TNUoS DCLF ICRP Transport & Tariff Model

11 December 2019

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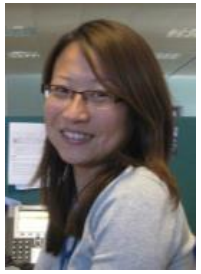
Housekeeping

Revenue team: TNUoS Tariff Forecasting & Setting



Rebecca Yang

Forecasting, setting and billing TNUoS to recover £2.8bn of TO revenue per year from generators, demand and suppliers

Sarah Chleboun

- Offshore
- Annual Load Factors (ALFs)

Jo Zhou

- Revenue
- Onshore Local Circuits

Alice Grayson

- Generation
- Local substation

Matt Wootton

- Demand
- EET

Introductions

1. Who are you and where have you come from?
2. What do you want to get out of this session?
3. How do you plan on using the TNUoS model?

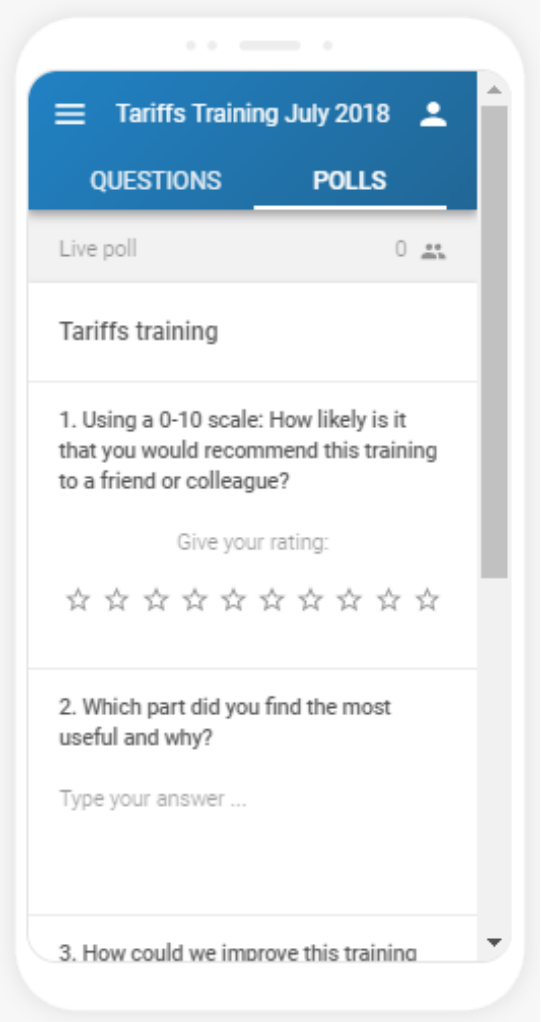
Agenda

Time	Topic
10:00	**Welcome & Introductions**
10:15	Overview of Transport & Tariff Model
11:00	How to Change Key Transport Model Inputs: • Demand & Generation (Contracted)
11:30	**Coffee**
11:40	How to Change Key Transport Model Inputs: • Circuits
12:00	How to Change Key Tariff Model Inputs: • Revenue • Charging Base (Demand & Generation)
12:45	**Lunch** Running the Model Interactive Session: Worked Example
13:40	Trouble Shooting!
14:10	Other TNUoS FAQs
14:30	Sli.do and Q&A
15:00	**Finish**

Sli.do

We want your feedback! #tariffs

1. Using a 0-10 scale: How likely is it that you would recommend this training to a friend or colleague?
2. Which part did you find the most useful and why?
3. How could we improve this training session?



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What is TNUoS?

- **TNUoS is the Transmission Network Use of System charge, and recovers the allowed revenue for Transmission Owners for the cost of building and maintaining transmission infrastructure.**
- **ESO recovers the charges on behalf of the TOs, including SPT, SHET, NGET and OFTOs.**
- **The tariffs are set annually and in advance.**
- **Charges are split between generation and demand.**

Generation

- Generation tariffs are capped by a €2.50/MWh limit set by the EU
- Generations charges are charged against transmission entry capacity (TEC)

Demand

- Demand charges charged based on usage:
  - HH – Triad demand
  - NHH – Annual usage between 16:00 & 19:00

What is the Transport and Tariff Model & what does it do?

Calculates Transmission Network Use of System Charges (TNUoS) consistent with the methodology set out in the CUSC (Section 14, Part 2, Section 1).

It has two fundamental purposes:

1. Produce cost-reflective tariffs with locational signals, to incentivise the efficient siting of generation and demand across the transmission system
2. Ensure accurate revenue recovery for the TOs

What is the Transport and Tariff Model & what does it do?

1

Within the transport model is a simplified GB onshore transmission network model with demand and generation assumptions for each node

2

The transport model adds on 1MW of generation and then 1MW of demand to derive the approximate long run marginal costs of transmission. These are measured in MWkm

3

The model applies different generation profiles for peak & year round conditions

4

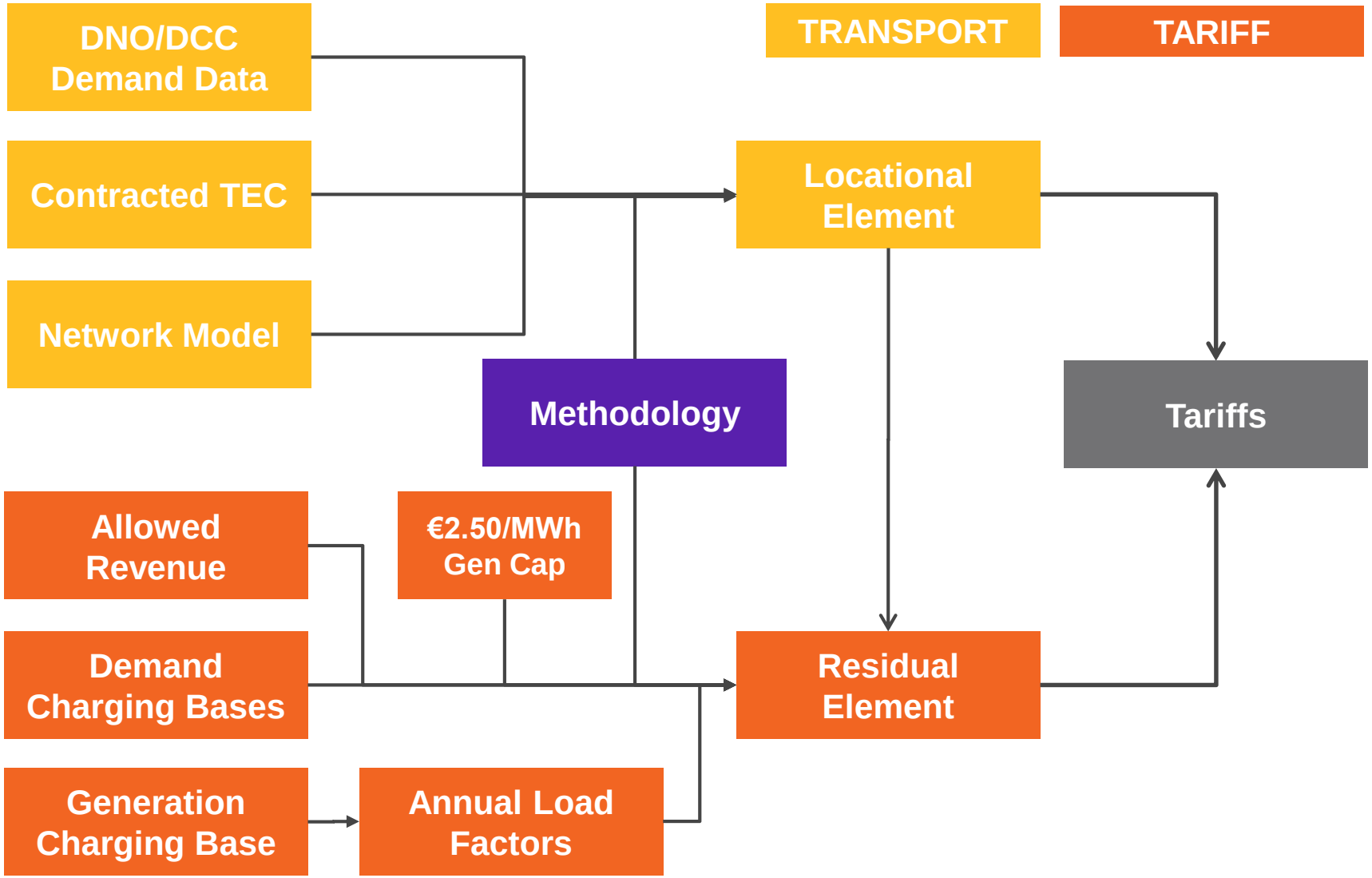
It then converts MWkm incremental cost into £/kW by applying a "unit cost" (in £/MWkm) for different types of circuits. This gives locational tariffs.

- e.g. 400kV OHL, 275kV underground cable...

5

The tariff models uses revenue, generation and demand assumptions to calculate the residual element and final tariffs

Inputs in to TNUoS Charges



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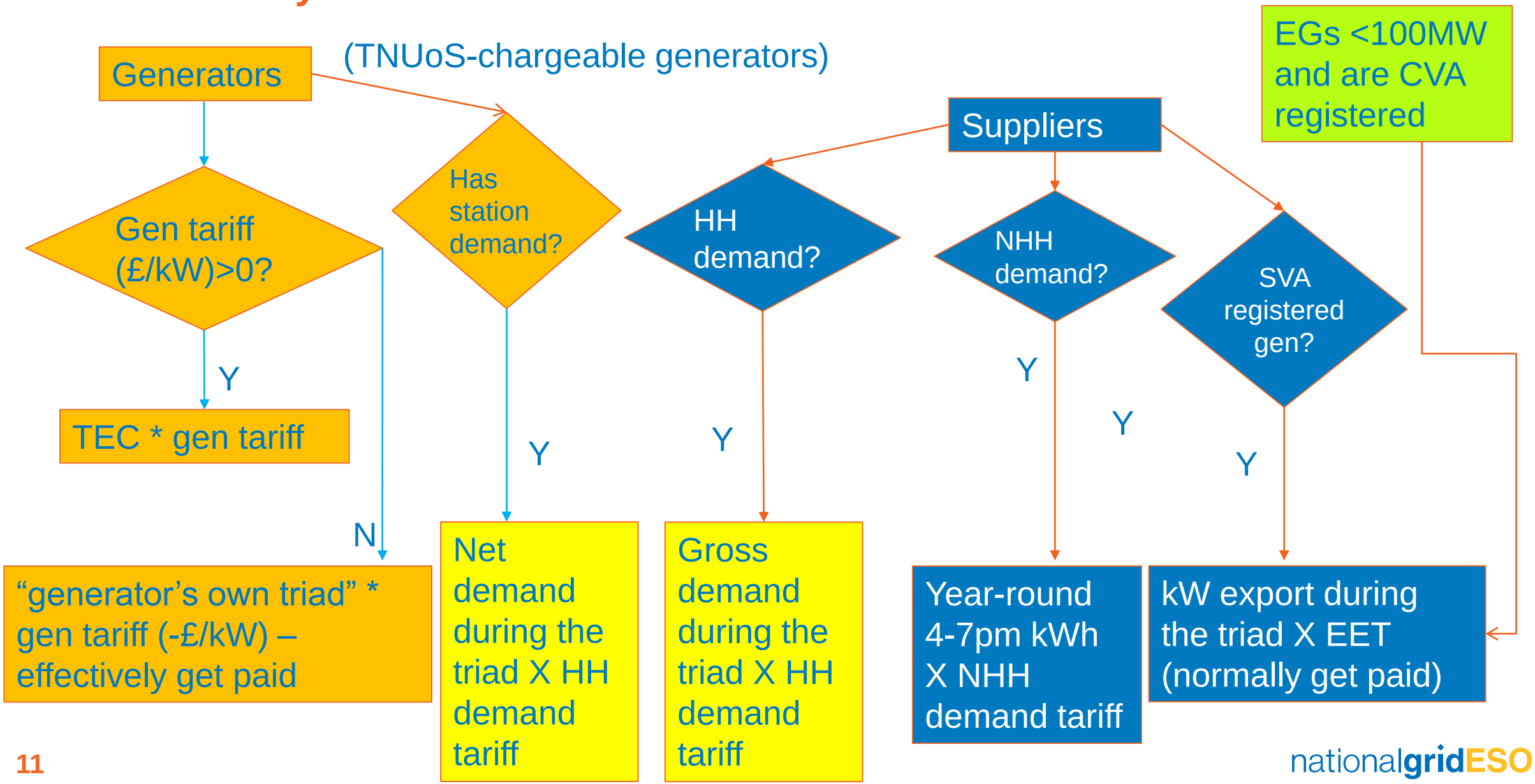
TNUoS Liability



The Transport Sheet & Week 24 Demand

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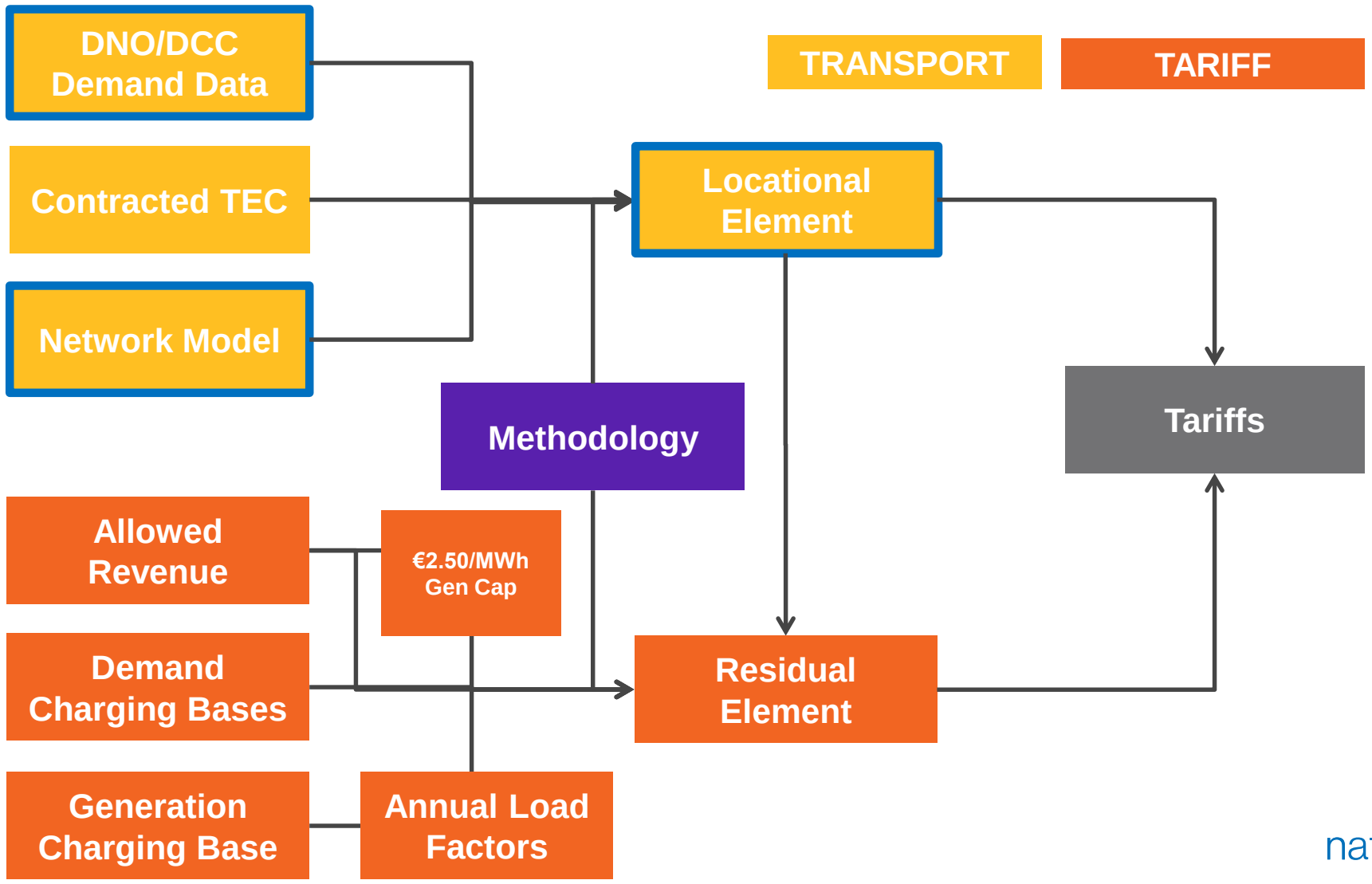
Inputs in to TNUoS Charges -

The Transport Sheet & Week 24 Demand



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Principles of locational signal

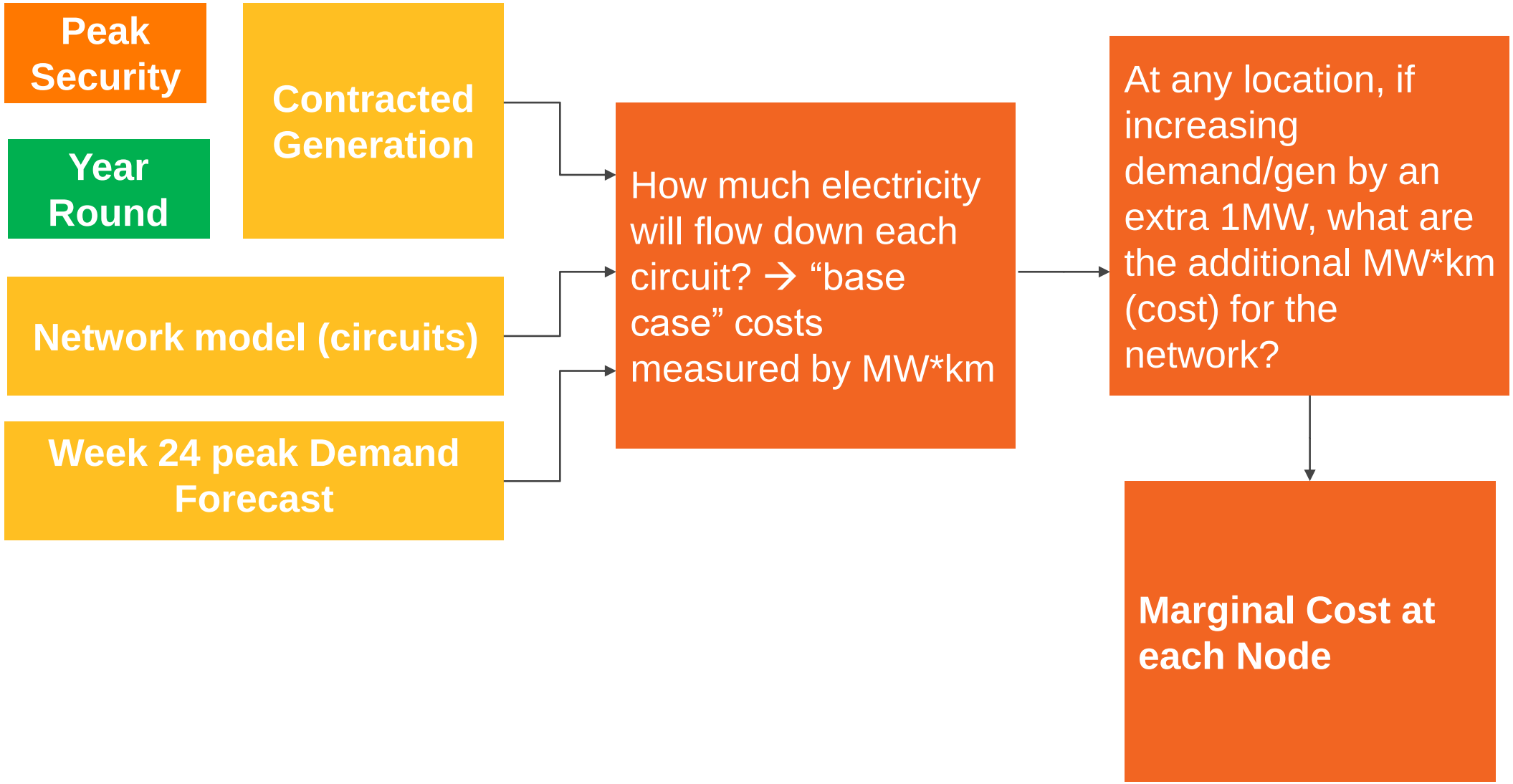
North: More Generation than Demand
Higher Generation Charges
Lower Demand Charges

South: More Demand than Generation
Lower Generation Charges
Higher Demand Charges

Flow of electricity under an "artificial" background

Cost reflective signal reflects incremental network development to meet flows

Transport Model – how to derive locational signals



Jargon Buster

How much does it cost the TO(s) to move 1MW of power, along 1km of 400kV overhead line?

The Expansion Constant (in £/MWkm)

How many times as expensive as the EC, if we move 1MW of power, along 1km of other types of circuits (e.g. 275/132kV OHL/cable, or 400kV cable, or HVDC etc)?

The Expansion Factors

The transmission network requires redundancy, for maintenance / construction / resilience. How many times as much as the “no-redundancy” network capacity is needed?

The (Global) Security Factor

Transport Model – dual backgrounds

Peak Security - Reflects how the system is used by peaking generation (Conventional Carbon generators)

Year Round – Reflects how the system needs to be built to accommodate less flexible generation under SQSS economic criteria (Low Carbon and Intermittent generators)

Load Factor Scaling for Contracted Generation		
	Peak	**Year Round**
Wind, Solar, Tidal	Fixed 0%	Fixed 70%
Nuclear	Variable	Fixed 85%
Interconnectors	Fixed 0%	Fixed 100%
Hydro	Variable	Variable
Pumped Storage	Variable	Fixed 50%
Peaking	Variable	Fixed 0%
Other	Variable	Variable

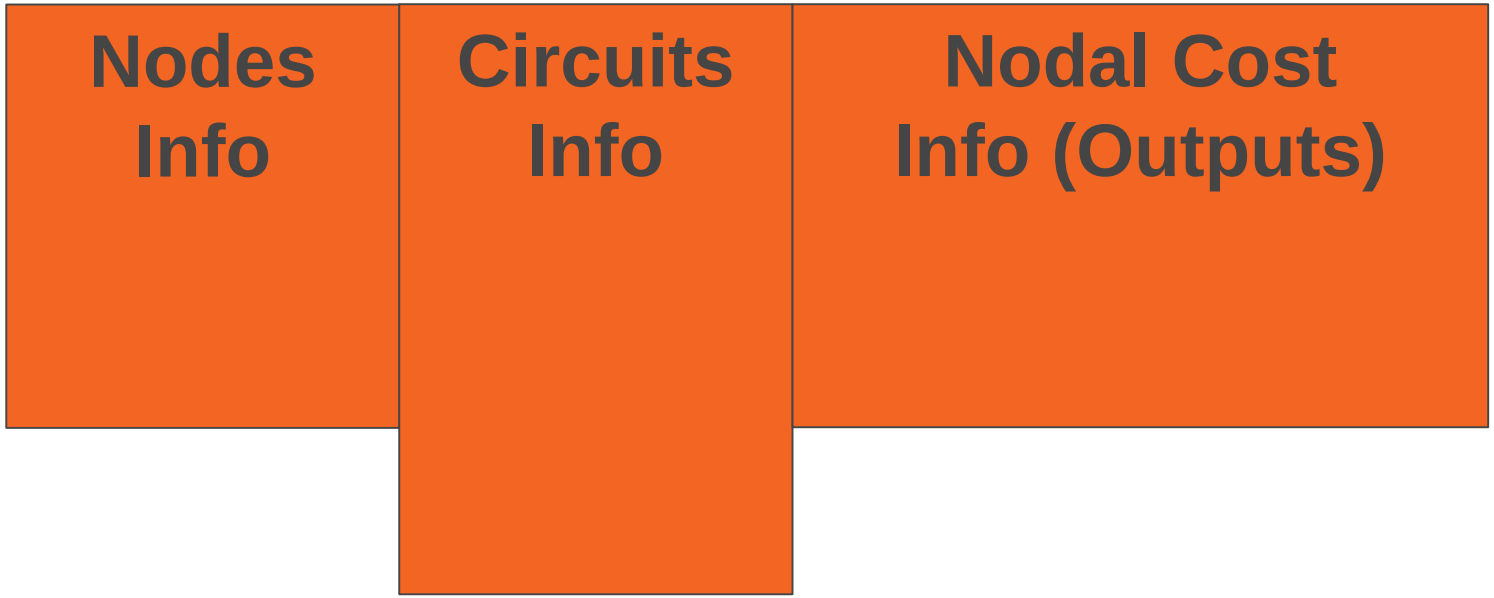
Transport Model Demand	
Peak	**Year Round**
Winter Peak from Week 24 Data	

The “T” Shape Layout

Column A – O: Nodes

Column P – AL: Branches

Column AN and beyond: Nodes



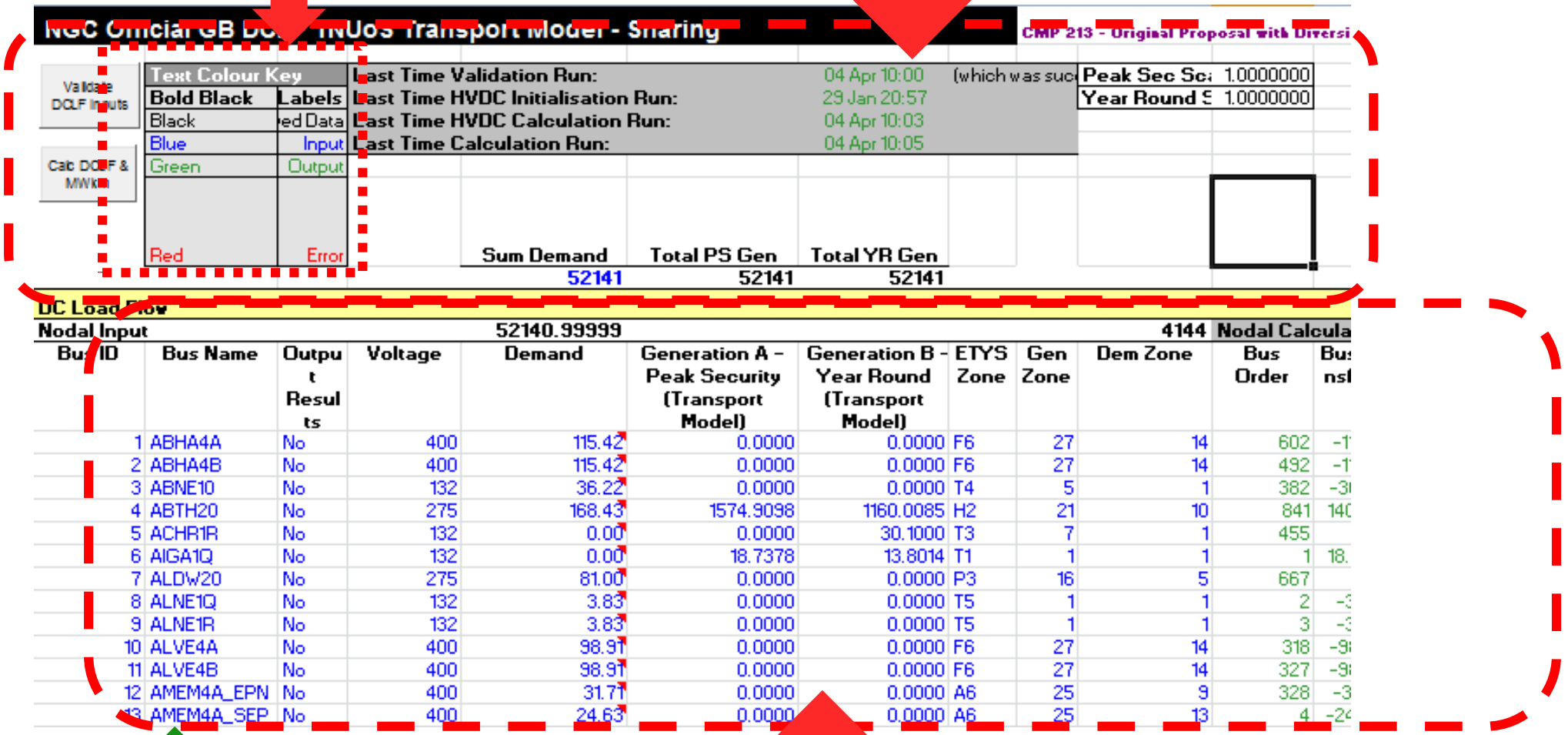
Nodes Information

blue text box – manual inputs

Green text box – auto calculated values

Colour Key

Same as on GenInput tab (and others)



Text Colour Key	
Bold Black	Labels
Black	ed Data
Blue	Input
Green	Output
Red	Error

Last Time Validation Run:	04 Apr 10:00 (which was suc
Last Time HVDC Initialisation Run:	29 Jan 20:57
Last Time HVDC Calculation Run:	04 Apr 10:03
Last Time Calculation Run:	04 Apr 10:05

Peak Sec Sc	1.0000000
Year Round S	1.0000000

Sum Demand	Total PS Gen	Total YR Gen
52141	52141	52141

DC Load Flow

Nodal Input 52140.99999 4144 Nodal Calcula

Bus ID	Bus Name	Output Results	Voltage	Demand	Generation A – Peak Security (Transport Model)	Generation B – Year Round (Transport Model)	ETYS Zone	Gen Zone	Dem Zone	Bus Order	Bus nsl
1	ABHA4A	No	400	115.42	0.0000	0.0000	F6	27	14	602	-1
2	ABHA4B	No	400	115.42	0.0000	0.0000	F6	27	14	492	-1
3	ABNE10	No	132	36.22	0.0000	0.0000	T4	5	1	382	-3
4	ABTH20	No	275	168.43	1574.9098	1160.0085	H2	21	10	841	140
5	ACHR1R	No	132	0.00	0.0000	30.1000	T3	7	1	455	
6	AIGA1Q	No	132	0.00	18.7378	13.8014	T1	1	1	1	18.
7	ALDW20	No	275	81.00	0.0000	0.0000	P3	16	5	667	
8	ALNE1Q	No	132	3.83	0.0000	0.0000	T5	1	1	2	-3
9	ALNE1R	No	132	3.83	0.0000	0.0000	T5	1	1	3	-3
10	ALVE4A	No	400	98.91	0.0000	0.0000	F6	27	14	318	-9
11	ALVE4B	No	400	98.91	0.0000	0.0000	F6	27	14	327	-9
12	AMEM4A_EPN	No	400	31.71	0.0000	0.0000	A6	25	9	328	-3
13	AMEM4A_SEP	No	400	24.63	0.0000	0.0000	A6	25	13	4	-2

NODES

MWs under each scenario

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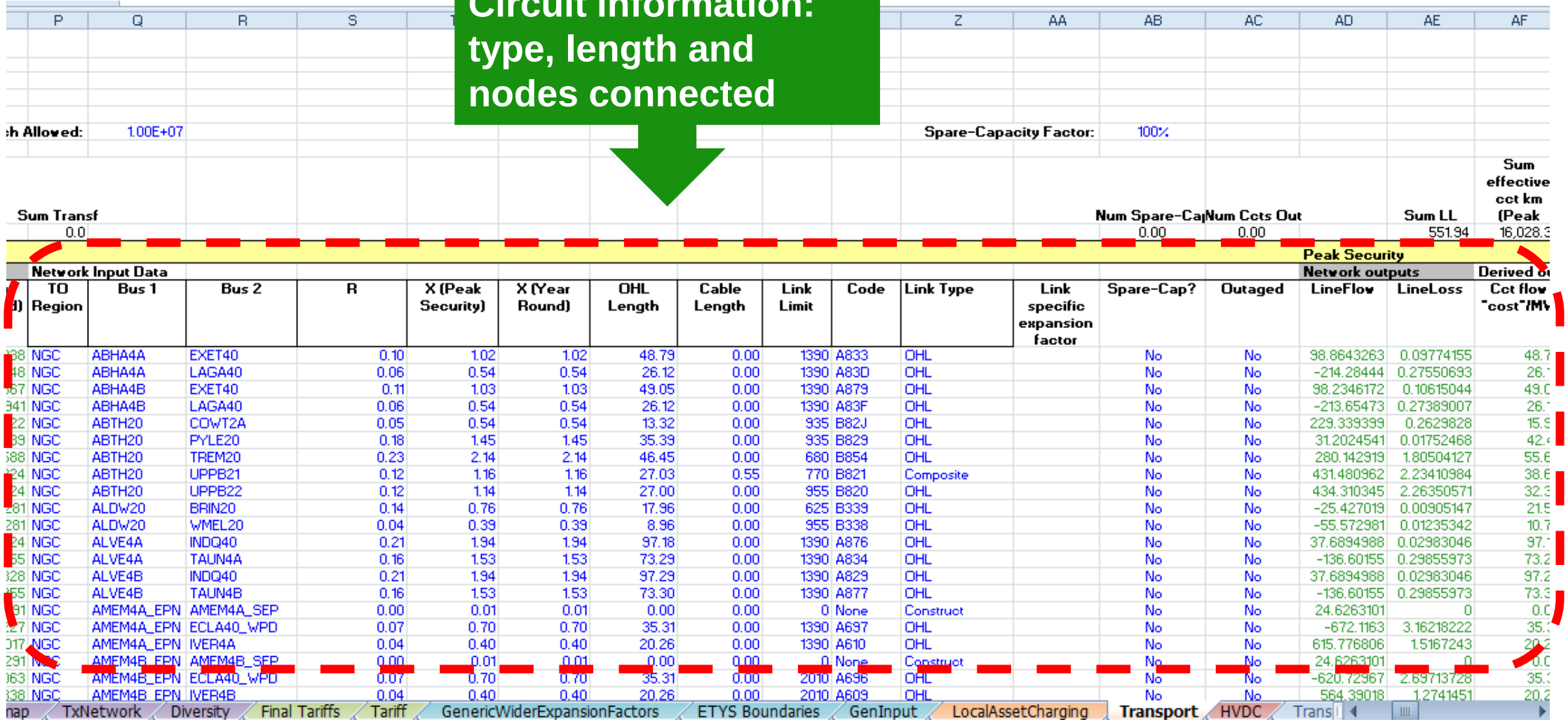
Circuits Information

Circuit information: type, length and nodes connected



	P	Q	R	S	Z	AA	AB	AC	AD	AE	AF
	h Allowed:	1.00E+07			Spare-Capacity Factor:		100%				
	Sum Transf						Num Spare-Ca	Num Ccts Out		Sum LL	Sum effective cct km (Peak
	0.0						0.00	0.00		551.94	16,028.3
									Peak Security		
	Network Input Data								Network outputs		Derived o
d)	TO Region	Bus 1	Bus 2	R	X (Peak Security)	X (Year Round)	OHL Length	Cable Length	Link Limit	Code	Link Type	Link specific expansion factor	Spare-Cap?	Outaged	LineFlow	LineLoss	Cct flow "cost"/MV
38	NGC	ABHA4A	EXET40	0.10	1.02	1.02	48.79	0.00	1390	A833	OHL		No	No	98.8643263	0.09774155	48.7
48	NGC	ABHA4A	LAGA40	0.06	0.54	0.54	26.12	0.00	1390	A83D	OHL		No	No	-214.28444	0.27550693	26.7
67	NGC	ABHA4B	EXET40	0.11	1.03	1.03	49.05	0.00	1390	A879	OHL		No	No	98.2346172	0.10615044	49.0
941	NGC	ABHA4B	LAGA40	0.06	0.54	0.54	26.12	0.00	1390	A83F	OHL		No	No	-213.65473	0.27389007	26.7
22	NGC	ABTH20	COWT2A	0.05	0.54	0.54	13.32	0.00	935	B82J	OHL		No	No	229.339399	0.2629828	15.9
39	NGC	ABTH20	PYLE20	0.18	1.45	1.45	35.39	0.00	935	B829	OHL		No	No	31.2024541	0.01752468	42.4
88	NGC	ABTH20	TREM20	0.23	2.14	2.14	46.45	0.00	680	B854	OHL		No	No	280.142919	1.80504127	55.6
24	NGC	ABTH20	UPPB21	0.12	1.16	1.16	27.03	0.55	770	B821	Composite		No	No	431.480962	2.23410984	38.6
24	NGC	ABTH20	UPPB22	0.12	1.14	1.14	27.00	0.00	955	B820	OHL		No	No	434.310345	2.26350571	32.3
281	NGC	ALDW20	BRIN20	0.14	0.76	0.76	17.96	0.00	625	B339	OHL		No	No	-25.427019	0.00905147	21.5
281	NGC	ALDW20	WMEL20	0.04	0.39	0.39	8.96	0.00	955	B338	OHL		No	No	-55.572981	0.01235342	10.7
24	NGC	ALVE4A	INDQ40	0.21	1.94	1.94	97.18	0.00	1390	A876	OHL		No	No	37.6894988	0.02983046	97.7
55	NGC	ALVE4A	TAUN4A	0.16	1.53	1.53	73.29	0.00	1390	A834	OHL		No	No	-136.60155	0.29855973	73.2
28	NGC	ALVE4B	INDQ40	0.21	1.94	1.94	97.29	0.00	1390	A829	OHL		No	No	37.6894988	0.02983046	97.2
55	NGC	ALVE4B	TAUN4B	0.16	1.53	1.53	73.30	0.00	1390	A877	OHL		No	No	-136.60155	0.29855973	73.3
31	NGC	AMEM4A_EPN	AMEM4A_SEP	0.00	0.01	0.01	0.00	0.00	0	None	Construct		No	No	24.6263101	0	0.0
27	NGC	AMEM4A_EPN	ECLA40_WPD	0.07	0.70	0.70	35.31	0.00	1390	A697	OHL		No	No	-672.1163	3.16218222	35.3
017	NGC	AMEM4A_EPN	IVER4A	0.04	0.40	0.40	20.26	0.00	1390	A610	OHL		No	No	615.776806	1.5167243	20.2
291	NGC	AMEM4B_EPN	AMEM4B_SEP	0.00	0.01	0.01	0.00	0.00	0	None	Construct		No	No	24.6263101	0	0.0
063	NGC	AMEM4B_EPN	ECLA40_WPD	0.07	0.70	0.70	35.31	0.00	2010	A696	OHL		No	No	-620.72967	2.69713728	35.3
338	NGC	AMEM4B_EPN	IVER4B	0.04	0.40	0.40	20.26	0.00	2010	A609	OHL		No	No	564.39018	1.2741451	20.2

nap | TxNetwork | Diversity | Final Tariffs | Tariff | GenericWiderExpansionFactors | ETYS Boundaries | GenInput | LocalAssetCharging | Transport | HVDC | Trans

Data freeze by 31 October each year

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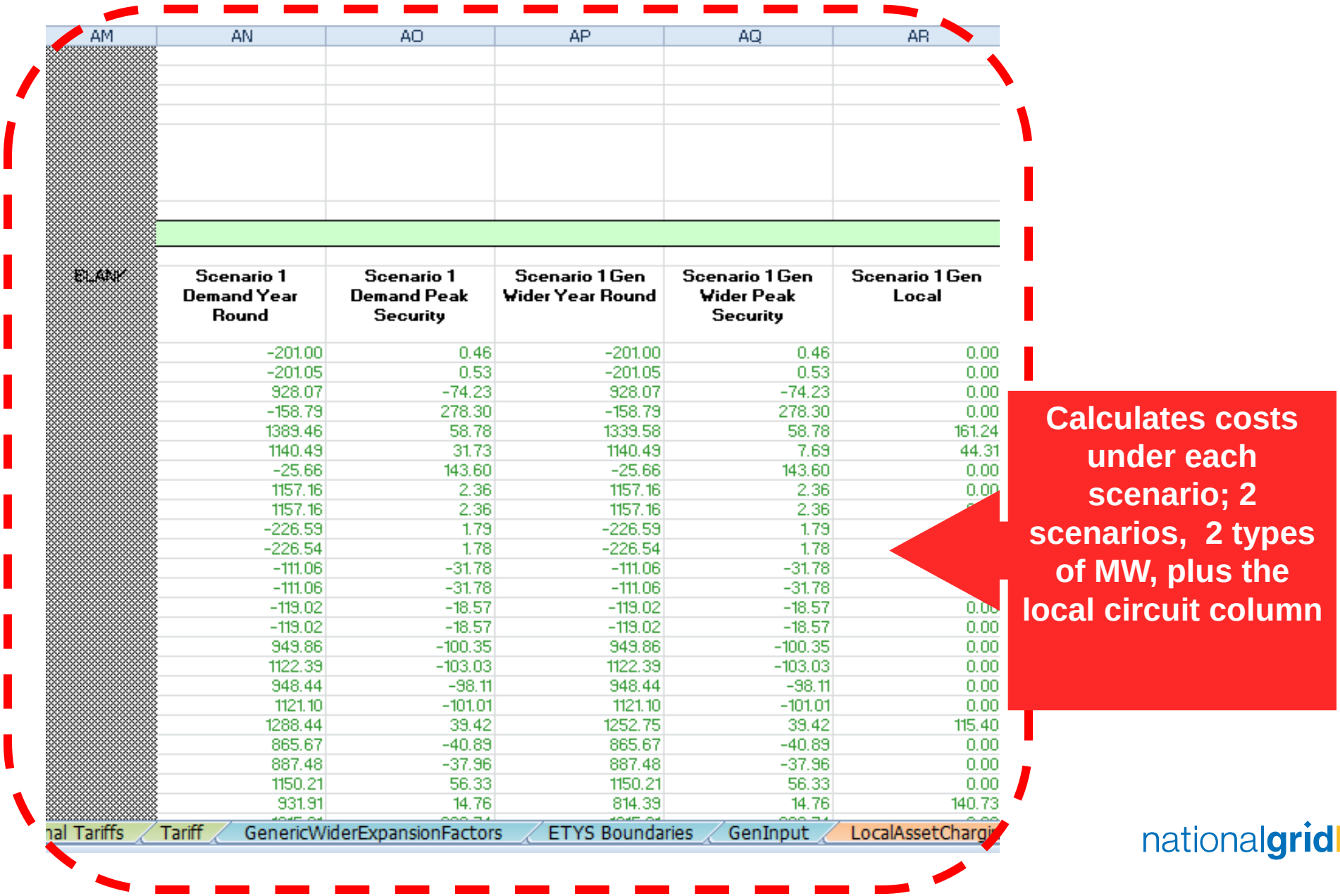
Nodal Cost Information (Output)



AM	AN	AO	AP	AQ	AR
BLANK	Scenario 1 Demand Year Round	Scenario 1 Demand Peak Security	Scenario 1 Gen Wider Year Round	Scenario 1 Gen Wider Peak Security	Scenario 1 Gen Local
	-201.00	0.46	-201.00	0.46	0.00
	-201.05	0.53	-201.05	0.53	0.00
	928.07	-74.23	928.07	-74.23	0.00
	-158.79	278.30	-158.79	278.30	0.00
	1389.46	58.78	1339.58	58.78	161.24
	1140.49	31.73	1140.49	7.69	44.31
	-25.66	143.60	-25.66	143.60	0.00
	1157.16	2.36	1157.16	2.36	0.00
	1157.16	2.36	1157.16	2.36	
	-226.59	1.79	-226.59	1.79	
	-226.54	1.78	-226.54	1.78	
	-111.06	-31.78	-111.06	-31.78	
	-111.06	-31.78	-111.06	-31.78	
	-119.02	-18.57	-119.02	-18.57	0.00
	-119.02	-18.57	-119.02	-18.57	0.00
	949.86	-100.35	949.86	-100.35	0.00
	1122.39	-103.03	1122.39	-103.03	0.00
	948.44	-98.11	948.44	-98.11	0.00
	1121.10	-101.01	1121.10	-101.01	0.00
	1288.44	39.42	1252.75	39.42	115.40
	865.67	-40.89	865.67	-40.89	0.00
	887.48	-37.96	887.48	-37.96	0.00
	1150.21	56.33	1150.21	56.33	0.00
	931.91	14.76	814.39	14.76	140.73

nal Tariffs | Tariff | GenericWiderExpansionFactors | ETYS Boundaries | GenInput | LocalAssetChargi

Calculates costs under each scenario; 2 scenarios, 2 types of MW, plus the local circuit column

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Exercise 1

- Open the DCLF – ICRP model
- On the “GenInput” sheet, change the fuel type of “Windy Standard II” from “Wind Onshore” to “Wind”
- Go back to the “Transport” sheet, and spot the errors
- Find column F
- Search for #N/A within column F
- Locate the nodes with #N/A errors, and try to trace the source of error

Local circuits (for generators)

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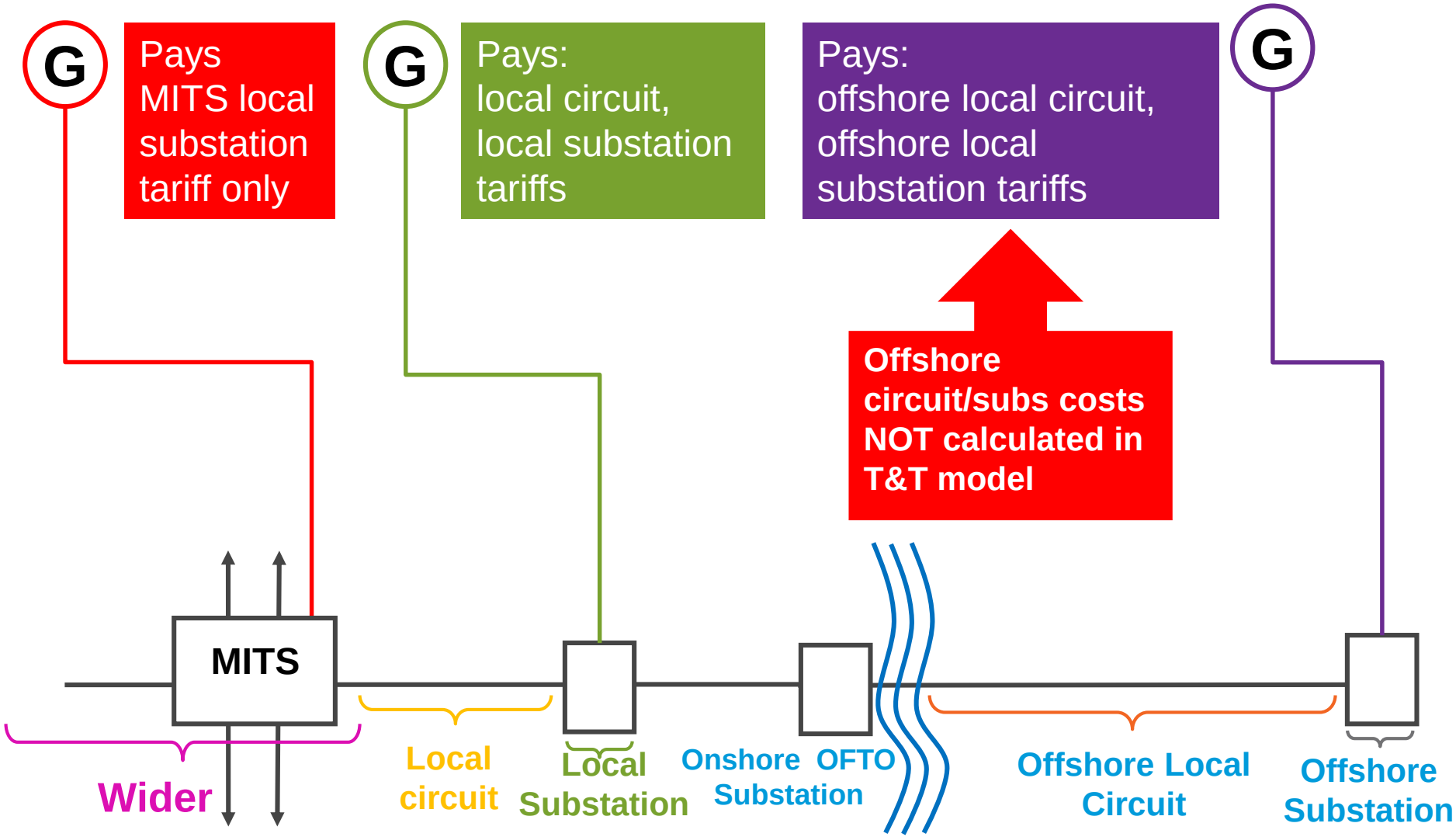
Local Circuit/Substation Tariffs: Directly Connected Generators



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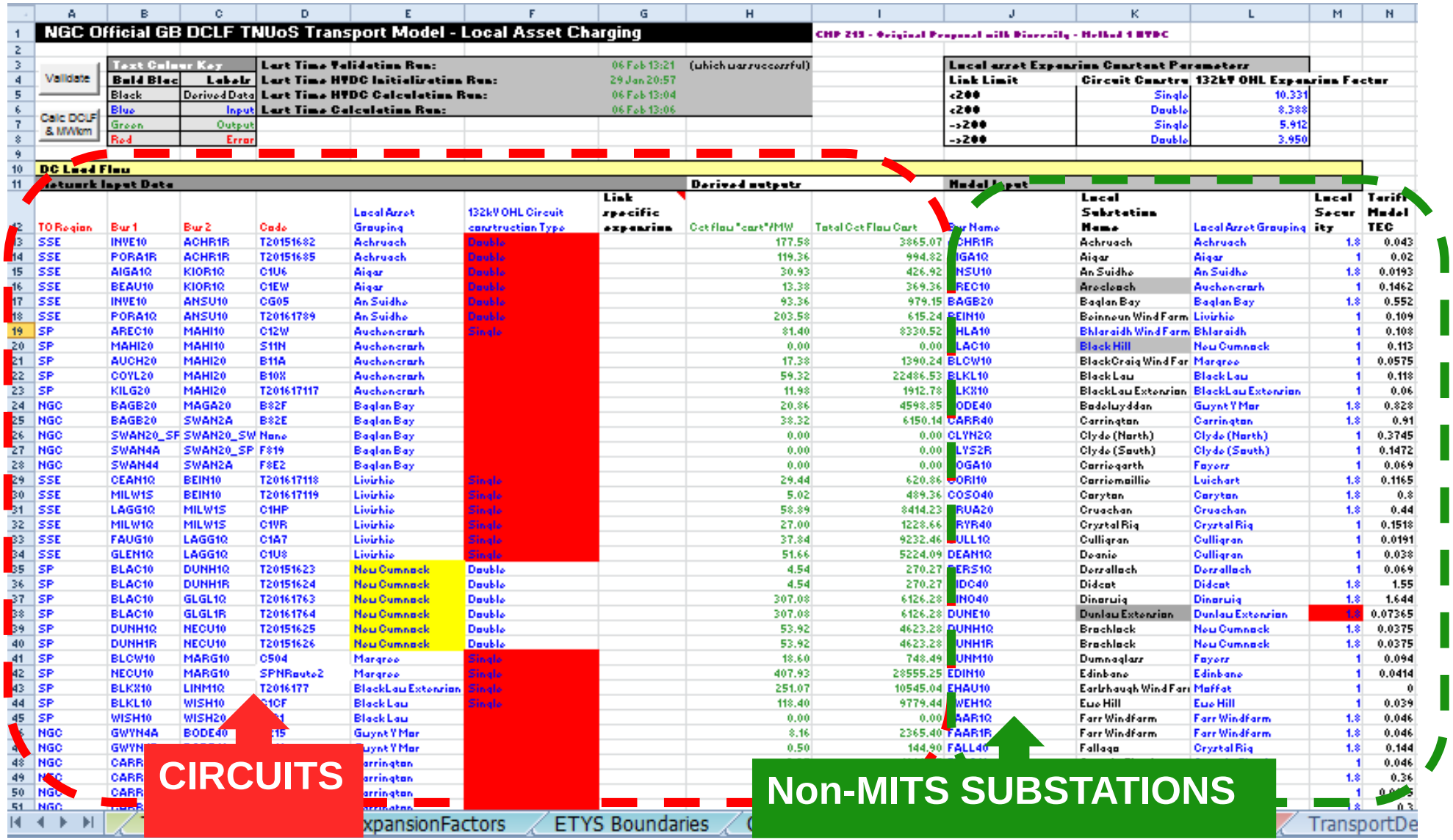
The LocalAssetCharging Sheet



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Local Circuits by Groups

NGC Official GB DCLF TNUoS Transport Model - Local Asset Charging — CMP 213 – Original F

Validate

Calc DCLF & MWkm

Text Colour Key	
Bold Black	Labels
Black	Derived Data
Blue	Input
Green	Output
Red	Error

Last Time Validation Run:	06 Feb 13:21	(which was successful)
Last Time HVDC Initialisation Run:	29 Jan 20:57	
Last Time HVDC Calculation Run:	06 Feb 13:04	
Last Time Calculation Run:	06 Feb 13:06	

DC Load Flow

Network Input Data							Derived outputs	
TO Region	Bus 1	Bus 2	Code	Local Asset Grouping	132kV OHL Circuit construction Type	Link specific expansion factor (local)	Cct flow "cost"/MW	Total Cct Flow Cost
SSE	INVE10	ACHR1R	T20151682	Achruach	Double		177.58	3865.07
SSE	PORA1R	ACHR1R	T20151685	Achruach	Double		119.36	994.82
SSE	AIGA1Q	KIOR1Q	C1U6	Aigas	Double		30.93	426.92
SSE	BEAU10	KIOR1Q	C1EW	Aigas	Double		13.38	369.36
SSE	INVE10	ANSU10	CG05	n Suidhe	Double		93.36	979.15
SSE	PORA1Q	ANSU10	T20161789	Suidhe	Double		203.58	615.24
SP	AREC10	MAHI10	C12W	chencrosh	Single		81.40	8330.52
SP	MAHI20	MAHI10					0.00	0.00
SP	AUCH20	MAHI20					17.38	1390.24
SP	COYL20	MAHI20					59.32	22486.53
SP	KILG20	MAHI20					11.98	1912.78
NGC	BAGB20	MAGA20					20.86	4598.85
NGC	BAGB20	SWAN2A					38.32	6150.14

Local circuits with several nodes/circuits listed by groups

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Non-MITS Substations

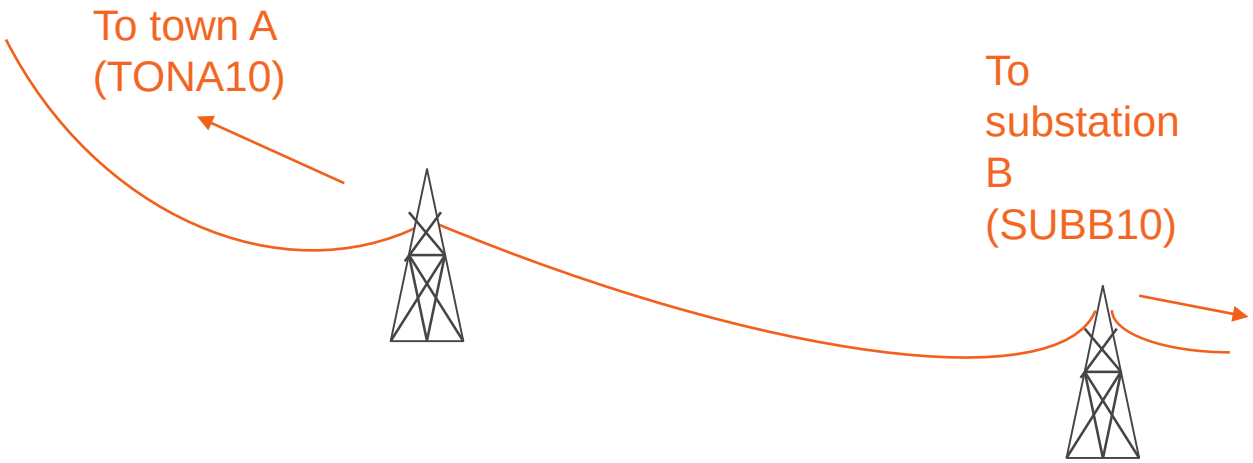
Local asset Expansion Constant Parameters		
Link Limit	Circuit Construction	132kV OHL Expansion Factor
<200	Single	10.331
<200	Double	8.388
=>200	Single	5.912
=>200	Double	3.950

Nodal Input

Bus Name	Local Substation Name	Local Asset Grouping	Local Security Factor	Tariff Model TEC
ACHR1R	Achruach	Achruach	1.8	0.043
AIGA1Q	Aigas	Aigas	1	0.02
ANSU10	An Suidhe	An Suidhe	1.8	0.0193
AREC10	Arecleoch	Auchencrosh	1	0.1462
BAGB20	Baglan Bay	Baglan Bay	1.8	0.552
BEIN10	Beinneun Wind rm	Livishie	1	0.109

These names appear in the local circuit tariff table (Tariff sheet)

Local Circuits – a worked example (existing network)



NGC Official GB DCLF TNUoS Transport Model - Sharing

2020/21 Tariff Model, incl

Validate DCLF Inputs	Text Colour Key		Last Time Validation Run:	11:07:40	(which was succ	Peak Sec Sca
	Bold Black	Labels	Last Time HVDC Initialisation Run:	15:54:30		Year Round S
	Black	ed Data	Last Time HVDC Calculation Run:	11:08:48		
Calc DCLF & MWkm	Blue	Input	Last Time Calculation Run:	11:10:18		
	Red	Error				

	Sum Demand	Total PS Gen	Total YR Gen
	50731	50731	50731

DC Load Flow

Nodal Input 50731 4264

Bus ID	Bus Name	Output Results	Voltage	Demand	Generation A - Peak Security (Transport Model)	Generation B - Year Round (Transport Model)	ETYS Zone	Gen Zone	Dem Zone
826	TONG1R	No	132	0	0	0	S6	10	2
827	TORN10	No	132	0	0	0	S1	11	2
828	TORN40	No	400	0	969	1063	S1	11	2
829	TOTT20	No	275	284	0	0	A1	24	9
830	TONA10	No	132	44	0	0	M7	16	6
831	SUBB10	No	132	0	0	0	M7	16	6

Allowed: 1.00E+07 Spare-Capacity Factor: 100%

Sum Transf 0.0 Num Spare-Cap 0.00 Num Ccts Out 0.00

Network Input Data

TO Region	Bus 1	Bus 2	R	X (Peak Security)	X (Year Round)	OHL Length	Cable Length	Link Limit	Code	Link Type	Link specific expansion factor	Spare-Cap?	Outaged
ATO	TONA10	SUBB10	0.51	3.60	3.60	20.48	0.00	180.00	Existing01	OHL		No	No

The “Transport” tab

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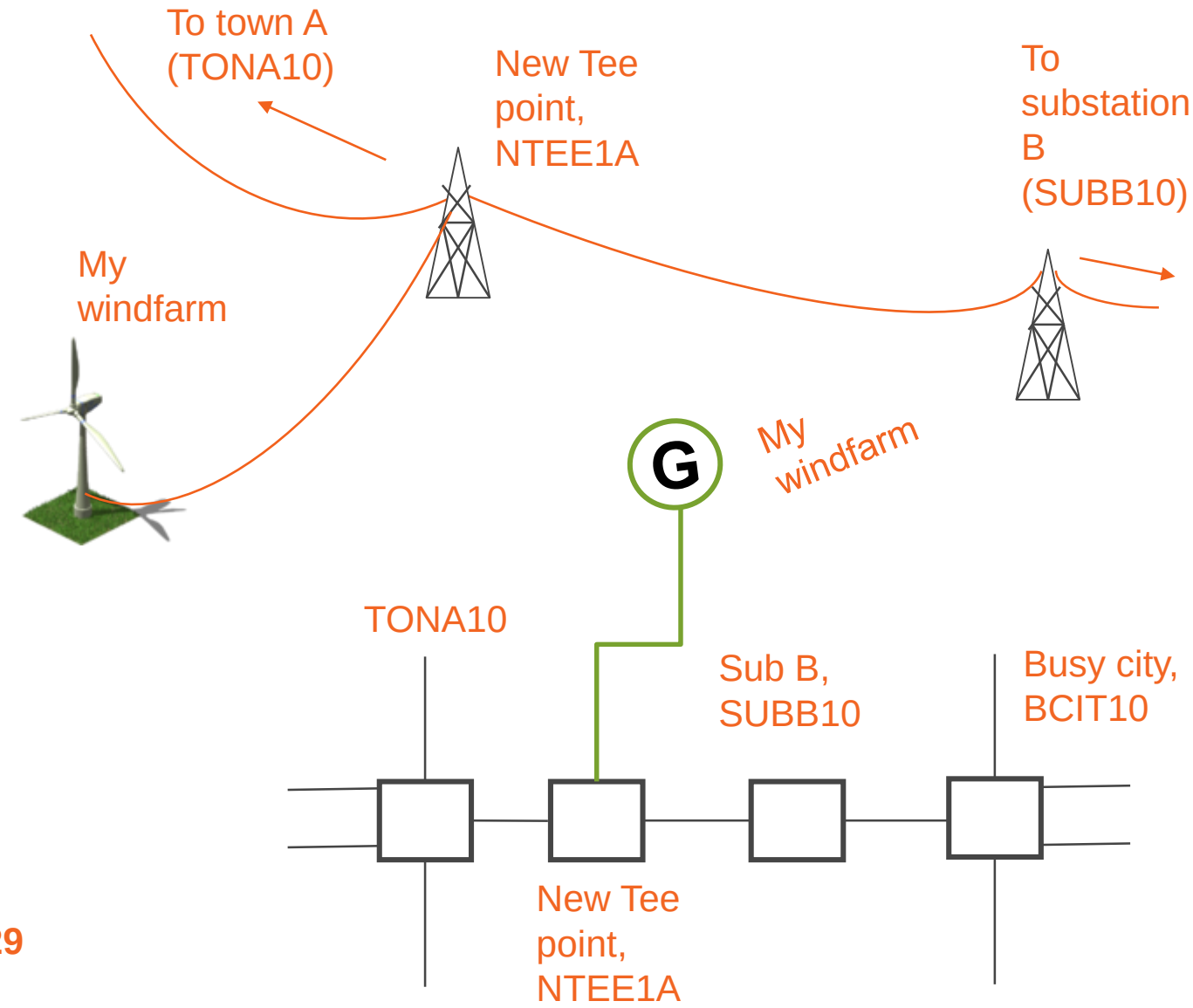
Local Circuits – a worked example (adding a new generator)



Step 1, revise the “Transport” tab: adding a new node, and revising the existing circuit records

Step 2, revise the “LocalAssetCharging” tab, to enable the model to calculate local circuit tariffs

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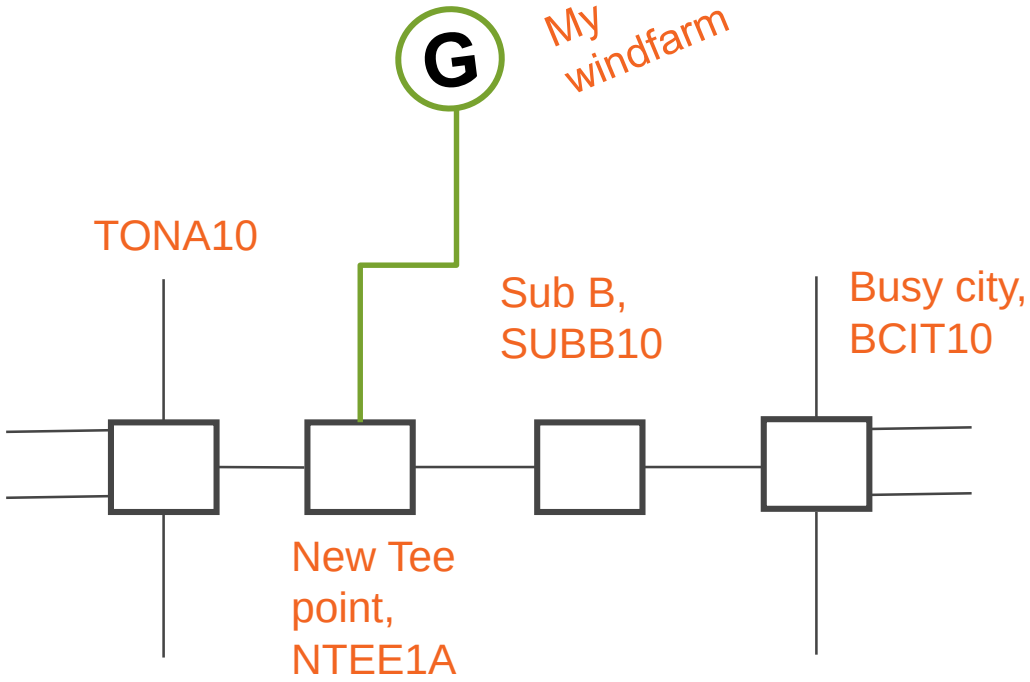
Local Circuits – a worked example (adding a new generator)



Step 1, revise the “Transport” tab: adding a new node, and revising the existing circuit records

New node

NGC Official GB DCLF TNUoS Transport Model - Sharing

Text Colour Key		Last Time Validation Run:	11:07:40
Bold Black	Labels	Last Time HVDC Initialisation Run:	15:54:30
Black	ved Data	Last Time HVDC Calculation Run:	11:08:48
Blue	Input	Last Time Calculation Run:	11:10:18
Red	Error		

	Sum Demand	Total PS Gen	Total YR Gen
	50731	50731	50766

DC Load Flow

Nodal Input 50731 4270

Bus ID	Bus Name	Output Results	Voltage	Demand	Generation A - Peak Security (Transport Model)	Generation B - Year Round (Transport Model)	ETYS Zone	Gen Zone	Dem Zone
826	TONG1R	No	132	0	0	0	S6	10	2
827	TORN10	No	132	0	0	0	S1	11	2
828	TORN40	No	400	0	969	1063	S1	11	2
829	TOTT20	No	275	284	0	0	A1	24	9
830	TONA10	No	132	44	0	0	M7	16	6
831	SUBB10	No	132	0	0	0	M7	16	6
832	NTEE1A	No	132	0	0	35	M7	16	6

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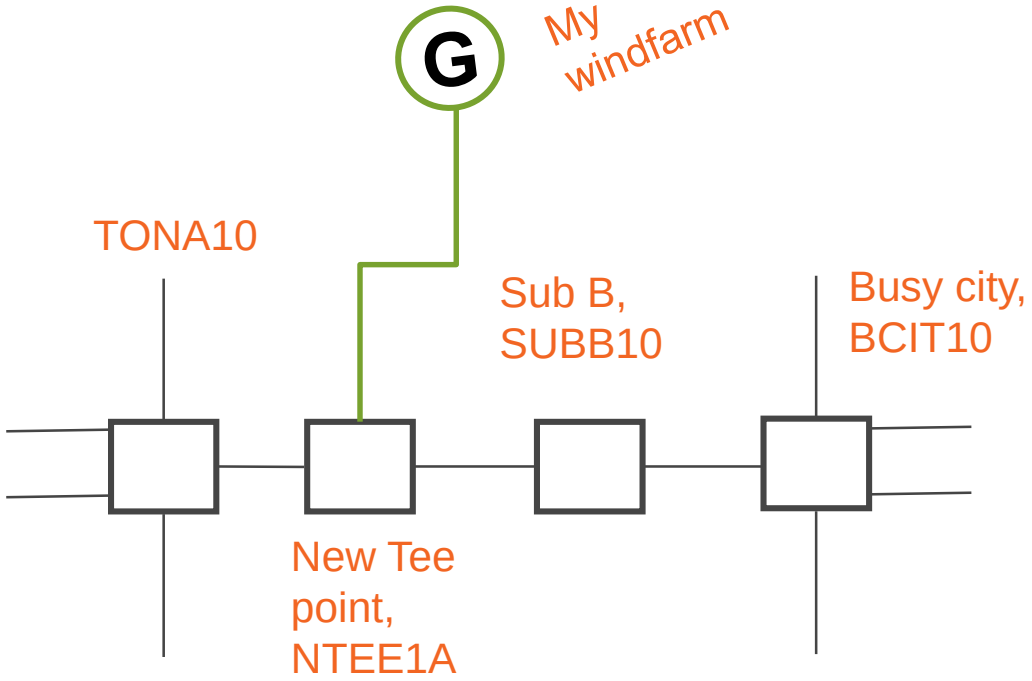
Local Circuits – a worked example (adding a new generator)



Step 1, revise the “Transport” tab: adding a new node, and revising the existing circuit records

Replace cct TONA10 – SUBB10 with two ccts:
TONA10 – NTEE1A and
NTEE1A – SUBB10

	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB	AC
	Allowed:	1.00E+07									Spare-Capacity Factor:		100%	
	Sum Transf												Num Spare-Cap	Num Ccts Out
	0.0												0.00	0.00
	Network Input Data													

TO Region	Bus 1	Bus 2	R	X (Peak Security)	X (Year Round)	OHL Length	Cable Length	Link Limit	Code	Link Type	Link specific expansion factor	Spare-Cap?	Outaged
ATO	TONA10	NTEE1A	0.13	0.89	0.89	5.05	0.00	180	NewCCT1	OHL		No	No
ATO	NTEE1A	SUBB10	0.38	2.71	2.71	15.42	0.00	180.00	NewCCT2	OHL		No	No

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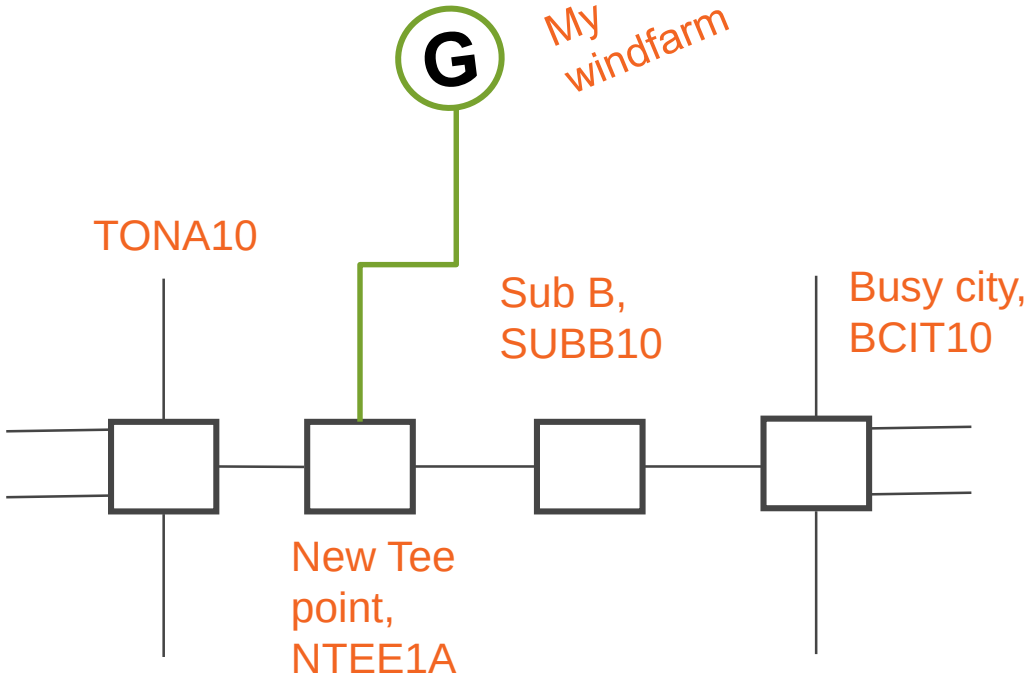
Local Circuits – a worked example (adding a new generator)



Step 2, revise the "LocalAssetCharging" tab, to enable the model to calculate local circuit tariffs

	J	K	L	M	N
	=>200	Single	5.912		
	=>200	Double	3.950		
	Nodal Input				
	Bus Name	**Local Substation Name**	Local Asset Grouping	**Local Security Factor**	**Tariff Model TEC**
	NTEE1A	New Tee Point	My windfarm group	1	0.05

	A	B	C	D	E	F	G
8	& MWkm	Red	Error				
9							
10	**DC Load Flow**						
11	**Network Input Data**						
12	TO Region	Bus 1	Bus 2	Code	Local Asset Grouping	132kV OHL Circuit construction Type	**Link specific expansion factor (local)**
180	ATO	TONA10	NTEE1A	NewCCT1	My windfarm group	Single	
181	ATO	NTEE1A	SUBB10	NewCCT2	My windfarm group	Single	
182	ATO	SUBB10	BCIT10	Existing02	My windfarm group	Single	

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GenInput Sheet – How to change generation?

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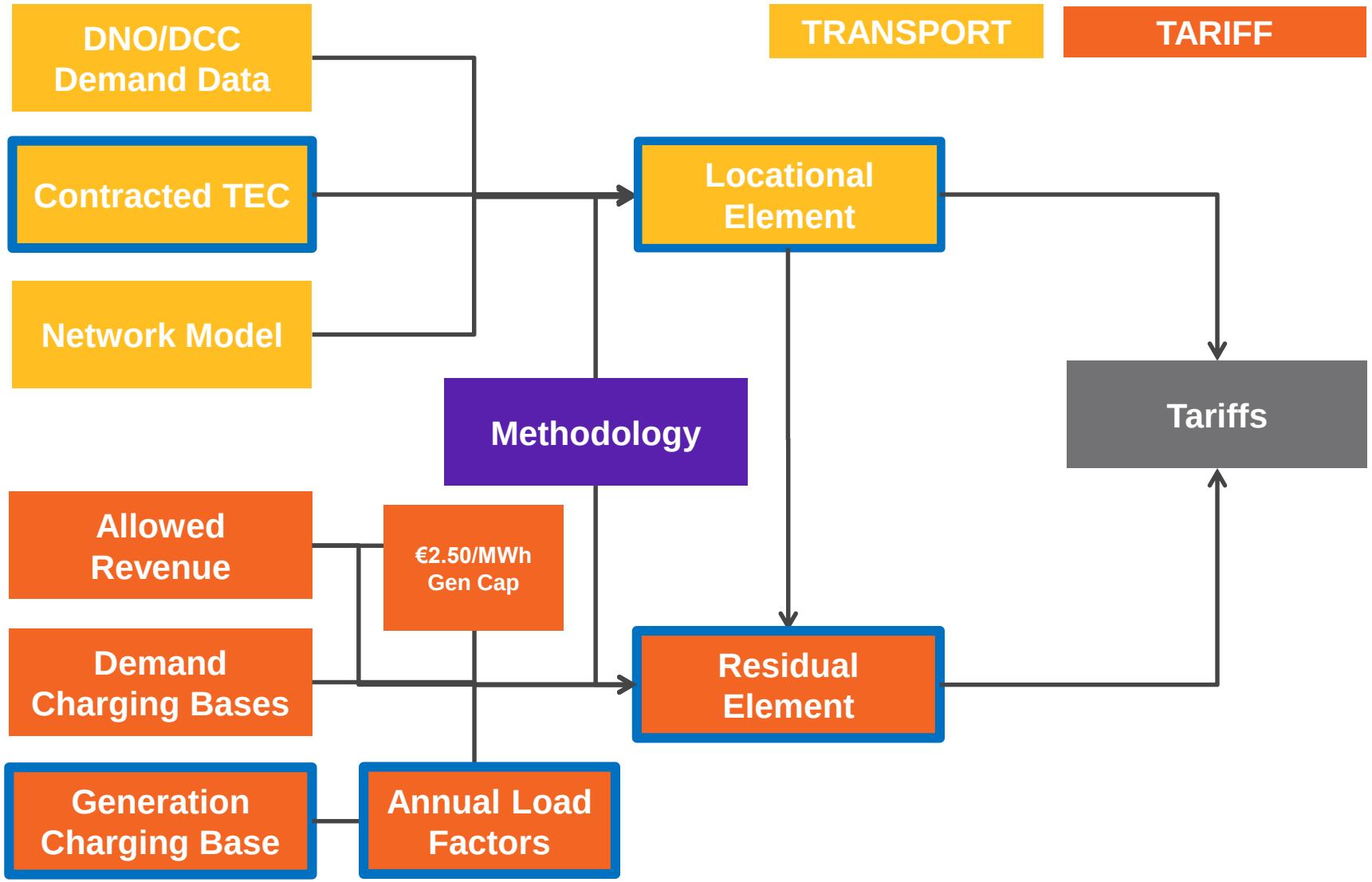
Inputs into TNUoS Charges



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GenInput Sheet

Input text should be in blue, but…

Generation Type Parameters table is AUTO CALCULATED

Enter your own generation data here

NGC Official GB TNUoS Transport & Tariff Model - Generation Input Sheet

CMP 213 - Original Proposal

Validate

Calc DCLF & MWkm

Text Colour Key	
Bold Black	Label
Black	Derived Data
Blue	Input
Green	Output
Red	Error

Last Time Validation Run:	06 Feb 13:21 (which was successful)
Last Time HVDC Initialisation Run:	29 Jan 20:57
Last Time HVDC Calculation Run:	06 Feb 13:04
Last Time Calculation Run:	06 Feb 13:06

Generation Type Parameters

Generator Type	Fuel Class	TEC	Peak Security Transport Model Scaling	Year Round Transport Model Scaling	Peak Security Liability Flag	Ca Ca
Biomass	Other (Conventional)	1,905.0	94%	69%	100%	Carbo
CCGT	Other (Conventional)	27,546.0	94%	69%	100%	Carbo
CHP	Other (Conventional)	1,651.0	94%	69%		
Coal	Other (Conventional)	11,680.0	94%	69%		
Hydro	Hydro	665.4	94%	69%	100%	Low C
Interconnectors	Interconnectors	4,785.0	0%	100%	0%	Carbo
Nuclear	Nuclear & CCS	9,297.0	94%	85%	100%	Low C
OCGT	Peaking	140.0	94%	0%	100%	Carbo
Pump Storage	Pumped Storage	2,769.0	94%	50%	100%	Carbon
Tidal	Intermittent	-	0%	70%	0%	Low Carbon
Wave	Intermittent	-	0%	70%	0%	Low Carbon
Wind Offshore	Intermittent	6,952.9	0%	70%	0%	Low Carbon
Wind Onshore	Intermittent	4,600.4	0%	70%	0%	Low Carbon
	Total Generation	71,991.660	52,140.99999	52,140.99999		
	Total Gen Check	71,991.660				
	Total Demand	52,141.000				

Tariff Model:	71,991.66	67,206.66
Check Totals:	71,991.66	67,206.66

Generation Specific Data

Generation Input Data

Derived Data

Station	Generator Type	Max Contracted TEC at Peak (Transport Model TEC)	Generation Base (Tariff Model TEC)	Node 1	Node 2	Node 3	ALF	Carbon / Low Carbon	Number
Auchencrosh (interconnector CCT)	Interconnectors	80.0	0.0000	AUCH20			0.00%	Carbo	
Britned	Interconnectors	1200.0	0.0000	GRAI40			0.00%	Carbo	

GenInput Parameters Table

Summary of the input data table below

Peak/Year Round scaling of TEC

Will be inconsistent if input data is changed before the 'Validate' function is run (see later slides)

Generation Type Pa...						
Generator Type	Fuel Class	TEC	Peak Security Transport Model Scaling	Year Round Transport Model Scaling	Peak Security Liability Flag	Carbon / Low Carbon Flag
Biomass	Other (Conventional)	1,905.0	94%	69%	100%	Carbon
CCGT	Other (Conventional)	27,546.0	94%	69%	100%	Carbon
CHP	Other (Conventional)	1,651.0	94%	69%	100%	Carbon
Coal	Other (Conventional)	11,680.0	94%	69%	100%	Carbon
Hydro	Hydro	665.4	94%	69%	100%	Low Carbon
Interconnectors	Interconnectors	4,785.0	0%	100%	0%	Carbon
Nuclear	Nuclear & CCS	9,297.0	94%	85%	100%	Low Carbon
OCGT	Peaking	140.0	94%	0%	100%	Carbon
Pump Storage	Pumped Storage	2,769.0	94%	50%	100%	Carbon
Tidal	Intermittent	-	0%	70%	0%	Low Carbon
Wave	Intermittent	-	0%	70%	0%	Low Carbon
Wind Offshore	Intermittent	6,952.9	0%	70%	0%	Low Carbon
Wind Onshore	Intermittent	4,600.4	0%	70%	0%	Low Carbon
	Total Generation	71,991.660	52,140.99999	52,140.99999		
	Total Gen Check	71,991.660				
	Total Demand	52,141.000				
Tariff Model:		71991.66	67,206.66			
Check Totals:		71,991.66	67,206.66			

Removal of interconnector TEC from calculation

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Generation Input Data

Generator name, fuel type & TEC (note specific fuel type naming)

Node data: important to locate generators in correct zone

Generation Specific Data								
Generation Input Data								Derived Data
Station	Generator Type	Contracted TEC at Peak (Transport Model TEC)	Generation Base (Tariff Model TEC)	Node 1	Node 2	Node 3	ALF	Carbon / Low Carbon
Achencrosh (interconnector CCT)	Interconnectors	80.0	0.0000	AUCH20			0.00%	Carbon
Brined	Interconnectors	1200.0	0.0000	GRAI40			0.00%	Carbon
East West Interconnector	Interconnectors	505.0	0.0000	CONQ40			0.00%	Carbon
ElecLink	Interconnectors	1000.0	0.0000	SELL40			0.00%	Carbon
IFA Interconnector	Interconnectors	2000.0	0.0000	SELL40			0.00%	Carbon
Aberthaw	Coal	1610.0	1610.0000	ABTH20			59.60%	Carbon
A'Chruach Wind Farm	Wind Onshore	43.0	43.0000	ACHR1R			36.42%	Low Carbon
Afton	Wind Onshore	50.0	50.0000	BLAC10			37.81%	Low Carbon
Aigas	Hydro	20.0	20.0000	AIGA1Q			35.93%	Low Carbon
Allengall II Windfarm	Wind Onshore	140.0	140.0000	WDOD10			37.81%	Low Carbon
An Suidhe Wind Farm, Argyll (SRO)	Wind Onshore	19.3	19.3000	ANSU10			35.76%	Low Carbon
Arecleoch	Wind Onshore	114.0	114.0000	AREC10			33.81%	Low Carbon
Baglan Bay	CCGT	552.0	552.0000	BAGB20			31.54%	C...
Barrow Offshore Wind Farm	Wind Offshore	90.0	90.0000	HEYS40			49.44%	...on
Barry Power Station	CCGT	14...	142.0000	ABTH20	CARE20		1.39%	...
Beinneun Wind Farm	Wind Onshore		109.0000	BEIN10			37.81%	...rbon
Bhlaraidh Wind Farm	Wind Onshore		108.0000	BHLA10				

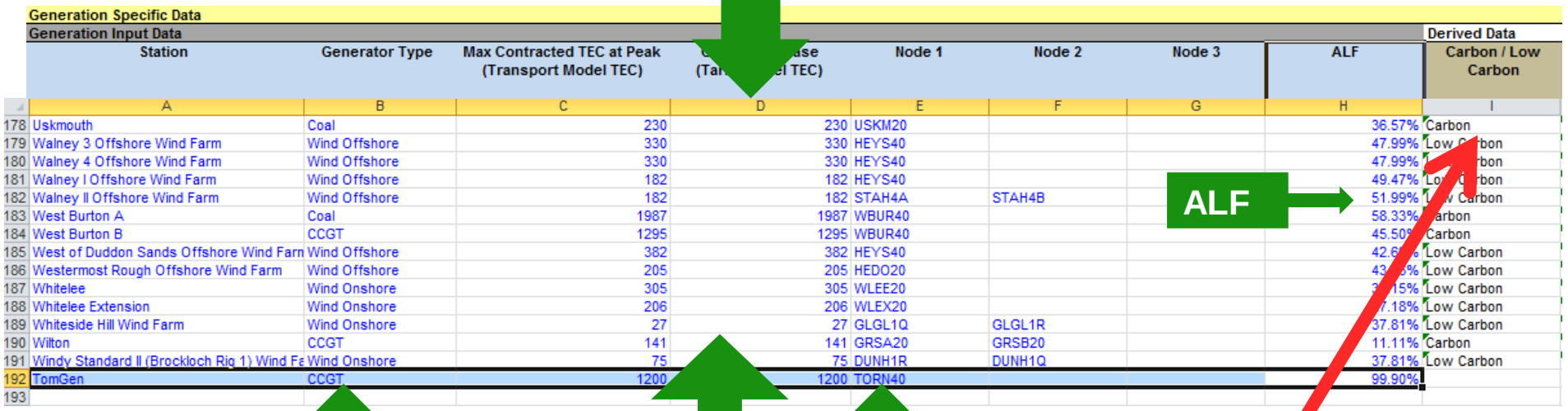
ALFs published January every year

Transport/Tariff TEC: Transport model uses current data, Tariff model uses Best View

Further columns are auto calculated

Inputting Generation Data Into the Model

You can copy and paste data from a table from another source… IN ALPHABETICAL ORDER (by Station)



	Generation Specific Data								
	Generation Input Data								Derived Data
	Station	Generator Type	Max Contracted TEC at Peak (Transport Model TEC)	(Tariff Model TEC)	Node 1	Node 2	Node 3	ALF	Carbon / Low Carbon
	A	B	C	D	E	F	G	H	I
178	Uskmouth	Coal	230	230	USKM20			36.57%	Carbon
179	Walney 3 Offshore Wind Farm	Wind Offshore	330	330	HEYS40			47.99%	Low Carbon
180	Walney 4 Offshore Wind Farm	Wind Offshore	330	330	HEYS40			47.99%	Low Carbon
181	Walney I Offshore Wind Farm	Wind Offshore	182	182	HEYS40			49.47%	Low Carbon
182	Walney II Offshore Wind Farm	Wind Offshore	182	182	STAH4A	STAH4B		51.99%	Low Carbon
183	West Burton A	Coal	1987	1987	WBUR40			58.33%	Carbon
184	West Burton B	CCGT	1295	1295	WBUR40			45.50%	Carbon
185	West of Duddon Sands Offshore Wind Farm	Wind Offshore	382	382	HEYS40			42.6%	Low Carbon
186	Westermost Rough Offshore Wind Farm	Wind Offshore	205	205	HEDO20			43.6%	Low Carbon
187	Whitelee	Wind Onshore	305	305	WLEE20			3.15%	Low Carbon
188	Whitelee Extension	Wind Onshore	206	206	WLEX20			7.18%	Low Carbon
189	Whiteside Hill Wind Farm	Wind Onshore	27	27	GLGL1Q	GLGL1R		37.81%	Low Carbon
190	Wilton	CCGT	141	141	GRSA20	GRSB20		11.11%	Carbon
191	Windy Standard II (Brockloch Rig 1) Wind Fa	Wind Onshore	75	75	DUNH1R	DUNH1Q		37.81%	Low Carbon
192	TomGen	CCGT	1200	1200	TORN40			99.90%	
193									

ALF

Or you can manually input individual lines

At least one node needed

Generation TEC can be different for Transport/Tariff models

Don't worry about gaps in column I onwards… Further columns will be populated during the validate process

Input Generators Alphabetically By Station

NGC Official GB TNUoS Transport & Tariff Model - Generation Input Sheet

Validate

Calc DCLF & MWkm

Text Colour Key	
Bold Black	Labels
Black	Derived Data
Blue	Input
Green	Output
Red	Error

Last Time Validation Run:	03 Apr 11:33
Last Time HVDC Initialisation Run:	29 Jan 20:57
Last Time HVDC Calculation Run:	06 Feb 13:04
Last Time Calculation Run:	06 Feb 13:06

Generation Type Parameters

Generator Type	Fuel Class	TEC	Peak Security Transport Model Scaling	Year Round Transport Model Scaling	Peak Security Liability Flag	Carbon / Low Carbon Flag
Biomass	Other (Conventional)	1,905.0	92%	67%	100%	Carbon
CCGT	Other (Conventional)	28,746.0	92%	67%	100%	Carbon
CHP	Other (Conventional)	1,651.0	92%	67%	100%	Carbon
Coal	Other (Conventional)	11,680.0	92%	67%	100%	Carbon
Hydro	Hydro	665.4	92%	67%	100%	Low Carbon
Interconnectors	Interconnectors	4,785.0	0%	100%	0%	Carbon
Nuclear	Nuclear & CCS	9,297.0	92%	85%	100%	Low Carbon
OCGT	Peaking	140.0	92%	0%	100%	Carbon
Pump Storage	Pumped Storage	2,769.0	92%	50%	100%	Carbon
Tidal	Intermittent	-	0%	70%	0%	Low Carbon
Wave	Intermittent	-	0%	70%	0%	Low Carbon
Wind Offshore	Intermittent	6,952.9	0%	70%	0%	Low Carbon
Wind Onshore	Intermittent	4,600.4	0%	70%	0%	Low Carbon
	Total Generation	73,191.660	52,140.99999	52,140.99999		
	Total Gen Check	73,191.660				
	Total Demand	52,141.000				

Tariff Model:	71991.66	68,406.66
Check Totals:	73,191.66	68,406.66

There is a risk that if the stations are not in alphabetical order, their TEC won't be picked up by the model

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Zonal generation tariffs

	A	B	C	D	E	F	G	H
79	Derivation of Zonal Generation Tariffs - Pea	Security						
80			Generation	Unadjusted	Final			
81			Charge Base:	Transport	Peak Security	Peak Security		
82			EC Net Stn * PS L	Zonal Wtd	Zonal	Zonal Revenue		
83	Zone	Zone Name	55.65	Marginal (km)	Tariff (£/kW)	(£m)		
84	1	North Scotland	0.468	5.18	**0.13**	0.06		
85	2	East Aberdeenshire	0.400	42.70	**1.04**			
86	3	Western Highlands	0.203	-14.16	**-0.35**			
87	4	Skye and Lochalsh	0.000	-252.33	**-6.17**			
88	5	Eastern Grampian and Tayside	0.136	-2.80	**-0.07**			
89	6	Central Grampian	0.064					
90	7	Argyll	0.015					
91	8	The Trossachs	0.520	68.45	**1.67**			
92	9	Stirlingshire and Fife	0.120	-4.15	**-0.10**			
93	10	South West Scotlands	1.074	72.40	**1.77**			
94	11	Lothian and Borders	1.215	119.85	**2.93**			
95	12	Solway and Cheviot	0.000	27.57	**0.67**	0.00		
96	13	North East England	1.749	135.15	**3.30**	5.78		
97	14	North Lancashire and The Lakes	2.588	53.43	**1.31**	3.38		
98	15	South Lancashire, Yorkshire and Humber	9.044	171.98	**4.20**	38.00		
99	16	North Midlands and North Wales	11.645	151.62	**3.70**	43.14		
100	17	South Lincolnshire and North Norfolk	1.944	84.37	**2.06**	4.01		
101	18	Mid Wales and The Midlands	4.783	47.51	**1.16**	5.55		
102	19	Anglesey and Snowdon	1.644	183.59	**4.49**	7.37		
103	20	Pembrokeshire	2.199	368.53	**9.00**	19.80		
104	21	South Wales & Gloucester	3.384	249.93	**6.11**	20.67		
105	22	Cotswold	1.234	126.83	**3.10**	3.82		
106	23	Central London	0.000	-177.88	**-4.35**	0.00		
107	24	Essex and Kent	6.071	-153.41	**-3.75**	-22.76		
108	25	Oxfordshire, Surrey and Sussex	1.970	-49.74	**-1.22**	-2.39		
109	26	Somerset and Wessex	2.139	-53.24	**-1.30**	-2.78		
110	27	West Devon and Cornwall	1.045	5.75	**0.14**	0.15		
111			**55.65**			**130.61**		
112								

Should be green, as is now populated automatically…

Locational tariffs calculated automatically by the Tariff macro , using data from GenInput and Transport sheets, residual ensures that £ from generation doesn't exceed the cap

Validating Model Inputs

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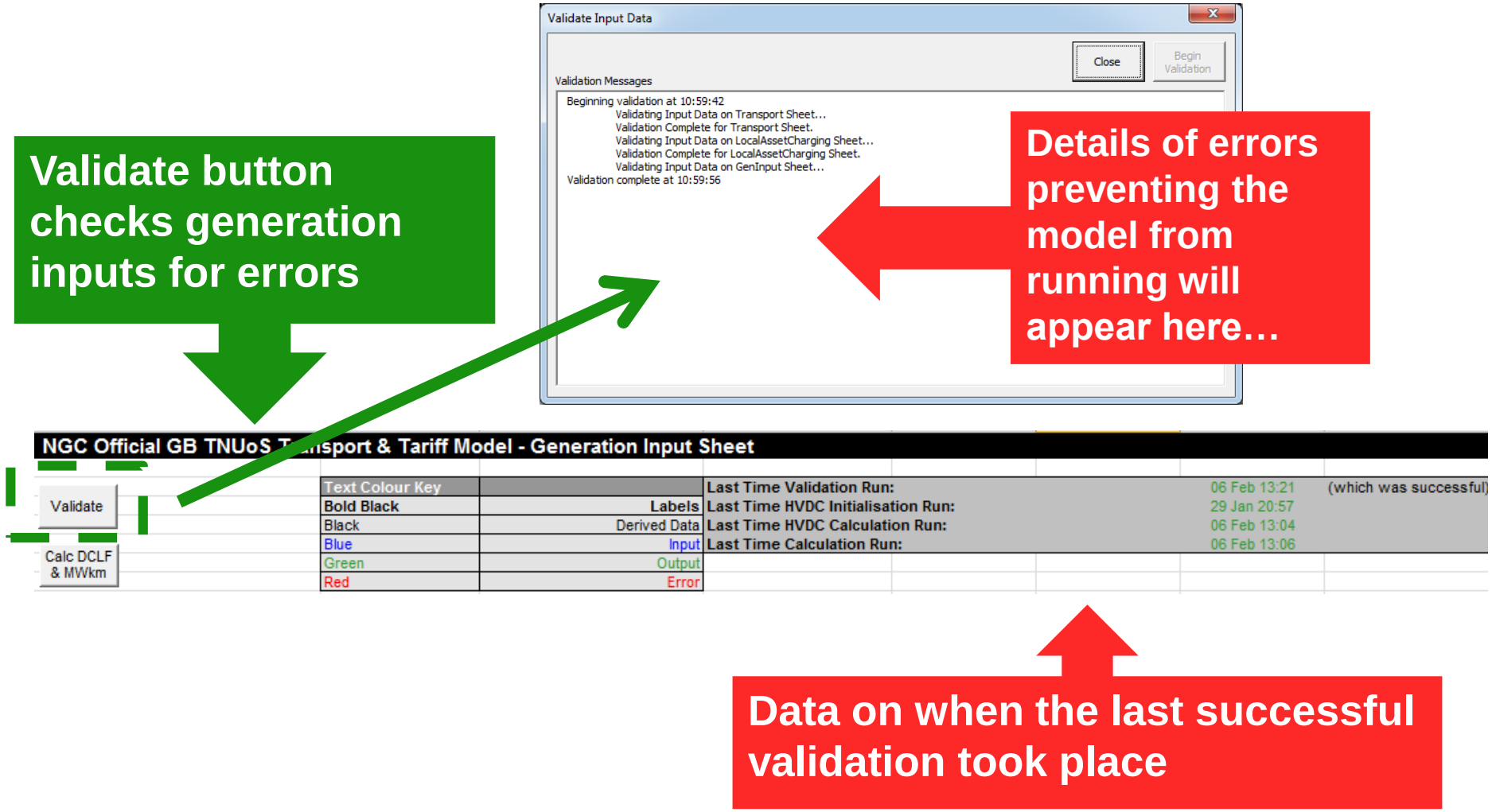
Validate Inputs



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Exercise 2

1. **On the Final Tariffs sheet, copy and paste the existing tariffs to the right of the tables**
2. **Add a new line in the GenInput sheet (lower table)**
    1. Station: (give the generator a name)
    2. Type: CCGT
    3. Transport Model TEC: 1200MW
    4. Tariff Model TEC: 1200MW
    5. Node 1: LOAN20
    6. ALF: 70%
3. **Validate the model**
4. **Run the DCLF & MWkm model**
5. **Check the changes to the tariffs**

Running the Model

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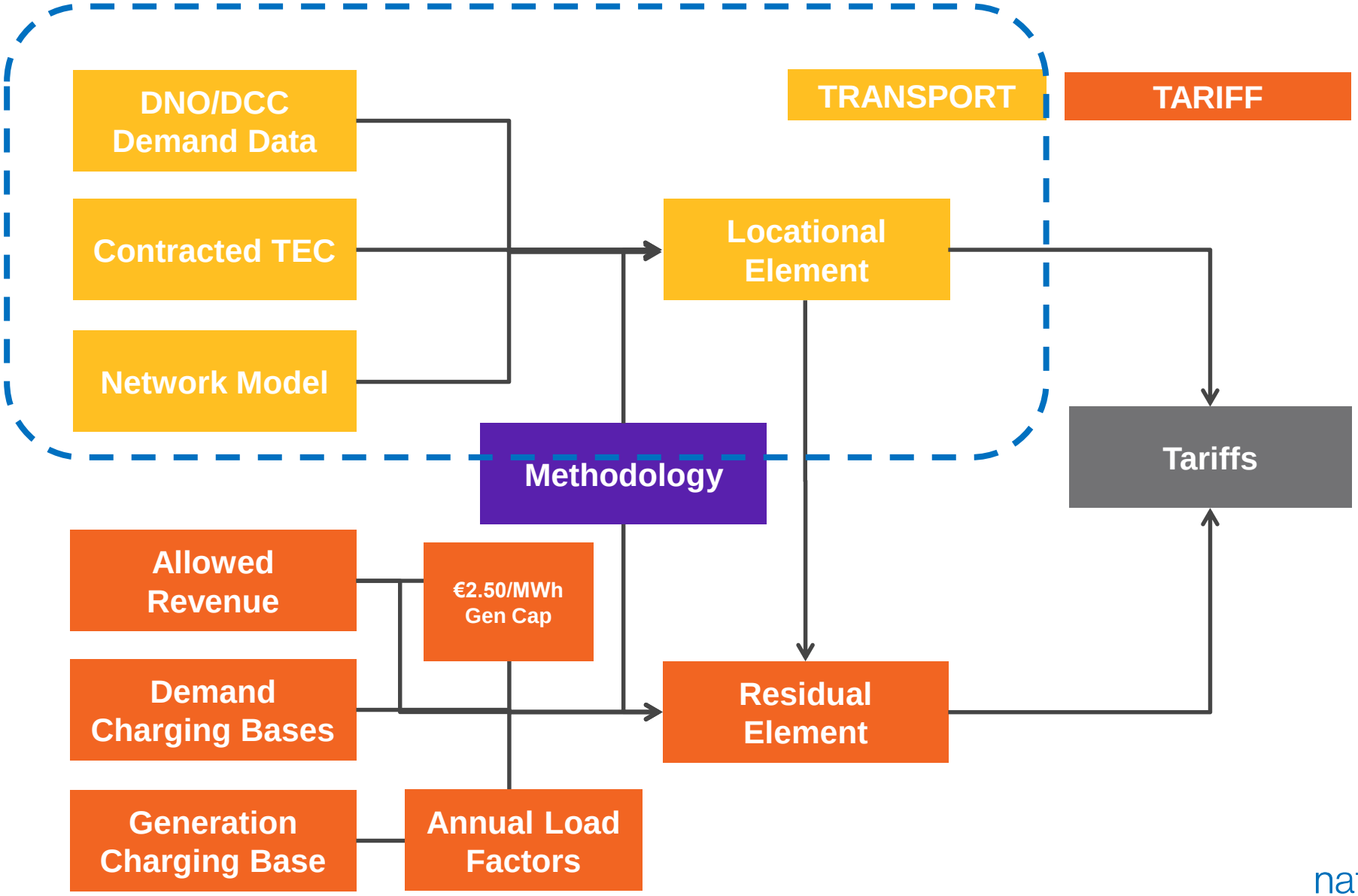
Running the Transport model



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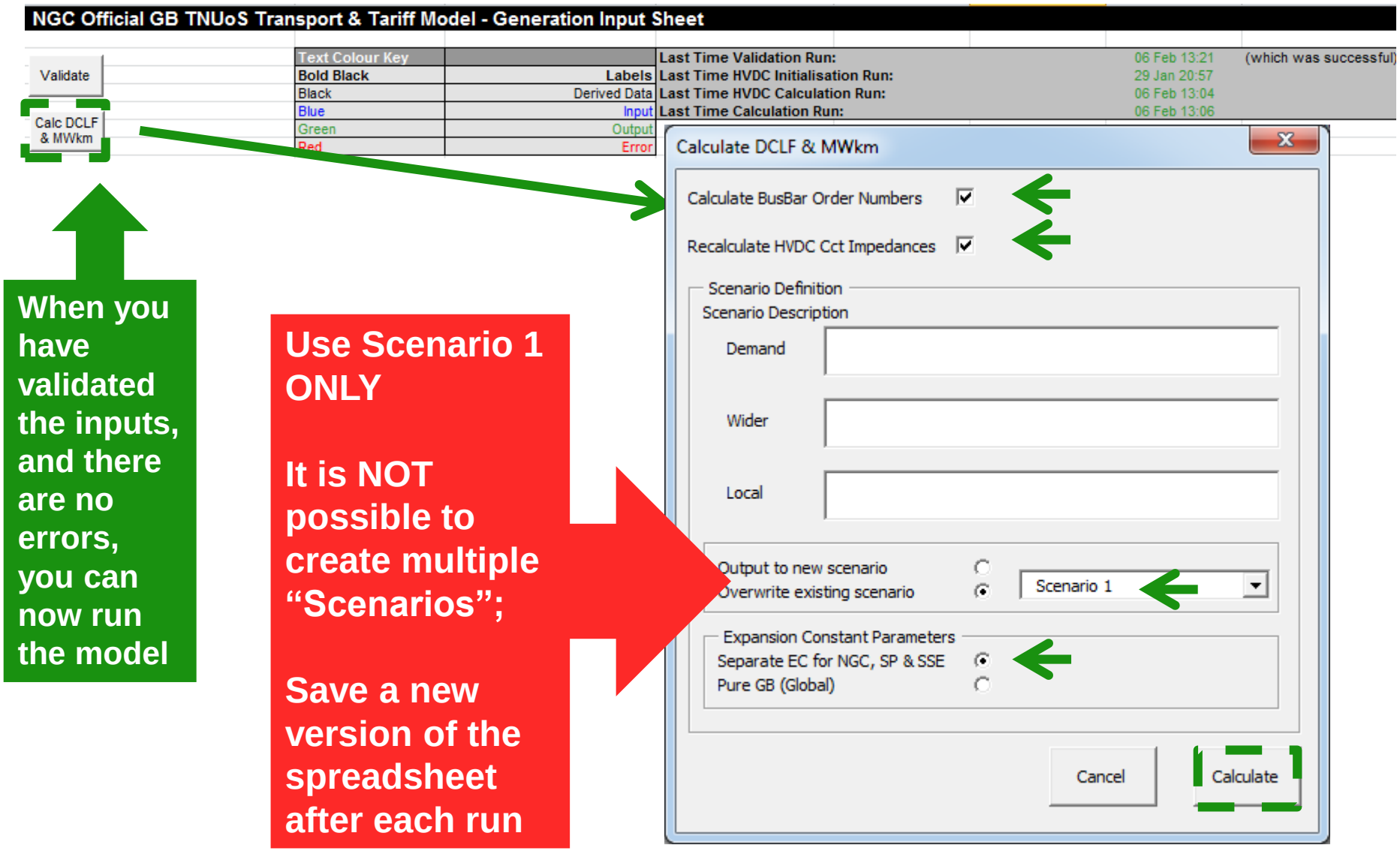
Running the Transport model



When you have validated the inputs, and there are no errors, you can now run the model

Use Scenario 1 ONLY

It is NOT possible to create multiple "Scenarios";

Save a new version of the spreadsheet after each run

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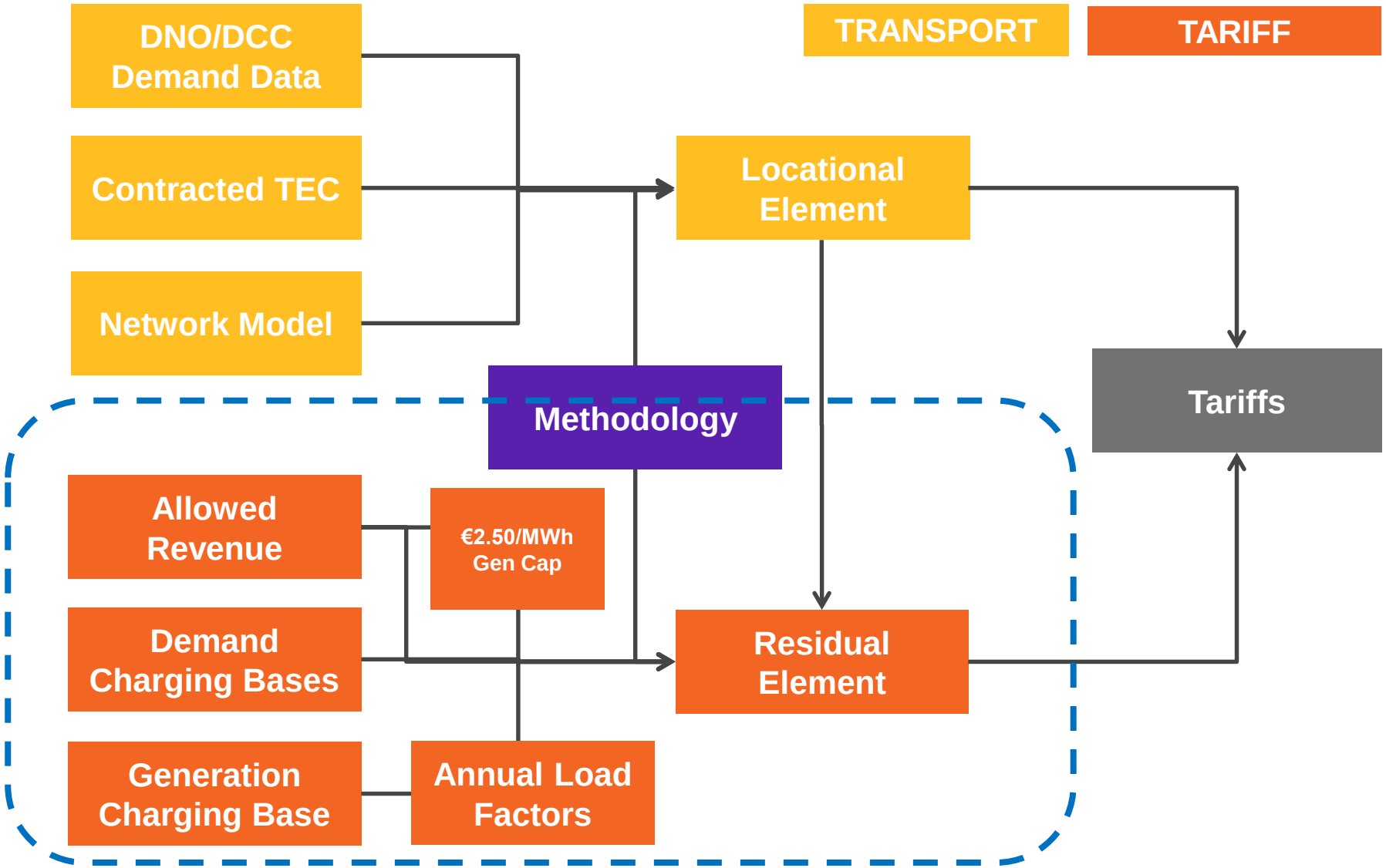
Running the Tariff model



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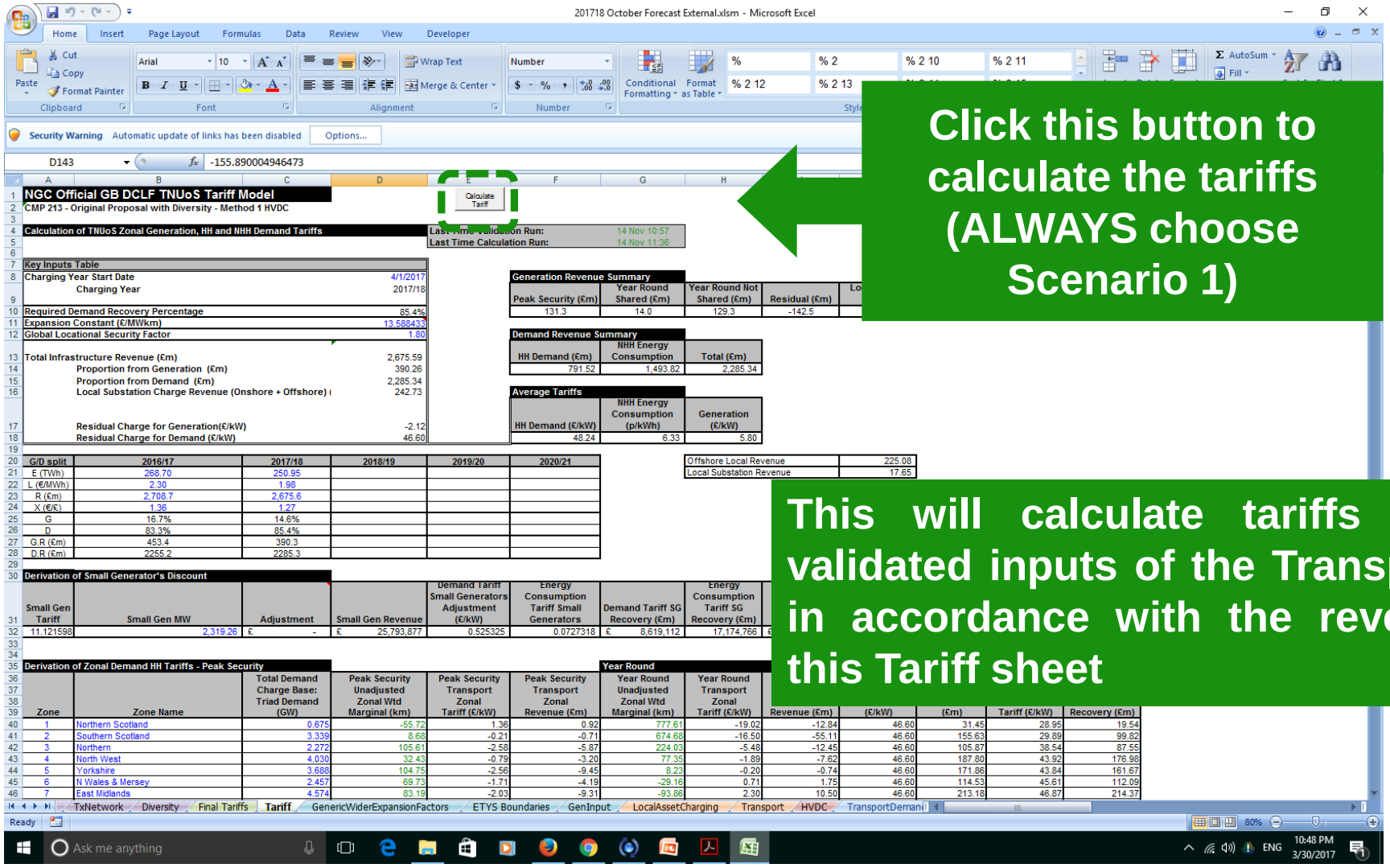
Running the Tariff model



Click this button to calculate the tariffs (ALWAYS choose Scenario 1)

This will calculate tariffs based on the validated inputs of the Transport model, and in accordance with the revenue inputs on this Tariff sheet

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Revenue Inputs

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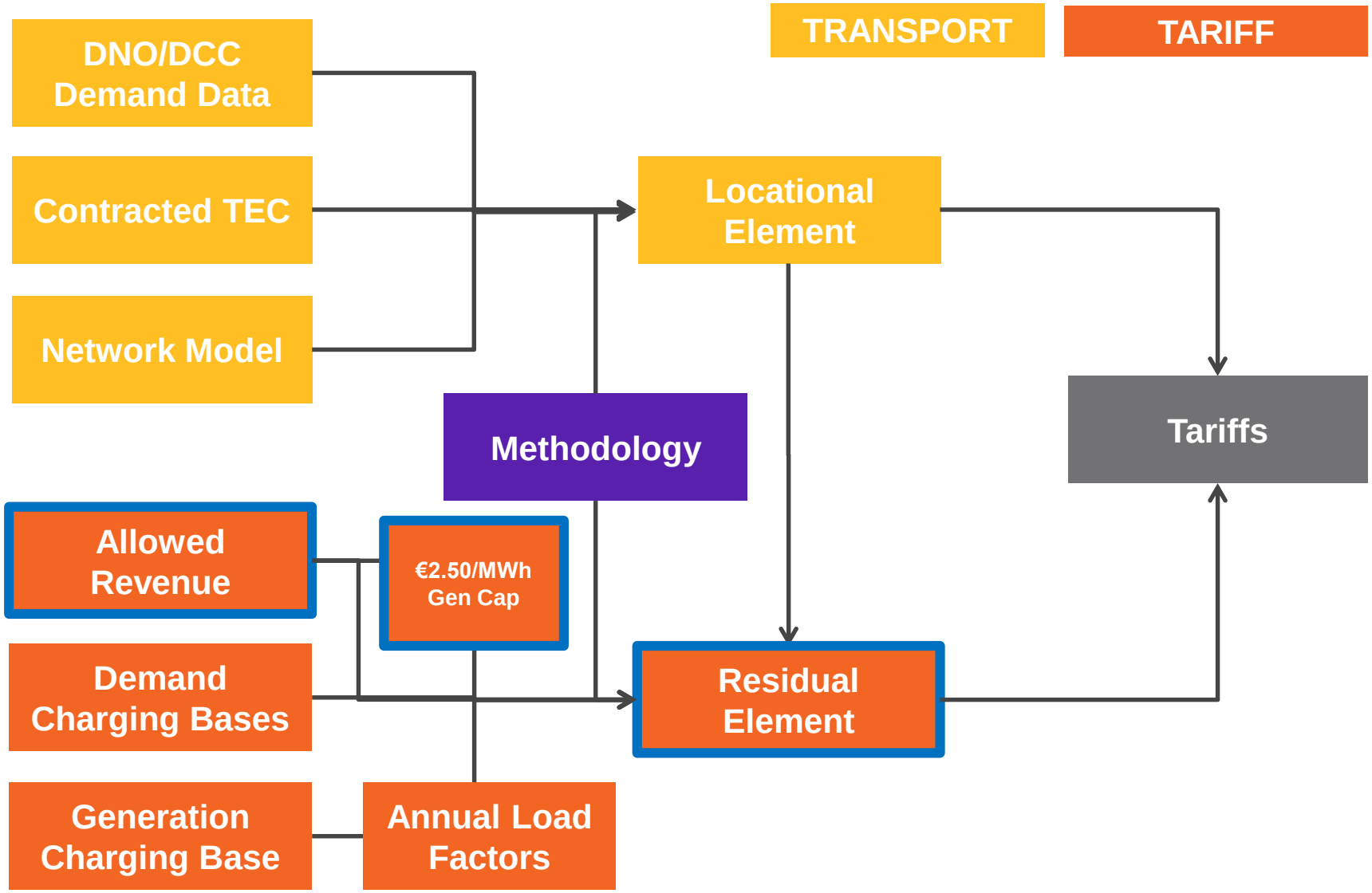
Inputs in to TNUoS Charges



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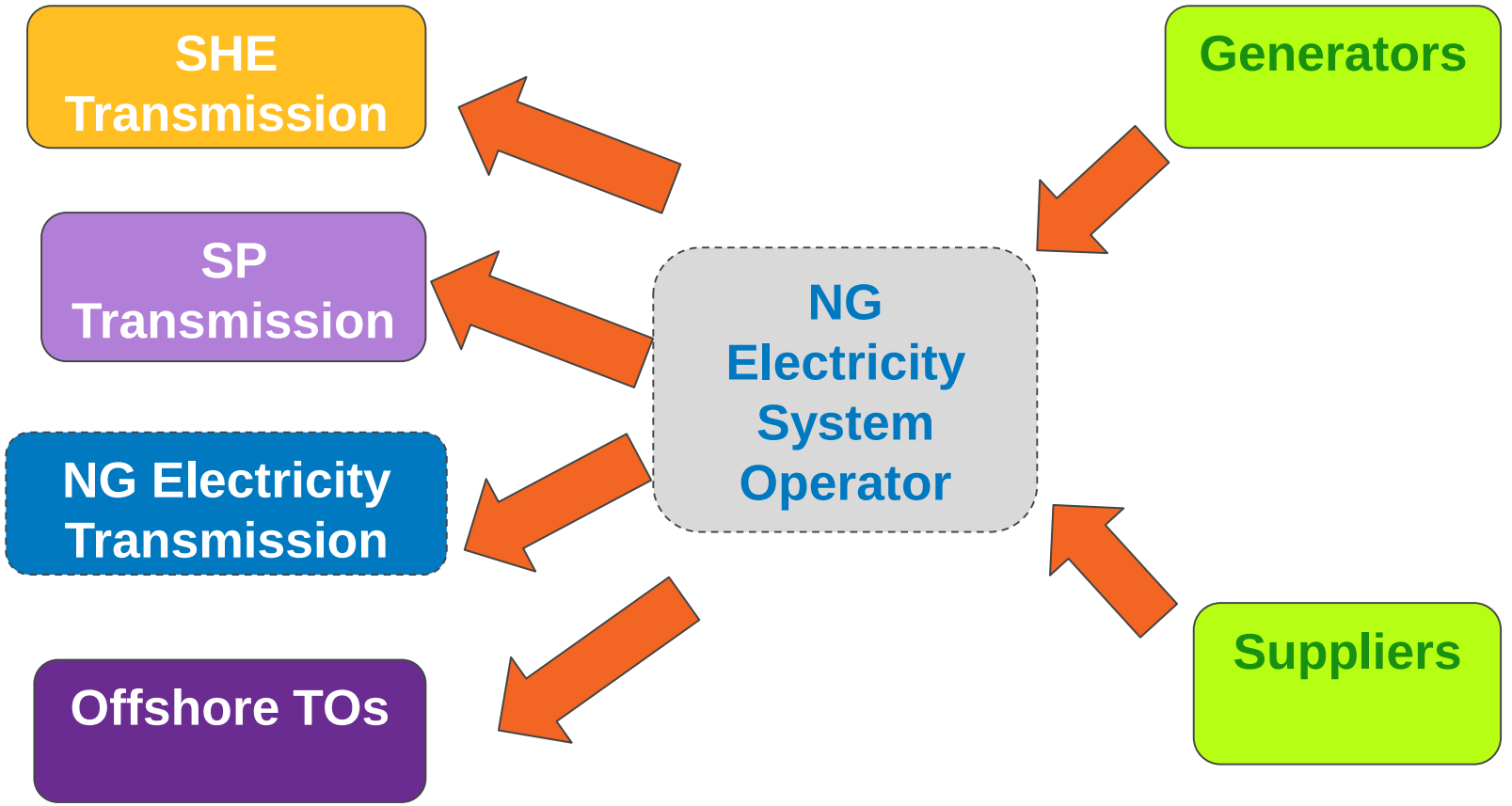
TNUoS Revenue and TNUoS Charges



The G/D split

€2.50 per MWh

£:€ exchange rate

Error margin

Forecast of generation volume (TWh) for the charging year

Revenue to be recovered from generation

Generation Revenue 2018/19

= €1.98/MWh

€2.50 per MWh
x 21% Error Margin

= £1.70/MWh

€1.98 ÷
£:€ exchange rate of
€1.16

OBR Spring Forecast

FES Forecast

Forecast of Generation
253TWh

X

£1.70/MWh

= £430m Revenue to be recovered from generation

Revenue inputs & Gen residual

NGC Official GB DCLF TNUoS Tariff Model

2019/20 Tariff Model, including CMP268, CMP264/265 and CMP282.

Calculate Tariff

Input required charging year and RPI'd expansion constant

Offshore Local Revenue (substations, circuits & ETUoS) Local Substation Revenue (Onshore)

Charging Year Start Date	01/04/2019
Charging Year	2019/20
Required Demand Recovery Percentage	86.0%
Expansion Constant (£/MWkm)	14.552251
Global Locational Security Factor	1.80
Total Infrastructure Revenue (£m)	2,879.25
Revenue from Generation (£m)	403.51
Revenue from Demand (£m)	2,475.74
Residual Charge for Generation(£/kW)	-3.60
Residual Charge for Gross Demand (£/kW)	51.74

Calculates G/D split and generation residual

Peak Security (£m)	Year Round Shared (£m)	Year Round Shared (£m)	Residual (£m)	Onshore Local Circuit (£m)	Onshore Local Substation (£m)	Offshore Local (£m)	Total (£m)
170.6	42.3	133.1	-277.2	19.6	19.2	296.0	403.5

Demand Revenue Summary

mand	Less Embedded Export Tariff (£m)	NHH Energ Consumpti (£m)	Total (£m)
914.07	-111.06	1,67	2,475.74

(£/kW)	Embedded Export Tariff (£/kW)	NHH Energ Consumpti (p/kW	Generation (£/kW)
50.76	14.32		5.24

Offshore Local Revenue	295.95
Onshore Local Substation Revenue	19.24

Embedded Export Tariff Parameters

AGIC	£/kW	3.33
Phased Residual	£/kW	14.65

Input AGIC & Phased Residual (for Embedded Export tariff)

G/D split	2019/20
E (TWh)	229.83
L (€/MWh)	1.98
R (£m)	2,879.3
X (€/£)	1.12
G	14.0%
D	86.0%
G.R (£m)	403.5
D.R (£m)	2475.7

Input: E (forecast chargeable generation TWh), L (€2.50 cap less error margin), R (Total revenue), X (exchange rate)

Derivation of Small Generator's Discount — **DISCONTINUED FROM 2019/20**

Small Gen Tariff	Small Gen MW	Adjustm		HH Gross Dmnd Trff Small Gen	Energy Consumption Tariff Small Generators	Demand Tariff SG £)	Energy Consumption Tariff SG Recovery (£)	Total SG Recovery
						-	-	£ -

Input small generator MW for calculation of small gens discount

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Demand Charging Base Inputs

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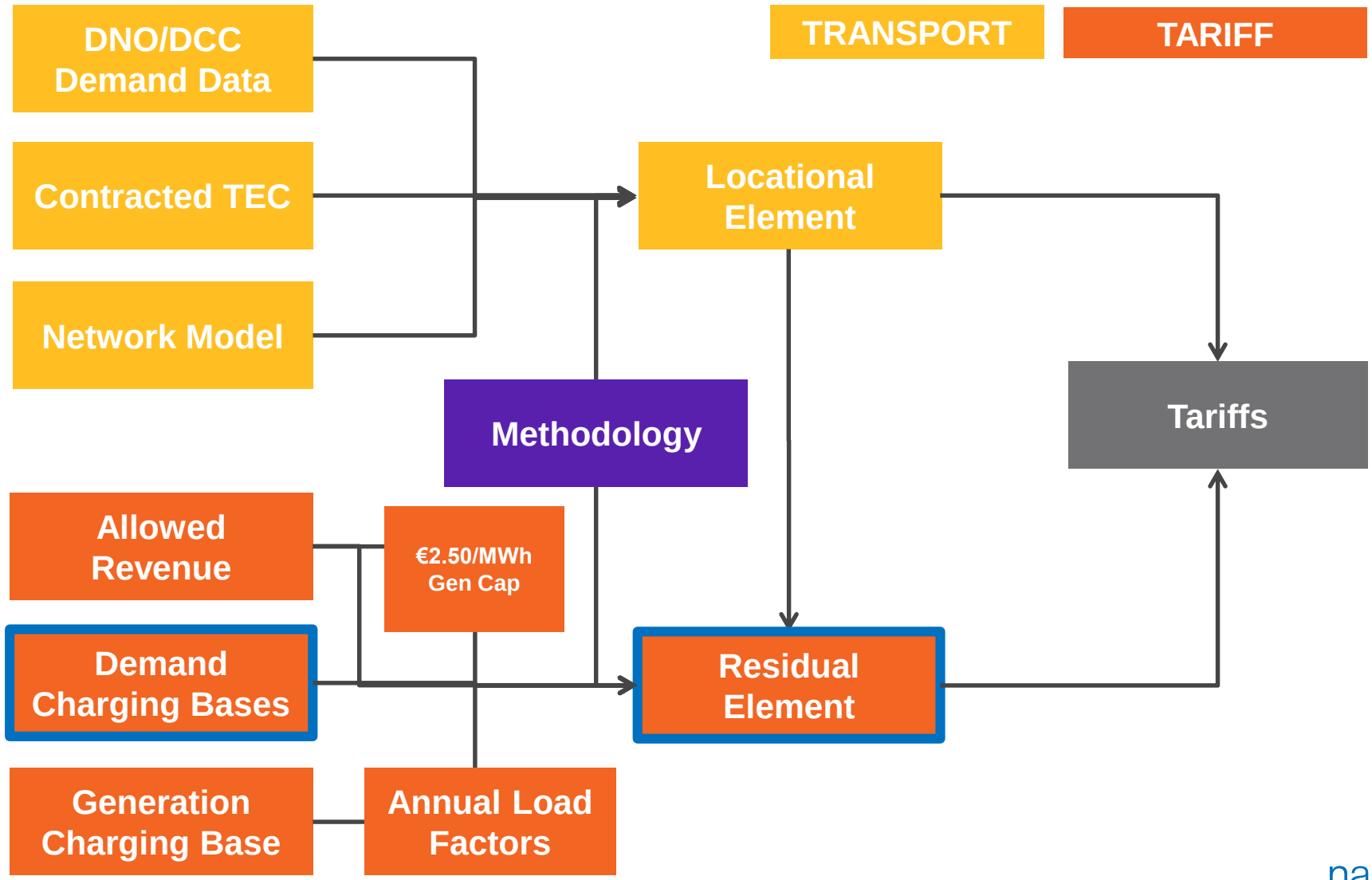
Inputs in to TNUoS Charges



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HH peak demand inputs

Net system peak by zone

Derivation of Zonal Gross HH and Embedded Export Tariff				
Zone	Zone Name	Total Demand Net Triad Demand (GW)	Total Demand Gross Triad Demand (GW)	Chargeable Export Volume (GW)
1	Northern Scotland	0.476	1.477	1.001
2	Southern Scotland	2.831	3.500	0.670
3	Northern	2.083	2.664	0.581
4	North West	3.773	4.117	0.343
5	Yorkshire	3.284	3.920	0.635
6	N Wales & Mersey	2.140	2.678	
7	East Midlands	4.286	4.763	
8	Midlands	4.159	4.371	
9	Eastern	5.980	6.605	0.624
10	South Wales	1.511	1.843	0.331
11	South East	3.681	3.999	0.318
12	London	4.174	4.323	0.149
13	Southern	5.147	5.584	0.437
14	South Western	2.420	2.621	0.200
		45.947	**52.463**	**6.516**

Gross system peak is the first of these two columns

HH tariff

Locational Demand Tariff (derived from Transport Model)

Peak Security Unadjusted Zonal Wtd Marginal (km)	Peak Security Transport Zonal Tariff (£/kW)	Peak Security Transport Zonal Revenue (£m)	Year Round Unadjusted Zonal Wtd Marginal (km)	Year Round Transport Zonal Tariff (£/kW)	Year Round Transport Zonal Revenue (£m)
-120.83	3.06	4.52	958.01	-24.29	-35.87
-5.32	0.13	0.47	733.38	-18.59	-65.08
122.21	-3.10	-8.25	260.82	-6.61	-17.61
47.92	-1.21	-5.00	98.83	-2.51	-10.31
114.49	-2.90	-11.38	21.73	-0.55	-2.16
92.11	-2.33	-6.25	-12.67	0.32	0.86
89.07	-2.26	-10.75	-88.09	2.23	10.64
71.04	-1.80	-7.87	-121.17	3.07	13.42
-44.98	1.14	7.53	-30.05	0.76	5.03
242.67	-6.15	-11.34	-174.74	4.43	8.16
-152.65	3.87				
-201.93	5.12				
-64.60	1.64				
40.5	-1.03				

Locational demand tariffs calculated

Embedded Export Tariff

EET Locational £/kW	EET AGIC £/kW	T Phased Resid £/kW	Final EET Tariff (Floored at zero) £/kW	EET Re £
-21.22	3.22	29.36	11.36	
-18.46	3.22	29.36	14.12	
-9.71	3.22	29.36	22.87	
-3.72	3.22	29.36	28.86	9.91
-3.45	3.22	29.36	29.13	18.50
-2.01	3.22	29.36	30.57	16.44
-0.02	3.22	29.36	32.56	15.52
1.27	3.22			
1.90	3.22			
-1.72	3.22			
4.58	3.22			
7.38	3.22			
5.89	3.22			
1.34	3.22			

Embedded export tariffs calculated

Residual tariffs; Final tariffs

Gross HH Demand Tariff

Gross HH Peak Security Location Tariff (£/kW)	Gross HH Year Round Location Tariff (£/kW)	Gross Demand Residual Tariff (£/kW)	Final Gross HH Zonal Tariff (£/kW)	Final Zonal Revenue Recovery (£m)
3.06	-24.29	46.93	25.71	37.98
0.13	-18.59	46.93	28.48	99.69
-3.10	-6.61	46.93	37.22	99.16
-1.21	-2.51	46.93	43.21	177.90
-2.90	-0.55	46.93	43.48	170.43
-2.33	0.32	46.93	44.92	120.28
-2.26	2.23	46.93	46.91	223.43
-1.80	3.07	46.93	48.20	210.68
1.14	0.76	46.93	48.84	322.53
-6.15	4.43	46.93	45.21	83.31
3.87	0.71	46.93	51.52	206.03
5.12	2.26	46.93	54.31	234.79
1.64	4.26	46.93	52.83	294.98
-1.03	5.37	46.93	51.27	134.37
				2,415.56

HH & NHH Charging Bases

Input HH demand at Triad

Input NHH demand (4-7pm, 365 days)

Derivation of Capped Zonal Demand NHH Tariffs

Zone	Zone Name	Total Demand Charge Base: Triad Demand (MW)	Chargeable HH Gross Zonal Triad Demand (MW)	HH Zonal Triad Gross Demand Rev. Recovery (£m)	Required NHH Zonal Revenue Recovery (£m)	NHH Zonal 1600-1900 Demand (TWh)	NHH Zonal Tariff (p/kWh)
1	Northern Scotland	476.21	489.059	12.57	25.40	0.741	3.43
2	Southern Scotland	2,830.97	1,258.785	35.85	63.84	1.663	3.84
3	Northern	2,083.25	1,078.299	40.14	59.03	1.200	4.92
4	North West	3,773.44	1,522.520	65.79	112.11	1.932	5.80
5	Yorkshire	3,284.43	1,609.735	69.99	100.44	1.761	5.71
6	N Wales & Mersey	2,139.64	1,085.298	48.75	71.52	1.223	5.85
7	East Midlands	4,286.33	1,878.074	88.10	135.33	2.160	6.26
8	Midlands	4,159.05	1,616.958	77.94	132.73	1.995	6.65
9	Eastern	5,980.31	2,132.611	104.15	218.39	3.086	7.08
10	South Wales	1,511.30	838.743	37.92	45.39	0.829	5.47
11	South East	3,680.97	1,168.967	60.22	145.81	1.910	7.63
12	London	4,173.79	2,285.730	4.15	110.64	1.836	6.03
13	Southern	5,147.26	2,072.206		185.51	2.563	7.24
14	South Western	2,420.32	764.182	9.18	95.19	1.273	7.48
		45,947.27	**19,801.17**	**22**	**1,501.33**	**24.17**	

For each zone, calculates £ revenue to be collected from HH based on triad demand forecast, and therefore remaining £ that must be collected from NHH demand

Zonal NHH tariffs calculated = remaining revenue / NHH demand

Excercise

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Exercise 3

1. **Open the DCLF – ICRP model**
2. **Add a new line in the GenInput sheet (lower table)**
    1. Station: (give the generator a name)
    2. Type: CCGT
    3. Transport Model TEC: 500MW
    4. Tariff Model TEC: 500MW
    5. Node 1: EXER20
    6. ALF: 70%
3. **Add the Node EXER20 to the Transport sheet (on the left) and add the circuit EXER20 – HADH10 (middle table)**
    1. TO region SP, Demand zone 2, generation zone 10, ETYS zone S1
    2. 132kV
    3. 10MW of nodal demand
    4. OHL
4. **Update Hadyard Hill local circuit on LocalAssetCharging Tab**
    1. Local asset grouping: Hadyard Hill
    2. Single construction type
5. **Validate the model**

Summary

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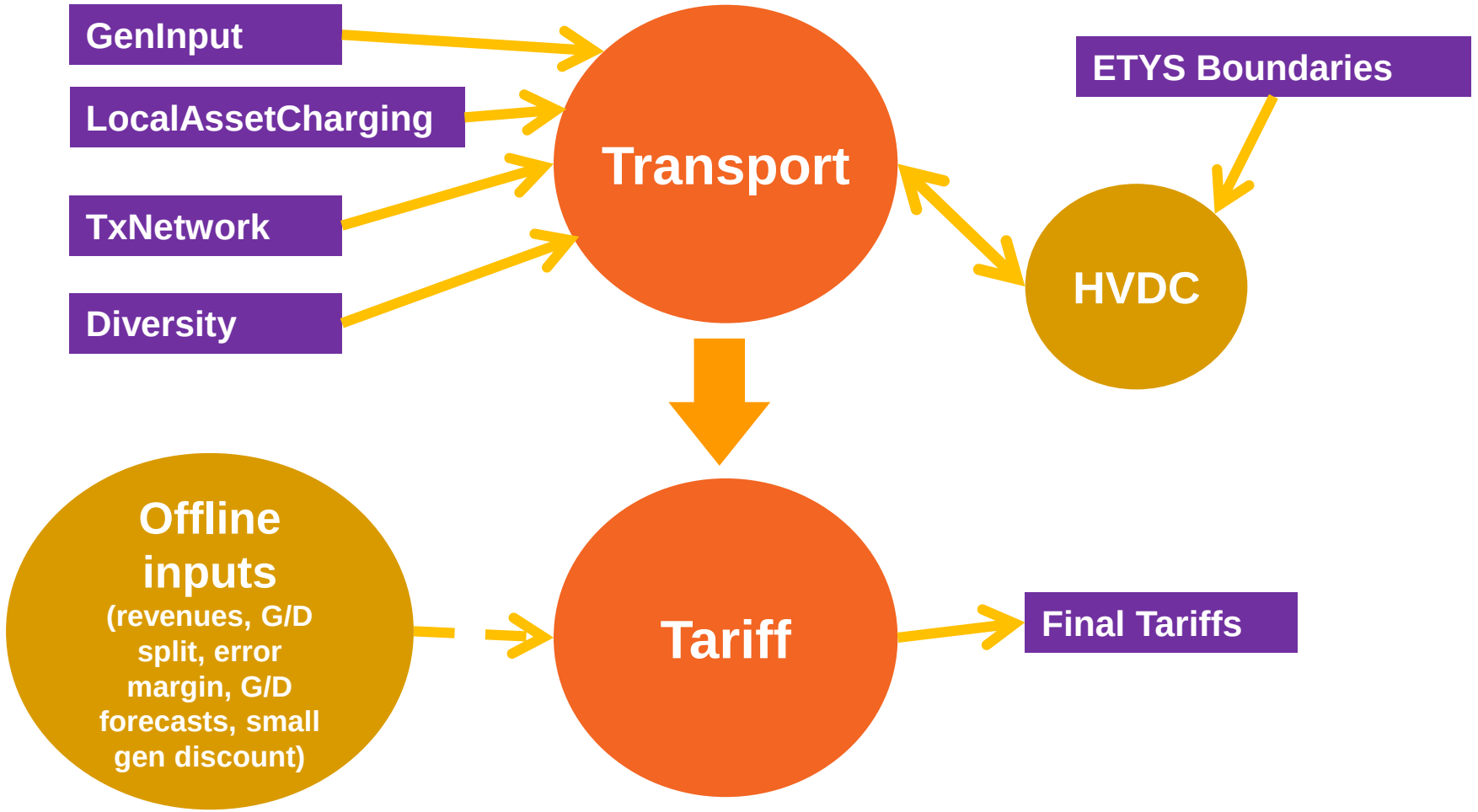
The DCLF ICRP model: aka T&T model



Calculating TNUoS tariffs

Transport Model

- used to calculated the locational investment signals (wider and local)
- if you add 1MW of generation capacity, what impact does it have?
- the impact is measured in terms of additional flows
- proxy for level of investment across the network

Tariff Model

- used to ensure correct revenue recovery
- also ensures that revenue recovered in desired G / D proportions

Troubleshooting

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Troubleshooting

If you click the Validate button, there are some issues with the inputs.

Can you work out what the issues are?

Do you know how to fix them?

Changes to future forecasts

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When do inputs change in quarterly forecasts?

		Five-year forecast	March	July	DRAFT Nov	FINAL Jan
Methodology		Open to industry governance				
Locational	DNO/DCC Demand Data	Previous year			Week 24 updated	
	Contracted TEC	Latest TEC	Latest TEC	Latest TEC	TEC Register Frozen at 31 October	
	Network Model	Previous year (except new local circuits)			Latest version based on ETYS	
Residual	Allowed Revenue	Update financial parameters	Update financial parameters	Update financial parameters	Latest TO Forecasts	From TOs
	Demand Charging Bases	Revised Forecast	Revised Forecast	Revised Forecast	*Only by exception*	*Only by exception*
	Generation Charging Base	NG Best View	NG Best View	NG Best View	NG Best View	NG Final Best View
	Generation ALFs	Previous Year			New ALFs published	
	Generation Revenue	Forecast	Forecast	Fixed Gen Rev £m		

RIIO T-2

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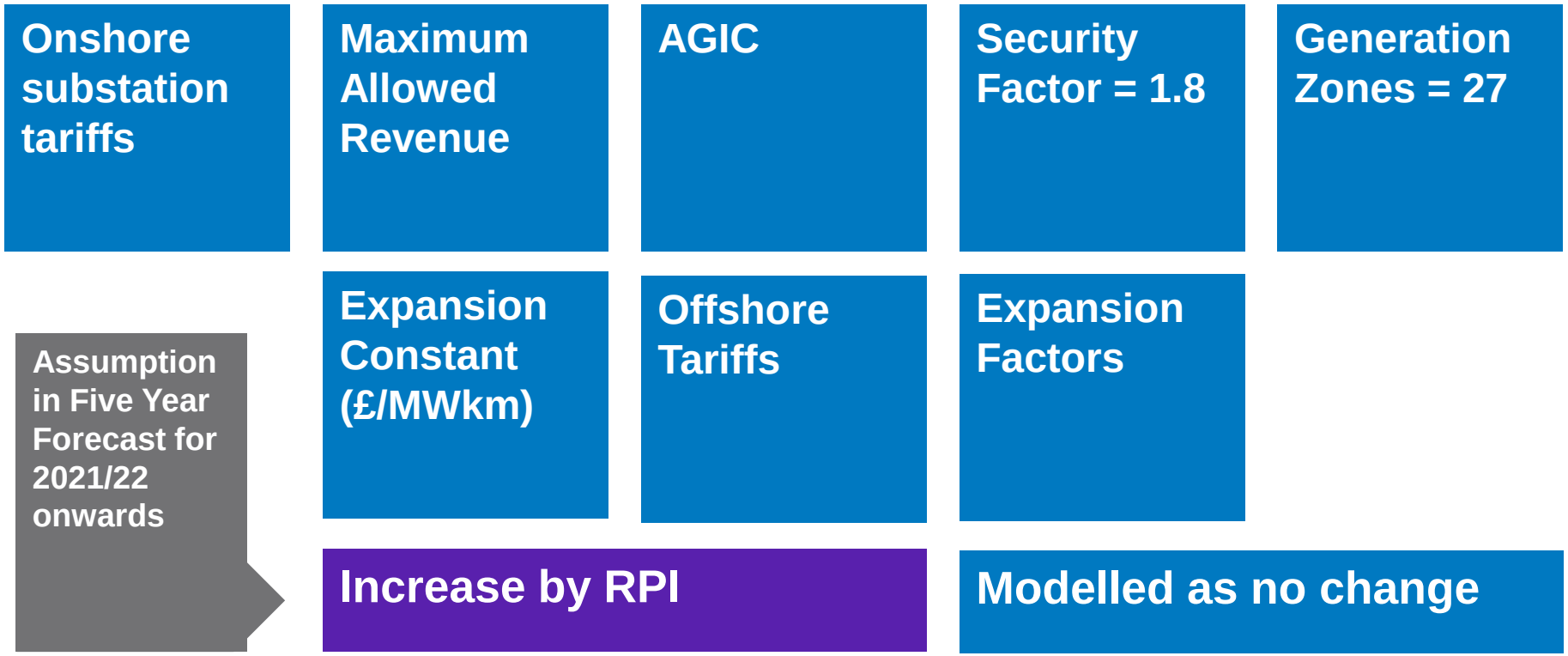
Impact of next price control on Tariffs

- The next RIIO-T2 price control is expected to start on 1 April 2021.
- The CUSC requires various parameters to be updated at that point for the 2021/22 tariffs, but are dependent on each TOs RIIO ‘deal’



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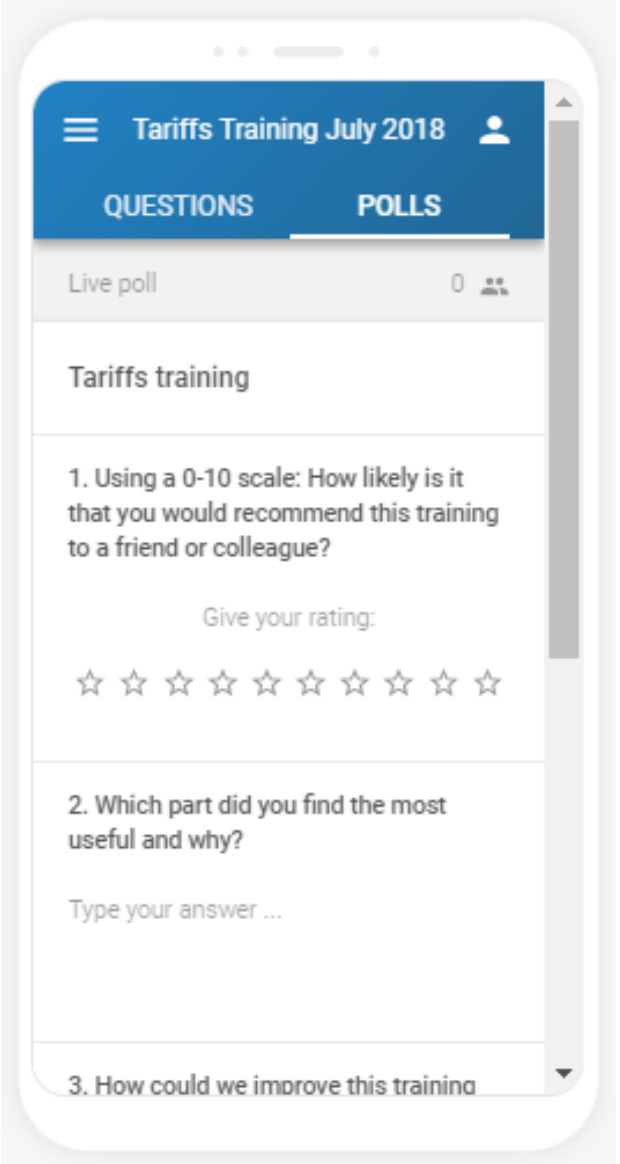
Feedback

Type sli.do into your browser

Enter code #Tariffs

Click on the POLLS tab



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Any questions?

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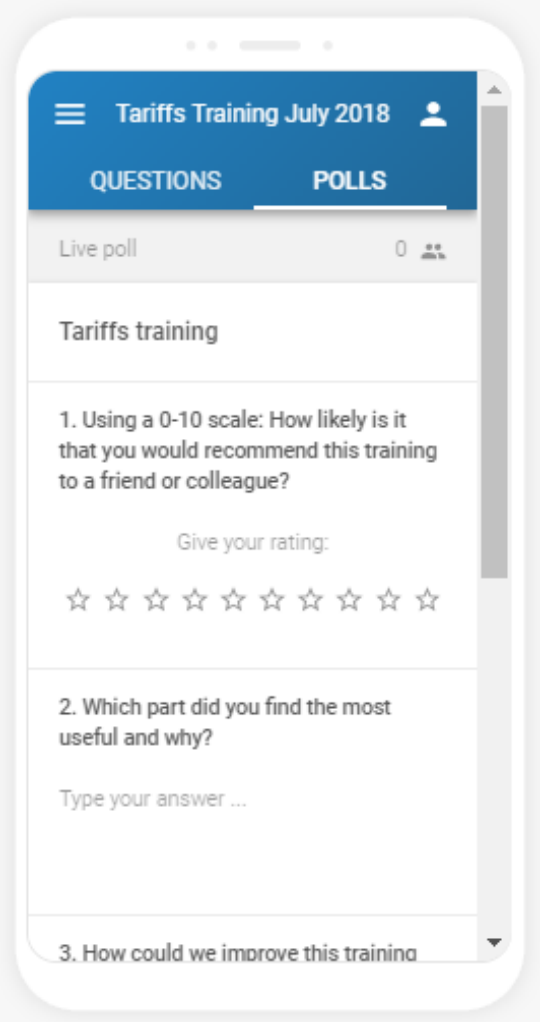
Sli.do

We want your feedback!

1. Using a 0-10 scale: How likely is it that you would recommend this training to a friend or colleague?
2. Which part did you find the most useful and why?
3. How could we improve this training session?



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Thank you

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Data sources

Data sources: Generation

TEC, Embedded and Interconnector registers

https://www.nationalgrideso.com/connections/registers-reports-and-guidance

Offshore: OFTO tenders & asset transfer values

https://www.ofgem.gov.uk/electricity/transmission-networks/offshore-transmission/offshore-transmission-tenders

Future Energy Scenarios (FES): Future generation & demand volumes

http://fes.nationalgrid.com/

CfD & Capacity Market information

https://lowcarboncontracts.uk/cfds

https://www.emrdeliverybody.com/cm/home.aspx

BEIS renewable energy planning database

https://www.gov.uk/government/publications/renewable-energy-planning-database-monthly-extract

Data sources: Generation (continued)

Digest of UK Energy Statistics (DUKES) – generator volumes & fuel types

https://www.gov.uk/government/publications/digest-of-uk-energy-statistics-dukes-archive

BM Reports – outturn generation

https://www.bmreports.com/

Data sources: G/D Split

G/D Split: £:€ rate – OBR Economic & Fiscal Outlook

http://obr.uk/report/economic-and-fiscal-outlook/

G/D Split: Generation output TWh volumes

Derived from FES – average over all four scenarios of transmission connected generation output (minus interconnectors) per year

Please note that FES data is January to December; we use April to March data (individual months are not published), so using published FES data will not quite match the data we use to calculate TNUoS.

http://fes.nationalgrid.com/

Data sources: Demand

Triads

https://www.nationalgrideso.com/charging/transmission-network-use-system-tnuos-charges/triads-data

BM Reports – past outturn demand

https://www.bmreports.com/

Data sources: Transport & network inputs

Electricity Ten Year Statement (ETYS)

Appendix A: Existing power stations, network maps and ETYS zone boundaries

Appendix B: Node name codes and circuit data

https://www.nationalgrideso.com/insights/electricity-ten-year-statement-etys

Transmission works register

May help to provide information about local circuit characteristics

https://www.nationalgrideso.com/connections/registers-reports-and-guidance

Data sources: Revenue

RPI

Indexation of offshore local tariffs, expansion constant, AGIC etc.

https://www.ons.gov.uk/economy/inflationandpriceindices

OFTO tenders

Asset transfer values, cost assessment publications & OFTOt values

https://www.ofgem.gov.uk/electricity/transmission-networks/offshore-transmission/offshore-transmission-tenders

Data sources: Methodology

Ofgem CUSC decisions

https://www.ofgem.gov.uk/licences-industry-codes-and-standards/industry-codes/electricity-codes/connection-and-use-system-code-cusc

CUSC text & development

https://www.nationalgrideso.com/codes/connection-and-use-system-code-cusc

Data sources: Elexon portal & BM Reports

Registered BM units

Loss factors (BSUoS only)

https://www.elexonportal.co.uk/

BM Reports – past outturn demand & generation

https://www.bmreports.com/