Load Service Areas and Critical Contingencies

Load Area	Approximate Peak Load (MW)	Critical Outages						
		Double Circuit	Common ROW	Breaker Failure (# PCB's Exposure)				
Olympic Peninsula	1150	X	X	12				
Kitsap Area	650	X		8				
North of Shelton	400	X						
Aberdeen/Satsop	300	X						
Northern Oregon Coast (Tillamook / Clatsop)	250			7				
Central Oregon Coast (No.of Wendson)	200			4				
SW Oregon Coast (So. of Fairview)	100	X						
Wendson/Tahkenitch	150		X	3				
Out of Fairview	250		X	5				
Hood River/The Dalles	100			8				
Walla Walla	200			10				
Okanogan	200		X	5				
Lower Valley / So.Idaho	200		X	15				
Flathead Valley	250	X	X	11				
Warner / Alturas	50		X					
INTEGRATED LOAD AREAS ***(see Note 5)***								
Clark County	700	X	X					
Longview	450	X		23				
Salem	700			5				
Albany / Eugene	700		X	27				
Central Oregon	150			6				
Southern Oregon	1150	*Non-BPA Load Area*						
Tri-Cities	800			26				
NOTES								
(1) Approximate peak load in MW reflects the "net" load for each area based on a 1 in 2 winter peak load forecast for winter 2005-2006								
(2) For most load areas, cut planes are not defined. Cut planes used to develop this list are approximations								
(3) Load areas of less than 50 MW are not included in this list								
(4) Load areas spanning a very large geographic area (Puget Sound, Portland, etc.) are not included in this list.								
(5) These load service areas are integrated into the network (rather than served radially). Only a portion of the load would be at risk for each of the critical outages.								
(6) This list includes only BPA service areas. Other utilities may have similar or more significant problem areas, but we are not aware of all of these.								
(7) This is only a list of potential problems. The actual load level at which problems would occur, has not been determined for all cases								

What Outages Should we Plan For? NERC and WECC Standards

- **Category A: System normal**
- **Category B: N-1 contingency**
  - Single high-voltage line or transformer due to weather, equipment failure or some other problem.
- **Category C: N-2 contingency**
  - Two lines or other equipment due to common exposure or dependency
  - An N-2 outage on the Peninsula must not adversely affect the main grid
- **Category D: Extreme Event**

LOAD SERVICE AREAS
and Critical Contingencies

Load Area	Approximate Peak Load (MW)	Critical Outages		
		Double Circuit	Common ROW	Breaker Failure (# PCB's Exposure)
Olympic Peninsula	1150	X	X	12
Kitsap Area	650	X		8
North of Shelton	400	X		
Aberdeen/Satsop	300	X		
Northern Oregon Coast (Tillamook / Clatsop)	250			7
Central Oregon Coast (No.of Wendson)	200			4
SW Oregon Coast (So. of Fairview)	100	X		
Wendson/Tahkenitch	150		X	3
Out of Fairview	250		X	5
Hood River/The Dalles	100			8
Walla Walla	200			10
Okanogan	200		X	5
Lower Valley / So.Idaho	200		X	15
Flathead Valley	250	X	X	11
Warner / Alturas	50		X	
INTEGRATED LOAD AREAS ***(see Note 5)***				
Clark County	700	X	X	
Longview	450	X		23
Salem	700			5
Albany / Eugene	700		X	27
Central Oregon	150			6
Southern Oregon	1150	*Non-BPA Load Area*		
Tri-Cities	800			26
NOTES				
(1) Approximate peak load in MW reflects the "net" load for each area based on a 1 in 2 winter peak load forecast for winter 2005-2006				
(2) For most load areas, cut planes are not defined. Cut planes used to develop this list are approximations				
(3) Load areas of less than 50 MW are not included in this list				
(4) Load areas spanning a very large geographic area (Puget Sound, Portland, etc.) are not included in this list.				
(5) These load service areas are integrated into the network (rather than served radially). Only a portion of the load would be at risk for each of the critical outages.				
(6) This list includes only BPA service areas. Other utilities may have similar or more significant problem areas, but we are not aware of all of these.				
(7) This is only a list of potential problems. The actual load level at which problems would occur, has not been determined for all cases				

Portland and Puget Sound Load Areas

- Portland Area Load – approx. 3500 MW
- Puget Sound Area Load – approx. 5200 MW

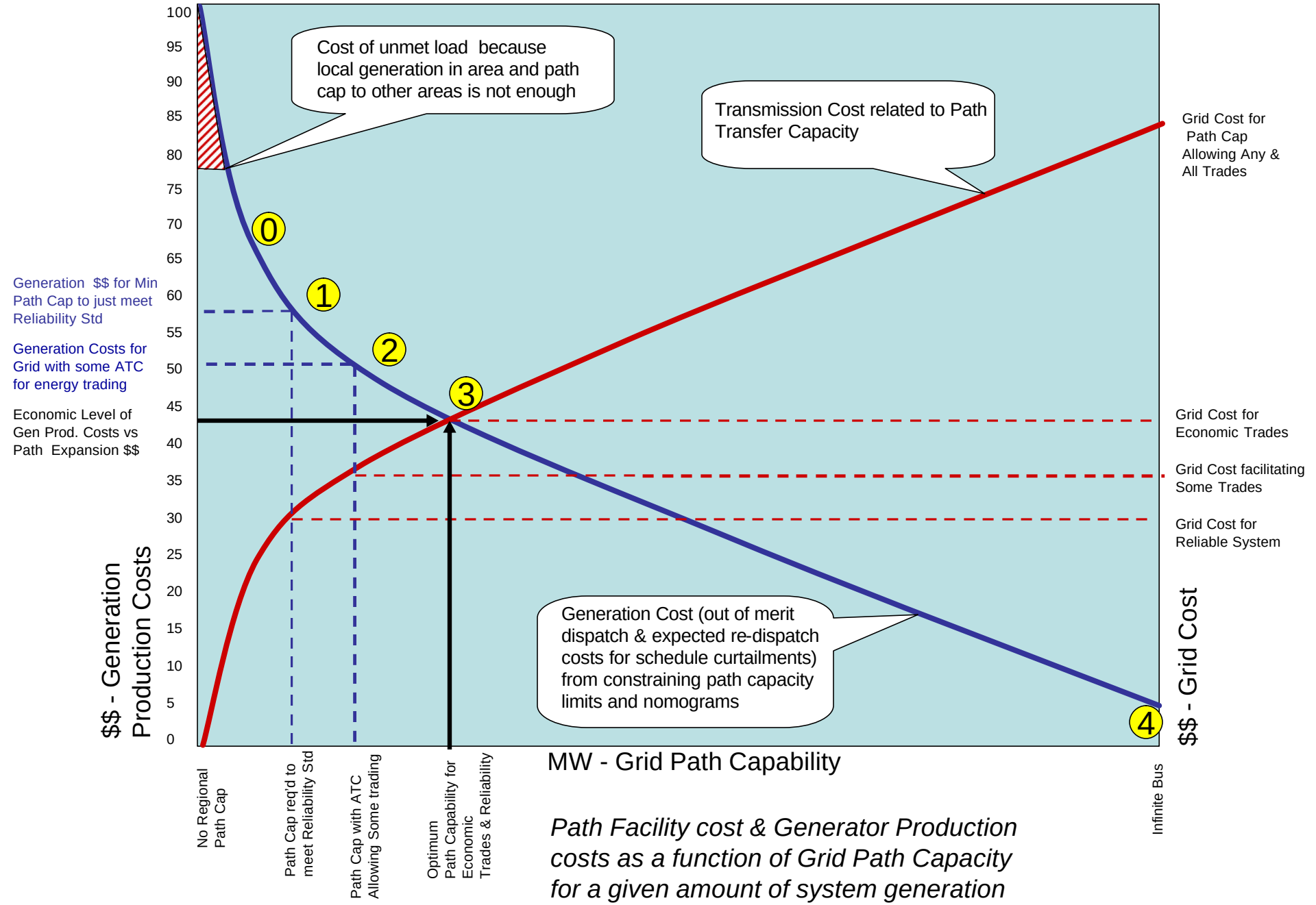
NOTE: These load levels are approximations based on assumed cut-planes

Ranking N-2 Events

- Consequence
  - Peak load
  - Fraction of load that can be served under N-2
- Exposure
  - Likelihood of outage(s)
  - Load-duration curve
- Benefit/Cost analysis
  - Cost to fix
  - Societal cost of outages

Next Steps

- Complete analysis of identified areas at risk
- Engage interested Northwest parties through the Transmission Adequacy process
- Develop a criterion



Path Facility cost & Generator Production costs as a function of Grid Path Capacity for a given amount of system generation

Transmission Adequacy Issues

- Reliability Versus Economic Adequacy: Policy issues
  - Keep the lights with reasonable assuredness
  - Provide comparable access to supply markets,
  - Provide economic access to economic markets for lowest cost
- Generation costs versus grid transfer path costs
- Generation costs include?
  - Cost of unmet load
  - Out of merit generation production costs as limited by path ratings and scheduling limits
  - Expected curtailment re-dispatch following transmission outages
  - Generation cost/price volatility: illiquidity created by transmission constraints
- 1. What is the "prudent utility practice" and acceptable amount of generation costs at point 1
  - How is acceptable amount established
  - To whom and how are costs allocated now – tariff provisions
    - Generation and transmission
  - What is meant by firm?
- 2. If grid is expanded to point 2 to bring reliability back from pt 0
  - "Lumpyness" of transmission capacity additions and environmental, ROW concerns
  - How much to add (why stop at point 2?)
  - Allocation of costs and capacity added: present tariff treatment
  - Who pays for extra
- 3. For pt 3, how is path capacity allocated to make sure of best use
  - Who pays for added capacity
  - Who receives generation cost reductions
- 4. Pt 4: Decoupling transmission and generation, totally comparable service
  - Society can't afford to add enough transmission to decouple generation from transmission costs totally,
  - or provide exactly comparable service.
  - How to provide fair allocation of costs and benefits