Table UP-2: ATC Futures - ATC Energy Collaborative - Michigan

														nternal Use Only Discus											
						Load A	ssumption	s					, , , , , , , , , , , , , , , , , , , ,	,	, , ,	(eneration	Assumptions							
<u>UP Micro-</u> <u>Drivers</u>		d Growth W Demand MW		Energy Gr	owth Within MWHrs)	UP (Energy	Total Point	Loads MW add (2018/2024)	ded in the UP	Total UP Growth (2018)	Total UP Growth (2024)	Demand Growth Outside UP (MWs)		Existing UP Generation Profile (Note: U.P. generation on-line only if dictated by merit order dispatch, or unless noted below)				ration Additions	UP Generation retirements			Wind Generation			New Generation in Northern Lower Michigan
Bounds	West	Central	East	West	Central	East	West	Central	East	U.P.	U.P.		West	Central	East	West	Central	East	West	Central	East	West	Central	East	
							(-6 / 0)	(-111 / 0)	(-2 / 0)				Fossil (-69MW Total) 'WP Mine1 2-3 (40) + SM-ST (11) + Warden (18)		9.4MW Diesel Available			5 MW		116 MW					
Lower	-0.10%	0.08%	0.10%	-0.10%	0.08%	0.10%	-6 MW	-111 MW	-2 MW	-1.44%	-0.86%	0.5%	Hydro 20% of max	Hydro 20% of max	0MW Hydro Available	None	None	5MW Diesel	None	PI3-4 (116)	None	Zero	Zero	Zero	Zero
Mid-Lower	0.36%	0.48%	0.40%	0.36%	0.48%	0.40%	No Change	(-40 / 0) -40 MW	No Change	-0.24%	-0.05%	1.0%	(-51MW Total) "WP Mine1-2-3 (40) + SM-ST (11) Hydro 20% of max	Fossil (-134MW Total) PI5-6 Derate (40) + ESC 1-2 (26) + Neenah-MUN (5) + MBLP (25) + NP7 (38) Hydro 20% of max			None								
Máid	0.73%	0.84%	0.75%	0.73%	0.84%	0.75%	(+5 / 0) +5 MW	(+29 / 0) +29 MW	(+33 / 0) +33 MW	1.14%	0.84%	1.75%	(-40MW Total) 'WP Mine1-2-3 (40) Hydro 40% of max	Fossii (-65MW Total) PI5-6 Derate (40) + MBLP (25) Hydro 40% of max.	11.4MW Diesel Available 20MW Hydro Available	None	10MW 10MW Bio Mass NMU	29 MW 5MW Diesel + 24MW Bio Mass	None		None	25MW	50MW	50MW	100MW
Mid-Upper	1.23%	1.25%	1.25%	1.23%	1.25%	1.25%		(+79 / +20) +99 MW		2.00%	1.60%		Fossil all available Hydro 50% of max	Fossil (-40MW Total) PI 5-6 (40) Hydro 50% of max	11.4MW diesel Available 32MW Hydro Available	None	35MW 10 NMU+25 Sawyer Bio Mass	93MW 24MW Bio Mass + 9MW Hydro + 60 MW Mascoma	None		None	50MW	100MW	100MW	TOOMVV
Upper	1.93%	2.00%	2.00%	1.93%	2.00%	2.00%	(+19 / +22) +41 MW	(+134 /+50) +184 MW		3.00%	2.58%	3.0%	Fossil all available Hydro 60% of max	Fossil all available Hydro 60% of max	16MW Diesel Available 44MW Hydro Available	None	50MW 10 NMU+40 Sawyer Bio Mass		None	138 MW PI3-4 (116) +GLAD (22)	None	100MW	200MW	200MW	600MW
2018 Futures Descriptions																									

	(+1.93%)	(+2.00%)	(+2.00%)	(+1.93%)	(+2.00%)	(+2.00%)	(+19 MW)	(+134 MW)	(+46 MW)	(+3.00%)	3.0%	-OMW	-0MW	20MW Hydro	(none)	35MW	(+101 MW)	(none)	(-116 MW)	(none)	(+25 MW)	(+50 MW)	(+50 MW)	(+ 600 MW)
	(1.5570)	(12.0070)	(12.0070)	(1.5570)	(12.0070)	(12.0070)	(101010)	(10411111)	(140 1010)	(10.0070)	0.070	011114	OWITT	Zowiw riyalo	(Horic)	OOWIVV	(101 11111)	(Horic)	(11011111)	(Horic)	(120 10177)	(100 10111)	(100 11111)	(1 000 11111)
Robust Economy	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Mid	Upper	Mid-Upper	Upper	Lower	Lower	Lower	Mid	Mid	Mid	Upper						
	(+0.73%)	(+0.84%)	(+0.75%)	(+0.73%)	(+0.84%)	(+0.75%)	(+5 MW)	(+29 MW)	(+33 MW)	(+1.14%)	1.75%	-69MW	-151MW	32MW Hydro	(none)	(none)	(+29MW)	(none)	(-138 MW)	(none)	(+25 MW)	(+50 MW)	(+50 MW)	(+ 600 MW)
																						A T	A T	
High Retirements	Mid	Mid	Mid	Mid	Mid	Lower	Lower	Mid-Upper	Lower	Lower	Mid	Lower	Upper	Lower	Mid	Mid	Mid	Upper						
	(+0.36%)	(+0.48%)	(+0.40%)	(+0.36%)	(+0.48%)	(+0.40%)	(no change)	(-40 MW)	(no change)	(-0.24%)	1.0%	-51MW	-134MW	20MW Hydro	(none)	(none)	(+5 MW)	(none)	(-116 MW)	(none)	(+50 MW)	(+100 MW)	(+100 MW)	(none)
High Environmental	Mid-Lower	Mid-Lower					Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid	Lower	Lower	Lower	Lower	Lower	Lower			r Mid-Upper	
	(-0.10%)	(+0.08%)	(+0.10%)	(-0.10%)	(+0.08%)	(+0.10%)	(-6 MW)	(-111 MW)	(-2 MW)	(-1.44%)	0.5%	-40MW	-65MW	44MW Hydro	(none)	10MW	(+5 MW)	(none)	(-116 MW)	(none)	(+100 MW)	(+200 MW)) (+200 MW)	(none)
Slow Growth	Lower	Lower	Lower	Lower	Lower	Mid	Mid	Upper	Mid	Mid	Lower	Lower	Lower	Lower	Upper	Upper	Upper	Lower						
	(+1.23%)	(+1.25%)	(+1.25%)	(+1.23%)	(+1.25%)	(+1.25%)	(+16 MW)	(+79 MW)	(+35 MW)	(+2.00%)	2.0%	-69MW	-151MW	20MW Hydro	(none)	(none)	(+93 MW)	(none)	(-138 MW)	(none)	(+100 MW)	(+200 MW)	(+200 MW)	(+ 100 MW)
																						A T	A T	(Wind)
DOE 20% Wind	Mid-Upper	Mid-Upper	Mid-Upper	Mid-Upper	Mid-Upper	Lower	Lower	Mid	Lower	Lower	Mid-Upper	Lower	Upper	Lower	Upper	Upper	Upper	Mid						
	(+0.73%)	(+0.84%)	(+0.75%)	(+0.73%)	(+0.84%)	(+0.75%)	(no change)	(+6 MW)	(no change)	(0.48%)	1.3%	-40MW	-65MW	0MW Hydro	(none)	10MW	(+5 MW)	(none)	(-116 MW)	(none)	(none)	(none)	(none)	(none)
Fuel and Investment																								
Limitations	Mid	Mid	Mid	Mid	Mid	Mid	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid	Mid	Lower	Mid	Mid	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower

2024 Futures Descriptions

	(+1.93%)	(+2.00%)	(+2.00%)	(+1.93%)	(+2.00%)	(+2.00%)	(+41 MW)	(+184 MW)	(+56 MW)	(+2.58%)	3.0%	-0MW	-0MW	20MW Hydro	(none)	50MW	(+101 MW)	(none)	(-116 MW)	(none)	(+25 MW)	(+50 MW)	(+50 MW)	(+ 600 MW)
																							4	4
Robust Economy	Upper	Upper	Upper	Upper	Upper	Upper	Upper	Mid	Upper	Upper	Upper	Lower	Lower	Lower	Mid	Mid	Mid	Upper						
	(+0.73%)	(+0.84%)	(+0.75%)	(+0.73%)	(+0.84%)	(+0.75%)	(+5 MW)	(+29 MW)	(+33 MW)	(+0.84%)	1.75%	-69MW	-151MW	32MW Hydro	(none)	(none)	(+29MW)	(none)	(-138 MW)	(none)	(+25 MW)	(+50 MW)	(+50 MW)	(+ 600 MW)
																								4
High Retirements	Mid	Mid	Mid	Mid	Mid	Lower	Lower	Mid-Upper	Lower	Lower	Mid	Lower	Upper	Lower	Mid	Mid	Mid	Upper						
	(+0.36%)	(+0.48%)	(+0.40%)	(+0.36%)	(+0.48%)	(+0.40%)	(no change)	(-40 MW)	(no change)	(-0.05%)	1.0%	-51MW	-134MW	20MW Hydro	(none)	(none)	(+5 MW)	(none)	(-116 MW)	(none)	(+50 MW)	(+100 MW)	(+100 MW)	(none)
																								4
High Environmental	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid	Lower	Lower	Lower	Lower	Lower	Lower	Mid-Upper	Mid-Upper	Mid-Upper	Lower						
	(-0.10%)	(+0.08%)	(+0.10%)	(-0.10%)	(+0.08%)	(+0.10%)	(-6 MW)	(-111 MW)	(-2 MW)	(-0.86%)	0.5%	-40MW	-65MW	44MW Hydro	(none)	10MW	(+5 MW)	(none)	(-116 MW)	(none)	(+100 MW)	(+200 MW)	(+200 MW)	(none)
																						4		4
Slow Growth	Lower	Lower	Lower	Lower	Lower	Mid	Mid	Upper	Mid	Mid	Lower	Lower	Lower	Lower	Upper	Upper	Upper	Lower						
	(+1.23%)	(+1.25%)	(+1.25%)	(+1.23%)	(+1.25%)	(+1.25%)	(+19 MW)	(+99 MW)	(+40 MW)	(+1.60%)	2.0%	-69MW	-151MW	20MW Hydro	(none)	(none)	(+93 MW)	(none)	(-138 MW)	(none)	(+100 MW)	(+200 MW)	(+200 MW)	(+ 100 MW)
																						4		(Wind)
DOE 20% Wind	Mid-Upper	Mid-Upper	Mid-Upper	Mid-Upper	Mid-Upper	Lower	Lower	Mid	Lower	Lower	Mid-Upper	Lower	Upper	Lower	Upper	Upper	Upper	Mid						
	(+0.73%)	(+0.84%)	(+0.75%)	(+0.73%)	(+0.84%)	(+0.75%)	(no change)	(+6 MW)	(no change)	(0.45%)	1.3%	-40MW	-65MW	0MW Hydro	(none)	10MW	(+5 MW)	(none)	(-116 MW)	(none)	(none)	(none)	(none)	(none)
Fuel and Investment																								4
Limitations	Mid	Mid	Mid	Mid	Mid	Mid	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid-Lower	Mid	Mid	Lower	Mid	Mid	Lower	Lower	Lower	Lower	Lower	Lower	Lower	Lower

Table UP-3: U.P. Futures High Level Summary, Western/Central/Eastern U.P. Zones

MISO Future	Load Growth Outside ATC		Scalable Load Growth	Point Load Changes	Generation Additions	Generation Retirements	Existing Generation	Wind Gen. Additions	Rogers City Generation	
Reference	Upper	Robust Economy	Upper	Upper	None	None	Upper	+25 MW	Upper	Large increase in western U.P. import
Environmental	Mid	High Retirements	Mid	Mid	None	None	Lower	+25 MW	Upper	Large increase in western U.P. import
Environmental	Mid-Lower	High Environmental	Mid-Lower	Mid-Lower	None	None	Mid-Lower	+50 MW	Lower	Modest generation/load balance issues
Reference	Lower	Slow Growth	Lower	Lower	None	None	Mid	+100 MW	Lower	Modest generation/load balance issues
20% Wind	Mid-Upper	DOE 20% Wind	Mid-Upper	Mid-Upper	None	None	Lower	+100 MW	Mid	Large increase in western U.P. import
Investment Limitation	Mid-Lower	Fuel & Inv. Limitations	Mid	Mid-Lower	None	None	Mid	None	Lower	Modest generation/load balance issues

MISO Future	Load Growth Outside ATC		Scalable Load Growth	Point Load Changes	Generation Additions	Generation Retirements	Existing Generation	Wind Gen. Additions	Rogers City Generation	
Reference	Upper	Robust Economy	Upper	Upper	+60/110 MW	-116 MW	Upper	+50 MW	Upper	Large load increase, net generation reductions, Sawyer bio-mass
Environmental	Mid	High Retirements	Mid	Mid	None	-138 MW	Lower	+50 MW	Upper	Maximum Escanaba area import
Environmental	Mid-Lower	High Environmental	Mid-Lower	Mid-Lower	None	-116 MW	Mid-Lower	+100 MW	Lower	High Escanaba area import
Reference	Lower	Slow Growth	Lower	Lower	+10 MW	-116 MW	Mid	+200 MW	Lower	Modest generation/load balance issues
20% Wind	Mid-Upper	DOE 20% Wind	Mid-Upper	Mid-Upper	None	-138 MW	Lower	+200 MW	Mid	Maximum Escanaba area import
Investment Limitation	Mid-Lower	Fuel & Inv. Limitations	Mid	Mid-Lower	+10 MW	-116 MW	Mid	None	Lower	Modest generation/load balance issues

	Load Growth	Eastern	Scalable	Point Load	Generation	Generation	Existing	Wind Gen.	Rogers City	
MISO Future	Outside ATC	U.P. Future	Load Growth	Changes	Additions	Retirements	Generation	Additions	Generation	Eastern U.P. System Summary
Reference	Upper	Robust Economy	Upper	Upper	+101 MW	None	Mid	+50 MW	Upper	Large load & generation increase, LP Gen. = high E-W flows
Environmental	Mid	High Retirements	Mid	Mid	+29 MW	None	Mid-Upper	+50 MW	Upper	LP Gen. = high E-W flows
Environmental	Mid-Lower	High Environmental	Mid-Lower	Mid-Lower	+5 MW	None	Mid	+100 MW	Lower	Modest generation/load balance issues
Reference	Lower	Slow Growth	Lower	Lower	+5 MW	None	Upper	+200 MW	Lower	Modest generation/load balance issues
20% Wind	Mid-Upper	DOE 20% Wind	Mid-Upper	Mid-Upper	+93 MW	None	Mid	+200 MW	Mid	Modest generation/load balance issues
Investment Limitation	Mid-Lower	Fuel & Inv. Limitations	Mid	Mid-Lower	+5 MW	None	Lower	None	Lower	Hydro off-line = high import + load-serving issues