All Island Generator TUoS 2011/12 Indicative Tariffs Methodology Workshop

Dundalk 22nd June 2011

Timothy Hurley

OUTLINE

- Overview
- Description of method/assumptions
- Analysis of indicative tariffs

Overview – Dynamic Model Features

Forward looking + 5 years

Charges based on NPV of cost of new assets

Charges for assets for 7 years after built

Postage Stamp charge for sunk assets

4 Network scenarios examined

Load flow analysis determines use of network

Overview – Dynamic Model

- The model looks at future network requirements in 5 years time and charges these based on current generation meeting the current demand i.e. looking at the existing use of future network

Description of Method

1. Input files for Integra set up
   - Network files
   - Load files
   - List of generators liable for TUoS
   - Dispatch files
   - Cost files
2. Load flow analysis was conducted to determine usage of all new assets in each of the four scenarios.
3. Any units that uses a new assets was charged for this in proportion to their usage
4. The maximum tariff from the 4 scenarios was identified for each unit & the resulting revenue recovery was calculated (capped at 30% of total revenue)
5. Remaining revenue requirement was spread across all units by adding a postage stamp amount to give the final €/kW/year tariff for each unit.

Description of Method: 4 Scenarios

- Network pricing based on network planning
- 4 network planning scenarios
  - Winter peak, 0% wind
  - Summer peak, 80% wind
  - Summer peak, 0% wind
  - Summer min, 80% wind

Description of Method: Network

- Future 2016/2017 network (TFS & SYS)
  - Winter peak 2016
  - Summer peak 2017
  - Summer min 2017
- Current 2011/2012 demand (exported terms)
  - Winter peak 2011
  - Summer peak 2012
  - Summer min 2012

Description of Method: Generators

- Generators liable for TUoS
  - Connected or assumed to be connected for all or part of the tariff year 1st Oct 2011 to 30th Sept 2012
- Generators connected >= 10MW
- Future generators >= 10MW

Description of Method: Dispatch

- Generators dispatched to meet demand in scenario, Generators >= 5MW
- Plexos derived merit order stack
  - based on plexos model for Constraints/DBCs
- Unconstrained model
  - Transmission
  - Generation
- Design reflects access to unconstrained Market Schedule

Description of Method: Dispatch

- Assumptions for Turlough Hill, hydro, wind, Moyle and priority dispatch plants

	WP Low Wind	SP Low Wind	SP High Wind	S Min High Wind
Turlough Hill	100% Gen	100% Gen	100% Gen	100% Pump demand
Hydro	100% Gen	100% Gen	100% Gen	0% Gen
Wind	0% Gen	0% Gen	80% Gen	80% Gen*
Moyle	440MW import	410MW import	410MW import	205MW import
Peat, Aughinish, Meath Waste	100% Gen	100% Gen	100% Gen	100% Gen

Description of Method: Asset Costs

- Cost of network reinforcements
  - Modern Equivalent Asset Value
- Include asset if within 5 year forecast horizon
- Include asset for max 12 years
  - 5 year forecast horizon
  - 7 year post-commissioning period

Description of Method: Asset Costs

- Assets included
  - New circuits
  - New stations
  - Incremental cost of upratings
- Assets excluded
  - Connection assets
  - DSO assets
  - Replacement assets at end of life
  - Voltage support devices

Description of Method: Asset Costs

- E.g. New circuit
  - Capital cost
  - Annualised capital cost

  - Net Present Value =

$$\frac{Annualised\ Capital\ Cost}{(1 + Discount\ Rate)^{No\ of\ year}}$$

Description of Method: Delayed Assets

- Include asset for max 12 years
  - 5 year forecast horizon
  - 7 year post-commissioning period
- If delayed, max 12 years applied

Description of Method: Revenue

- 25% of NI Network related costs
- 25% of ROI Network related costs

All-Island Revenue =	**€60m**
ROI Revenue =	€50m
NI Revenue =	€10m

- All island revenue “bucket” = €60M
- RA approved revenues to be used
- Indicative tariffs do not inc EWIC related costs

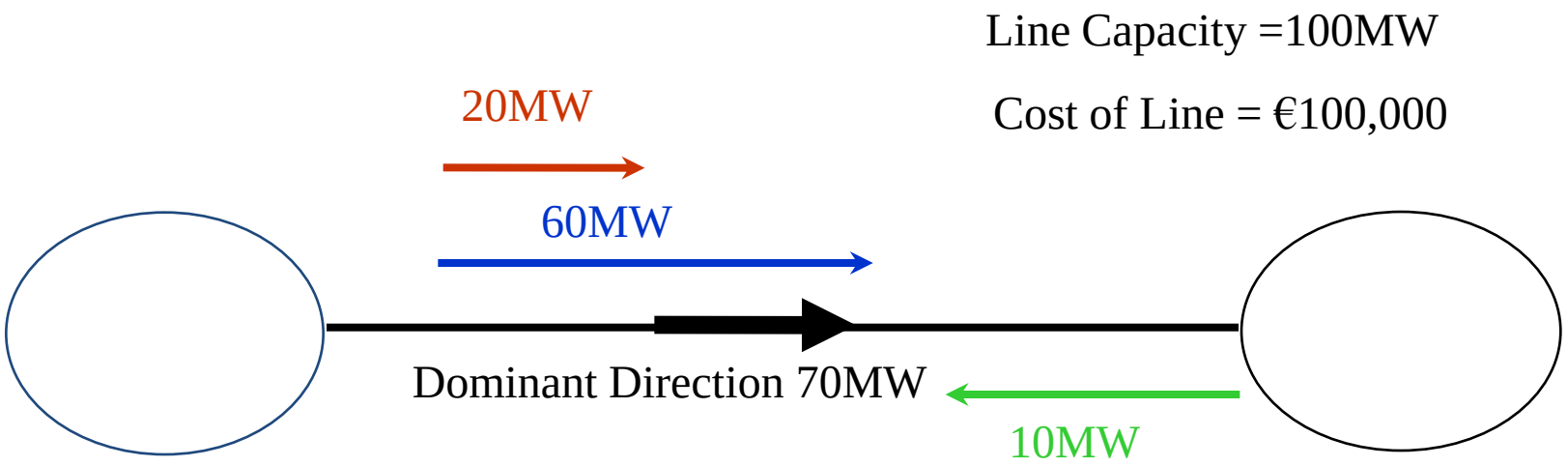
Description of Method – Load flow analysis

- DC Load flow
- Preformed in Integra
- Reverse MW-mile methodology
  - Establishes the extent of the network used by each generator
  - Rewards where a generator offsets the dominant flow on a line
  - Potential for negative tariffs
- Load flow ran for each of the 4 scenarios

Implementation of Reverse MW-Mile

1. Base case DC load flow
   - Identifies the dominant flows
2. Identify generator of interest
3. Decrease load on a pro-rata basis
4. Re-run DC load flow
   - Identifies usage of lines by the generator
5. Compare direction of flow with base case
   - Identifies charge/credit to generator
6. Calculate generator locational payment
7. Repeat steps 2 to 6 for all generators

Example: Reverse MW-Mile Approach



Generator 1: 20/100 = €20,000

Generator 2: 60/100 = €60,000

Generator 3: -10/100 = -€10,000

→ Any unit that uses a new asset is charged/credited for this in proportion to their usage

Description of Method: 1MW Incremental Tariff

- If a generator was not dispatched in the merit order, a tariff is derived using a dispatch of 1MW in order to get a tariff for every unit in all scenarios

Description of Method – Final Tariff Calc

- Max tariff from the 4 scenarios
- Resulting revenue recovery calculated
  - Capped at 30% of total revenue (scale by 47%)
  - Locational tariff = max tariff scaled
- Plus 70% postage stamp
  - €3.5416/kW/year
- Final tariff = locational + postage stamp

Description of Method: Tariff Adjustments

- Moyle in model but not charged
- Negative tariffs
  - Intermittent generation, lower cap €0
  - Non-intermittent generation, no cap

Indicative tariffs

	Indicative 11/12 tariff	Indicative 08/09 tariff Option 4	Current tariff
Max tariff (€/kW/yr)	7.2026	11.6835	10.3043
Minimum tariff (€/kW/yr)	3.9258	1.836	0.0000
Range (€/kW/yr)	3.2767	9.8474	10.3043

Comparison with Current Tariffs

- Beware – different methodologies

	Indicative Tariff 11/12	ROI Published Current Tariff 10/11	NI Published Current Tariff 10/11
Model description	Dynamic + postage stamp	Static+ postage stamp	Postage stamp
Jurisdiction	ROI and NI	ROI only	NI only
Cost database	Costs for future planned developments included using a 5 year horizon. Once the asset is classified as built, it remains in the cost file for 7 years	Costs for every asset in the current network included. No future looking component included. Also, lightly loaded lines (less than 20% of capacity utilised) are excluded from the cost file	n/a
Scenarios	4 different scenarios considered	Only 1 scenario considered (Winter Peak)	n/a
Dispatch	Dispatch is as per merit order plus dispatch assumptions	Dispatch on **all** generators is "pro-rata"	n/a

SONI System Operator for Northern Ireland

EIRGRID

Analysis – Which scenarios are driving the tariffs?

	Winter Peak		Summer Peak 0% wind		Summer Peak 80% wind		Summer Minimum	
	MW	**Direction**	**MW**	**Direction**	**MW**	**Direction**	**MW**	**Direction**
2nd N/S circuit	14.7	S->N	66.4	S->N	116.5	S->N	31.2	N->S
Existing N/S circuit	125	N->S	27.6	N->S	110	S->N	34	N->S
Net flow	110.3	N->S	38.8	S->N	226.5	S->N	65.2	N->S

Analysis - Drivers behind tariffs

- Enniskillen Wind
- Tariff set during summer min, high wind
  - Max tariff = €7.8793/kW/year, derived from:
  - Total costs = €89,830
  - Generator dispatch = 11.4MW
  - Max Tariff = €7.8793/kW/year
  - Final Tariff = €7.2026/kW/year

Analysis - Drivers behind tariffs

BUS NUM.	FROM NAME	BUS NUM.	TO NAME	UNIT COST €/kW	BASE FLOW MW	AGENT FLOW MW	AGENT COST (€'000s)
3774	CAVAN	90440	TURL4-	6.27	-31.07	-4.24	26.54
3774	CAVAN	5464	Woodland	5.13	69.8	3.94	20.23
79010	ENNK1_	87510	OMAH1-	1.85	17.14	5.65	10.42
79010	ENNK1_	87510	OMAH1-	1.85	17.14	5.65	10.42

From analysis the main contributors to the tariff are the

- 2nd north – south interconnector and associated ROI circuit between Cavan and Woodland
- Uprated circuits between Enniskillen and Omagh

Analysis - Drivers behind tariffs

- Trien Wind
- Tariff set during summer peak, high wind
  - Max tariff = €5.4264/kW/year, derived from:
  - Total costs = €204,550
  - Generator dispatch = 37.7MW
  - Max Tariff = €5.4264/kW/year
  - Final Tariff = €6.0629/kW/year

Analysis - Drivers behind tariffs

BUS NUM.	FROM NAME	BUS NUM.	TO NAME	UNIT COST €/kW	BASE FLOW MW	AGENT FLOW MW	AGENT COST (€'000s)
3462	Kilpaddo	3942	Moneypoi	2.34	305.81	17.97	41.98
3192	Knockanu	3191	Knockanu	2.39	-45.86	-14.87	35.52
3774	CAVAN	90440	TURL4-	6.27	116.42	5.3	33.24
3774	CAVAN	5464	Woodland	5.13	-108.05	-5.66	29.01

From analysis the main contributors to the tariff are the

- 220kV cable from Moneypoint to the new Kilpaddoge station in north Kerry
- New 220/110kV station at Knockanure
- 2nd north – south interconnector and associated circuit between Cavan and Woodland

Analysis – Which scenarios are driving the tariffs?

- For NI generators
  - Tariffs set by Summer Min scenario
  - Dominant North –> South flow
- For ROI generators
  - Majority of tariffs set by Summer Peak 80% wind
  - Dominant South -> North flow

QUESTIONS?