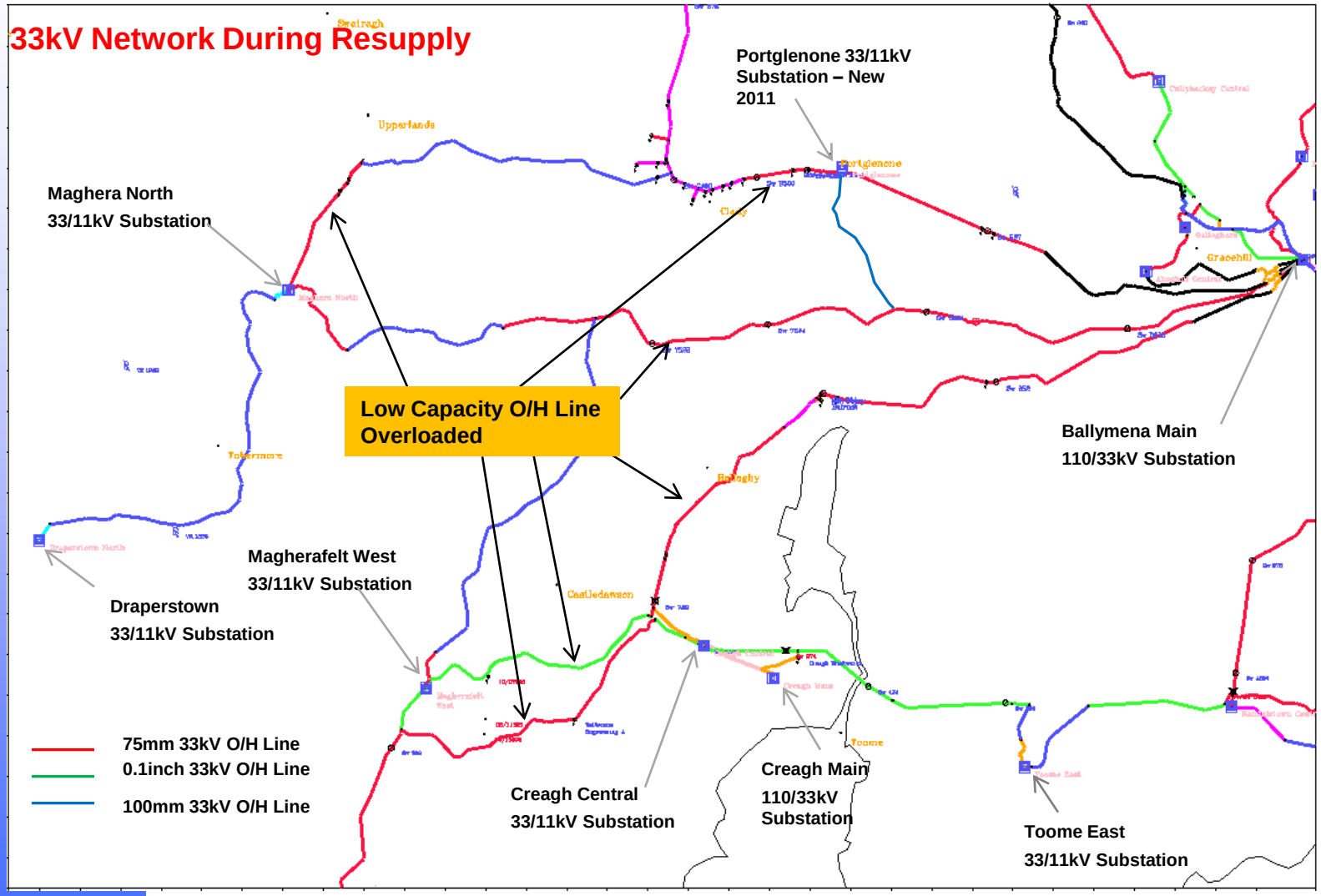

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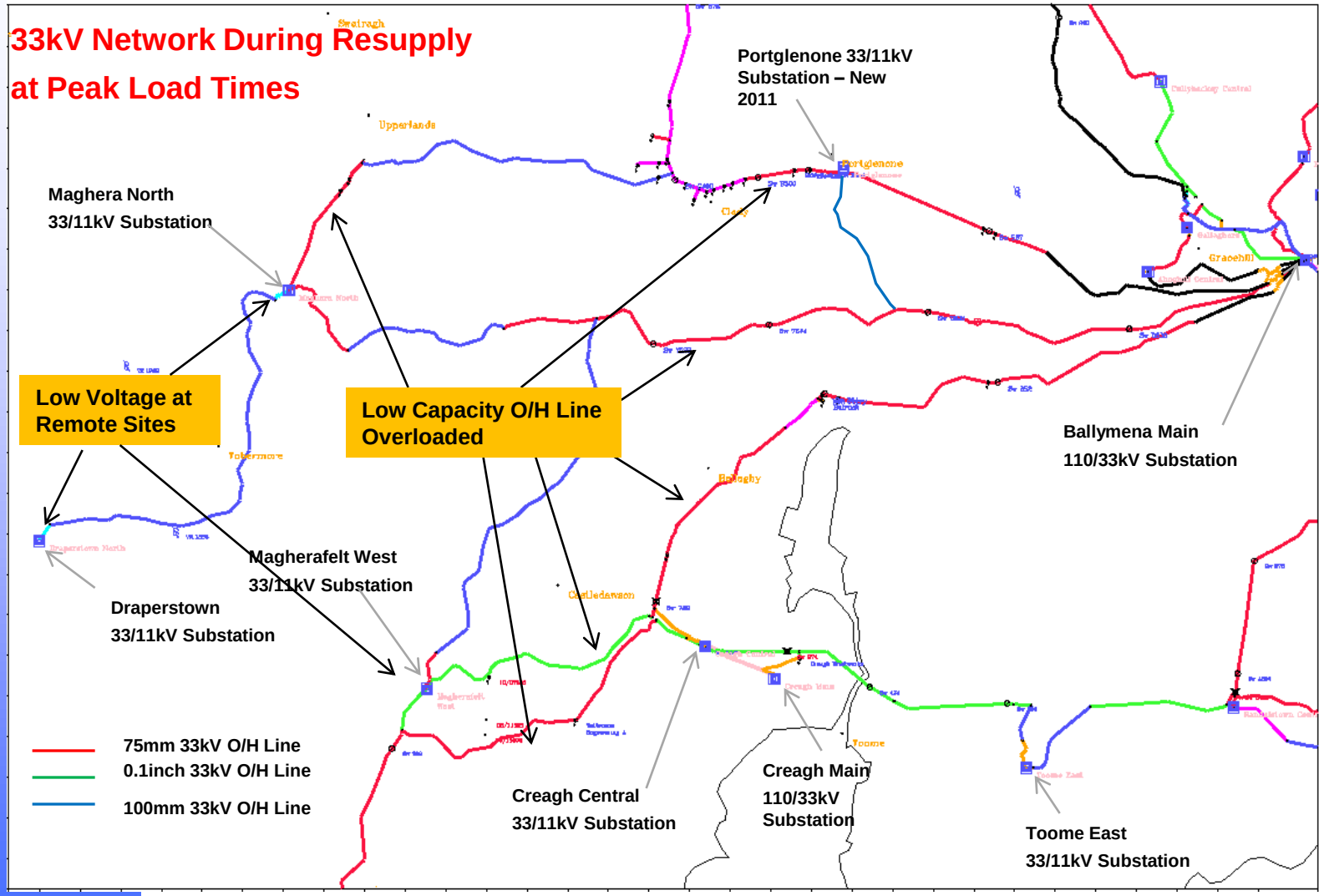

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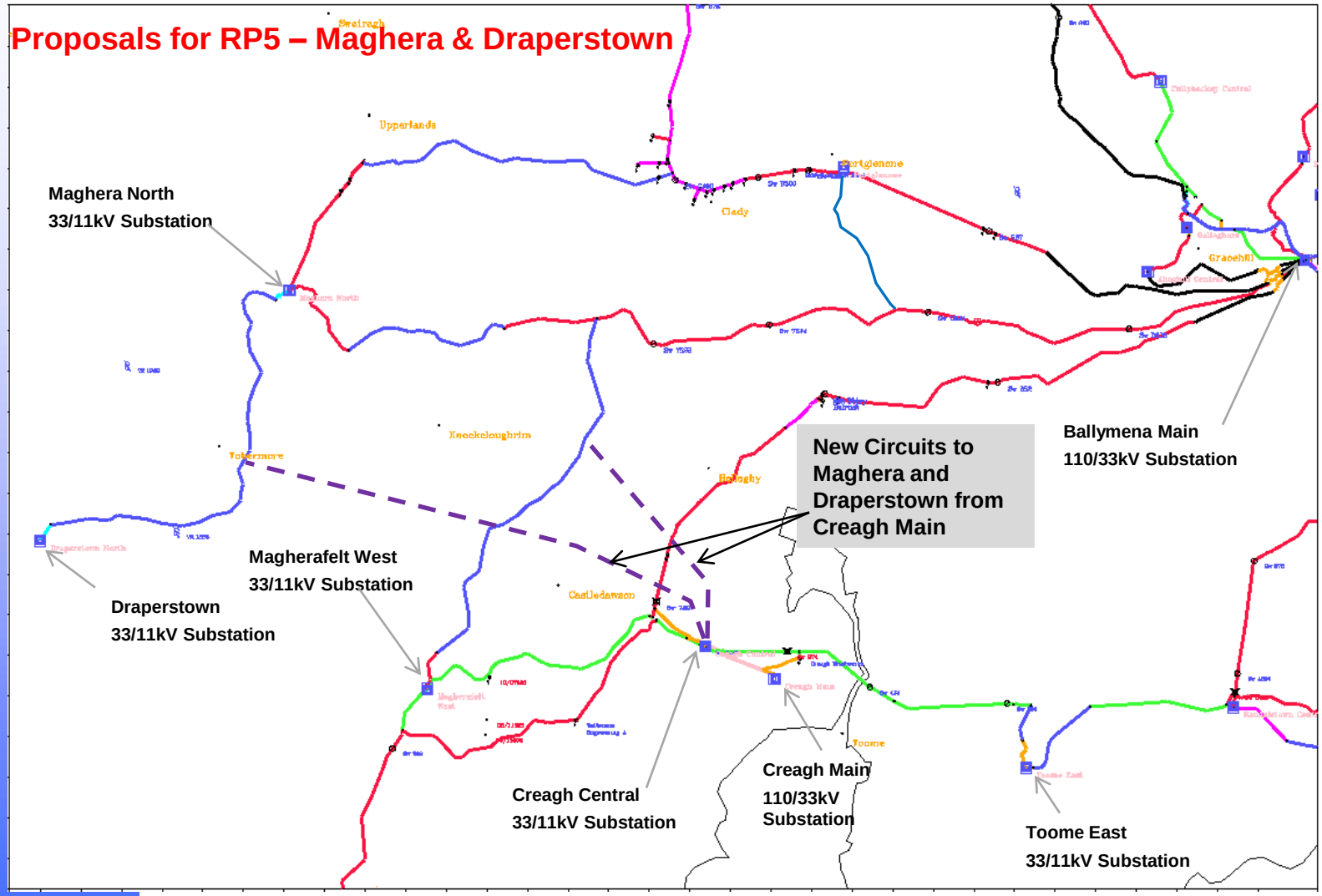

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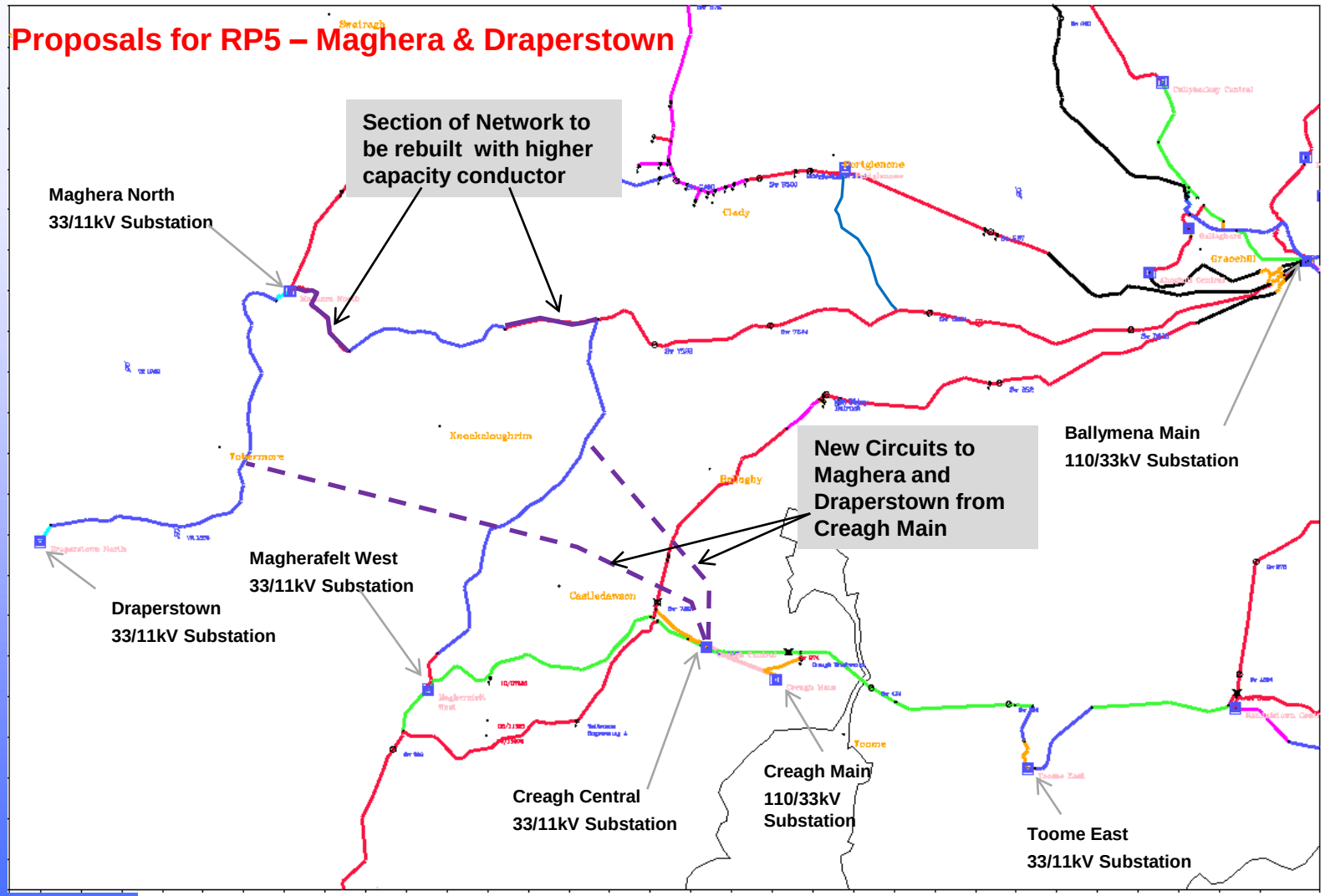

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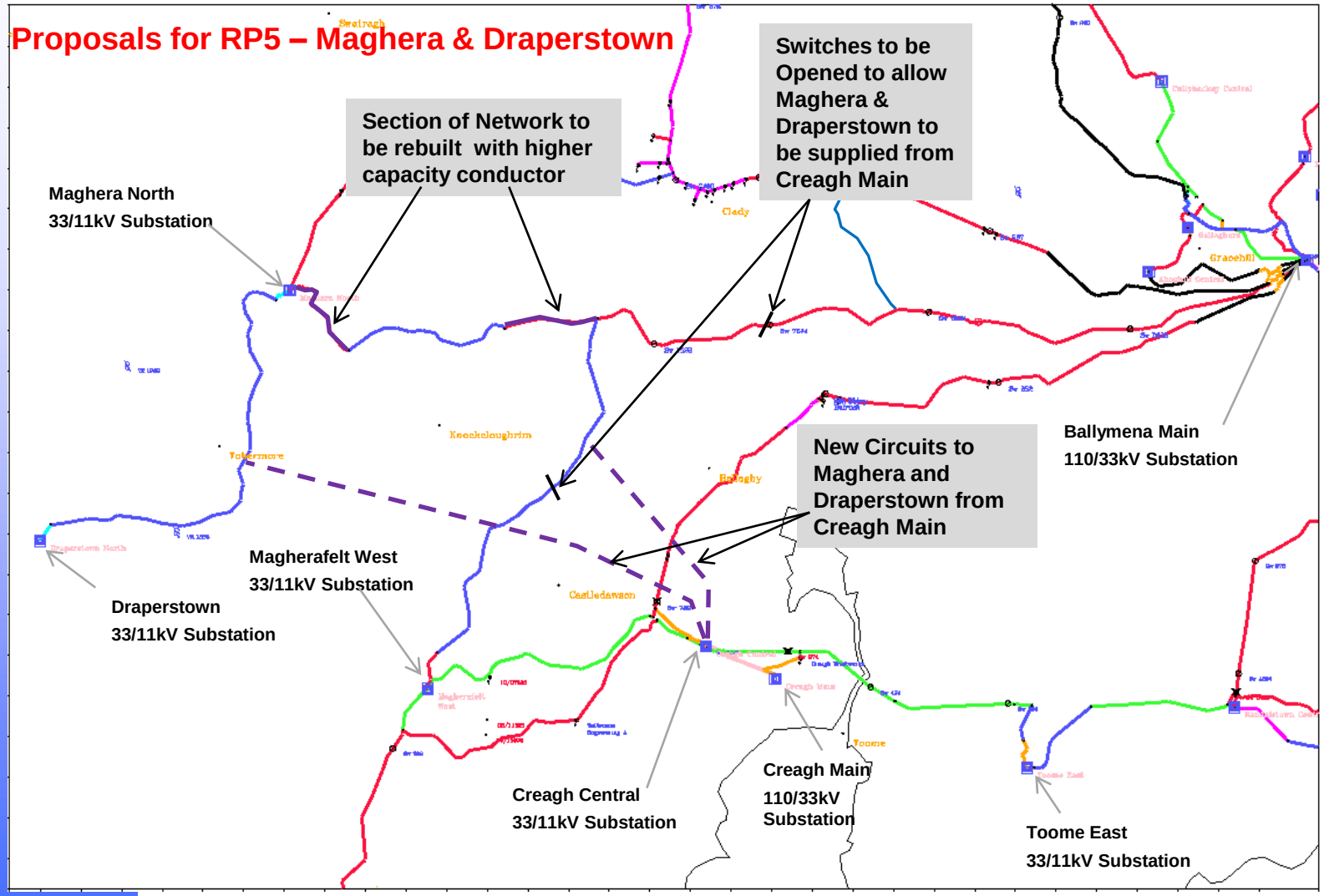

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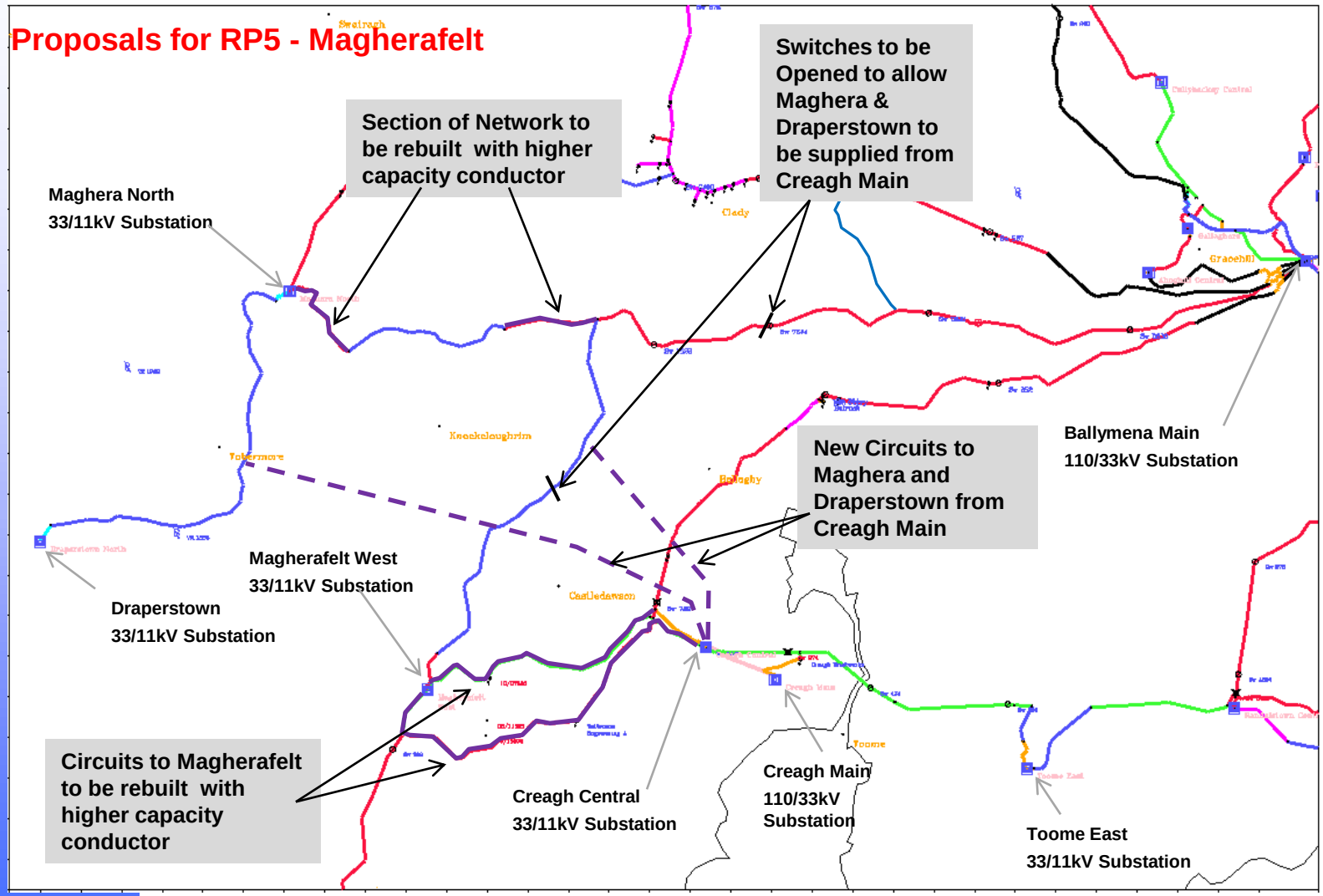


11kV network development – typical reinforcement requirements

Substation	Circuit	Issue	Solution	Cost (£k)
Derryleckagh / Rathfriland	26/95 & 36/63	Mayobridge low voltage and resupply issues	New 11kV Circuit from Derryleckagh Substation	120
Bishopscourt Central	27/69 & 27/70	Load high, NSO load close to VR rating, resupply very limited	New 100mm line (5km) required to establish 3rd circuit into Ardglass	245
Carrick North	54/5 & 54/4	150m section of 3x.15Al cable limits resupply to 54/9	Replace section of cable between Sw J6422 Castle Mara 'A' and pole 110 with 3x185Al	22
Ballyclare Central	48/79	4 S/Stns on an urban radial - 577 customers	520m of 3x185AL 11kV cable between J1019 Highgrove and pot ended cable connected to 5624 Clare Heights	55
Ballymoney West	49/54	Low capacity 0.06 11kV cable impeding resupply capability	Replace section of .06 cable between pole 262 and 95Al cable between North Road and Townhead Street S/S's and from 95Al between Townhead Street and Technical College to 95Al between Tech College and Margaret	66
Portrush South	13/70	Low capacity 0.06 11kV cable impeding resupply capability	Replace 190m of 0.06mm 11kV cable with 3x185mm cable - section between Eglinton Lane J6097 and BJ	28

Distribution Plant – extent of equipment on the network

- Primary Substations (33kV)
  - 230no. 33/11kV substations
    - 396 Transformers
    - 540no. 33kV circuit breakers and 274no. 33kV and 11kV switchboards
    - 136 Outdoor woodpole “mesh” structures supporting 33,000 volt equipment
    - Civil assets
    - Ancillary equipment

- Secondary Substations (11kV and 6.6kV)
    - 9,000 substations
      - 6,500 within kiosks or buildings
      - 2,500 pole mounted
      - 1,000 outdoor ground mounted
    - Oil filled switchgear and transformers
    - Situated close to residential properties

- LV plant
    - 11,000 pillars and underground boxes

Primary substations - 33kV switchgear

Primary Substations – outdoor equipment

Primary Substations - transformers

Primary Substations – indoor switchgear

Outdoor Polemounted Secondary Substation

Outdoor Groundmounted Secondary Substation

Failure of LV Fuseboard

Low voltage plant

Distribution Plant – principal asset replacement proposals

- Based on individual condition assessments
  - Visual assessments
  - Oil tests
  - Infra red assessment
  - Partial discharge

- Primary Substations (33/11/6.6kV)
  - 22no. 33kV mesh refurbishments and 86 associated outdoor 33kV circuit breakers
  - 32no. 33kV transformer replacements
  - 2no. 33kV switchboard replacements
  - 11kV switchboards replacements comprising 279no. 11kV circuit breakers
  - Refurbishment of civil assets
  - Substation flooding

- Secondary Substations (11/6.6/LV)
  - Replacement of 510 kiosk substations
  - Replacement of 360 outdoor substations
  - Replacement of 1,170 LV pillars and underground boxes

Distribution Overhead Lines and cables

- Generally woodpole with uninsulated conductors
  - Subject to wood pole rot
  - Deterioration of pole top equipment
  - Encroachment from vegetation
- Risks to be managed
  - Safety of staff and the public
  - Performance
  - Legislation
- Very significant overhead network
  - 71kms of 33kV tower line
  - 24,000kms of 33kV and 11kV woodpole line
  - 5,500km of LV line
  - Undereaves cabling
- 14,000km of underground cable
- 800,000 cutouts

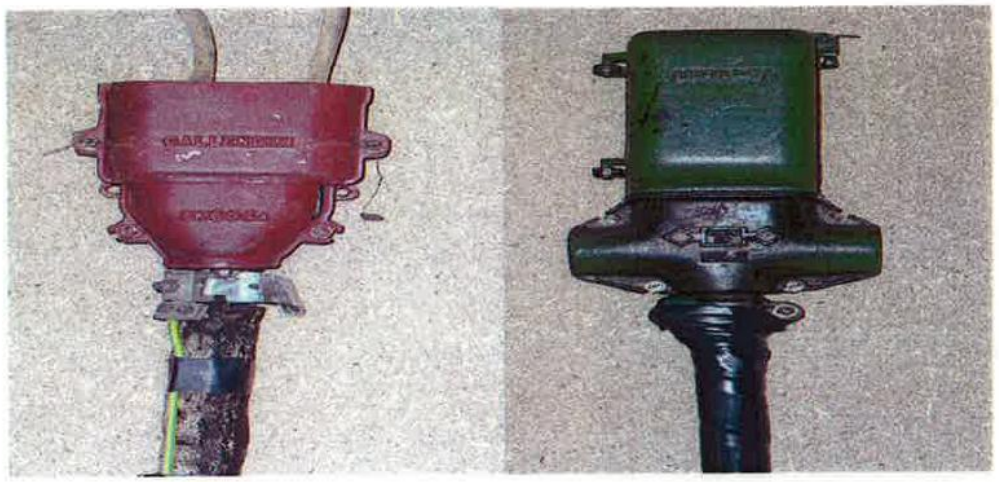
33,000 volt tower line

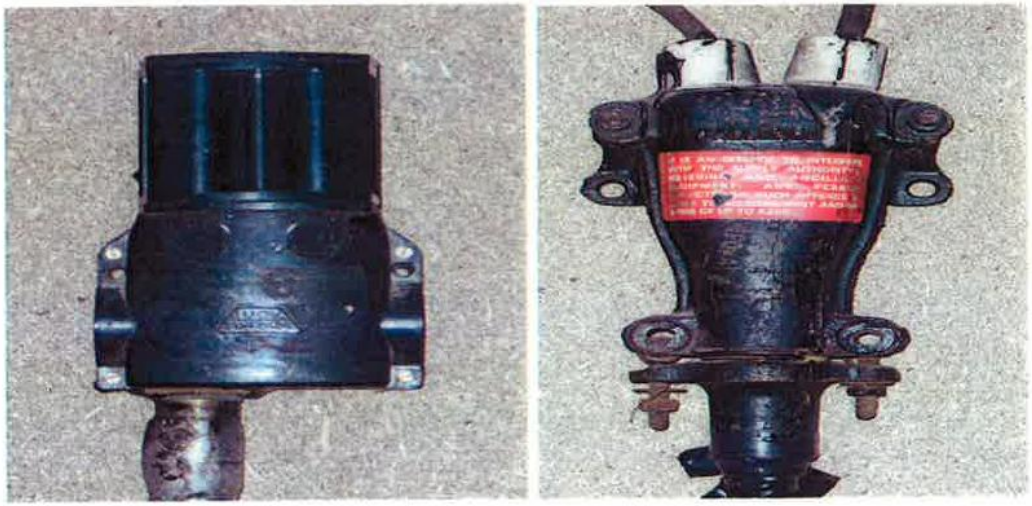
11,000 volt woodpole line

Overhead lines & vegetation management

Low voltage overhead line

House Cutout replacement





Distribution OHL & Cable – replacement proposals

- Refurbishment rather than wholesale replacement
  - 45 year reengineering
  - 15 year refurbishment
  - Supported by 5 year targeted asset replacement
  - Vegetation management
- Prioritised on the basis of regular patrolling
  - Each pole tested for rot and categorised in terms of severity
- On the LV network
  - In addition provision made for a programme of limited undergrounding
  - To address pockets of severely decayed poles
  - To address landlocked sections of network
- Overall strategy is to ensure that the complete network is assessed and receives a level of investment over the course of the five years
- Programmes of Undereaves and cutout replacement to continue
- Modest programme of proactive cable replacement to commence

Resilience of the 11kV overhead network to ice accretion

- Significant concerns over impact of another ice storm
- Previous events in 2001 (Co Down) and in 2010 (Co Antrim)
- Close call at Christmas 2010
- Proliferation of small cross section conductor
- Concern over a more widespread event than 2010
- Would not be manageable in terms of timescales to restore supplies
- Flagged up in our RP5 submission
- About to submit a more detailed submission
- Proposes accelerated replacement of conductor on the overhead network over the next 15 years

Network Performance

- Proposed level of network development and asset replacement investment is required to maintain performance
  - To drive performance improvement requires increased remote control of the network
- Many faults are of a transient nature
- Impact of many faults could be reduced through having remote control
- Increased extent of remote control has the potential to restore customers by remote intervention
  - Avoiding time to travel to site
- Proposal
  - Extend the programme commenced in RP4
  - 100 devices per year on OHL network
  - 200 fault indicators to provide for speedier fault location capability on cable networks

Legislation

- Roads and Streetworks Act
  - Anticipated in 2012 with scope for
    - Permit costs
    - Fixed penalty notices
    - Overrun charges
    - Increased out of hours working
    - Additional administration

- Increasing high quality pavement surfaces

- Electricity Safety, Quality And Continuity Regulations
  - Anticipated in 2011/12
  - Creation of a risk register during RP5 with details of every pole and tower on the network;
  - Carrying out remedial works necessary to comply with ESQCR over the course of RP5 and RP6;
  - Additional Vegetation Management; and
  - Increased Public Awareness

TRANSMISSION & DISTRIBUTION NETWORK

Transmission System Operator (TSO)

Dick Lewis

TRANSMISSION & DISTRIBUTION NETWORK

Transmission Network

Gerry Hodgkinson

Transmission Planning and Generation Connections Manager

Investment in the Transmission network in RP5

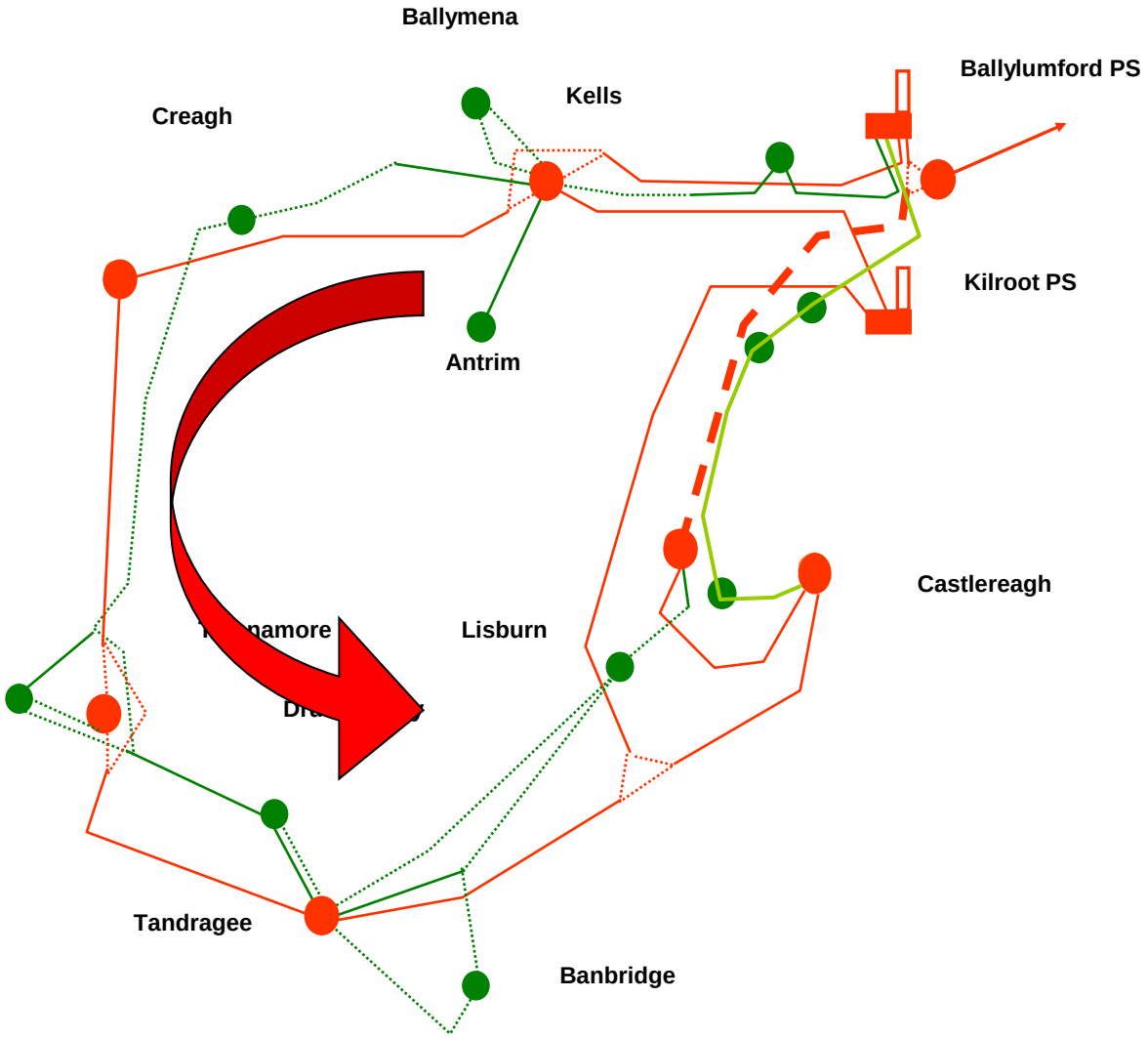
- Network development
  - 275kV network interconnecting the power stations and the major centres of demand
  - 110kV network supplying the distribution system
  - And into the future both networks servicing the bulk transfer of renewable generation

- Asset Replacement
  - Refurbishment of the plant, equipment and civil assets at the 30+ transmission substations
  - Refurbishment of the 275kV tower lines
  - And the 110kV tower and woodpole lines

Transmission Development

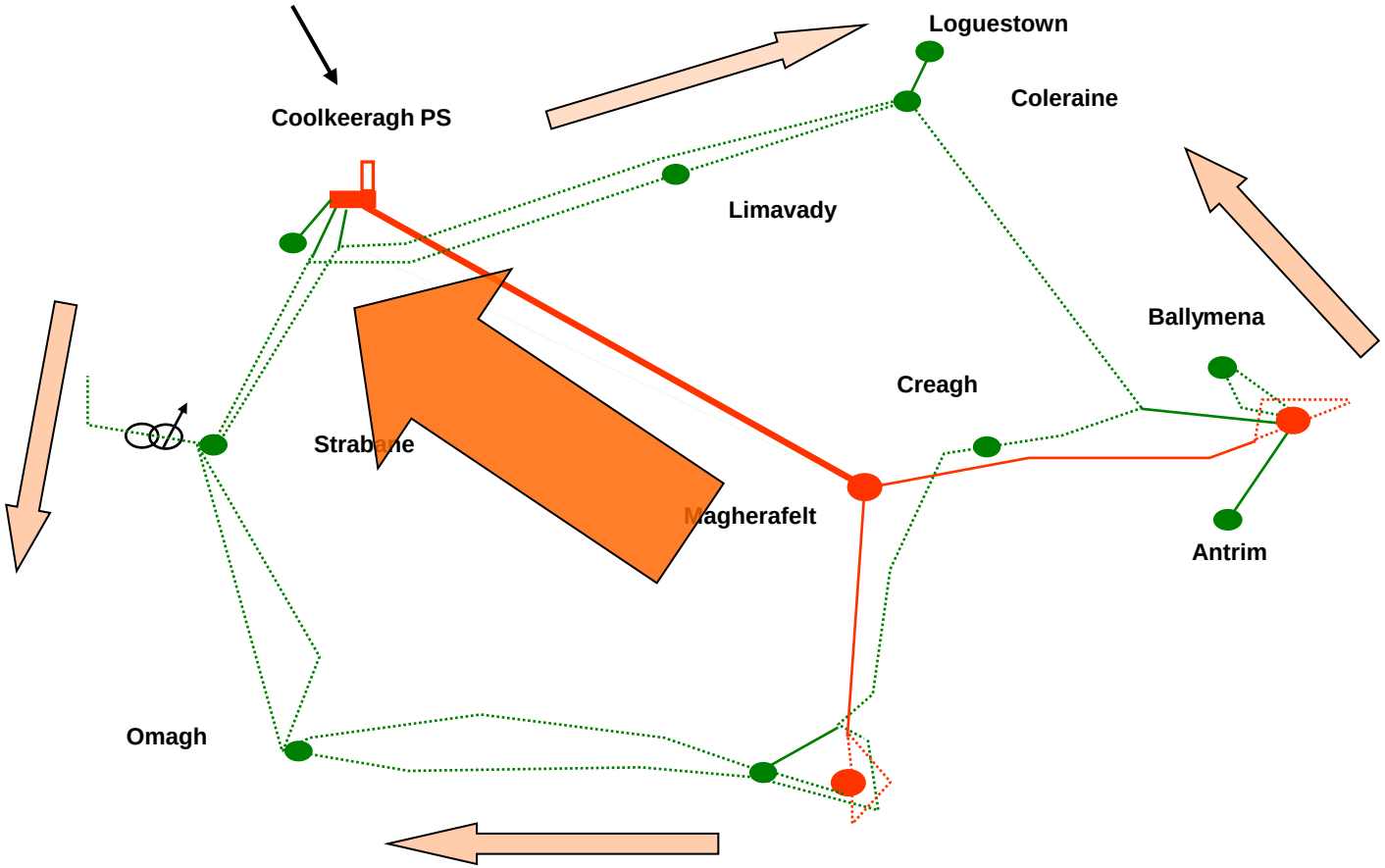
- A total of 16 projects have been identified. The projects will seek to address:
  - Risk of voltage collapse
  - Replacement of switchgear and cabling due to fault level
  - Establishment of four new 110/33kV substations
  - Installation of additional 275/110kV transformer and additional 275kV bus coupler
  - Uprating of 110kV circuits
  - Replacement of generator cables
  - Installation of sequence switching schemes

Castlereagh and Tandragee voltage support

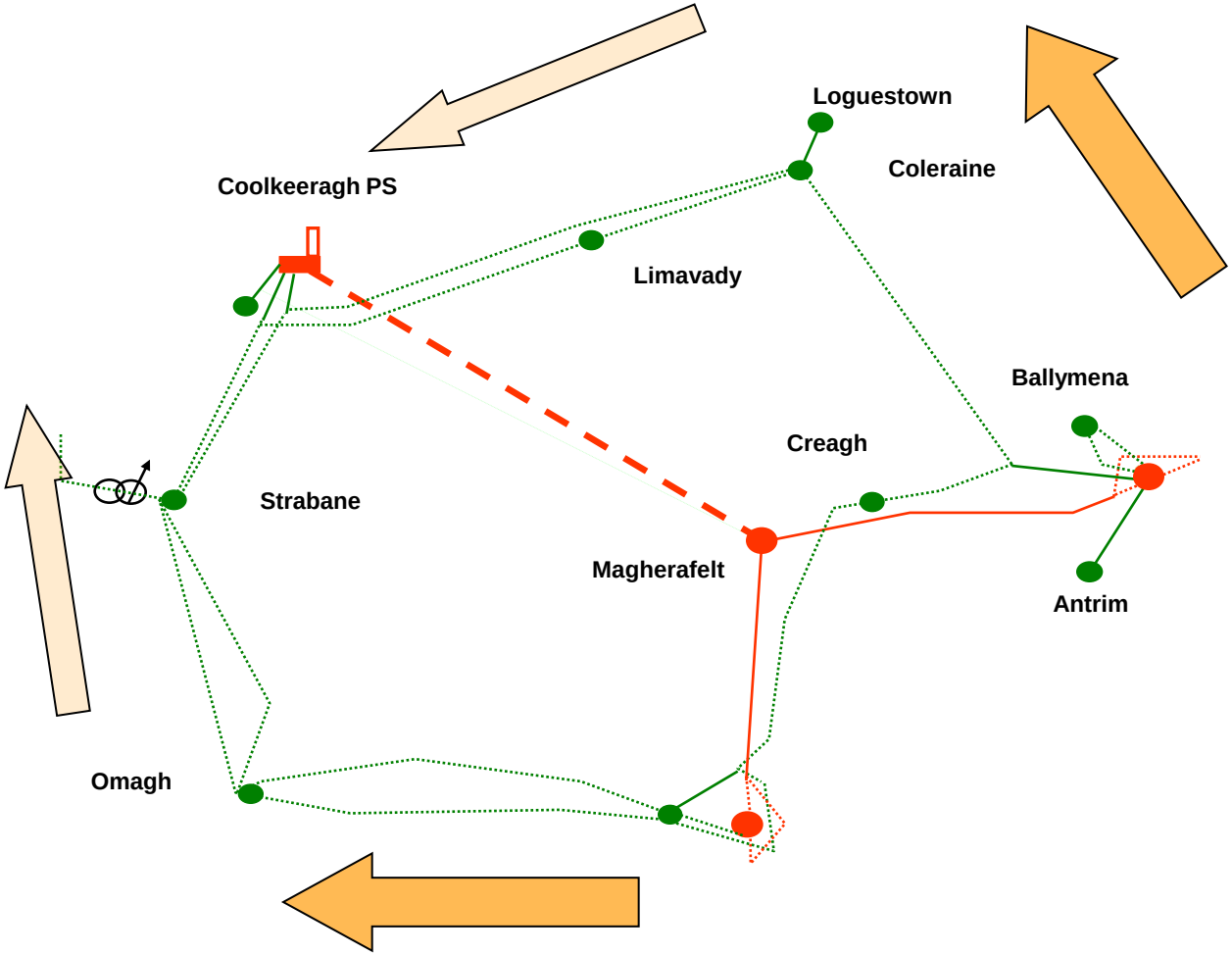


North-west voltage support

400MW CCGT with run back scheme



North-west voltage support



Typical Static Var Compensator (SVC) Installation

Transmission Asset Replacement - Plant

- Principal risks to be managed
  - Performance – system security
  - Safety
  - Environment
- 10no. 275/110kV substations
- 33no. 110/33kV substations
- Majority established between 1950's and 1970's
- Transmission Plant
  - 275kV and 110kV switchgear
  - 275/110kV and 110/33kV transformers
  - Reactors
  - Range of minor 275kV and 110kV equipment

- Ancillary systems include
  - Outdoor structures supporting air insulated equipment
  - Buildings
  - Batteries and chargers
  - Protection
  - Earthing
  - Security systems

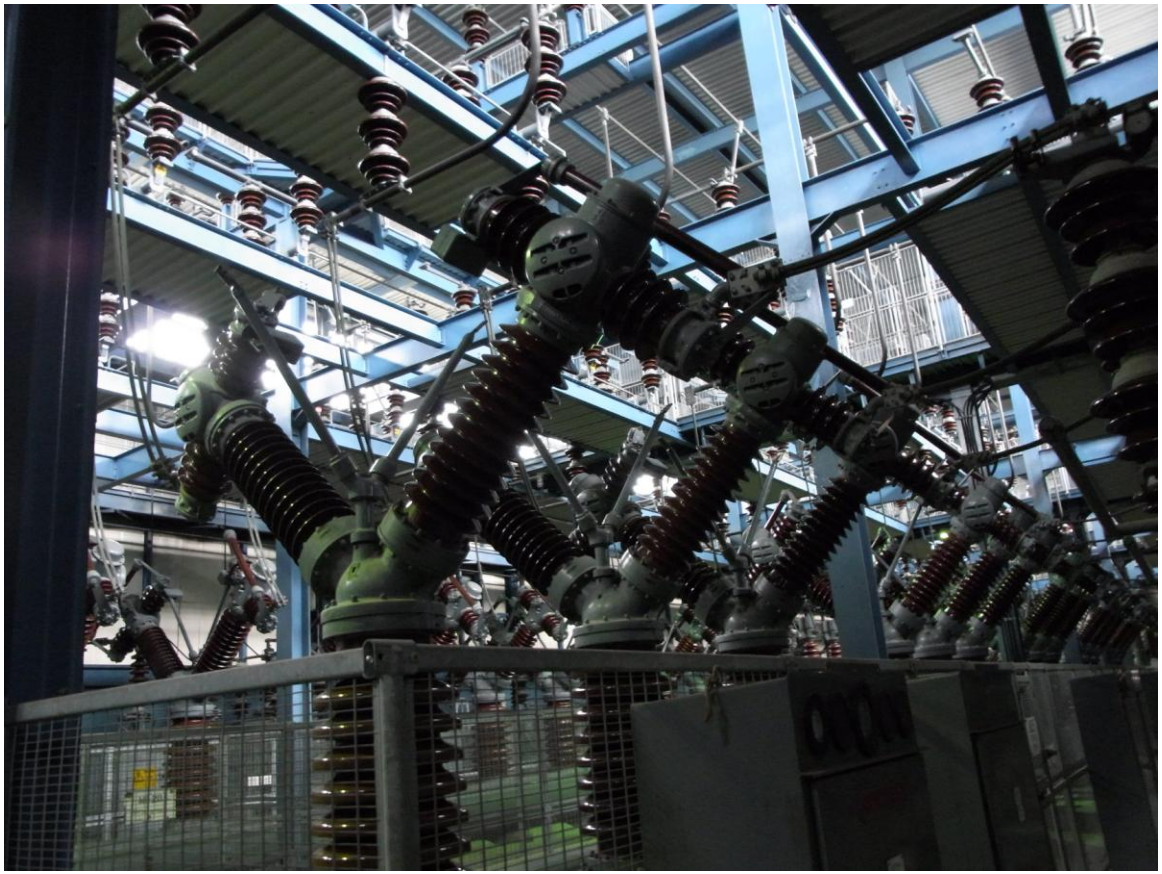
Transmission – aged 110/33kV transformer

Transmission – modern 275/110kV transformer

Transmission substation – concrete structures

Transmission substation – replacement structures

Transmission – indoor switchgear



Transmission ancillaries

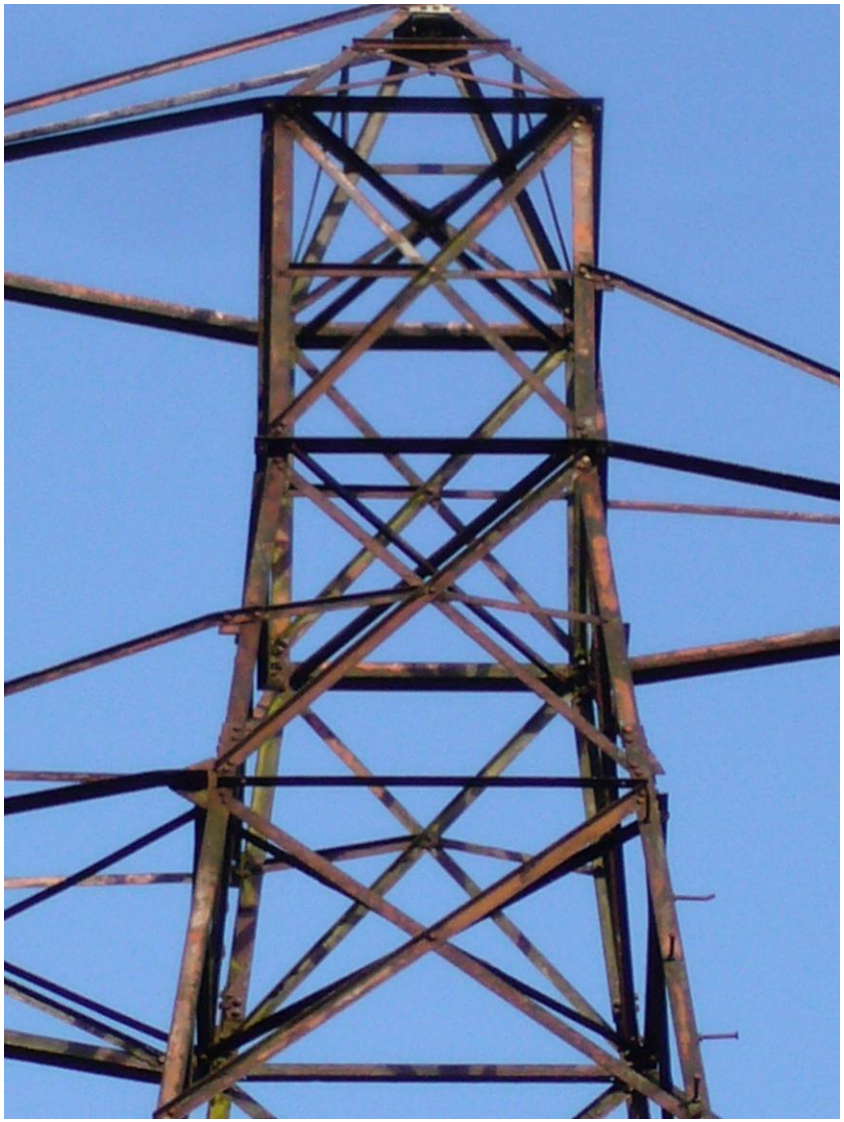
Transmission Plant – principal replacement proposals

- Based on detailed individual condition assessments
  - Visual assessments
  - Oil tests
  - Infra red assessment
  - Partial discharge
- Refurbishment of 6 transmission substations
  - Structures
  - 16no. 110kV Circuit breakers
  - Electrical components
  - Civil assets
  - Ancillary and security systems
- Replacement of the complete 110kV S/S at Ballylumford
- 3no. 275/110kV and 8no. 110/33kV transformer replacements
- Life extension applied to a number of additional transformers
- Replacement of 3 reactors

Transmission Asset Replacement – Overhead Lines

- Principal risks to be managed
  - Performance
    - System security
  - Safety
    - Staff and the public
- 275kV
  - Double circuit towerline
  - 400km route length
  - Constructed between 1966 and 1978
- 110kV
  - Double circuit towerline
  - Single circuit towerline and woodpole
  - 924km route length
  - Majority constructed between 1950 and late 1970's

Transmission overhead lines



Transmission tower struts

Transmission tower - insulator fittings

Transmission tower - insulator fittings

Transmission tower foundation

Transmission Overhead lines – principal replacement proposals

- Based on detailed individual condition assessments
  - Assessments of tower structures
  - Foundations
  - Insulators and fittings
  - Pole rot assessments

- Refurbishment proposed
  - Insulator replacement
  - Tower painting
  - Woodpole replacement
  - Foundation replacement
  - Vegetation management

- Coolkeeragh to Magherafelt 275kV circuit
  - One of the most critical sections of transmission circuitry
  - Loss of this circuit has significant potential to result in loss of supply to all of L/Derry
  - Double cct event in 2009 resulted in this outcome
  - Has also experienced a number of single circuit failures
  - Needs to be reconductored end to end
  - Out to tender for a design

RENEWABLES INTEGRATION

Transmission system expansion for the integration of renewable energy

David de Casseres

Major Projects – Project Director

Drivers for Action

Climate Change

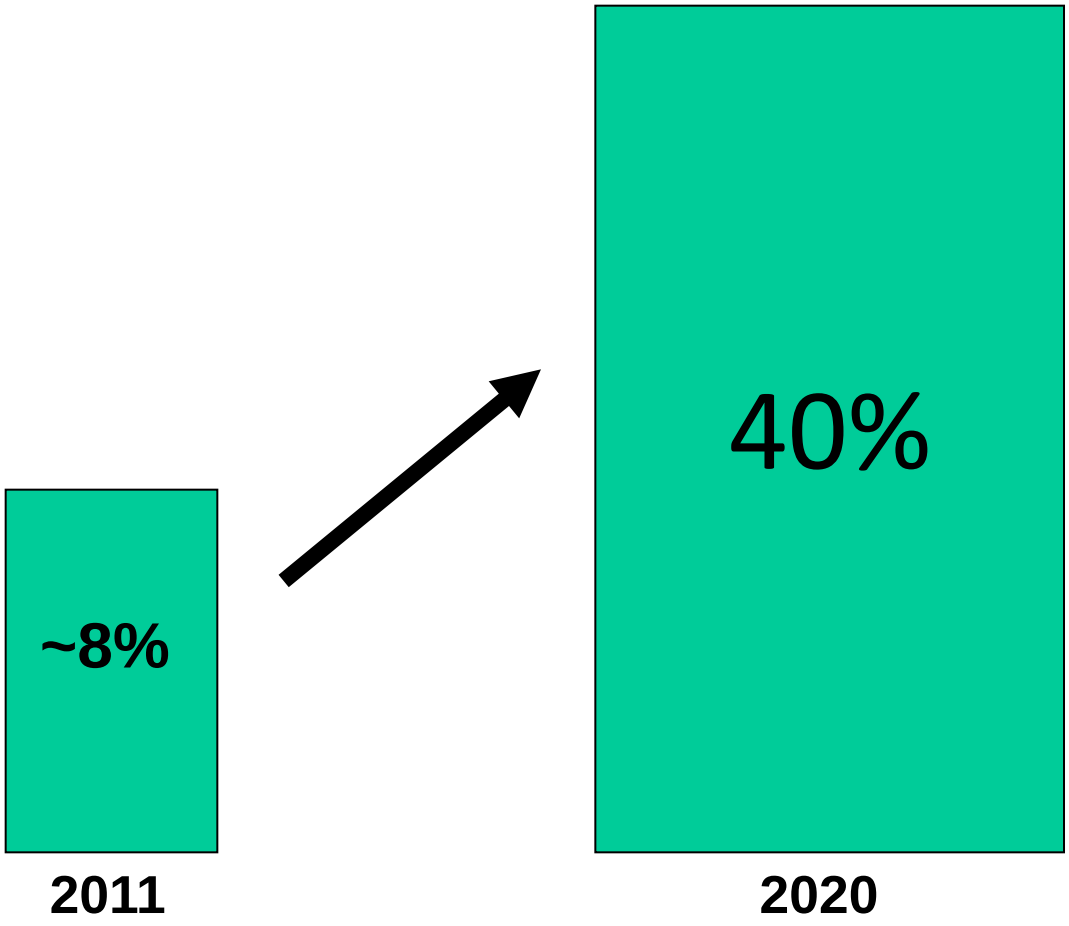
Global Agreements (Kyoto Protocol)

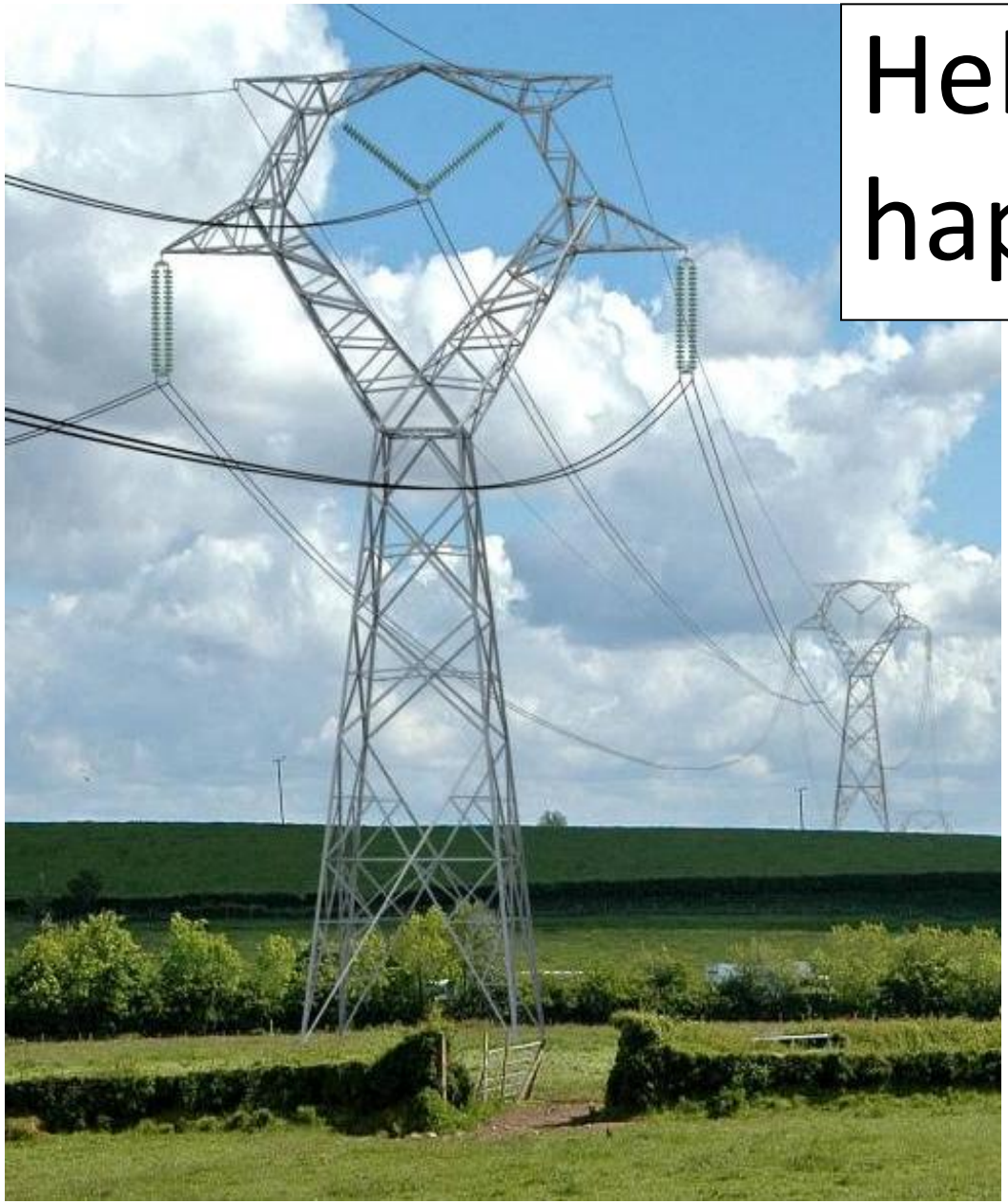
EU Directives

UK Renewable Energy Policy (Westminster)
Single Electricity Market
NI Renewable Energy Targets
(DETI Strategic Energy Framework)

NIE Infrastructure Investment

Government Targets for Renewable Electricity





Helping it happen!

The Renewable Generation Pipeline

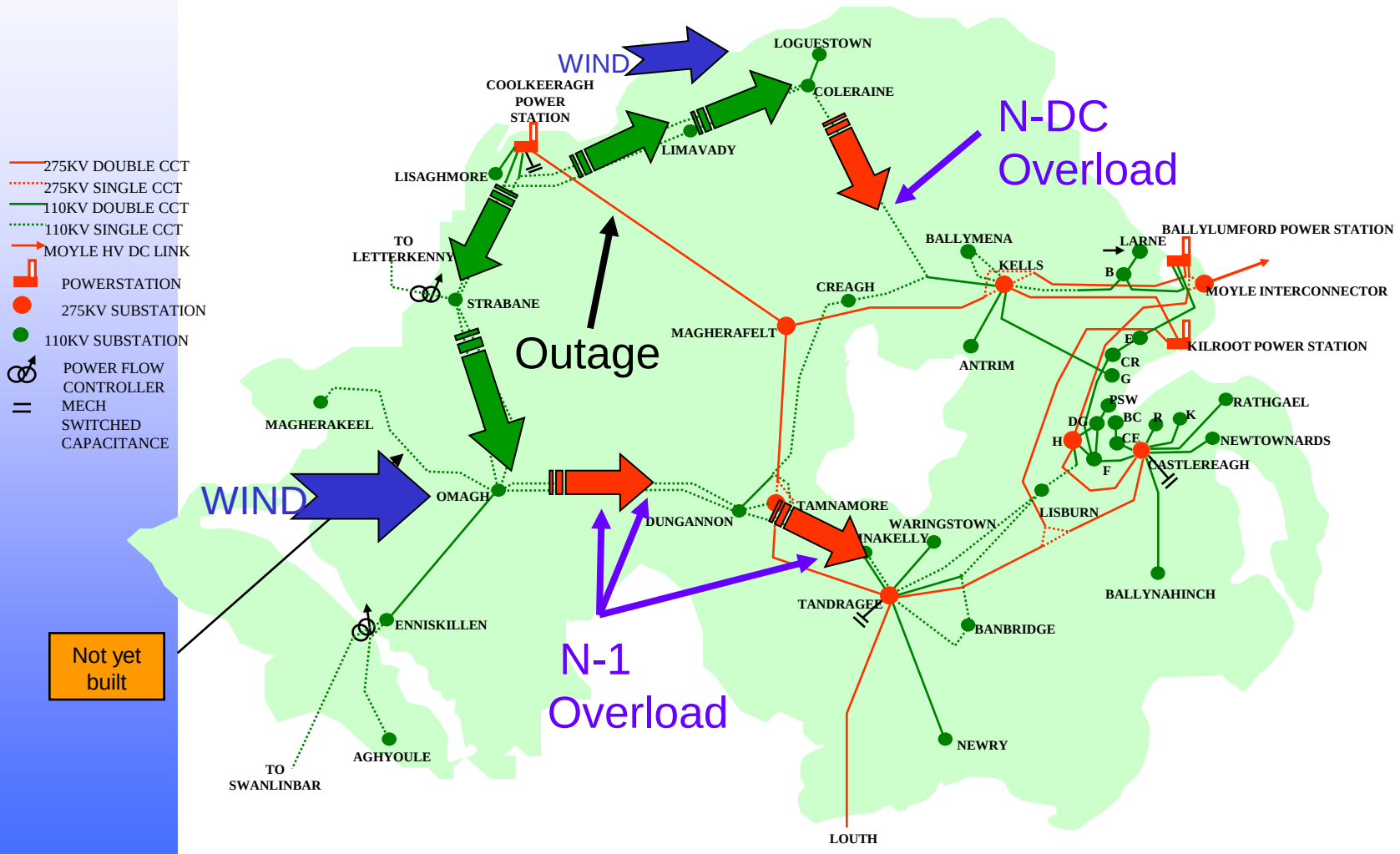
Energy Source	Quantity MW
Existing	
On-shore wind connected	340
Small scale connected	12
Future	
On-shore wind approved	452
On-shore wind in planning	720
Off-shore Tunes Plateau	300
Off-shore Irish Sea	300
Tidal at Rathlin	300
Biomass	230
Small scale	100
TOTAL MW	**2,754 MW**

As at Jan 2010

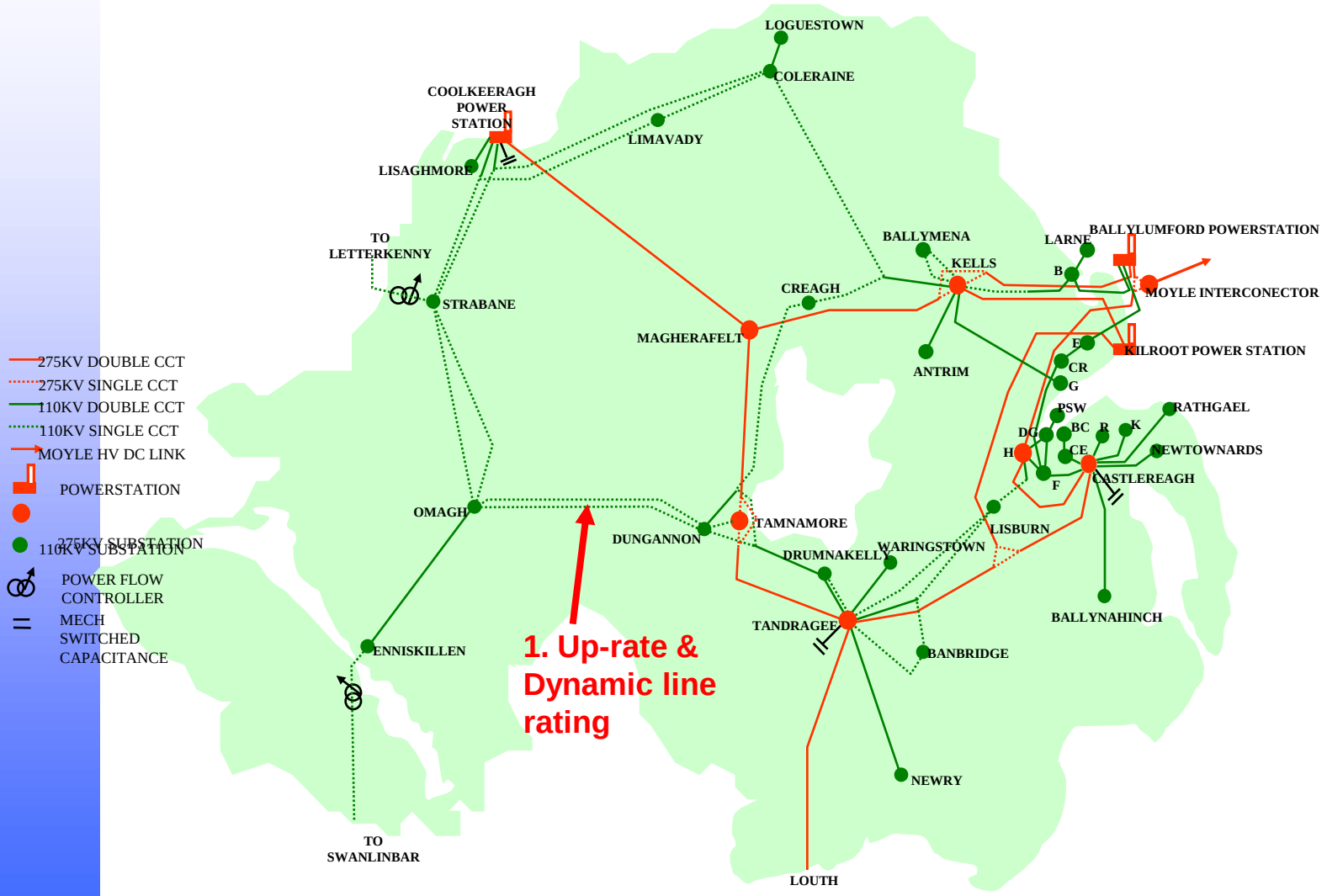
On-shore Wind Powered Generation

Off-shore and Biomass Generation

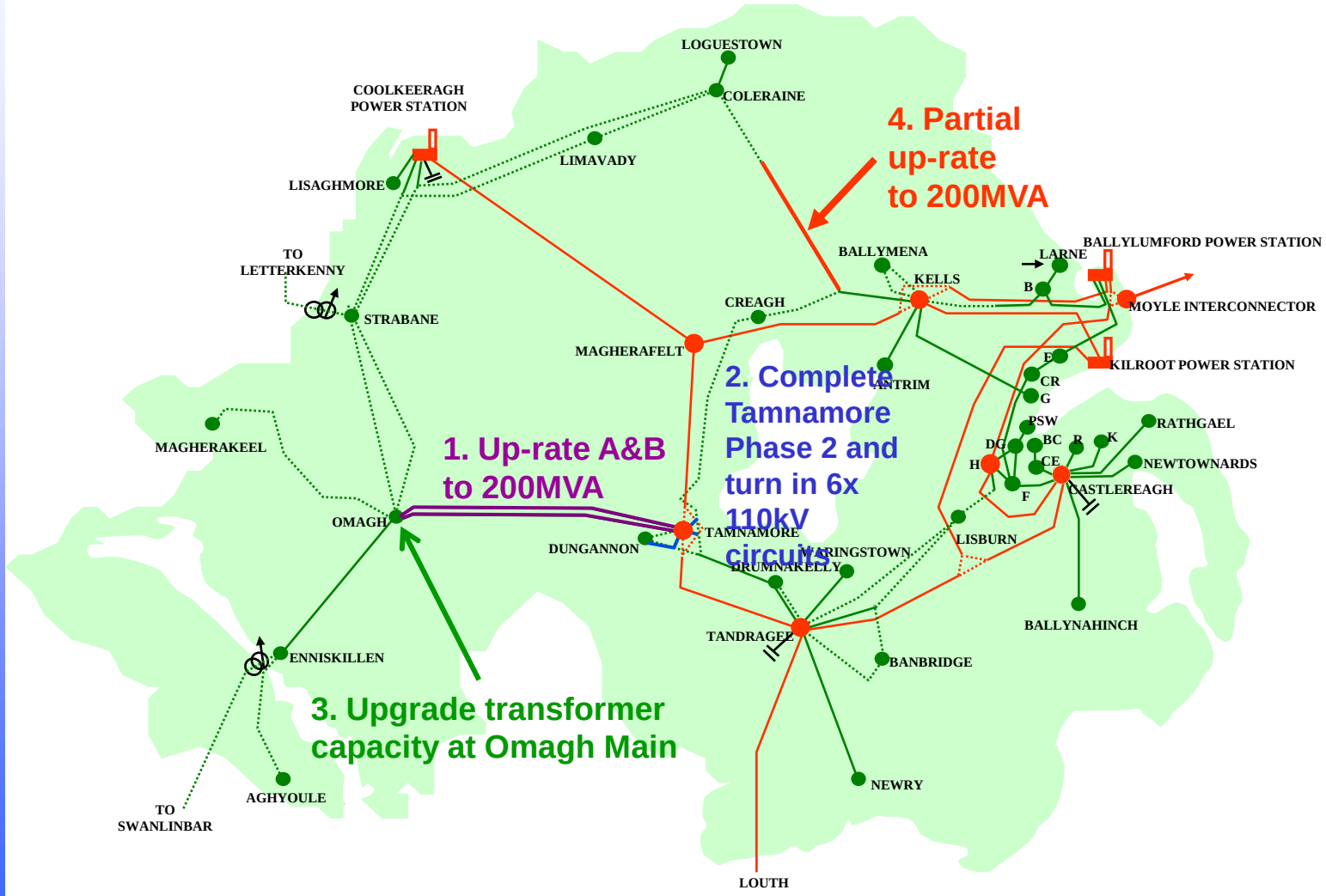
Transmission System Impacts – Today!



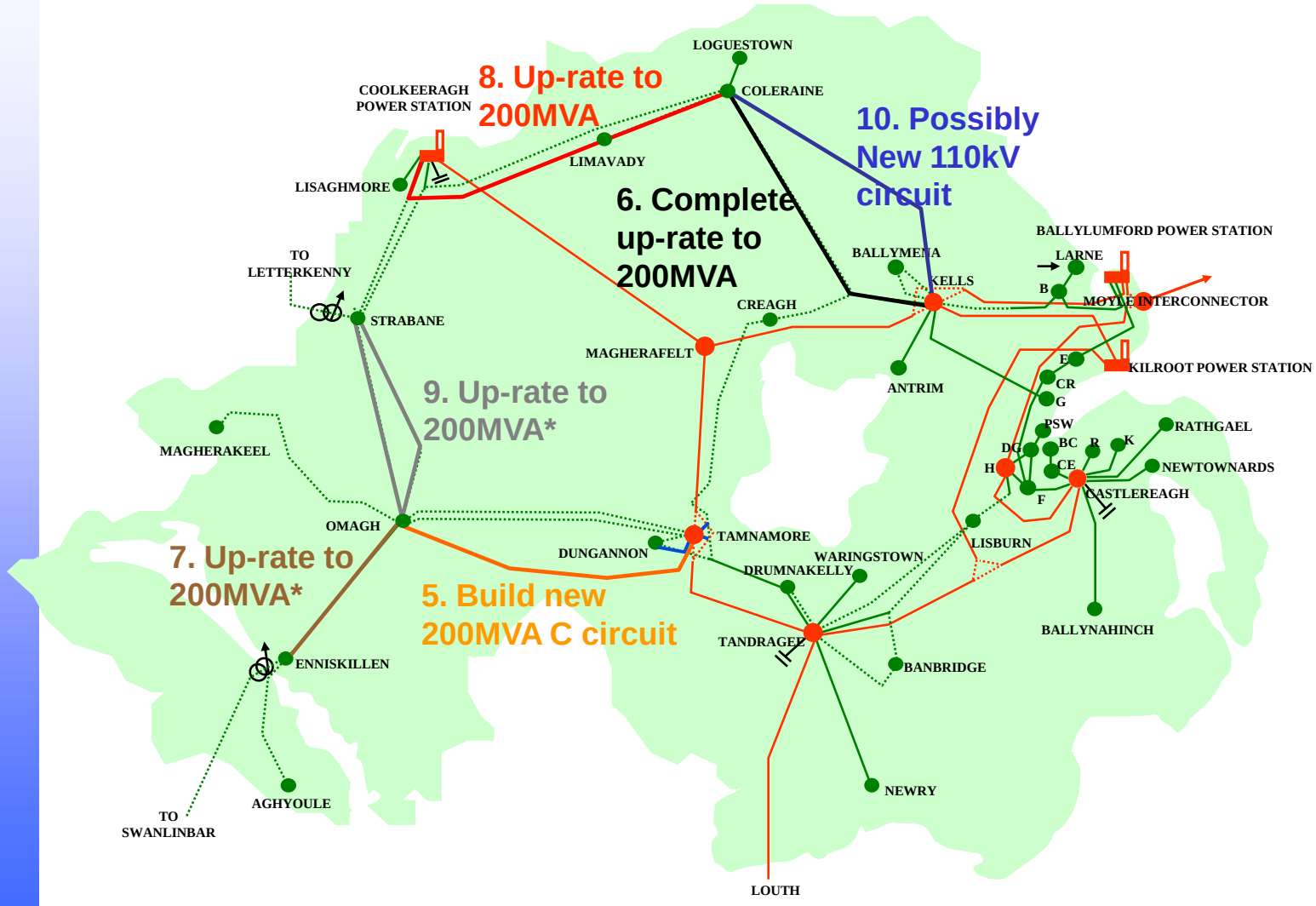
Short Term Measures - 2011



Medium Term Measures Part 1 - 2015



Medium Term Measures Remainder - 2017



110kV Medium Term Plan

Project	Overview of Work	Estimated Cost £m[1]
Tamnamore Phase 2.	Install a second transformer and connect six 110kV circuits	21.74
Dungannon to Omagh A&B Phase 2	Up-rate existing line to 200MVA	1.63
Kells to Coleraine Phase 1	Up-rate existing line to 200MVA	2.30
Tamnamore to Omagh new circuit.	New 200MVA 110kV circuit	14.35
Kells to Coleraine Phase 2	Up-rate existing line to 200MVA	2.87
Kells to Coleraine Phase 3	Up-rate existing line to 200MVA	1.43
Omagh to Enniskillen A&B	Up-rate existing line to 200MVA	6.70
Coleraine to Limavady	Up-rate existing line to 200MVA	2.00
Coolkeeragh to Limavady	Up-rate existing line to 200MVA	2.00
Limavady Substation	Connect the existing Coolkeeragh to Coleraine circuit into Limavady	11.48
Coolkeeragh to Coleraine	Up-rate existing line to 200MVA	3.83
Total		**£70.33m**

[1] RP5 costs are stated in 2009/10 prices.

Proposal for Expenditure Approval

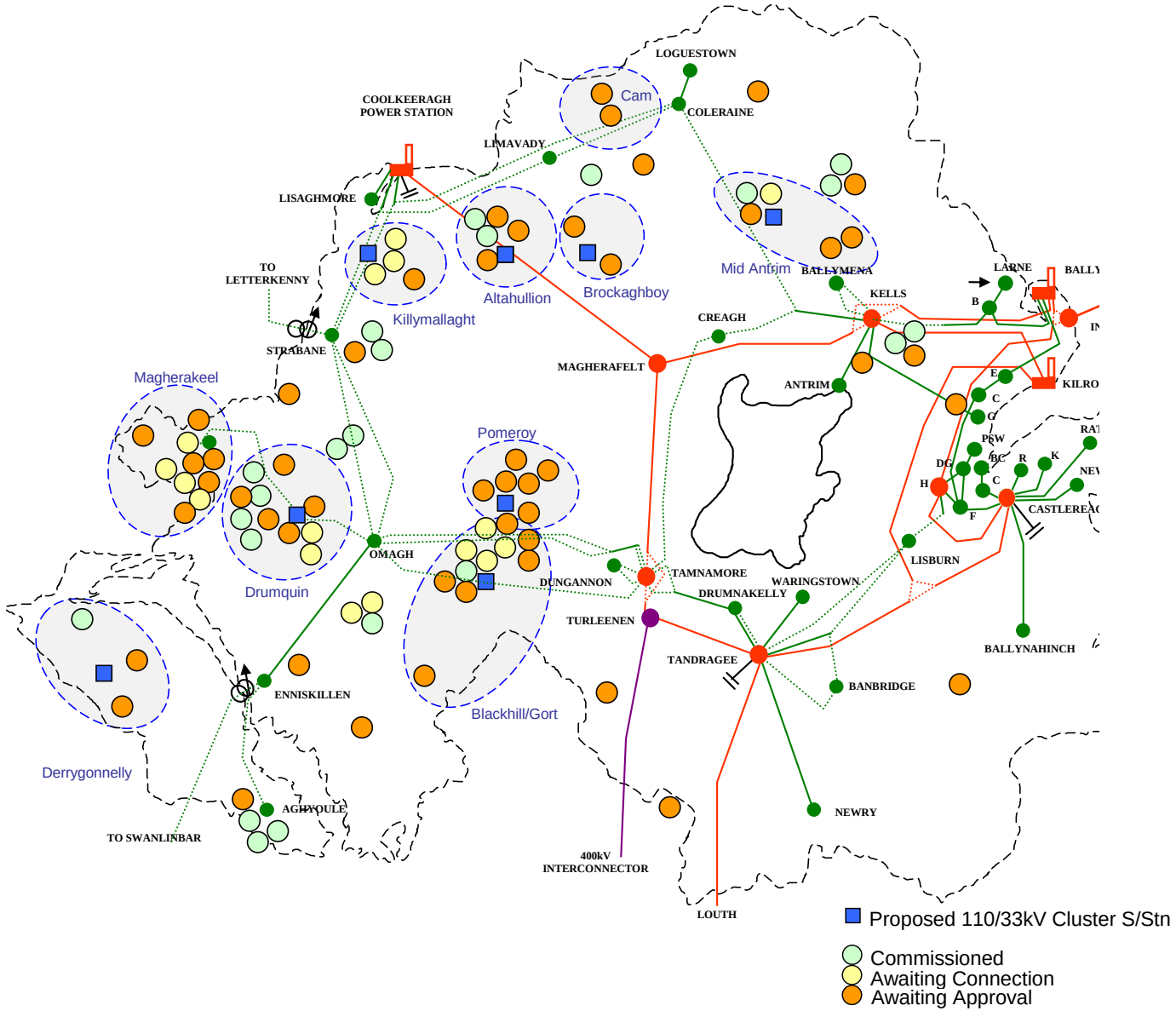
NIE's proposals for MTP expenditure recognise the need for a "staged approach" as follows:

1. Preliminary Development
   Included in Operating Costs. A "baseline" resource to manage and develop the programme and to bring forward proposals for specific approval

2. Pre-Construction Development
   Specific approval (by project) of an agreed budget to develop proposals, secure planning approvals etc, and propose a defined capital budget

3. Construction
   A specific capital budget for individual project delivery

Wind farm clusters and isolated wind farms



110kV Wind-farm Cluster Plan

Cluster	Estimated Cost
Magherakeel	£18.9m
Killymallaght	£3.3m
Fallaghearn	£6.2m
Pomeroy	£6.2m
Mid Antrim	£8.5m
Altahullion	£9.4m
Drumquin	£9.4m
Brockaghboy	£13.1m
Derrygonnelly	£9.9m

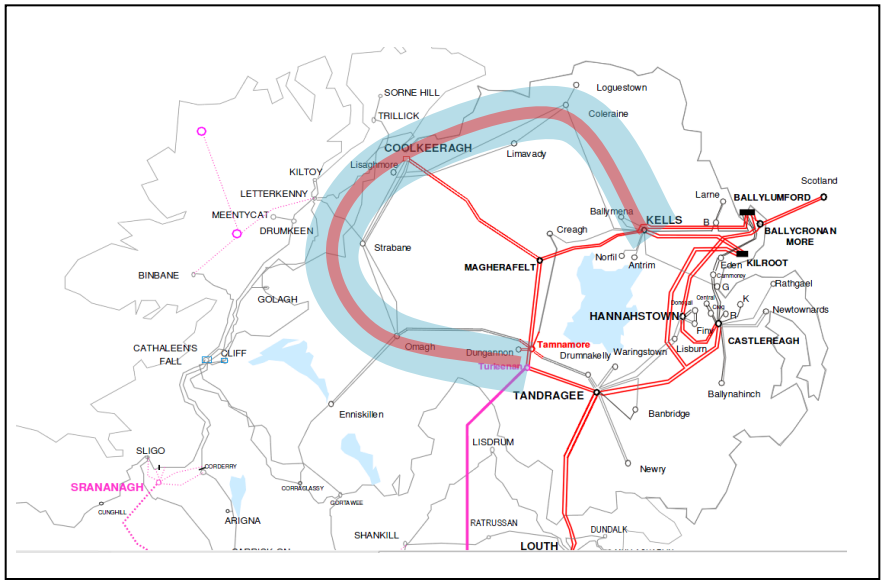
The total net costs to be expended within the RP5 period, after taking account of estimated receipts from developers, are estimated to be **£17.59m**

[1] RP5 costs are stated in 2009/10 prices.

Only Half-way there!

NIE's Long Term Plans are designed to achieve the 275kV "backbone" transmission system capability needed to connect and operate the full extent of renewable generation envisaged in order to deliver the 40% target.

The Renewable Integration Development Project (RIDP) is an ongoing development that is investigating the options for achieving this.



Prospective RIDP Expenditure

Project	Projected Capital Expenditure £m							
	RP4	RP5					RP6	Total
		12/13	13/14	14/15	15/16	16/17		
Turleenan to Border new 275kV single circuit	0.05	0.05	0.51	0.76	16.87	25.31	42.19	**85.74**
2x 275/110kV substations	-	0.24	0.66	0.87	16.72	25.08	41.80	**85.37**
Coolkeeragh to Strabane New 110kV line	-	0.10	0.39	0.61	6.89	10.33	-	**18.32**
Coolkeeragh to Strabane C Up-rate	-	-	-	-	0.38	0.56	2.68	**3.62**
Border to Coolkeeragh new 275kV single circuit	-	-	-	0.10	0.48	0.76	68.2	**69.54**
Kells to Coleraine new 110kV circuit	-	0.10	0.39	0.61	7.75	10.33	7.75	**26.93**
Kells to Coleraine 2x 275kV circuits	-	-	-	-	0.10	0.39	121.15	**121.63**
Total	**0.05**	**0.48**	**1.94**	**2.95**	**49.18**	**72.76**	**283.77**	**411.13**
		RP5 Total = £127.32m						

NB : All subject to individual project approval by the Utility Regulator

[1] RP5 costs are stated in 2009/10 prices.

Summary of proposed expenditure on transmission system expansion for the integration of renewable energy

Medium Term Plan	£70.33m
Clusters (Net)	£17.59m
RIDP	£127.32m
TOTAL	**£215.24m**

NB : All subject to individual project approval by the Utility Regulator

Completing the Picture …

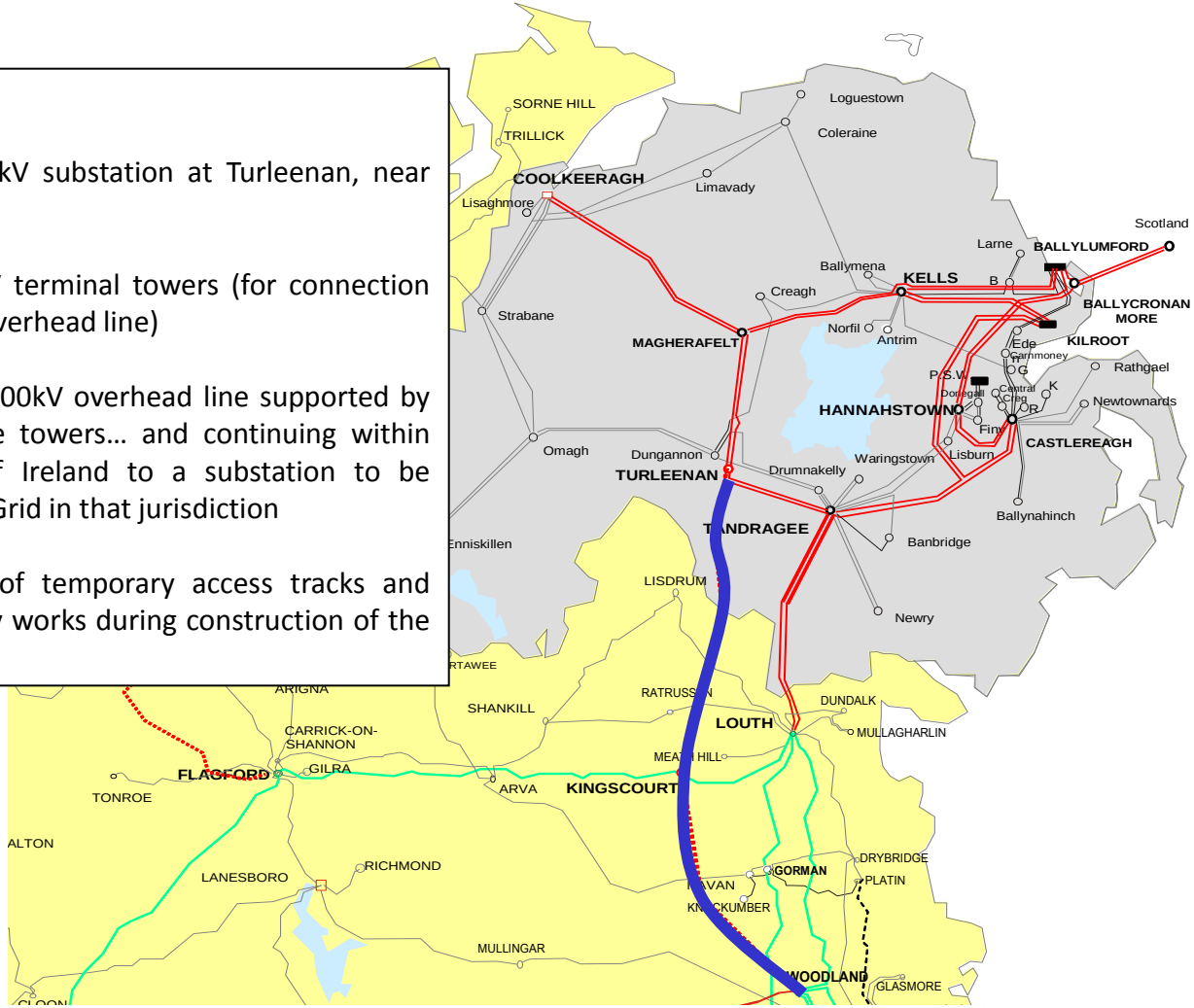
Additional Transmission Interconnection

A critical requirement for stable and long term operation of a power system that is able to serve a competitive “all-island” market incorporating a wide variety of geographically dispersed power generation plant, including an increasingly high proportion of wind powered generation.

400kV Interconnector Project

Project Description

- A new 275/400kV substation at Turleenan, near Moy
- Two new 275kV terminal towers (for connection to the existing overhead line)
- 34 km of new 400kV overhead line supported by 102 steel lattice towers… and continuing within the Republic of Ireland to a substation to be proposed by EirGrid in that jurisdiction
- The formation of temporary access tracks and other temporary works during construction of the line

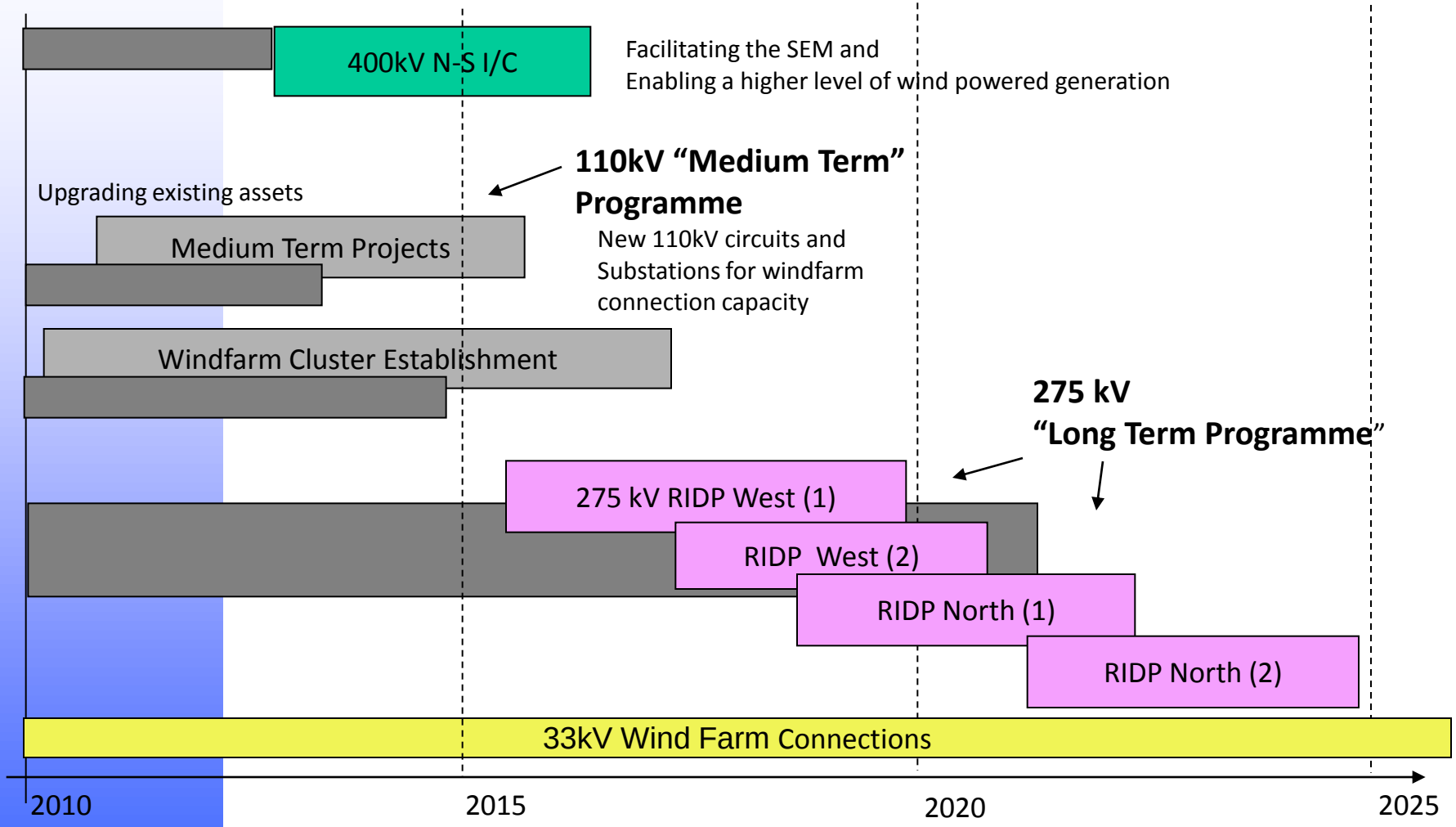


Summary of proposed expenditure on additional transmission system interconnection

Project	Projected Capital Expenditure £m						
	RP5					RP6	Total
	12/13	13/14	14/15	15/16	16/17		
Interconnector Construction	-	11.11	21.62	21.62	21.62	8.11	**84.08**
	RP5 Total = £75.97m						

[1] RP5 costs are stated in 2009/10 prices.

Transmission Development Programme



NB: For illustration only. Development / Pre-construction activity shown thus

RP5 CAPITAL INVESTMENT

Key Messages

Randal Gilbert

Manager Programme Management

T&D Network – Key Messages

- The RP5 investment plan primary objective is to provide a resilient network
- The key message is the focus on managing risk of failure
  - Safety, Legislative, Performance and Environmental
- Risk of failure is increasing due to:
  - Increasing age profile
  - Constrained investment
  - Higher customer expectations
- Failure Risk is already evident – not based on 'what-if' scenarios
  - VT failures, transformer bushing failures, insulator string corrosion
- Investment plan submitted has been based on a very detailed bottom up assessment of risk at each category level.
- The plan has been through several iterations and internal challenge
- NIE recognise the substantial increase in expenditure required but in our opinion, the plan has integrity

T&D Network – Key Messages

The RP5 T&D Network Investment plan will:

- Accommodate growth in demand and permit customer connection
- Maintain a continuing resilient network which is the also a key assumption behind the proposal for Renewable Integration investment
- Maintain a network complaint with legislative requirements
- Maintain levels of network performance
- Manage the level of age –expired assets preventing an unsustainable build-up of an ageing asset base
  - in so doing minimising the safety risks associated with the asset base

Renewables Integration – Key Messages

- The scale of the challenge is significant
- The most immediate, and real, demand arises from onshore wind-power
- NIE is obliged (by licence terms) to respond to this demand, and is already taking a number of steps to deliver:
  - An ongoing **Short Term Plan** to stretch existing assets
  - A **Medium Term Plan** that will deliver connection capacity for about half of the overall 40% target (**circa £88m in RP5**)
  - A Long Term Plan (RIDP) that is well advanced in identifying strategic options for major transmission system reinforcement (**circa £127m for commencement in RP5**, with further expenditure towards overall completion in circa 2025)
- The proposed new Interconnector is needed in RP5 for both market facilitation and for further wind-power. The investment cost of **circa £76m** will deliver a downward pressure on electricity prices
- All of these developments are subject to ongoing step by step investment approval by the Utility Regulator

Renewables Integration – Key Messages

- This is a critical time for clear choices to be made about investing in infrastructure for renewable integration
- There is an urgent need for “joined up” policy, direction and support throughout the range of relevant legislative, regulatory and planning authorities in Northern Ireland
- If the required support is not forthcoming and investment is delayed or prevented, then renewable generation targets will not be met

Thank You for your attention