Capacity Value Results for 2022 RNA 2030 Cases and IRM 2023 PBC Cases

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Overview

This slide deck summarizes the capacity value calculations, evaluated for the following sensitivities:

- Preliminary NYISO 2022 RNA Base Case for model year 2030 *(presented at the 9/30/22 ICAPWG)*
- Re-optimized NYISO 2022 RNA Base Case for model year 2030
- Preliminary NYISO 2022 RNA Policy Case for model year 2030
- Re-optimized NYISO 2022 RNA Policy Case for model year 2030
- NYISO 2023 IRM Preliminary Base Case (PBC)
- NYISO 2023 IRM PBC at Level of Excess (LOE)

The capacity value calculations were performed for the same list of marginal units, as presented in previous presentations:

Only includes the 50 MW and 100 MW sizes for incremental units, to reduce the number of simulations

Both ELCC and MRI techniques were applied to most cases

- The ELCC technique was not applied to calculate CAFs for the 2023 PBC LOE case
- The ELCC technique was applied to a subset of units for the re-optimized RNA Base Case and RNA Policy Case

Reference

For methodology, assumptions, and more details please refer to previous presentations:

- 3/31: https://www.nyiso.com/documents/20142/29607069/3%20GE-Support%20for%20NYISO%20Capacity%20Accreditation%20Project_0331.pdf
- 4/28: https://www.nyiso.com/documents/20142/30276257/GE-Support%20for%20NYISO%20Capacity%20Accreditation%20Project_0428.pdf
- 5/24: https://www.nyiso.com/documents/20142/30888946/2%20GE-Support%20for%20NYISO%20Capacity%20Accreditation%20Project_0524.pdf
- 6/28: https://www.nyiso.com/documents/20142/31830389/GE-Support-for-NYISO-Capacity-Accreditation-Project-0628.pdf

For context, some of the slides also include results for:

- NYISO 2022 IRM LCR database
- NYISO 2022 IRM LCR at Level of Excess (LOE)

Results for all cases are posted in a single spreadsheet, available for download

Preliminary 2022 RNA Base and Policy Cases for Model Year 2030

Reliability Needs Assessment (RNA) database sensitivities

Two sensitivities:

- 2022 1st pass Base Case Study for study year 2030
- 2022 Policy Case Study for study year 2030

The LCR Optimizer was used to bring the RNA Cases for year 2030 to the at criteria LOLE of 0.1

As discussed on the 10/19 meeting, the preliminary results of the RNA 2030 Base and Policy Cases were calculated on at criteria systems that were not fully optimized

- The IRMs and LCRs for the preliminary results are shown in the table on the right
- IRMs, LCRs, and CAF results for the re-optimized cases will be discussed beginning on slide 16

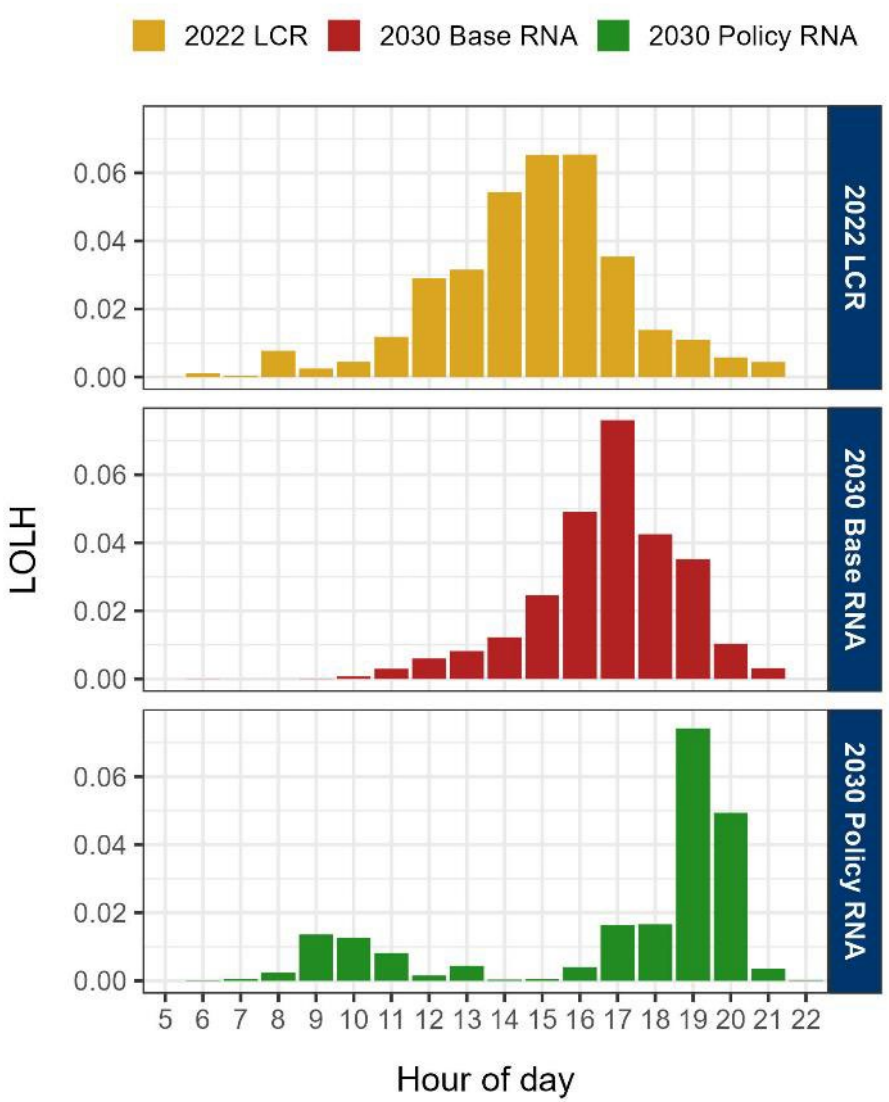
	Preliminary RNA Base Case 2030	Preliminary RNA Policy Case 2030
NYCA IRM	125.5%	162.3%
G-J LCR	80.6%	108.7%
J LCR	80.7%	120.5%
K LCR	109.2%	140.1%

Reliability Needs Assessment (RNA) database sensitivities (II)

The hourly LOLE distribution shifts to later in the day for study year 2030 of the 2022 1st pass Base Case Study in comparison to the hourly LOLE distribution from the 2022 NYISO LCR database, as shown in the figure

The RNA Policy Case has more behind-the-meter and utility-scale solar, which reduces the risk in the middle of the day, which moves to hours after sunset and before dawn

Capacity value results for year 2030 of the 2022 RNA Policy Case may not be representative of expected capacity values due to limitations in the modeling of energy storage at high renewable and energy storage penetration levels



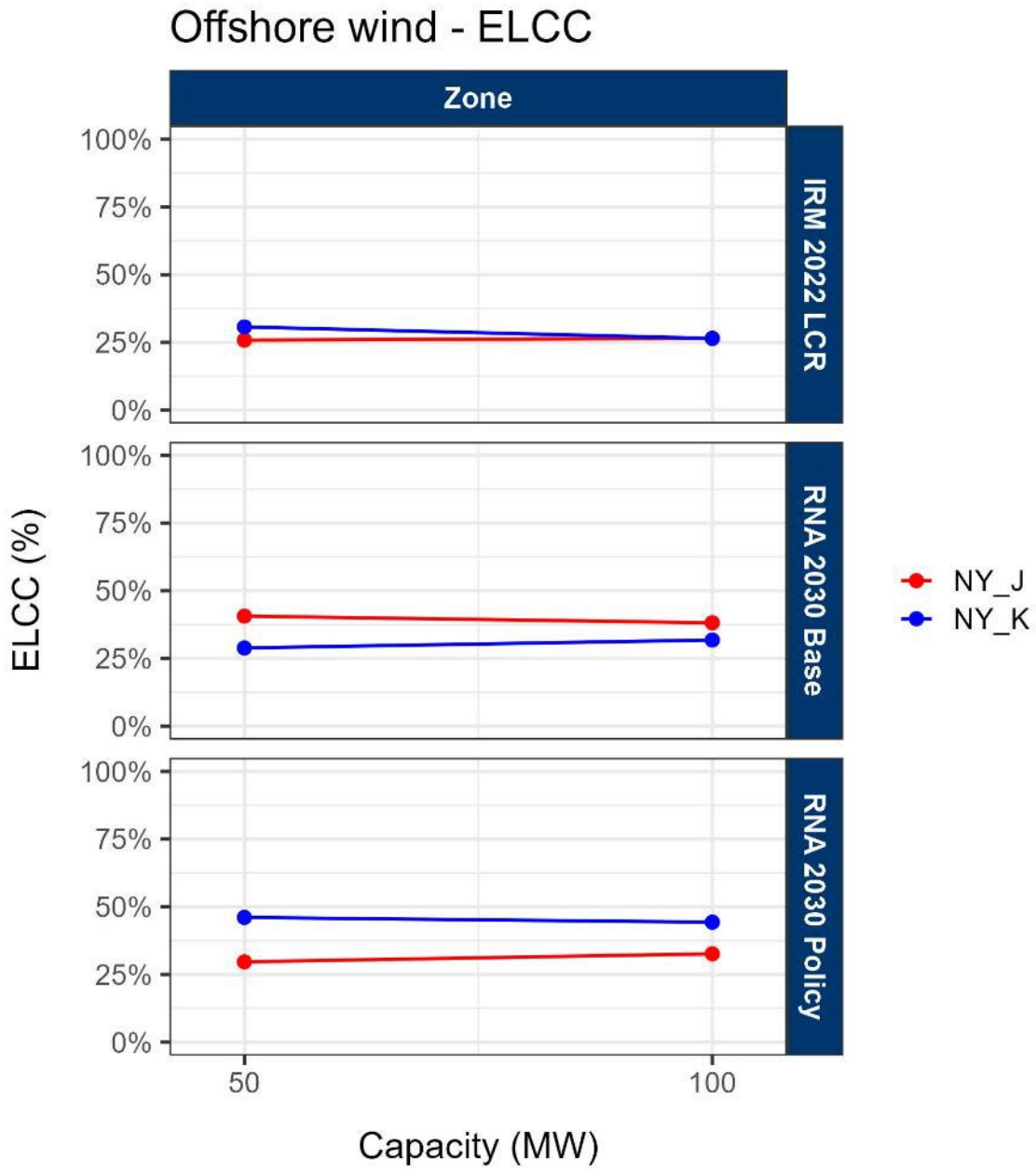
Comparison of preliminary RNA 2030 cases and IRM 2022 LCR

Table with capacity value for 100 MW size, averaged across zones

Biggest changes:

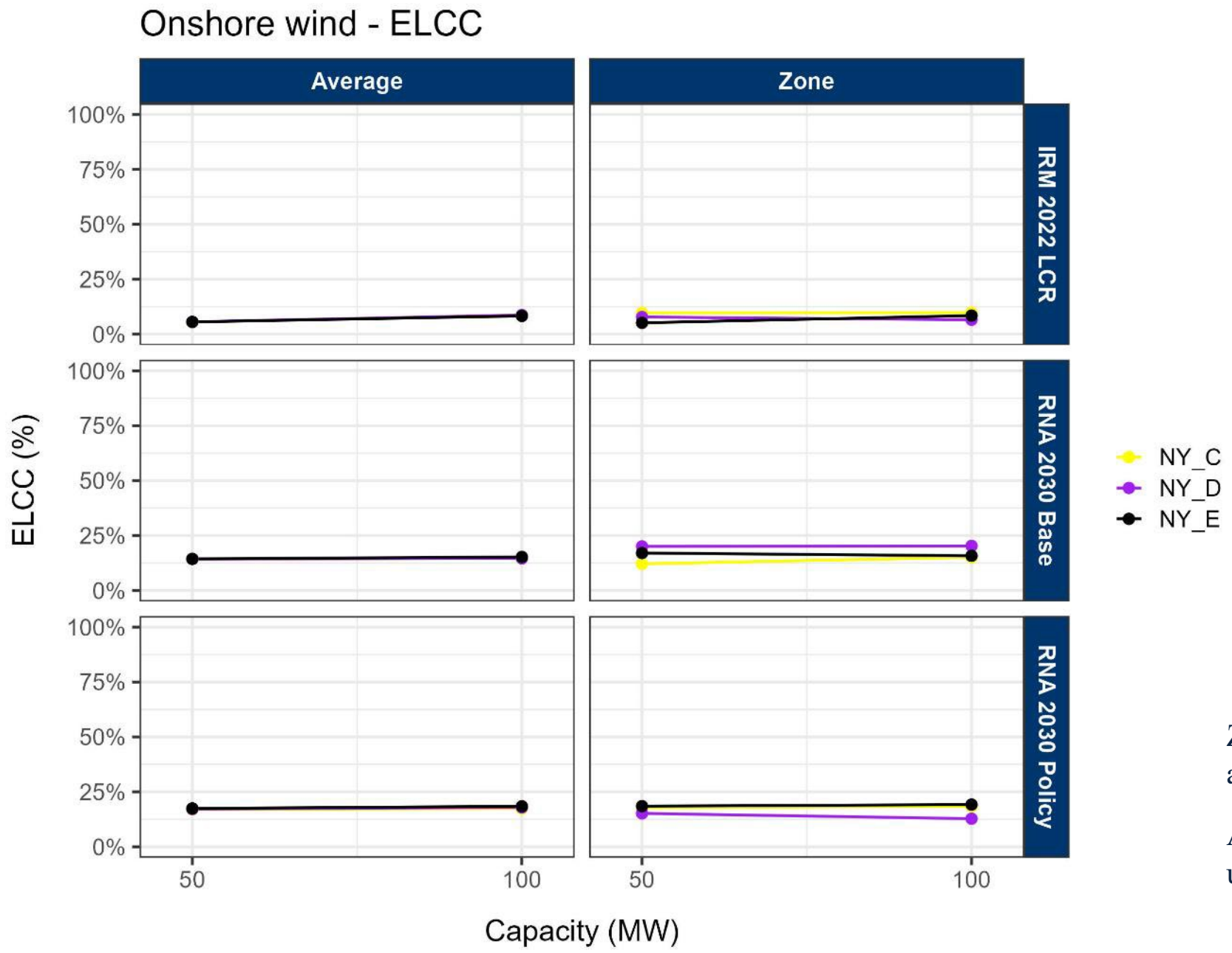
- Increase in offshore and offshore wind
- Reduction in solar
- Changes in ELR resources

		Average ELCC Capacity Value (100 MW)			Change from 2022 LCR	
Type	Subtype	IRM 2022 LCR	RNA 2030 Base	RNA 2030 Policy	RNA 2030 Base	RNA 2030 Policy
Thermal	5% EFOR	94.7%	96.0%	92.8%	1.3%	-1.9%
	10% EFOR	88.1%	89.4%	89.6%	1.3%	1.5%
Biomass	Average	65.3%	67.8%	68.1%	2.6%	2.8%
	Zone	62.0%	62.2%	62.4%	0.2%	0.4%
Run of river	Average	35.5%	36.4%	33.3%	0.9%	-2.1%
	Zone	39.3%	38.8%	37.6%	-0.6%	-1.8%
Onshore wind	Average	8.6%	14.8%	17.9%	6.2%	9.3%
	Zone	8.3%	17.1%	16.8%	8.8%	8.5%
Offshore wind	Zone	26.5%	35.0%	38.5%	8.5%	12.0%
Solar	Average	32.7%	10.1%	5.8%	-22.6%	-26.9%
	Zone	30.8%	10.1%	5.9%	-20.7%	-24.9%
Dynamic ELR	2h	42.7%	75.7%	37.8%	32.9%	-4.9%
	4h	70.5%	72.5%	42.5%	2.0%	-28.0%
	6h	76.7%	98.3%	73.1%	21.6%	-3.6%
	8h	98.7%	99.5%	67.5%	0.8%	-31.2%
Large hydro	Dynamic	98.9%	100.0%	100.0%	1.1%	1.1%
	Fixed shape	97.0%	96.4%	81.3%	-0.6%	-15.7%



Zone = each zone uses a different shape

Average = all zones use the same shape



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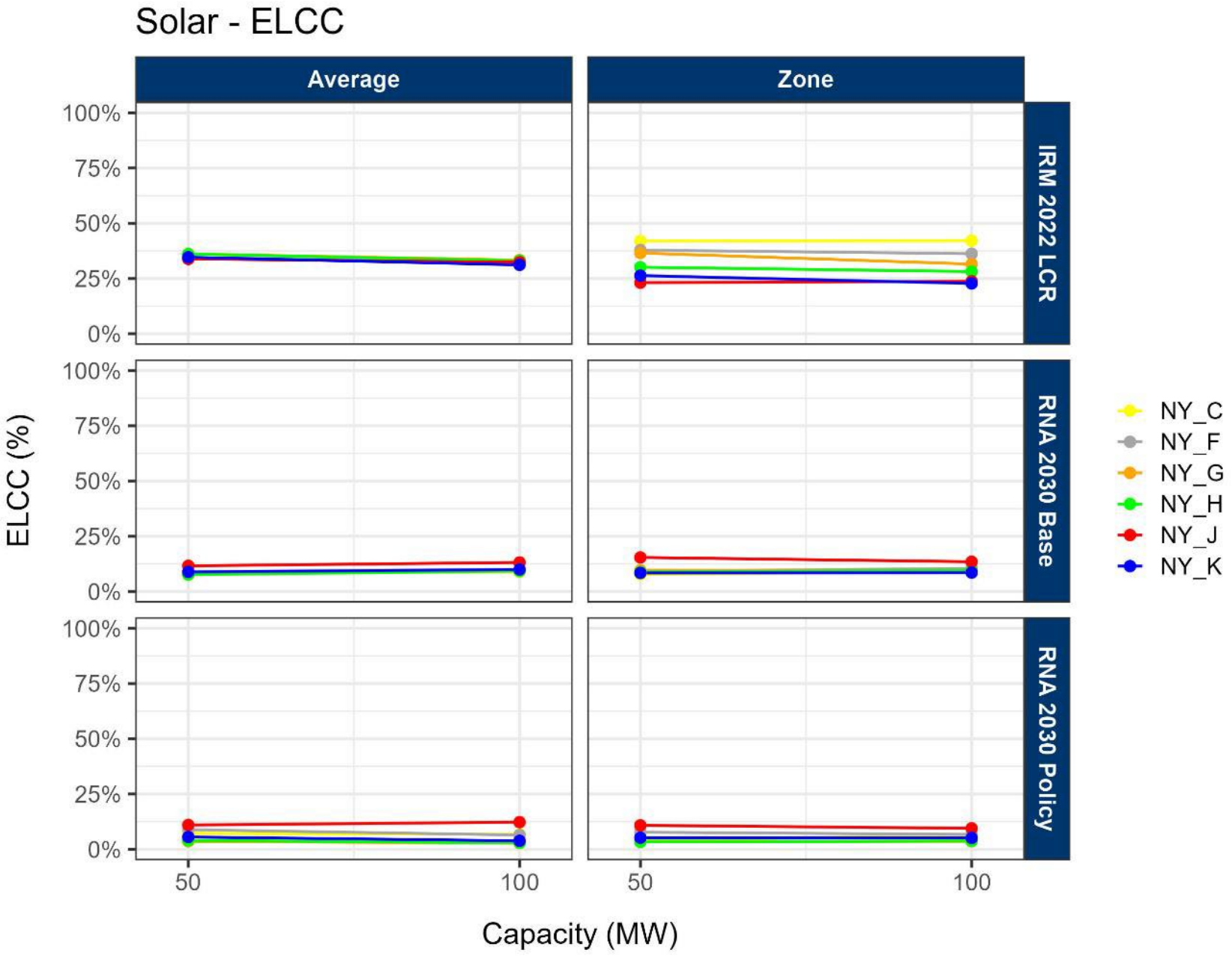

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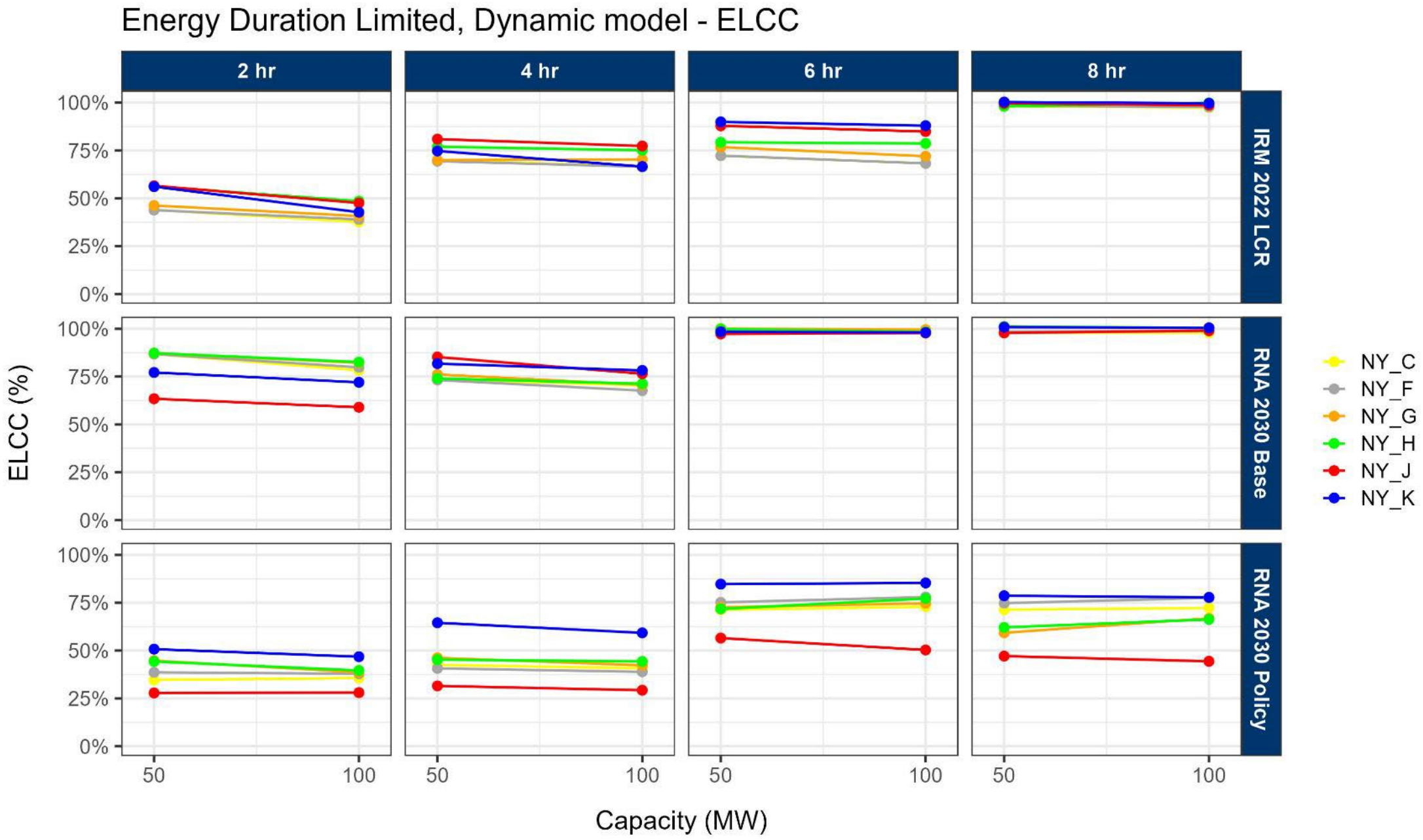

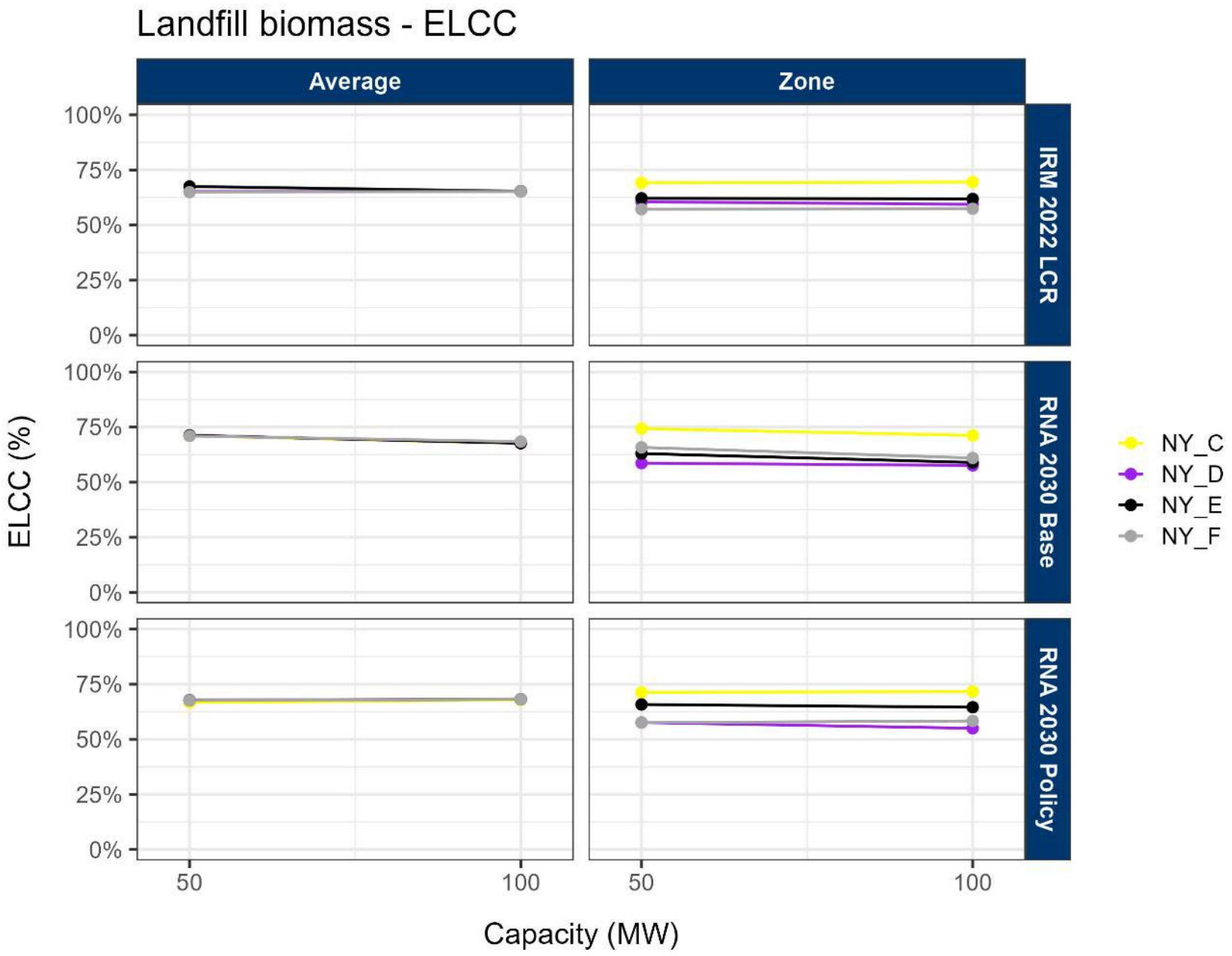

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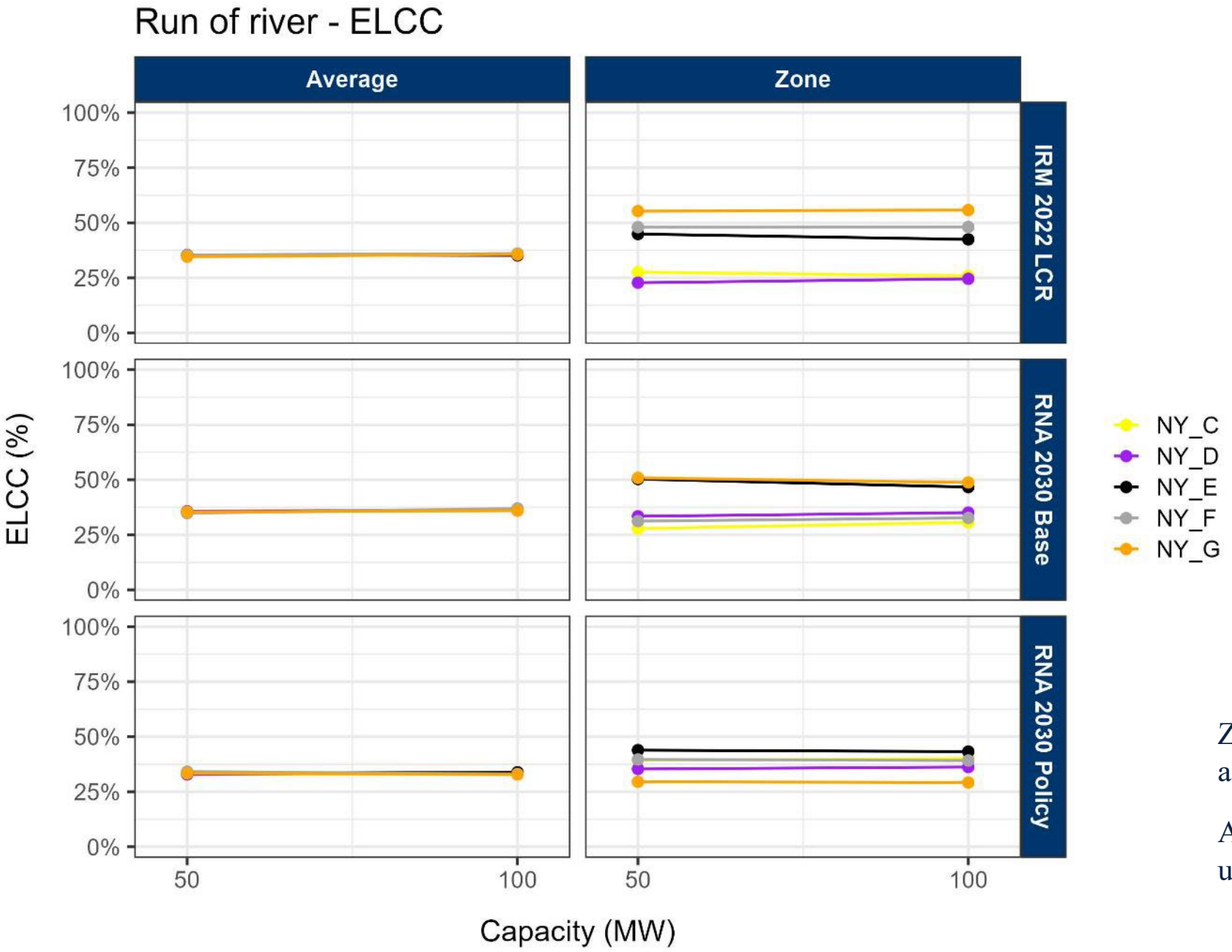

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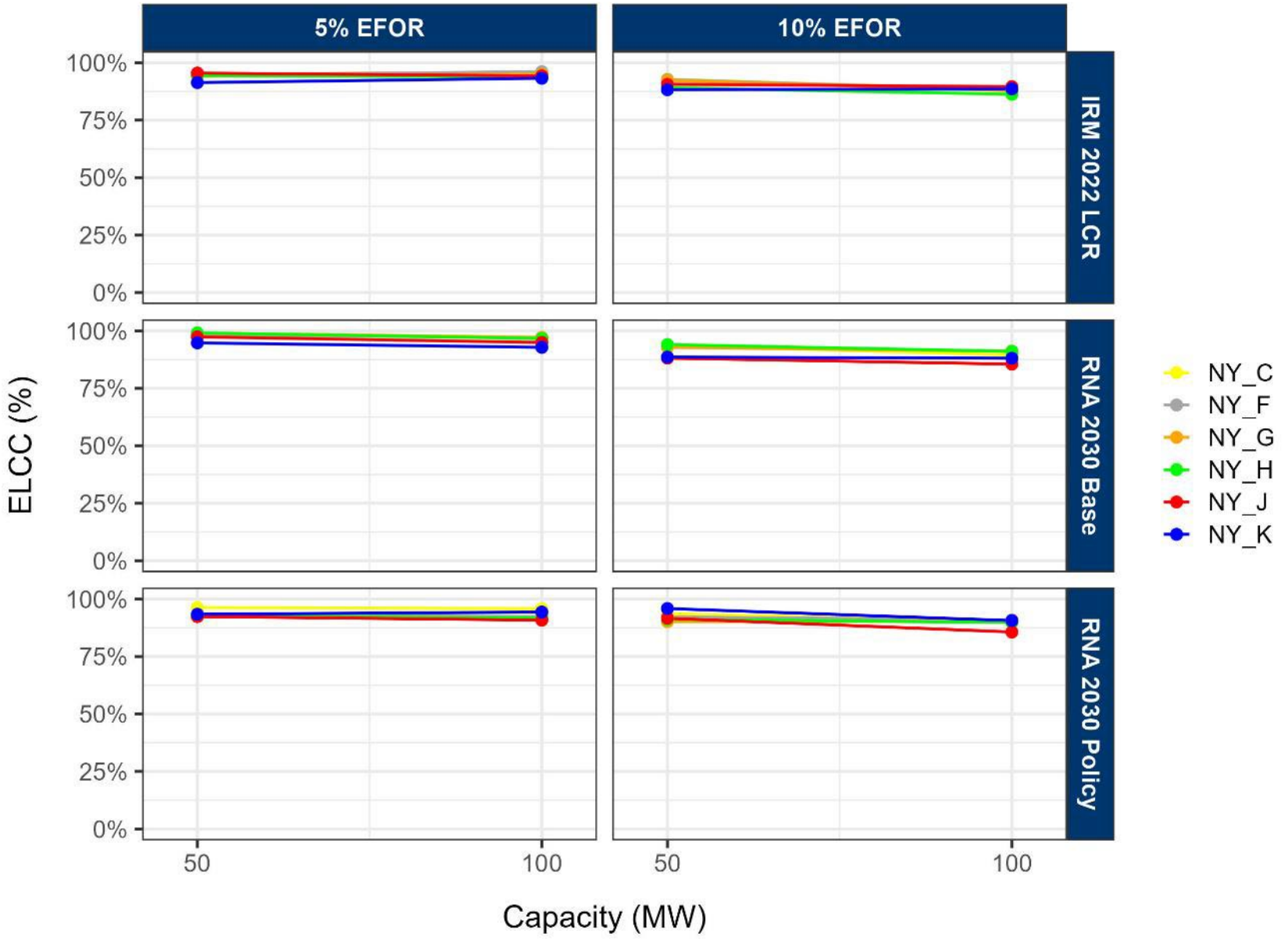
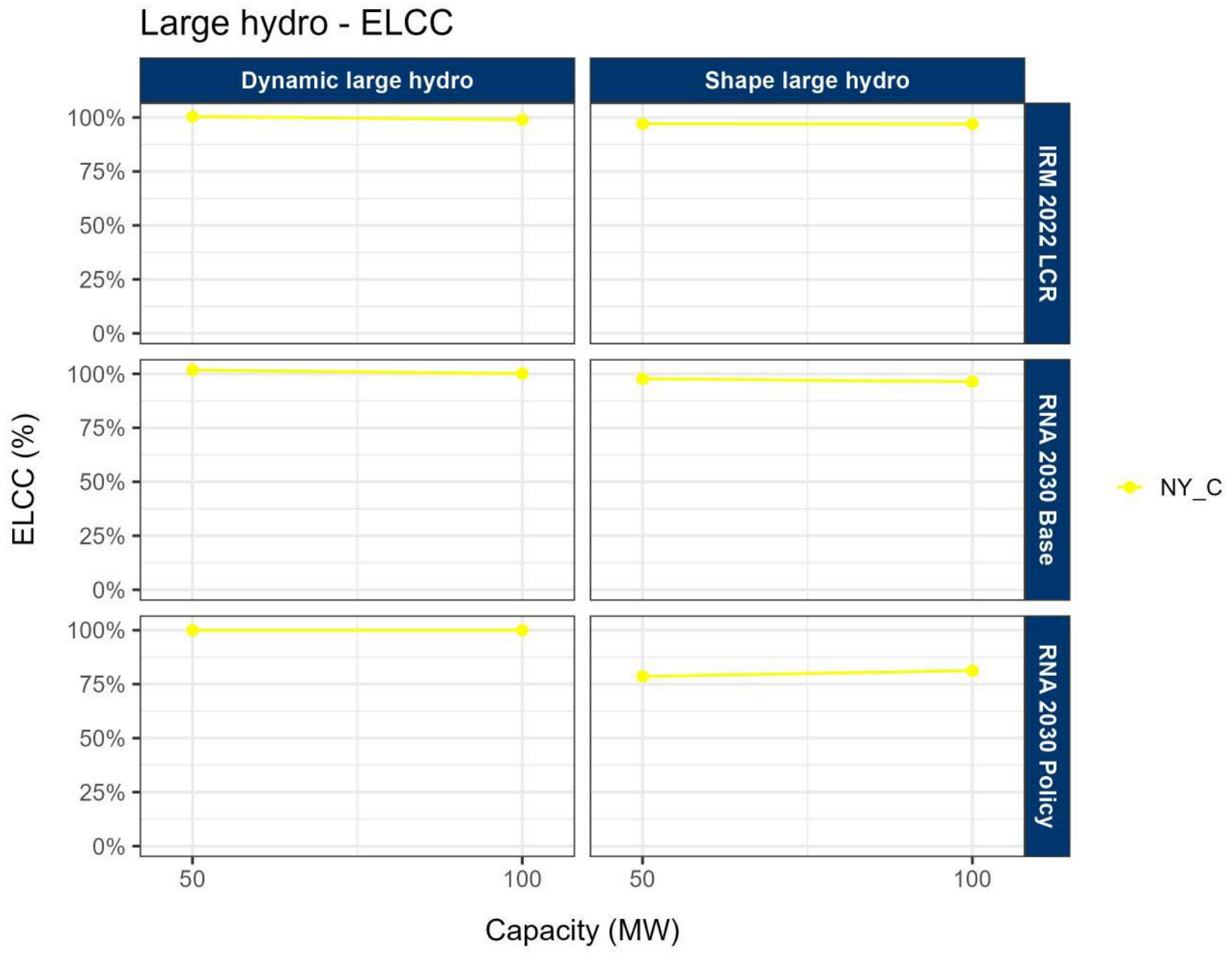
Average = all zones use the same shape

Thermal - ELCC





Shape = fixed shape dispatch

Dynamic = MARS dispatch algorithm

Re-optimization of the 2022 RNA 2030 Cases

Re-optimization of the RNA 2030 Cases

As discussed on the 10/19 meeting, the preliminary results of the RNA 2030 Base and Policy Cases were calculated on at criteria systems that were not fully optimized

The LCR optimizer was rerun for both cases with corrected inputs, resulting in similar, but distinct IRM/LCRs

The MRI-technique was applied to calculate CAFs on these re-optimized cases and compared to the preliminary results

The cases with the largest deviation of MRI results were recalculated through the ELCC technique

Update IRM/LCRs for RNA 2030 cases

The table below compares the correctly translated IRM and LCRs for the preliminary RNA Base Case and RNA Policy Case results and the IRM and LCRs for the re-optimized cases

	RNA Base Case 2030			RNA Policy Case 2030		
	Preliminary Results	Re-optimized Results	Change	Preliminary Results	Re-optimized Results	Change
NYCA IRM	125.5%	126.1%	0.6%	162.3%	162.4%	0.1%
G-J LCR	80.6%	79.5%	-1.1%	108.7%	111.9%	3.2%
J LCR	80.7%	79.1%	-1.6%	120.5%	119.5%	-1.0%
K LCR	109.2%	110.2%	1.1%	140.1%	138.4%	-1.7%

Comparison of preliminary and re-optimized RNA 2030 cases

Table with capacity value for 100 MW size, averaged across zones, using MRI technique

Biggest changes for RNA Base Case:

- Onshore wind
- Selected 2h ELRs
- 4h ELRs

Biggest changes for RNA Policy Case:

- Dynamic ELRs
- Selected solar cases
- Selected offshore wind

		RNA 2030 Base		RNA 2030 Policy		Change	
Type	Subtype	Preliminary	Re-optimized	Preliminary	Re-optimized	RNA Base	RNA Policy
Thermal	5% EFOR	94.8%	94.1%	95.0%	93.4%	-0.7%	-1.6%
	10% EFOR	92.2%	91.8%	89.5%	90.8%	-0.4%	1.3%
Biomass	Average	68.1%	69.5%	72.6%	70.6%	1.4%	-2.0%
	Zone	63.3%	63.8%	66.7%	66.3%	0.5%	-0.3%
Run of river	Average	38.5%	37.7%	37.6%	36.3%	-0.8%	-1.3%
	Zone	42.7%	42.2%	42.4%	39.7%	-0.5%	-2.7%
Onshore wind	Average	21.8%	15.9%	21.6%	17.9%	-5.8%	-3.7%
	Zone	22.1%	17.2%	20.4%	17.5%	-4.9%	-2.9%
Offshore wind	Zone	44.9%	47.7%	41.5%	39.6%	2.8%	-1.9%
Solar	Average	12.8%	11.8%	8.1%	9.5%	-1.1%	1.4%
	Zone	11.5%	11.4%	7.6%	9.1%	-0.1%	1.5%
Dynamic ELR	2h	83.0%	81.4%	42.1%	37.4%	-1.6%	-4.7%
	4h	74.8%	80.5%	46.4%	41.9%	5.7%	-4.5%
	6h	98.2%	98.7%	77.9%	66.3%	0.5%	-11.6%
	8h	99.3%	99.8%	74.2%	65.6%	0.5%	-8.5%
Large hydro	Dynamic	99.4%	98.2%	100.0%	94.3%	-1.2%	-5.7%
	Fixed shape	98.2%	97.4%	78.4%	77.6%	-0.8%	-0.8%

Largest changes for RNA 2030 Base Case re-run cases

In general, the changes observed for the ELCC- and MRI-based metrics are similar

For onshore wind, 4h ELRs: the magnitude of the changes is slightly smaller with ELCC, compared to MRI

			Preliminary		Re-optimized		Delta	
Type	Subtype	Zone	ELCC	MRI	ELCC	MRI	ELCC	MRI
Onshore wind	Average	NY_C	14.6%	21.8%	13.2%	16.0%	-1.4%	-5.8%
		NY_D	14.6%	21.8%	13.2%	16.0%	-1.4%	-5.8%
		NY_E	15.2%	21.8%	13.1%	15.9%	-2.2%	-5.9%
	Zone	NY_C	15.1%	18.0%	16.3%	17.2%	1.2%	-0.8%
		NY_D	20.3%	24.3%	15.5%	15.3%	-4.7%	-9.0%
		NY_E	15.8%	24.0%	13.8%	19.2%	-2.0%	-4.8%
Dynamic ELR	2hr	NY_J	59.0%	71.1%	46.9%	60.2%	-12.1%	-10.9%
		NY_K	72.0%	79.8%	76.7%	83.9%	4.7%	4.1%
	4hr	NY_C	70.4%	73.7%	73.2%	77.4%	2.8%	3.7%
		NY_F	67.7%	72.1%	71.9%	78.2%	4.2%	6.1%
		NY_G	70.7%	73.4%	72.6%	79.6%	1.9%	6.2%
		NY_H	71.3%	72.6%	74.4%	79.8%	3.1%	7.2%
		NY_J	76.5%	76.9%	78.2%	82.1%	1.7%	5.1%
		NY_K	78.2%	79.8%	85.0%	85.9%	6.8%	6.1%

Largest changes for RNA 2030 Policy Case re-run cases

Again, the changes observed for the ELCC- and MRI-based metrics are similar

6h and 8h ELRs: have largest deltas under MRI, more moderate with ELCC

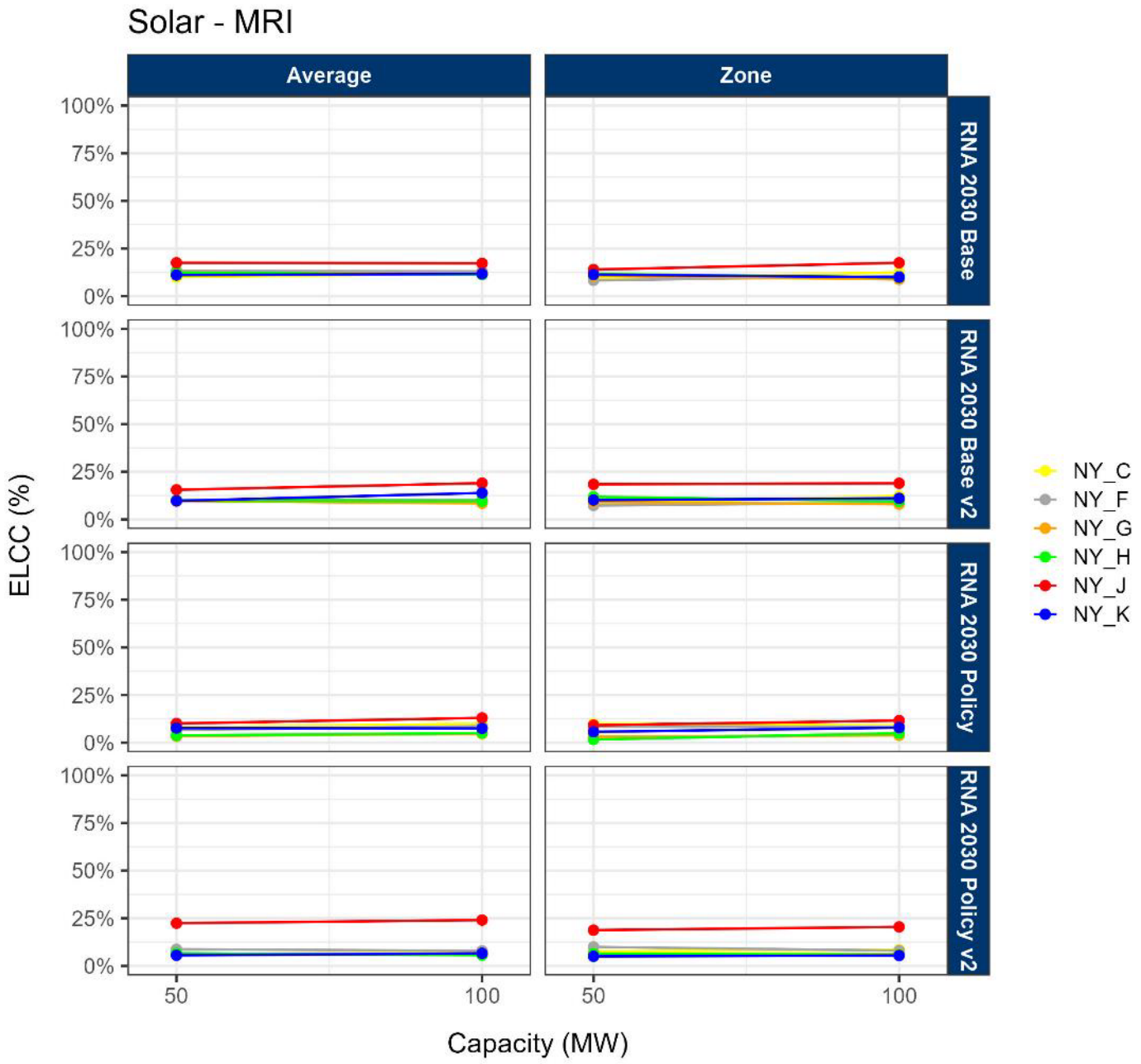
Those cases are not fully optimized because of the different pattern in daily risk (see slide 6)

			Preliminary		Re-optimized		Delta	
Type	Subtype	Zone	ELCC	MRI	ELCC	MRI	ELCC	MRI
Offshore wind	Zone	NY_J	32.6%	39.2%	28.3%	32.8%	-4.4%	-6.4%
Solar	Average	NY_J	12.2%	13.0%	19.2%	24.1%	7.0%	11.1%
	Zone	NY_J	9.5%	11.6%	16.4%	20.5%	7.0%	8.9%
Dynamic ELR	2hr	NY_C	35.6%	38.8%	35.7%	36.6%	0.1%	-2.2%
		NY_F	37.9%	38.9%	35.1%	35.6%	-2.8%	-3.3%
		NY_G	38.7%	44.0%	40.1%	38.5%	1.4%	-5.6%
		NY_H	39.6%	43.8%	40.7%	38.6%	1.1%	-5.2%
		NY_J	28.0%	35.1%	19.0%	24.5%	-9.0%	-10.5%
		NY_K	46.8%	51.8%	47.4%	50.6%	0.6%	-1.2%
	4hr	NY_C	40.8%	43.8%	37.6%	38.6%	-3.2%	-5.2%
		NY_F	38.9%	40.7%	37.7%	38.2%	-1.2%	-2.6%
		NY_G	42.3%	46.3%	41.9%	41.3%	-0.4%	-5.0%
		NY_H	44.3%	47.8%	43.1%	42.6%	-1.2%	-5.1%
		NY_J	29.3%	38.2%	21.5%	27.4%	-7.8%	-10.8%
		NY_K	59.3%	62.0%	61.9%	63.3%	2.7%	1.4%
	6hr	NY_C	72.9%	77.3%	62.5%	66.0%	-10.3%	-11.3%
		NY_F	77.9%	79.6%	68.6%	70.6%	-9.3%	-9.0%
		NY_G	74.7%	79.4%	67.1%	66.7%	-7.6%	-12.7%
		NY_H	77.2%	80.9%	68.5%	66.9%	-8.7%	-14.1%
		NY_J	50.3%	64.0%	43.1%	47.0%	-7.2%	-17.0%
		NY_K	85.3%	86.2%	78.3%	80.5%	-7.1%	-5.7%
	8hr	NY_C	72.3%	77.5%	62.1%	66.2%	-10.1%	-11.3%
		NY_F	77.5%	80.0%	68.4%	70.8%	-9.1%	-9.2%
		NY_G	66.9%	72.5%	63.8%	66.2%	-3.1%	-6.2%
		NY_H	66.3%	74.7%	65.1%	66.4%	-1.2%	-8.3%
		NY_J	44.4%	57.2%	41.8%	44.6%	-2.6%	-12.7%
		NY_K	77.8%	83.1%	76.0%	79.6%	-1.9%	-3.6%

Comparison of preliminary and re-optimized RNA 2030 cases

The graphs in the remainder of this section present the preliminary and re-optimized results for the RNA 2030 cases

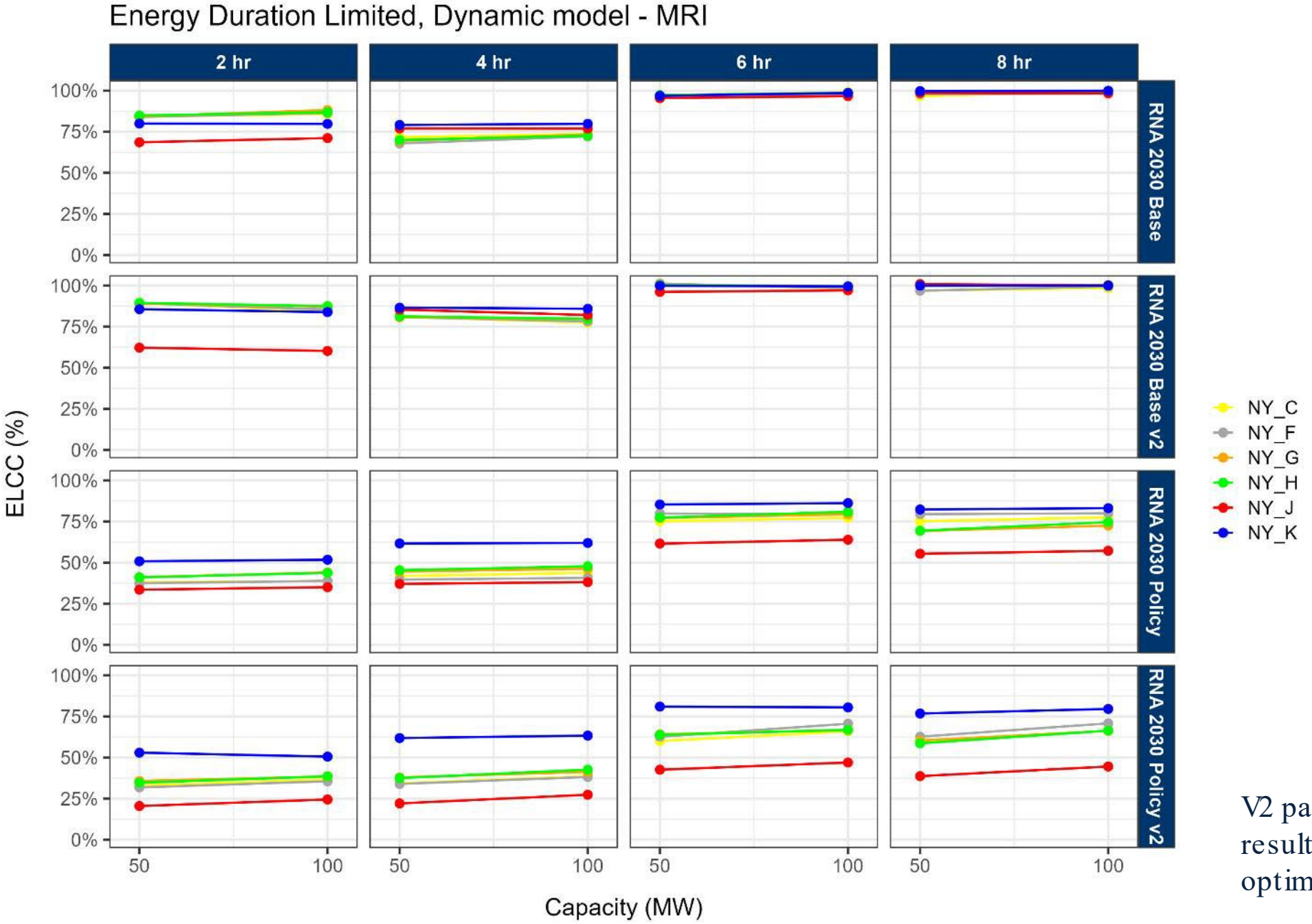
We present results with the MRI technique here



Zone = each zone uses a different shape

Average = all zones use the same shape

V2 panels show the results for the re-optimized system



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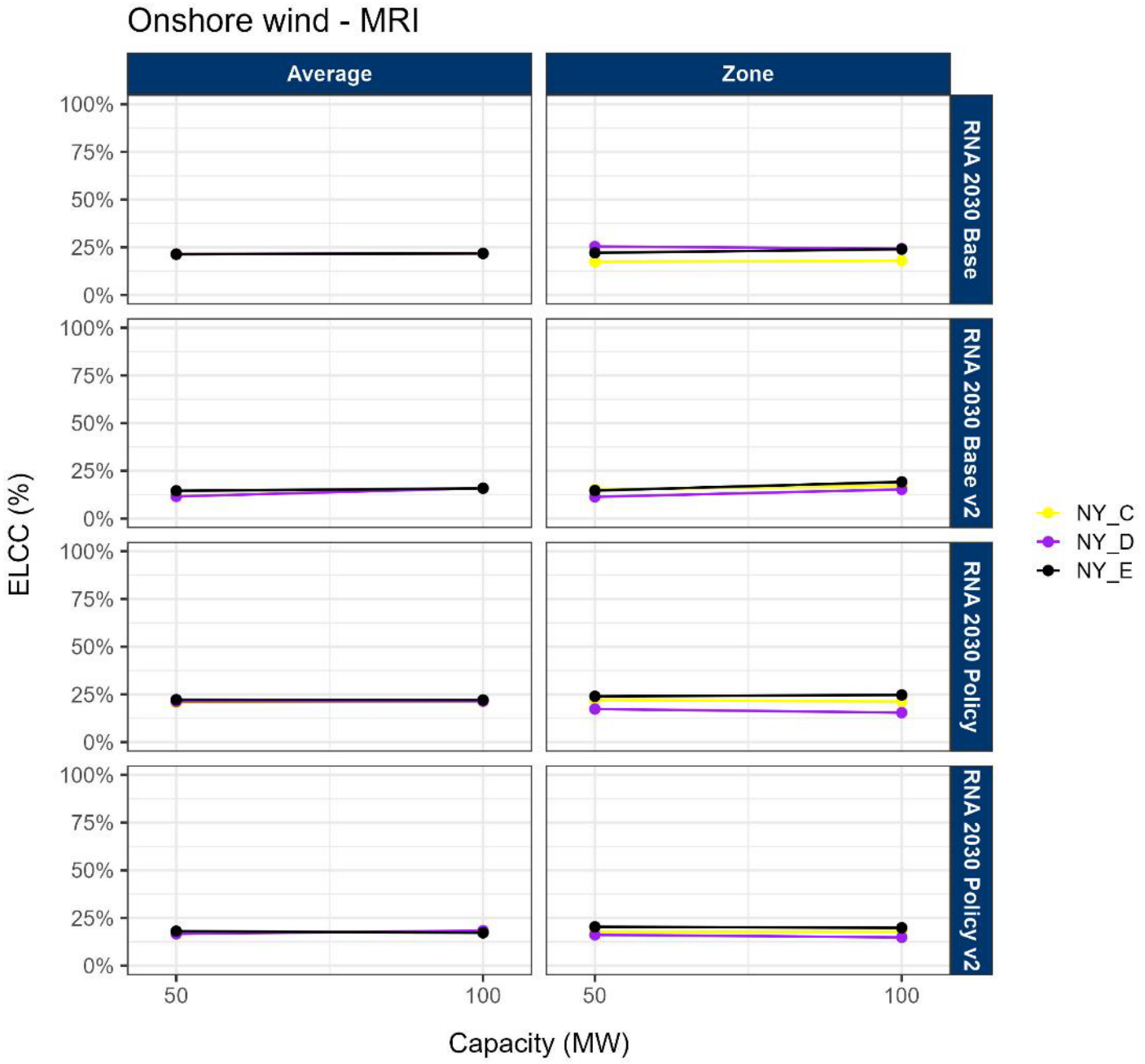

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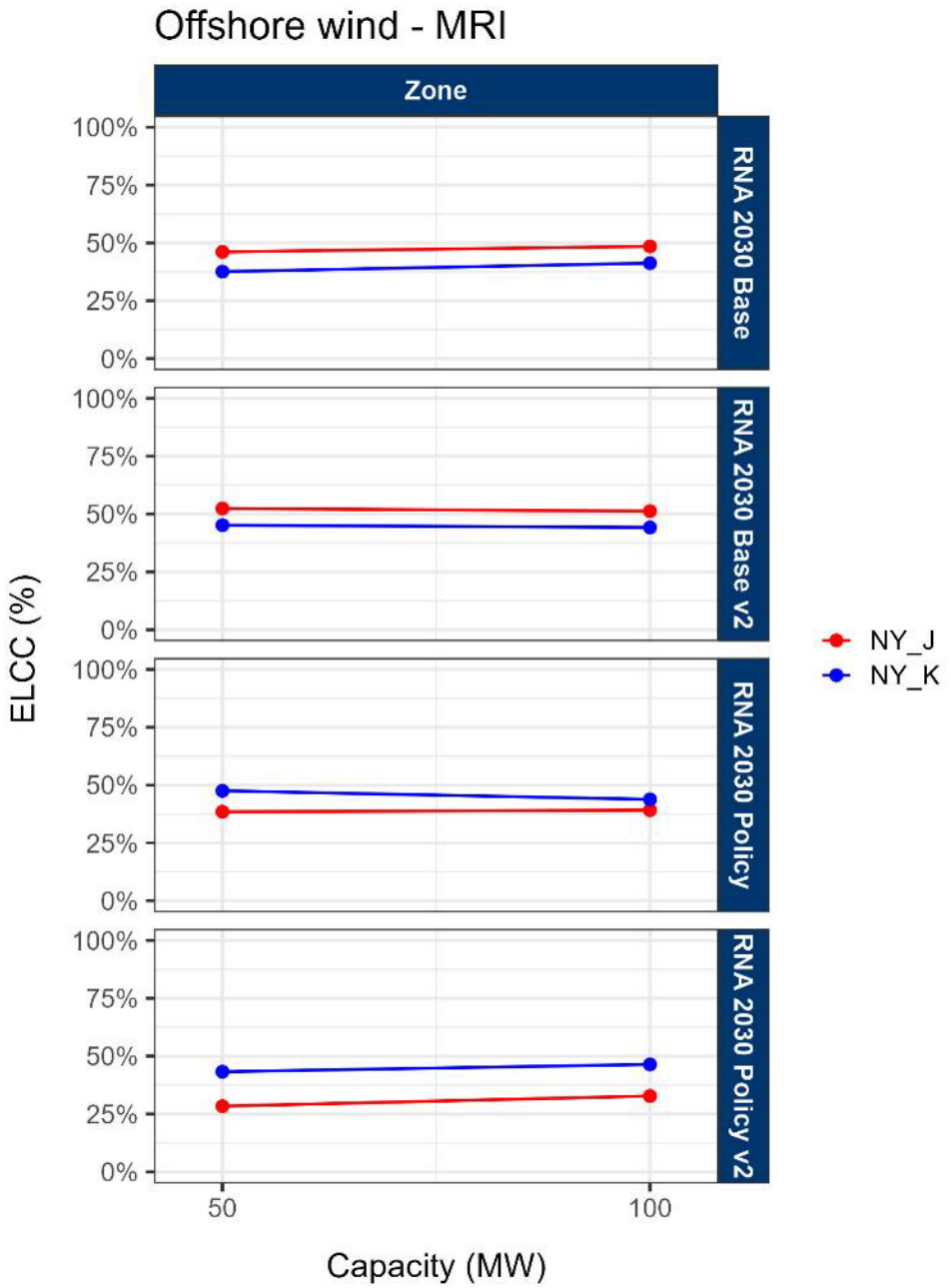
V2 panels show the results for the re-optimized system



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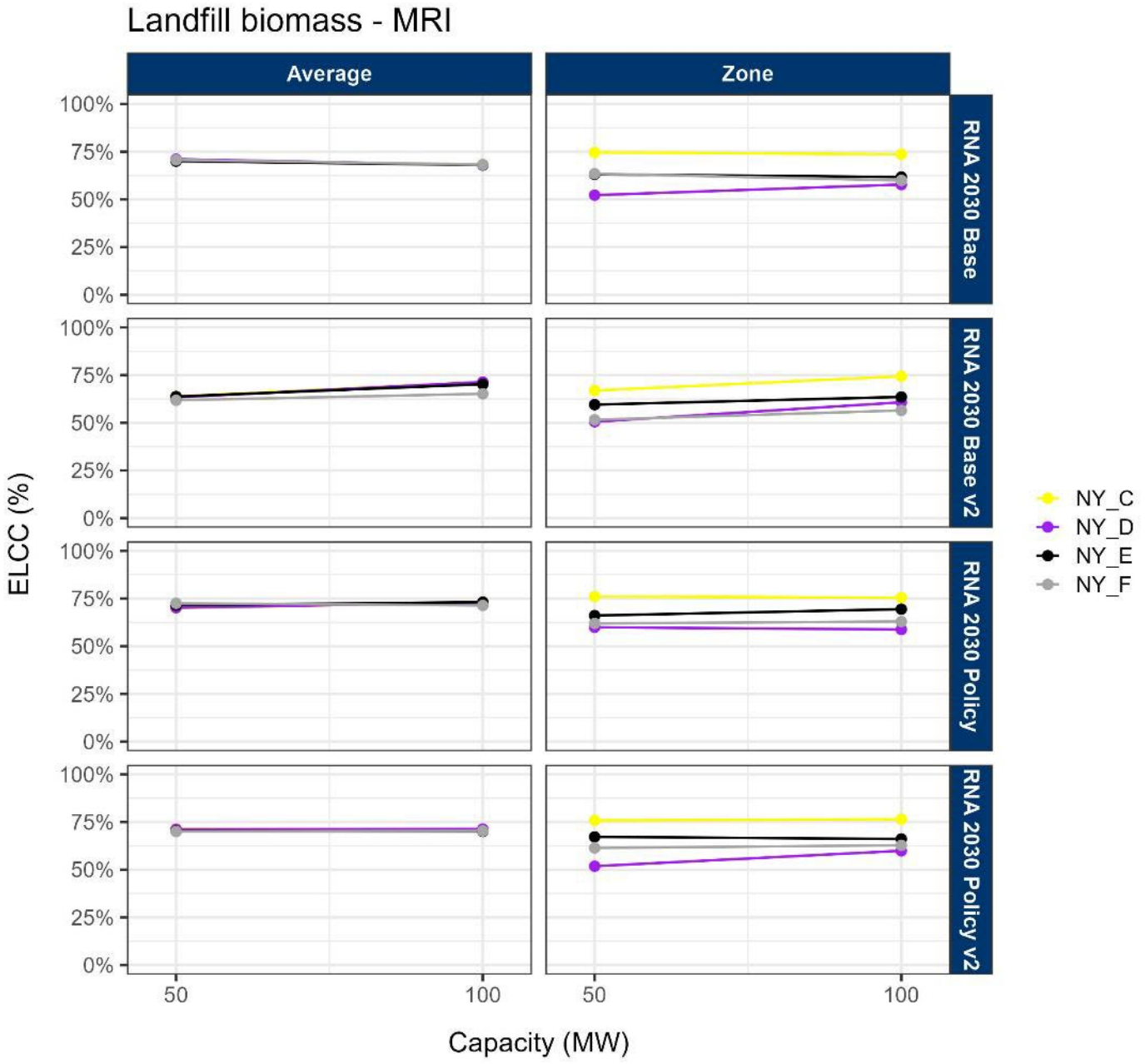

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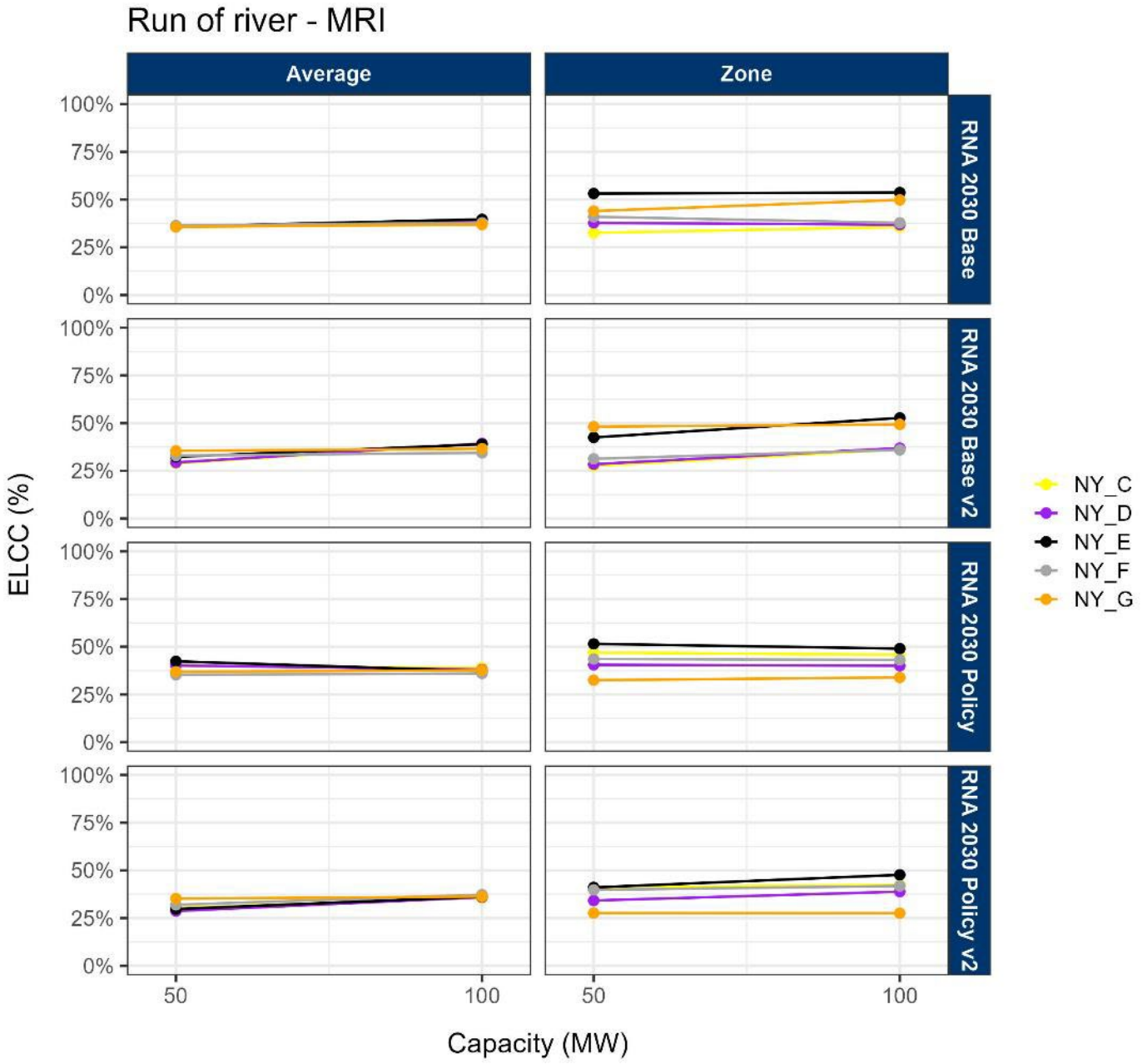

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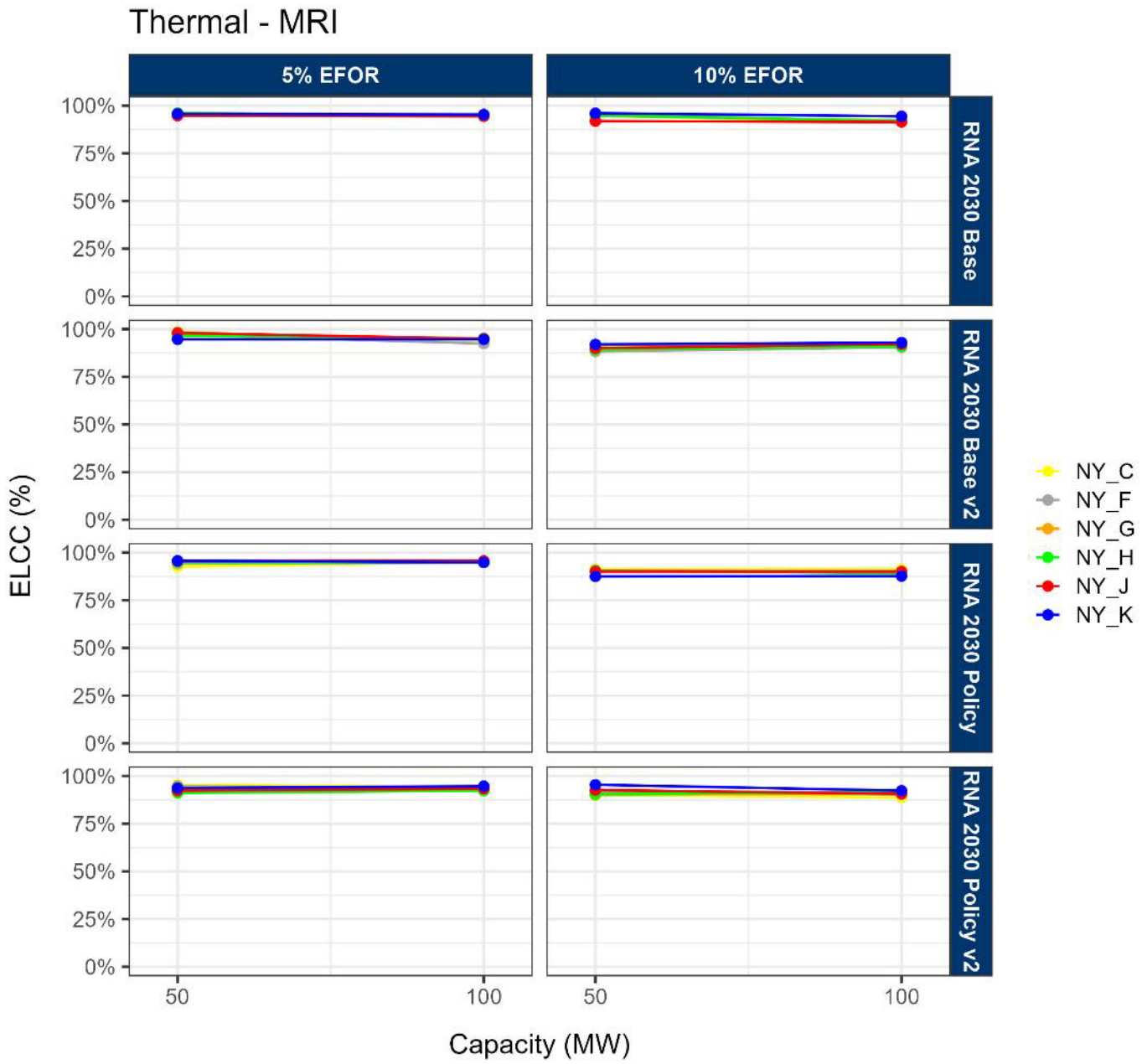
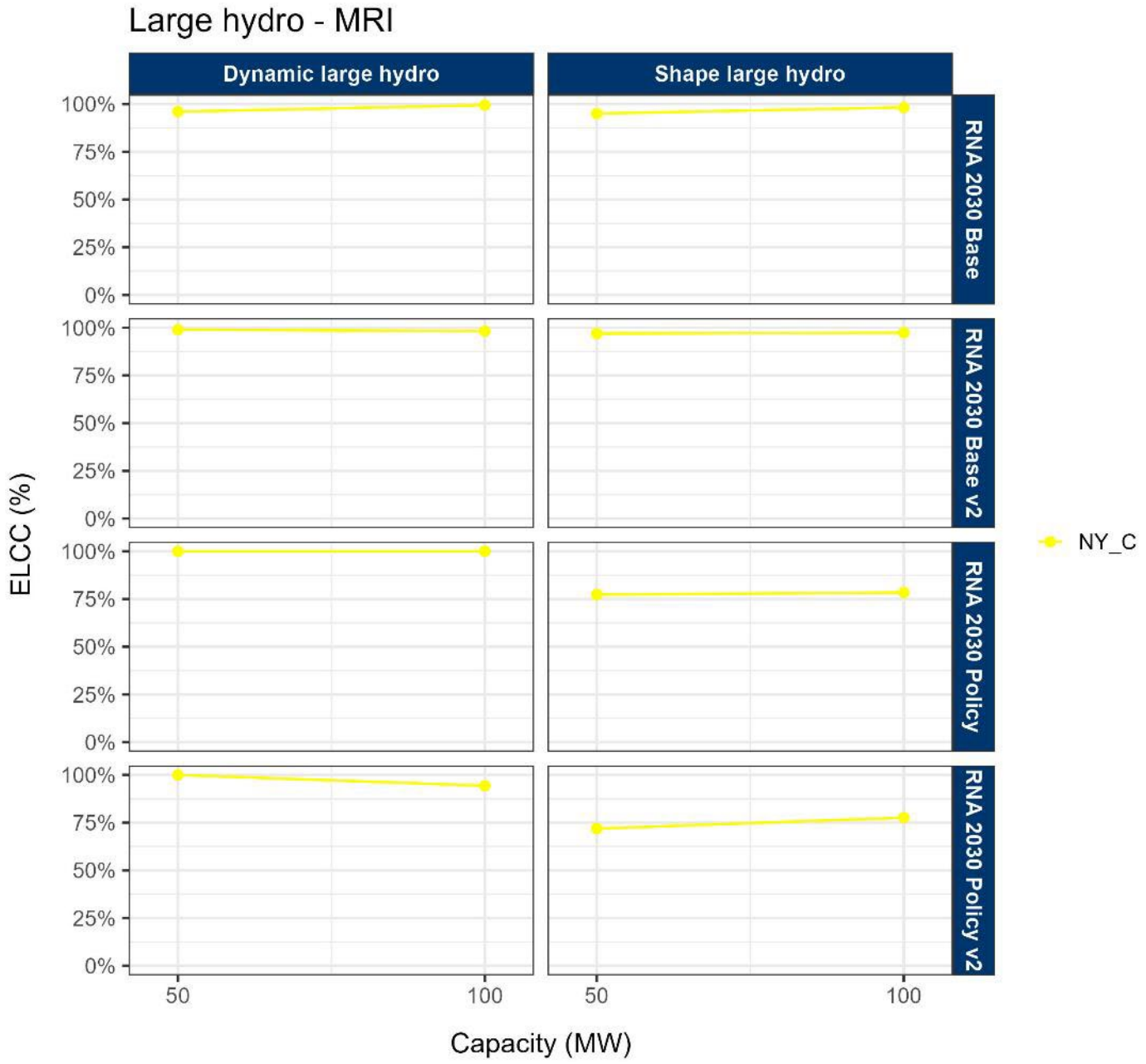


V2 panels show the results for the re-optimized system



Shape = fixed shape dispatch

Dynamic = MARS dispatch algorithm

V2 panels show the results for the re-optimized system

2023 IRM PBC sensitivities

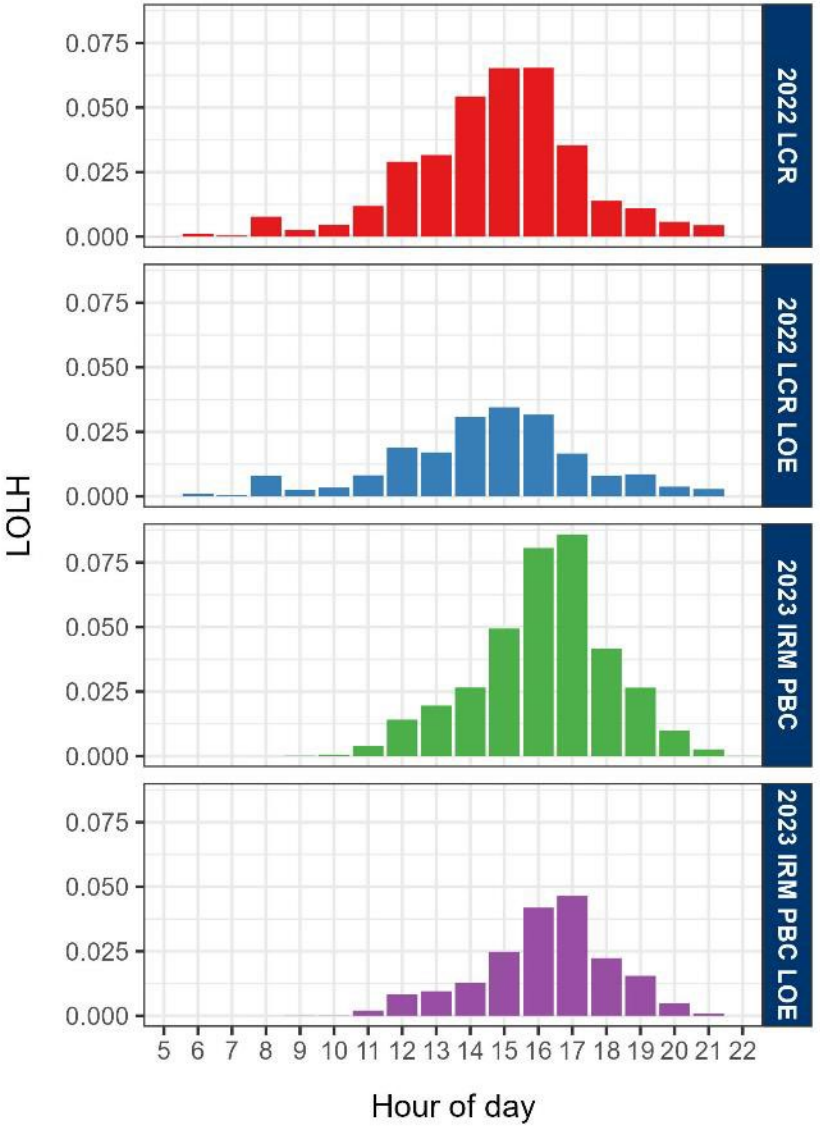
2023 Preliminary Base Case (PBC) database sensitivities

Two sensitivities:

- 2023 IRM Preliminary Base Case (PBC)*
  - 0.0998 LOLE
- 2023 IRM PBC at Level of Excess (LOE)*
  - 0.0531 LOLE

*Both cases include updated, newer load shapes (which were not included in the PBC, but will be included in the Final Base Case)

New load shapes cause the risk to shift later in the day. Distribution of outages is also tighter (an indicator or shorter outages being more frequent)



Comparison of 2023 PBC cases and IRM 2022 LCR

Table with capacity value for 100 MW size, averaged across zones, using MRI technique*

Biggest changes for 2023 PBC:

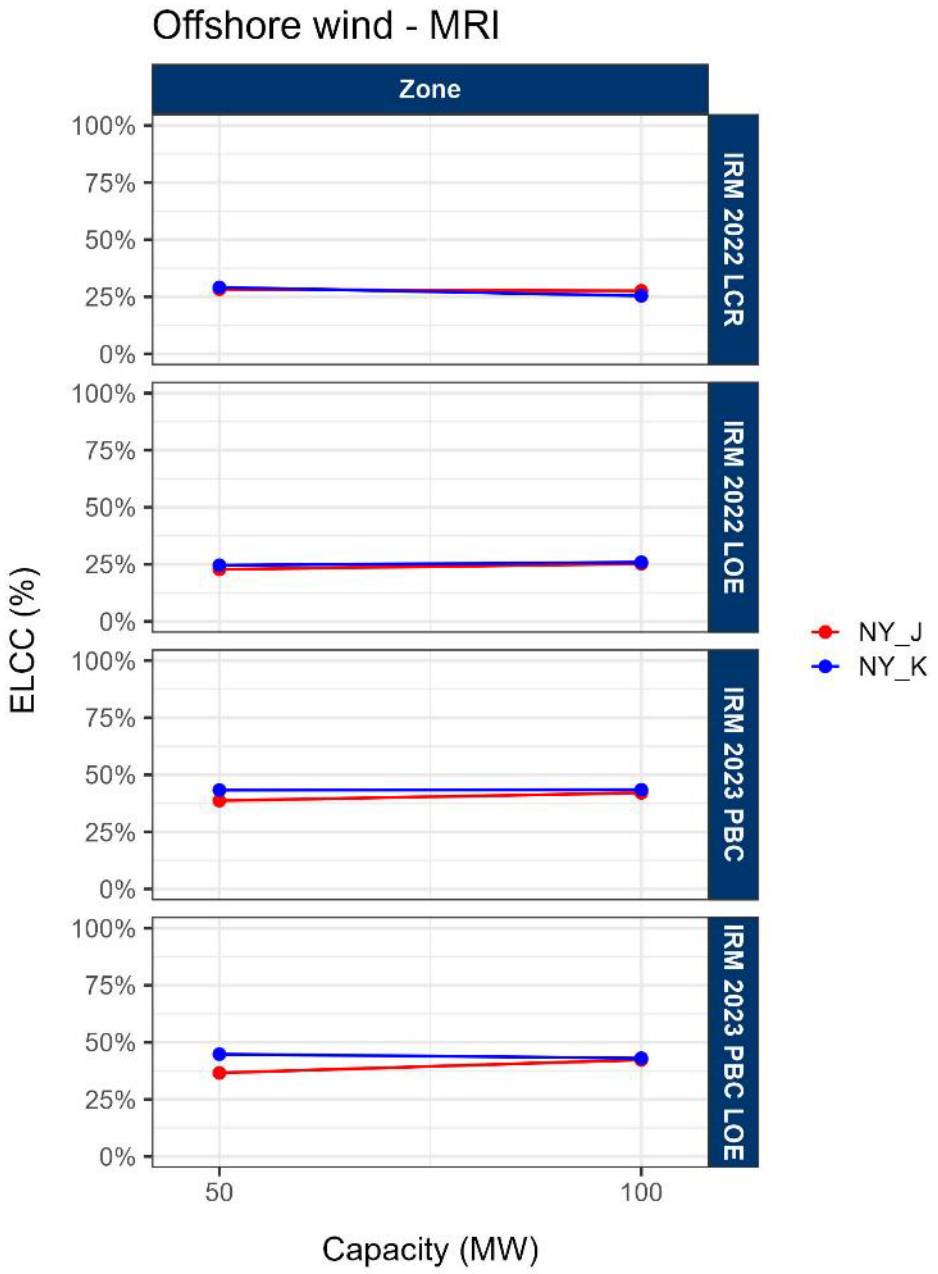
- Increase in offshore wind
- Reduction in solar
- Changes in ELR resources

Shape-base resources have updated shapes (the most recent 5 years are used)

* ELCC results available for all cases, except 2023 PBC LOE

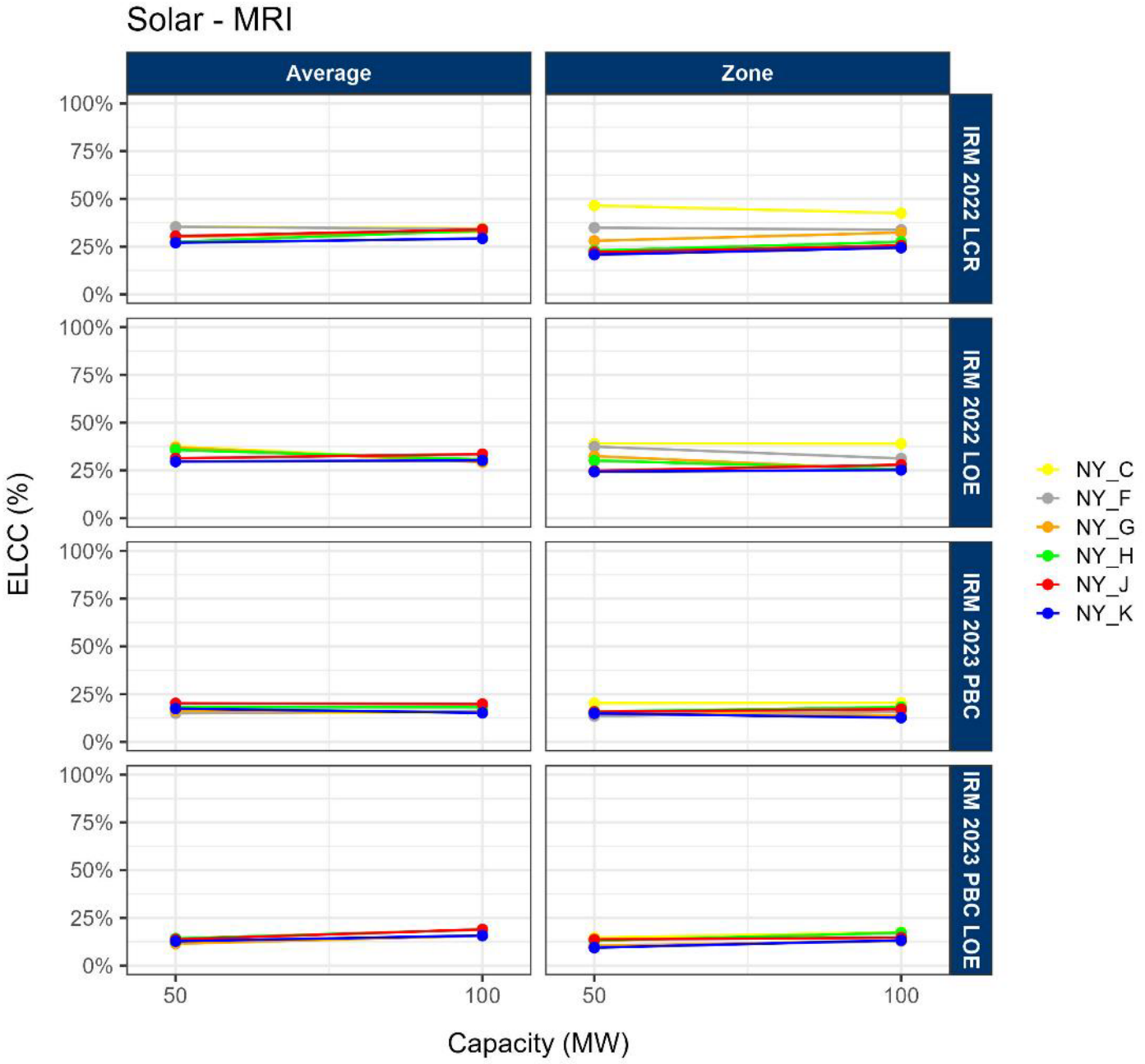
		Average MRI Capacity Value (100 MW)				Change from 2022 LCR	Change from 2022 LOE[1]
Type	Subtype	2022 LCR	2022 LOE	2023 PBC	2023 PBC LOE	2023 PBC	2023 PBC LOE
Thermal	5% EFOR	96.4%	93.4%	93.2%	94.4%	-3.3%	1.00%
	10% EFOR	90.3%	89.1%	92.6%	89.2%	2.3%	0.10%
Biomass	Average	66.6%	67.7%	71.3%	68.8%	4.7%	1.10%
	Zone	59.7%	62.2%	62.5%	61.7%	2.9%	-0.50%
Run of river	Average	33.8%	30.8%	39.2%	37.5%	5.3%	6.70%
	Zone	38.7%	36.7%	45.2%	40.9%	6.5%	4.20%
Onshore wind	Average	10.6%	8.8%	13.3%	9.3%	2.8%	0.50%
	Zone	10.3%	9.1%	15.3%	10.5%	5.0%	1.40%
Offshore wind	Zone	26.5%	25.6%	42.8%	42.7%	16.3%	17.10%
Solar	Average	33.1%	30.5%	16.7%	16.8%	-16.4%	-13.70%
	Zone	31.0%	29.1%	16.4%	14.8%	-14.7%	-14.30%
Dynamic ELR	2h	46.9%	45.3%	52.1%	61.2%	5.2%	15.90%
	4h	75.7%	82.4%	89.5%	88.4%	13.8%	6.00%
	6h	82.9%	85.0%	93.4%	91.6%	10.5%	6.60%
	8h	97.7%	99.8%	98.6%	97.7%	0.9%	-2.10%
Large hydro	Dynamic	98.9%	100.0%	100.0%	99.4%	1.1%	-0.60%
	Fixed shape	95.3%	96.6%	98.2%	97.2%	2.9%	0.60%

[1] Values updated to match new heading



Zone = each zone uses a different shape

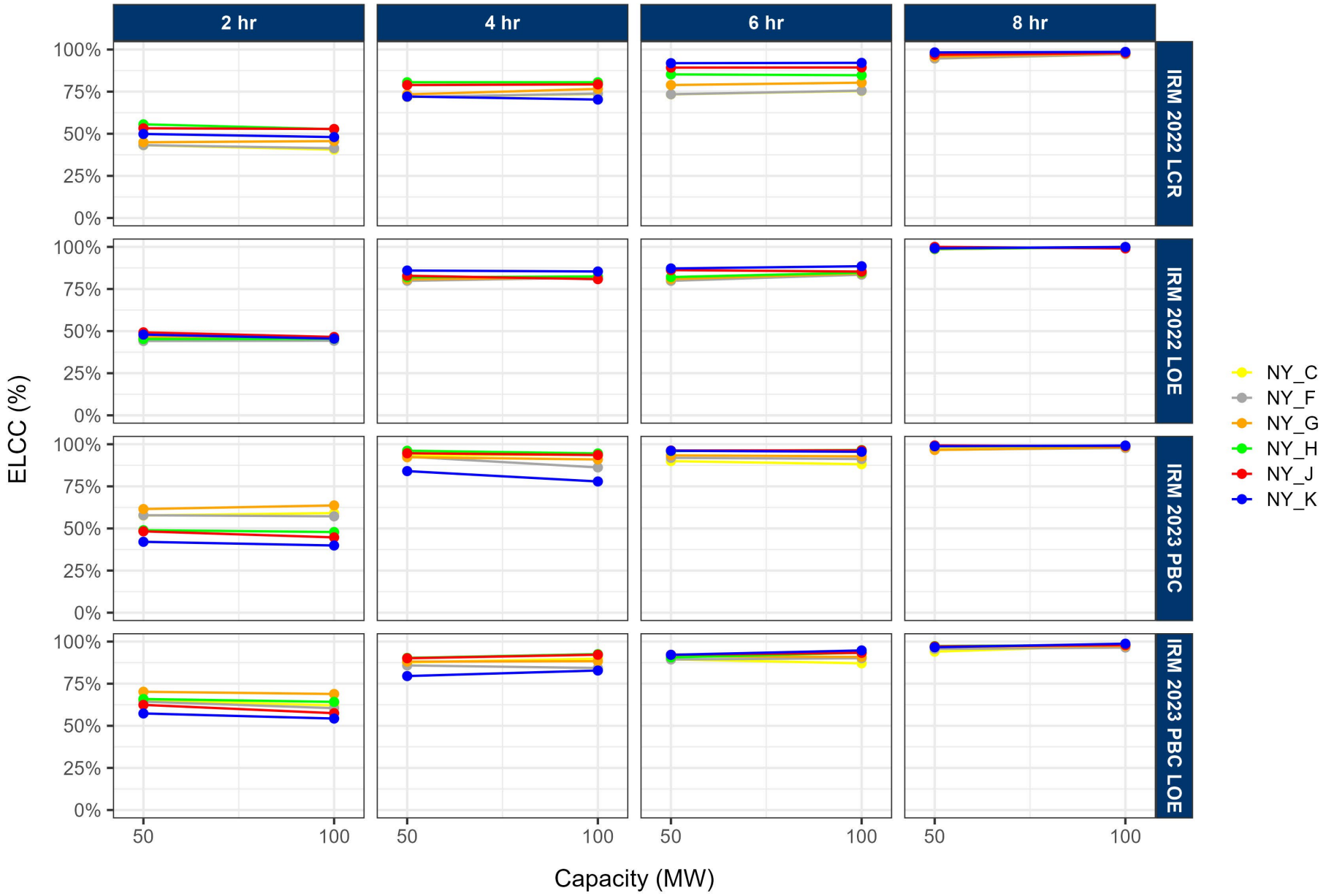
Average = all zones use the same shape

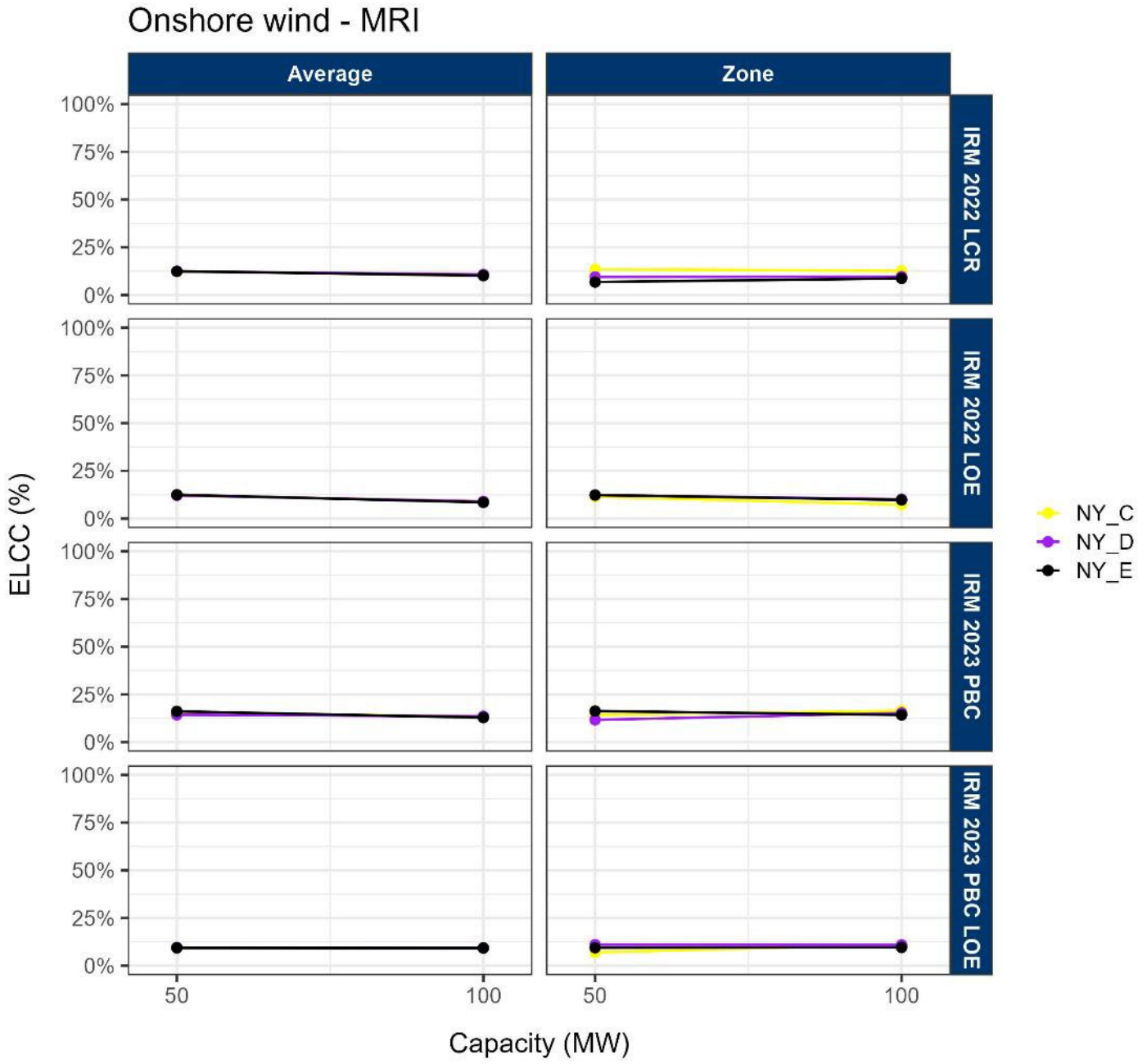


Zone = each zone uses a different shape

Average = all zones use the same shape

Energy Duration Limited, Dynamic model - MRI





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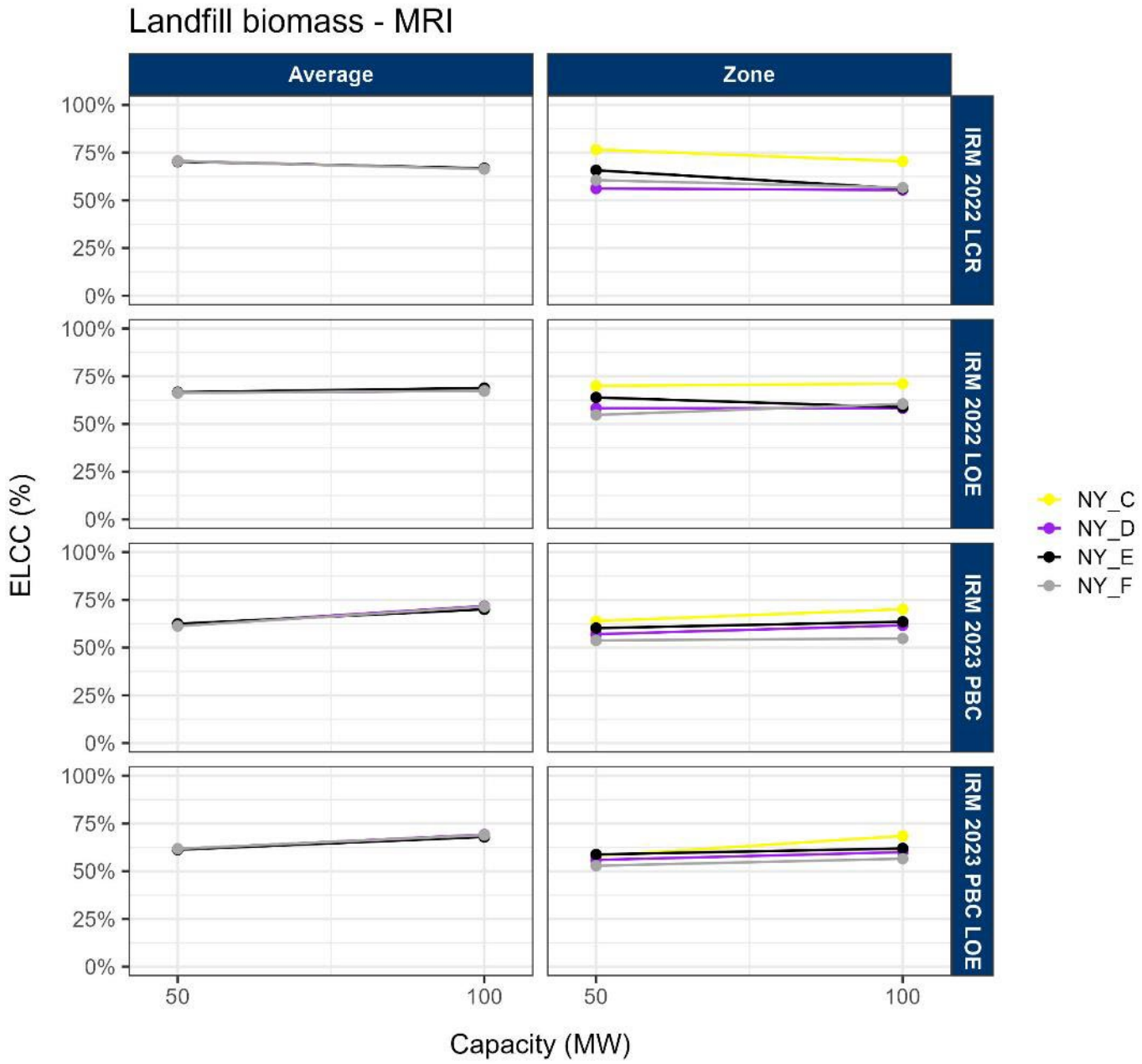

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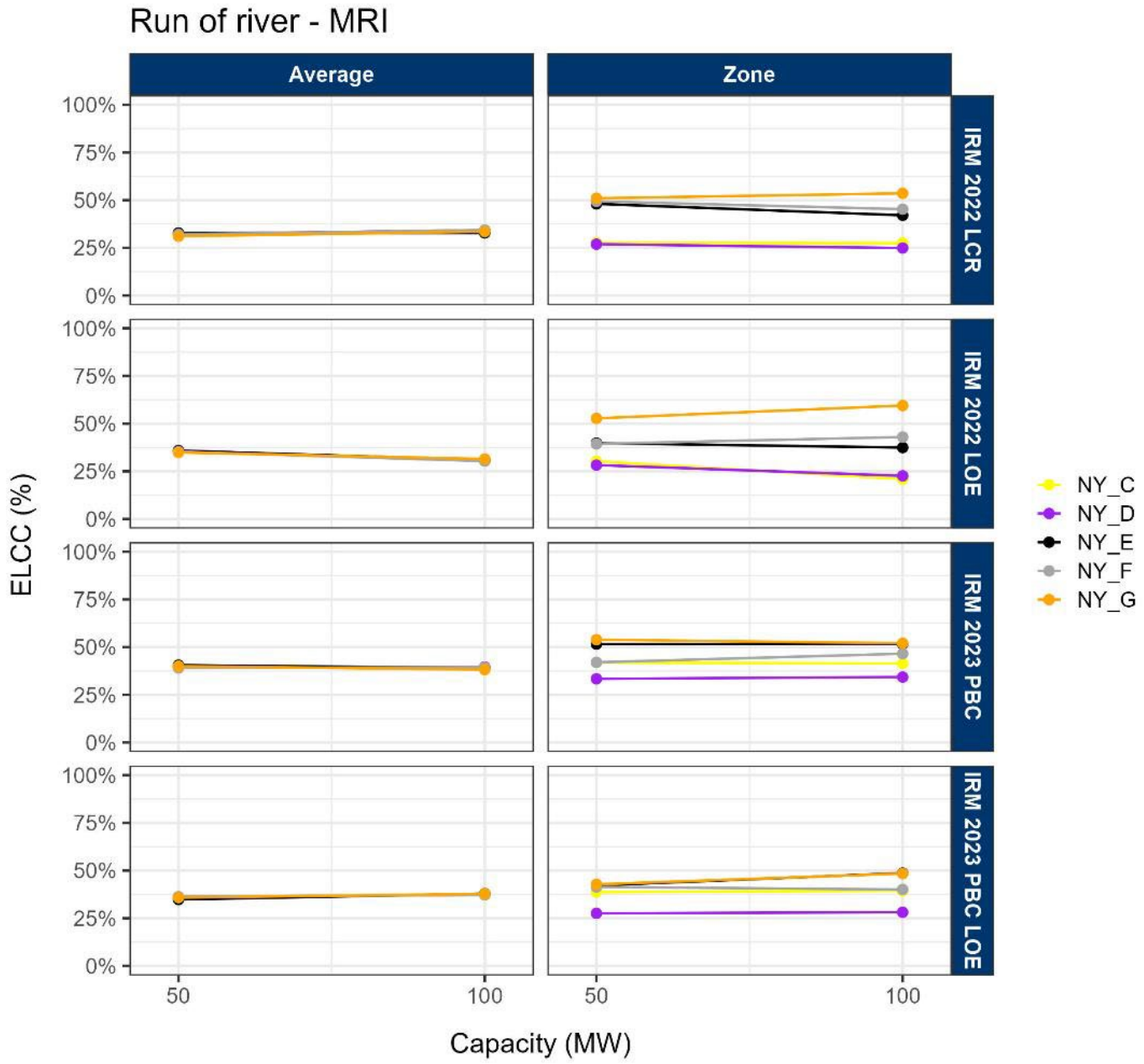

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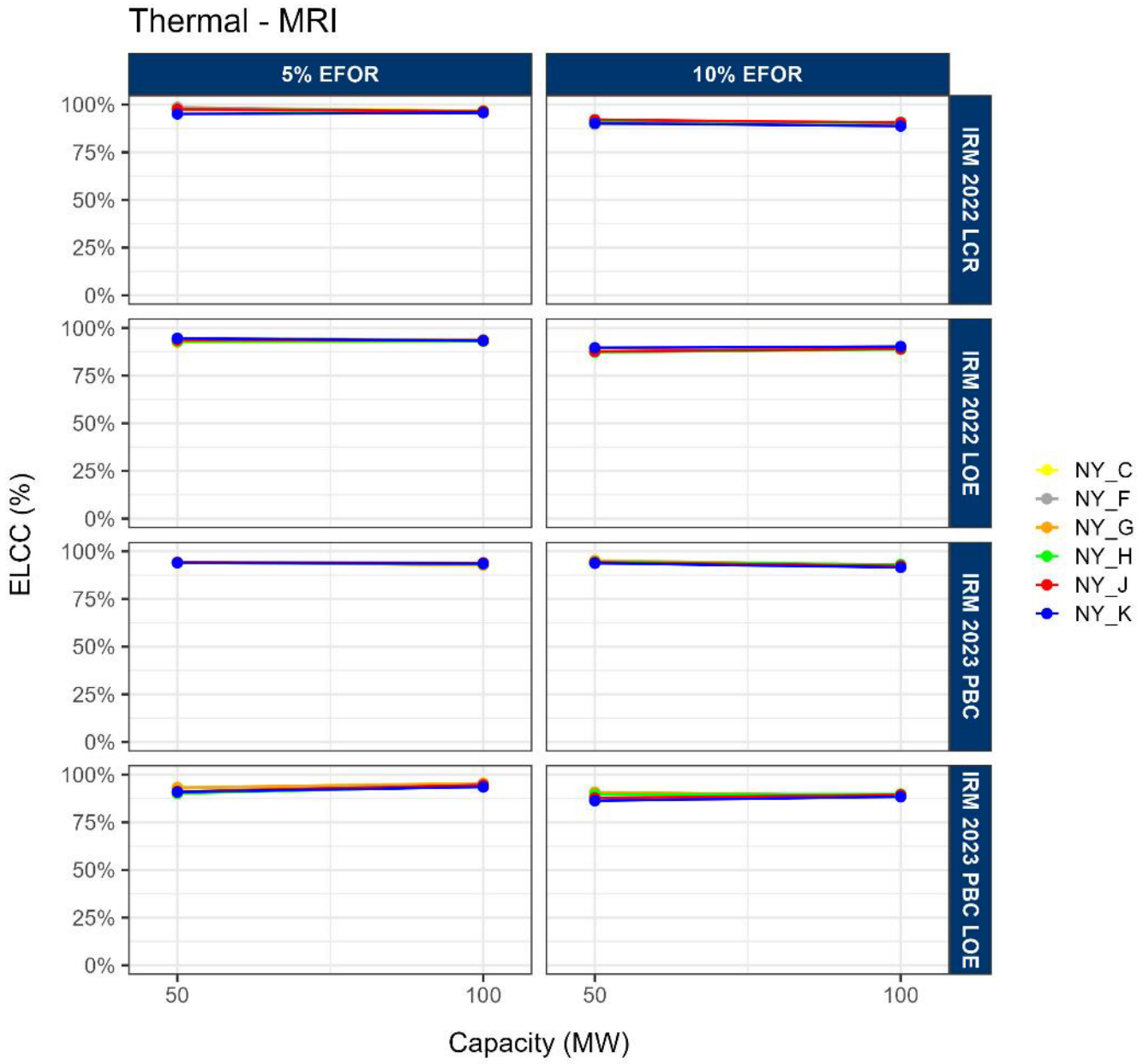

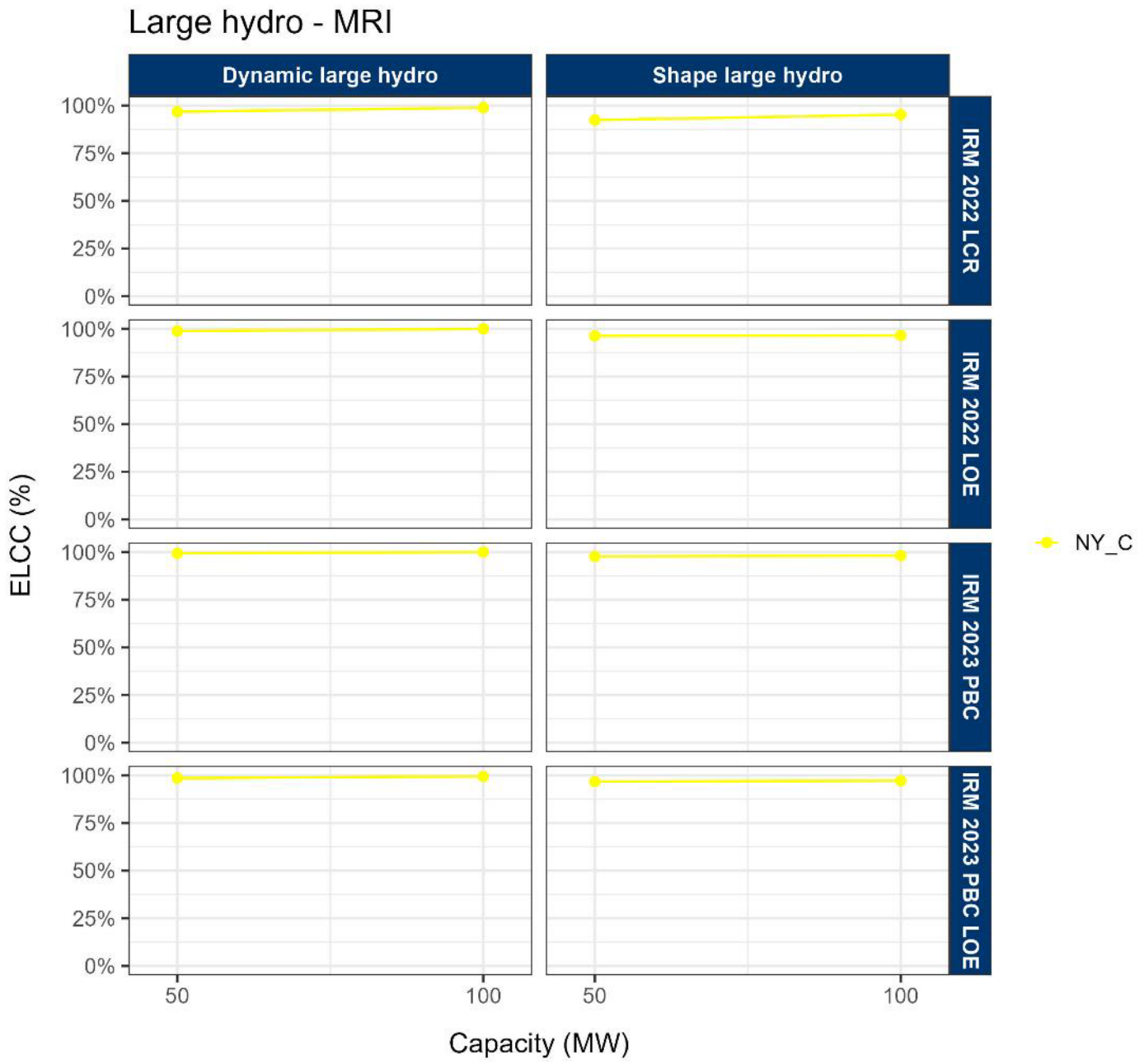

Shape = fixed shape dispatch

Dynamic = MARS dispatch algorithm

10/27/2022

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CAUTION CONCERNING FORWARD-LOOKING STATEMENTS:

This document contains "forward-looking statements" – that is, statements related to future events that by their nature address matters that are, to different degrees, uncertain. For details on the uncertainties that may cause our actual future results to be materially different than those expressed in our forward-looking statements, see http://www.ge.com/investor-relations/disclaimer-caution-concerning-forwardlooking-statements as well as our annual reports on Form 10-K and quarterly reports on Form 10-Q. We do not undertake to update our forward-looking statements. This document also includes certain forward-looking projected financial information that is based on current estimates and forecasts. Actual results could differ materially. to total risk-weighted assets.]

NON-GAAP FINANCIAL MEASURES:

In this document, we sometimes use information derived from consolidated financial data but not presented in our financial statements prepared in accordance with U.S. generally accepted accounting principles (GAAP). Certain of these data are considered "non-GAAP financial measures" under the U.S. Securities and Exchange Commission rules. These non-GAAP financial measures supplement our GAAP disclosures and should not be considered an alternative to the GAAP measure. The reasons we use these non-GAAP financial measures and the reconciliations to their most directly comparable GAAP financial measures are posted to the investor relations section of our website at www.ge.com. [We use non-GAAP financial measures including the following:

- Operating earnings and EPS, which is earnings from continuing operations excluding non-service-related pension costs of our principal pension plans.
- GE Industrial operating & Vertical earnings and EPS, which is operating earnings of our industrial businesses and the GE Capital businesses that we expect to retain.
- GE Industrial & Verticals revenues, which is revenue of our industrial businesses and the GE Capital businesses that we expect to retain.
- Industrial segment organic revenue, which is the sum of revenue from all of our industrial segments less the effects of acquisitions/dispositions and currency exchange.
- Industrial segment organic operating profit, which is the sum of segment profit from all of our industrial segments less the effects of acquisitions/dispositions and currency exchange.
- Industrial cash flows from operating activities (Industrial CFOA), which is GE's cash flow from operating activities excluding dividends received from GE Capital.
- Capital ending net investment (ENI), excluding liquidity, which is a measure we use to measure the size of our Capital segment.
- GE Capital Tier 1 Common ratio estimate is a ratio of equity

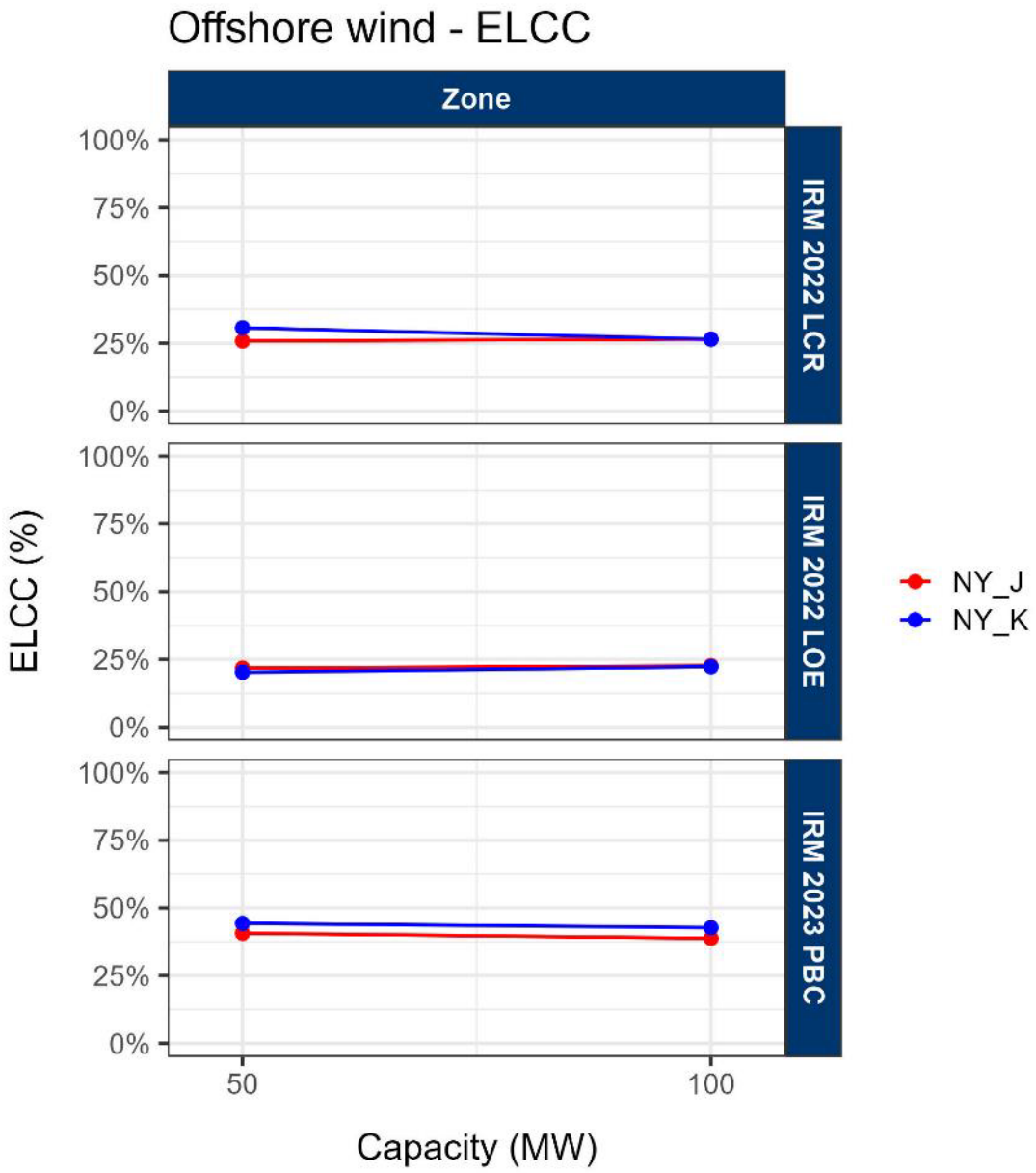
ADDITIONAL SLIDES

2023 IRM PBC ELCC results

Comparison of 2023 PBC cases and IRM 2022 LCR

		Average ELCC Capacity Value (100 MW)			Change from 2022 LCR
Type	Subtype	IRM 2022 LCR	IRM 2022 LOE	IRM 2023 PBC	IRM 2023 PBC
Thermal	5% EFOR	94.7%	95.2%	95.4%	0.7%
	10% EFOR	88.1%	95.0%	92.5%	4.4%
Biomass	Average	65.3%	67.1%	65.4%	0.1%
	Zone	62.0%	63.6%	57.7%	-4.4%
Run of river	Average	35.5%	32.7%	35.6%	0.2%
	Zone	39.3%	37.3%	39.3%	0.0%
Onshore wind	Average	8.6%	6.3%	13.1%	4.5%
	Zone	8.3%	8.0%	11.2%	2.9%
Offshore wind	Zone	26.5%	22.5%	40.7%	14.3%
Solar	Average	32.7%	34.8%	16.3%	-16.4%
	Zone	30.8%	30.5%	15.1%	-15.6%
Dynamic ELR	2h	42.7%	48.3%	N/A	N/A
	4h	70.5%	87.7%	86.3%	15.9%
	6h	76.7%	90.5%	91.5%	14.8%
	8h	98.7%	99.0%	98.4%	-0.3%
Large hydro	Dynamic	98.9%	99.2%	98.8%	-0.2%
	Fixed shape	97.0%	99.2%	98.7%	1.8%

Similar trends were described for the MRI-based results in the main slides



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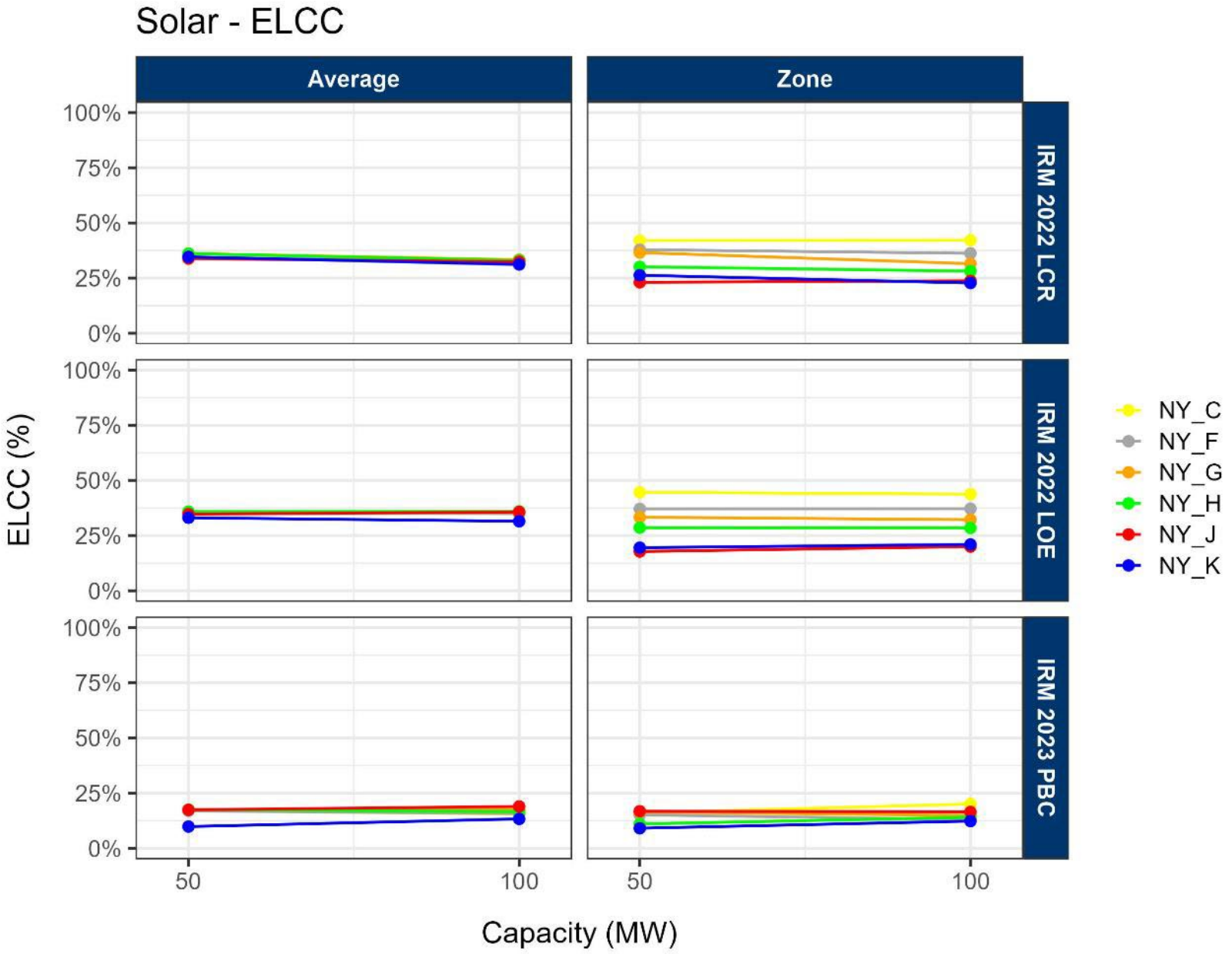

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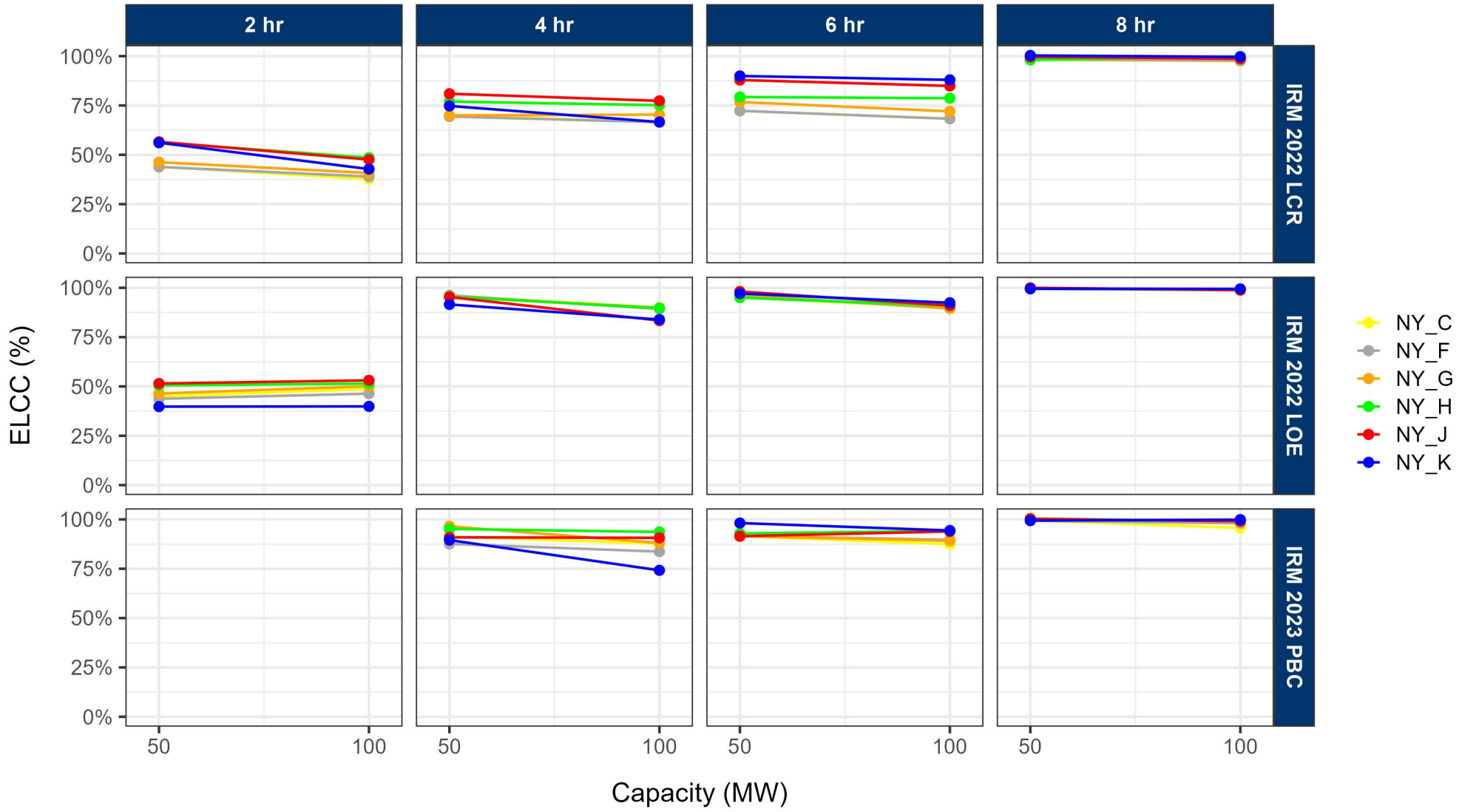
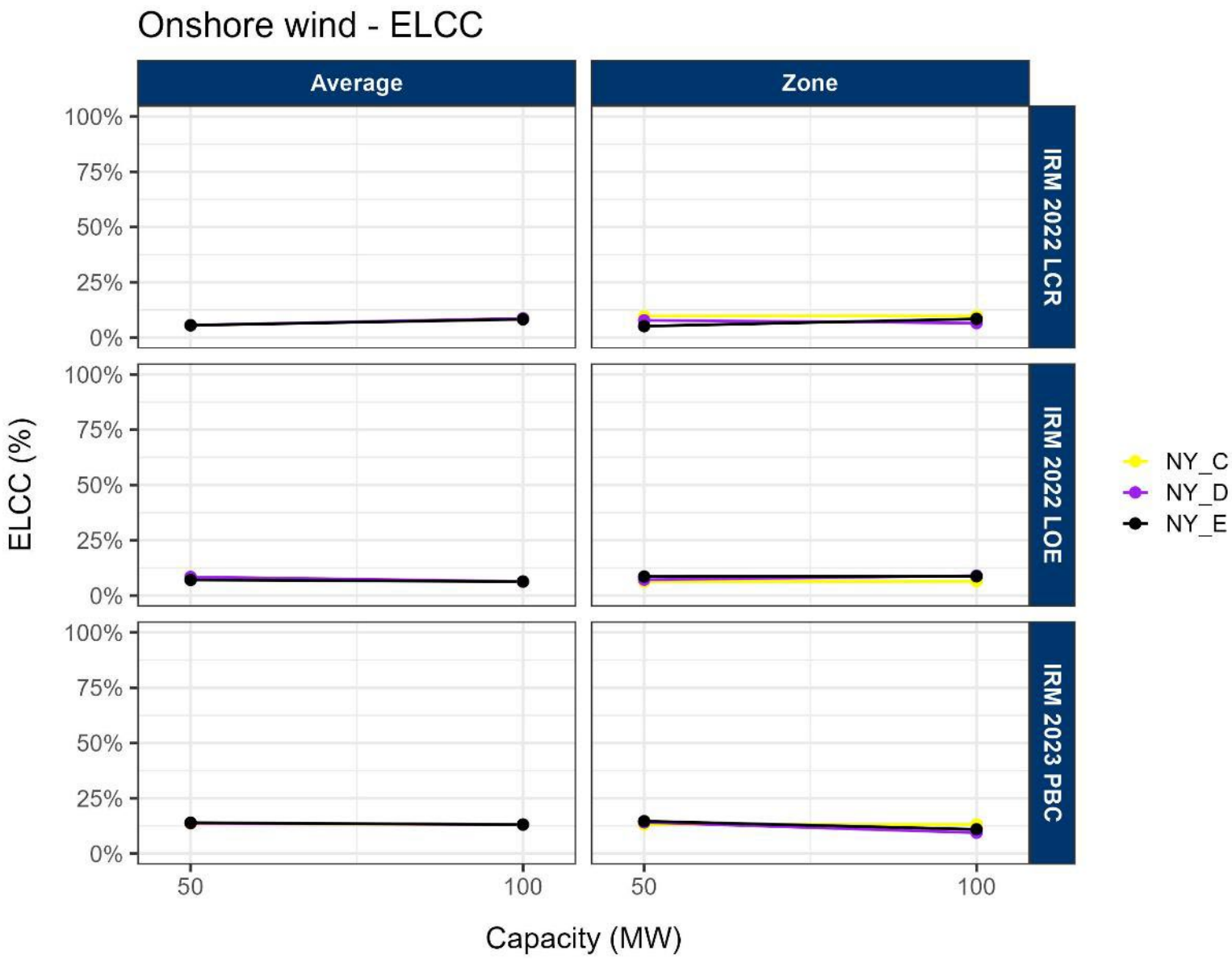
Average = all zones use the same shape

Energy Duration Limited, Dynamic model - ELCC





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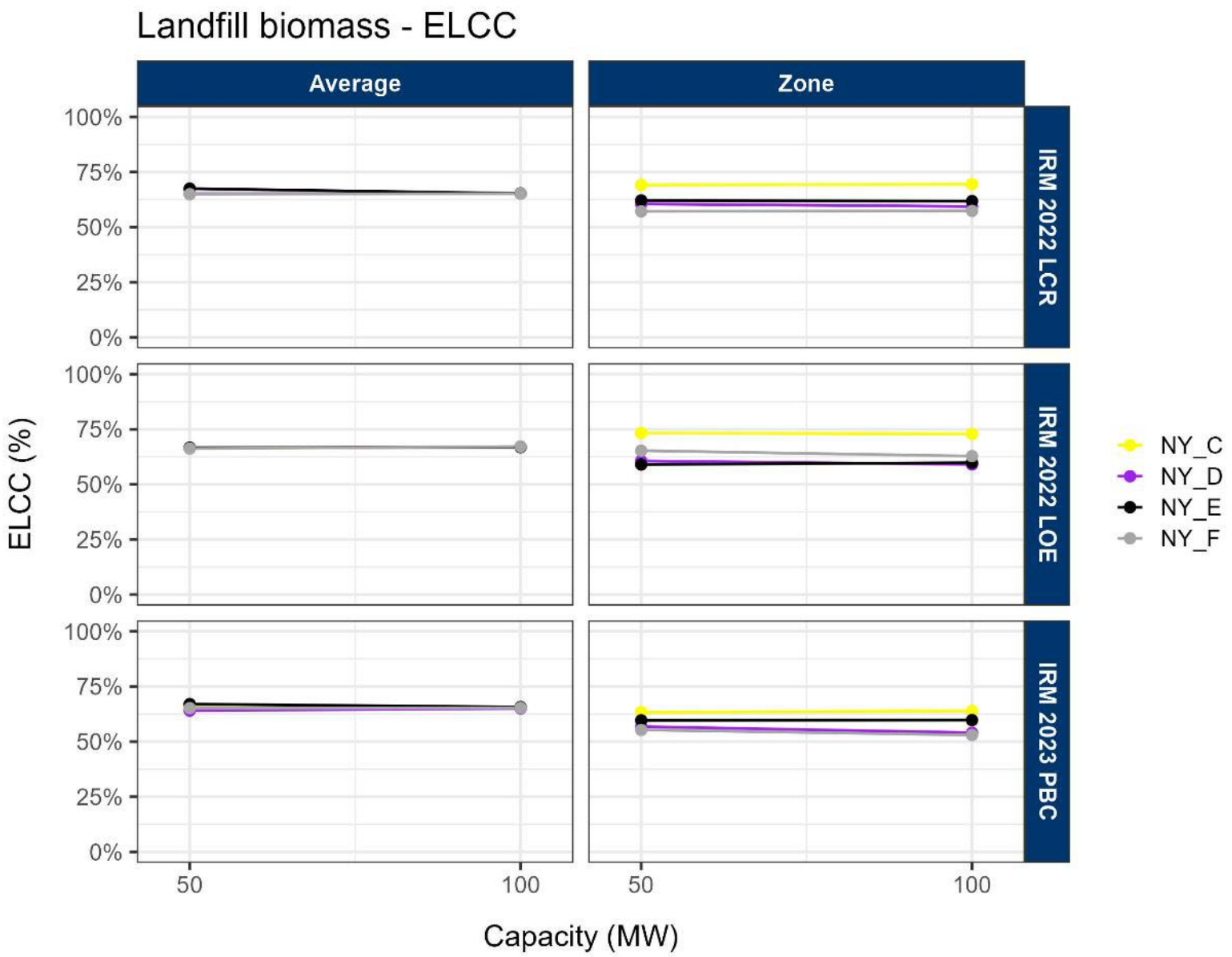

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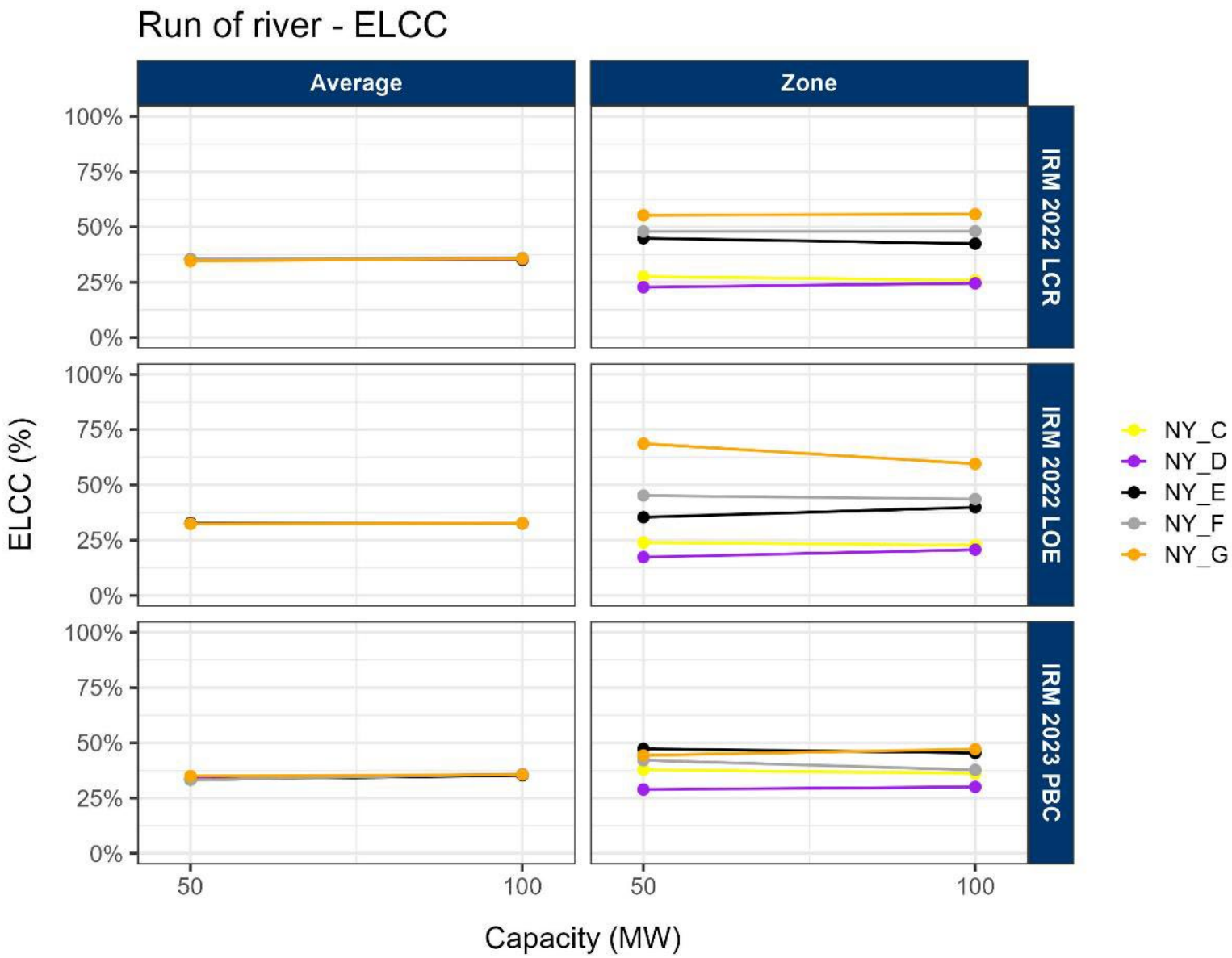

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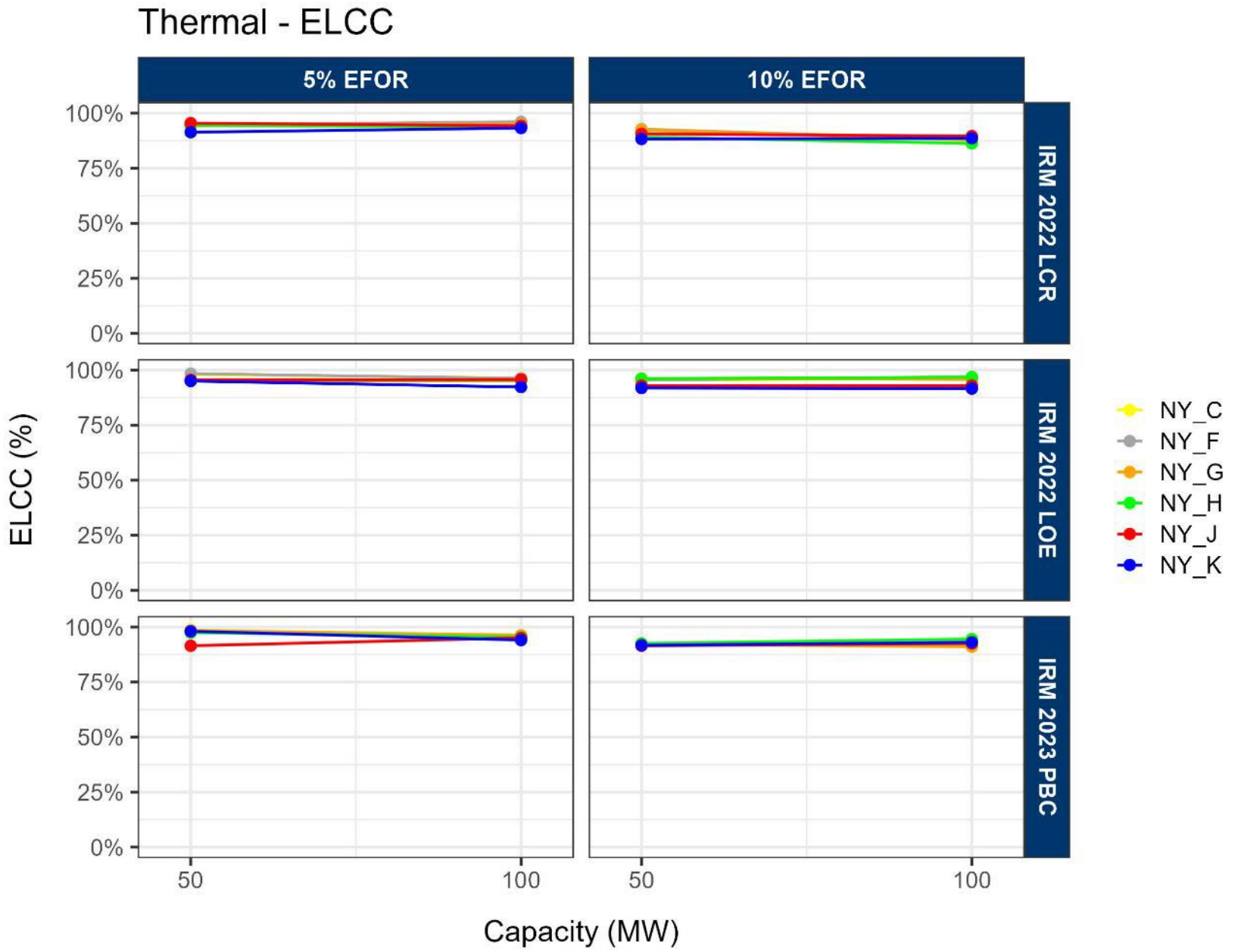

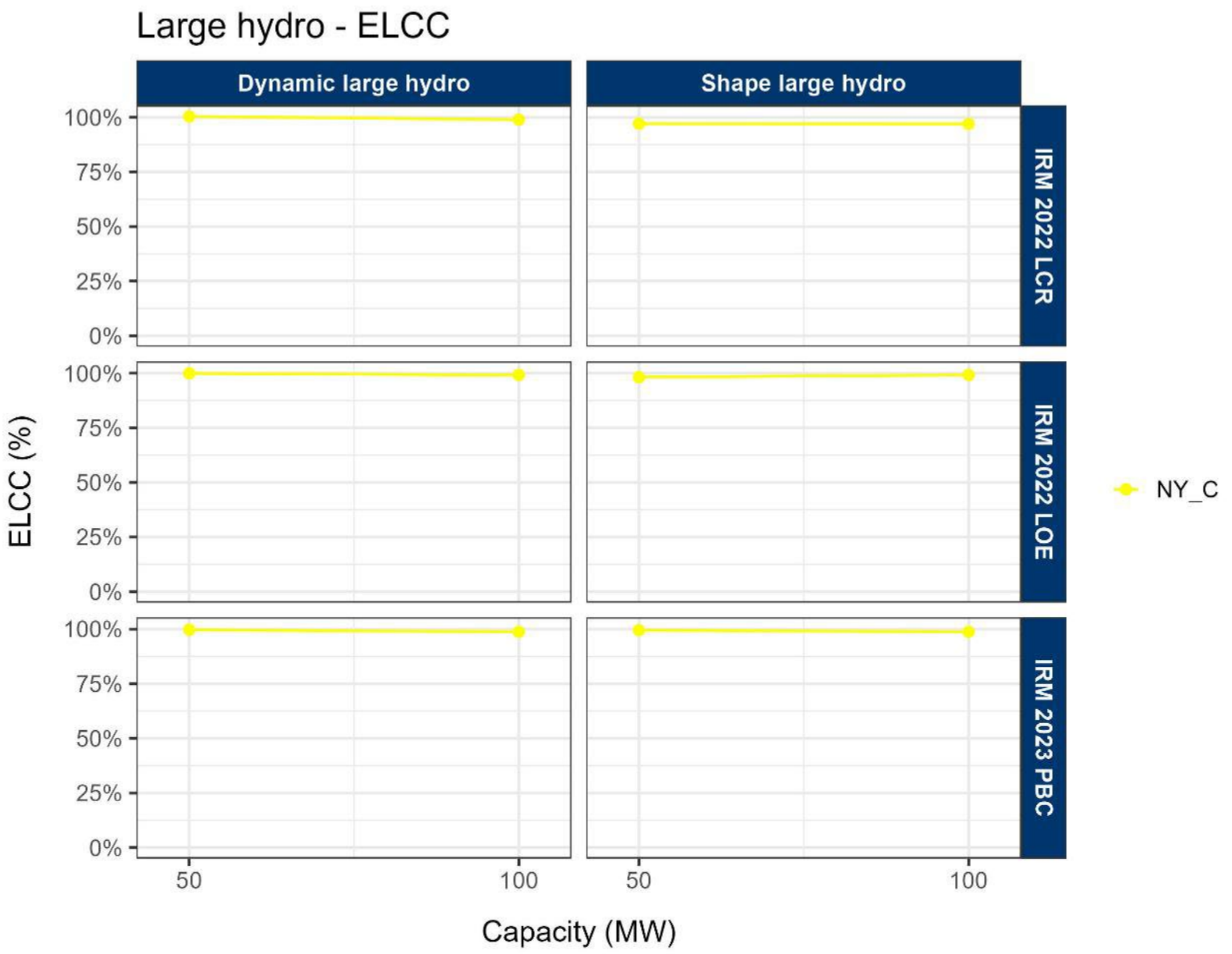

Shape = fixed shape dispatch

Dynamic = MARS dispatch algorithm