

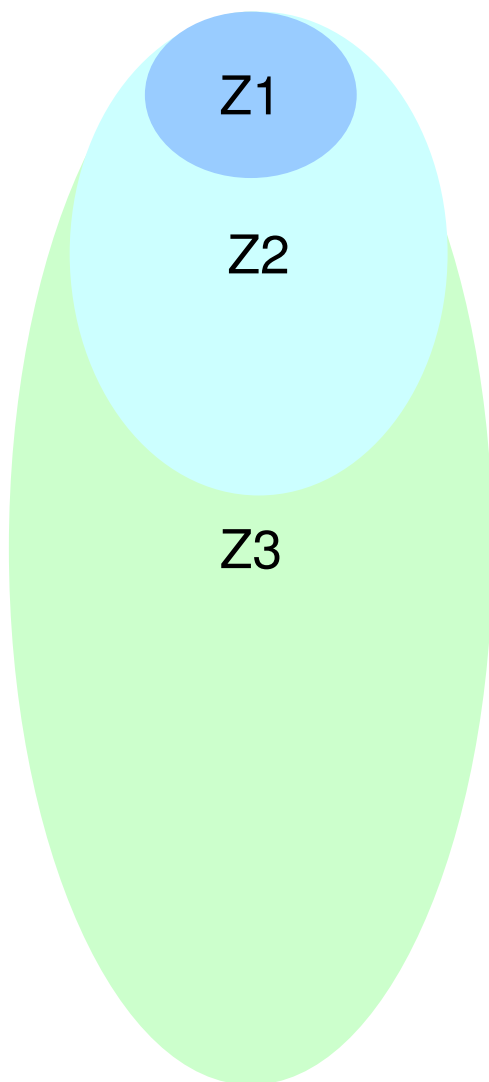
Overrun pricing

Possible charging models

Introduction

- ◆ Conceptual 3 zone / 9 generator system system
- ◆ Describe a single system state
- ◆ How could the price be established
 - ◆ Marginal price
 - ◆ Average price

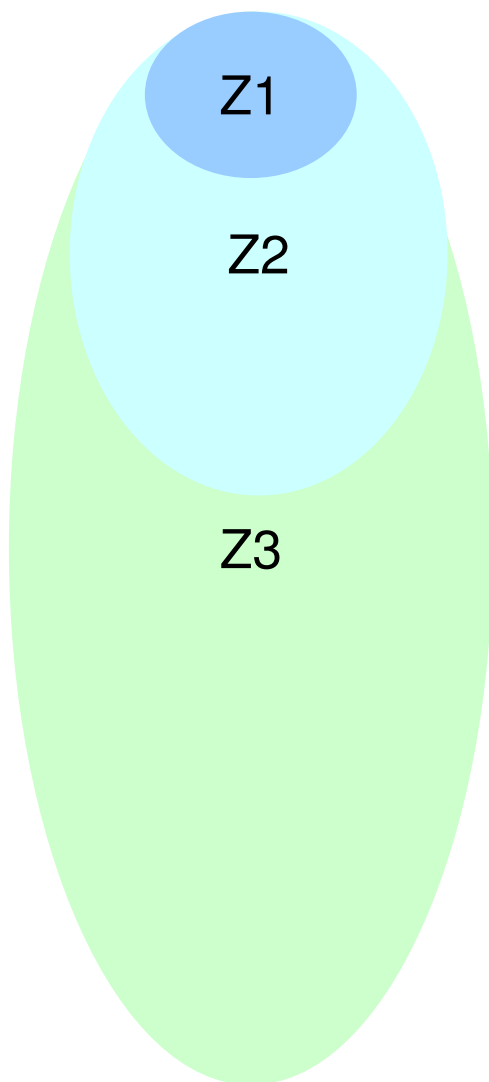
Zone 1



Z1 Demand	100		
	FPN	ZTEC	Avail
Gen A	100	200	200
Gen B	200	0	200
Gen C	10	0	10

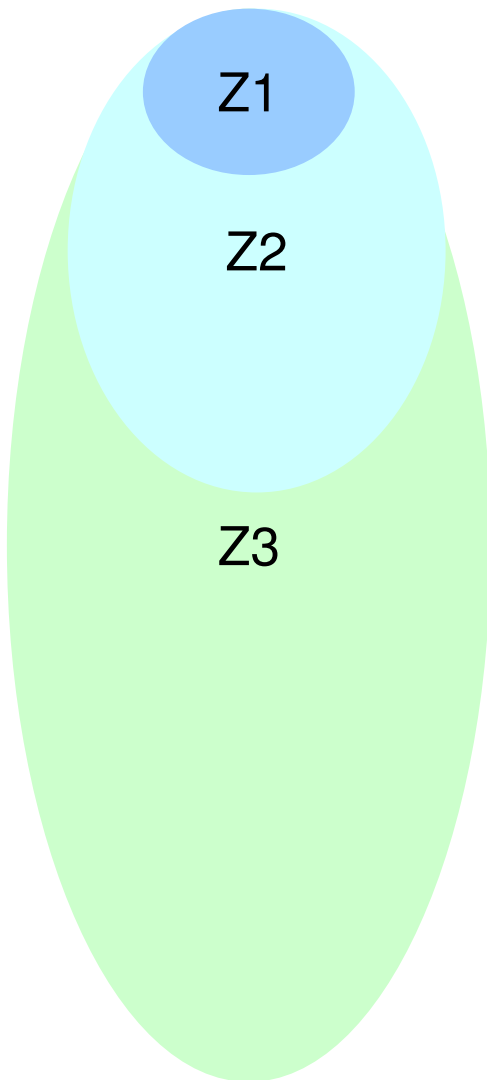
Overrun is 210, could be as low as 110 if A shared

Zone 2



Z2 Demand	400		
Gen D	200	200	200
Gen E	300	300	300
Gen F	50	0	50

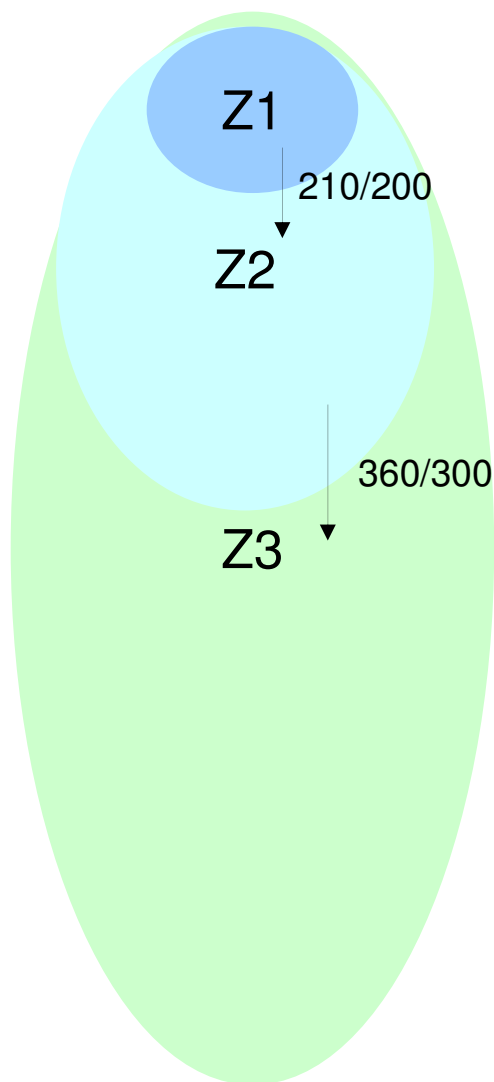
50 overrun, no sharing available in this zone



Generation required in Zone 3 to replace plant pulled back in Z 1 and Z2

Z3 Demand	660		
Gen G	200	500	500
Gen H	100	0	100
Gen I	0	500	500

System state



System Capability	200
Natural flow	210
Natural overload	10
Constrained flow	200
Constraint	-10

System capability	300
Natural flow	360
Natural overload (ignoring Z1/2)	60
Total Constrained flow	300
Constraint (taking account of Z1/2)	-50

Zonal Constraint 60

What the SO sees

Merit Orders

System

Gen	Bid price	Gen	Offers
A	10	A	50
B	-50	B	999
C	-50	C	999
D	5	D	999
E	5	E	999
F	-50	F	999
G	15	G	50
H	-50	H	999
I	30	I	50

Zonal merit orders

Z1			
Gen	Bid price	avail volume	
A	10	100	
B	-50	200	
C	-50	10	
Gen	Offer price	avail volume	
A	50	100	
B	999	0	
C	999	0	

Z3			
Gen	Bid price	avail volume	
G	30	200	
E	15	100	
F	-50	0	
Gen	Offer price	avail volume	
G	50	300	
E	999	0	
F	50	500	

Z2			
Gen	Bid price	avail volume	
D	5	200	
E	5	300	
F	-50	50	
Gen	Offer price	avail volume	
D	999	0	
E	999	0	
F	999	0	

SO actions

SO actions								
Accepted bids					Accepted offers			
Gen	Volume	Cost			Gen	Volume	Cost	
A	10	100			A	0	0	
B	0	0			B	0	0	
C	0	0			C	0	0	
D	*50	250			D	0	0	
E	0	0			E	0	0	
F	0	0			F	0	0	
G	0	0			G	60	3000	
H	0	0			H	0	0	
I	0	0			I	0	0	

*SO required to take 50MW out of merit (dynamics, sub zonal constraint etc.)

3 Models

- ◆ Marginal Absolute
- ◆ Marginal Cost Recovery
- ◆ Average price

Marginal adjusted basic

Overrun charges			Cost revenue	2650 Surplus	-0.4
	Volume	Price	charge revenue	2649.6	
Z1	210	19.86	4170.6		
Z2	50	19.86	993		
Z3	100	-25.14 *	-2514		
Gen	Volume	Cost			
A	0	0			
B	200	3972			
C	10	198.6			
D	0	0			
E	0	0			
F	50	993			
G	0	0			
H	100	-2514			
I	0	0			

* Price referenced to ensure cost recovery

Average recovery (BAAR)

Overrun charges	Volume	Price	Cost revenue charge	2650Surplus revenue	-0.25
Z1	210	10.5	2199.75	2650	
Z2	50	9	450		
Z3	100	0	0		
Gen	Volume	Cost			
A	0	0			
B	200	2095			
C	10	105			
D	0	0			
E	0	0			
F	50	450			
G	0	0			
H	100	0			
I	0	0			

Conclusion

- ◆ Constraints occur on boundaries not zones
 - ◆ Zones combine
- ◆ It is not simple
 - ◆ Within zone inaccuracies
 - ◆ Interaction with dynamics
 - ◆ Interaction between zones
- ◆ Next steps?