

# Standby Residual Check Training Workshop Market Services Participant Guide May 2007

TRANSPower



SYSTEM OPERATOR

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- What the Standby Residual Check (SRC) is about
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# Purpose of the Training

- Learn what SRC is
- Understand the inputs into the SRC calculations
- Use the SRC model to determine what actions can change the results

# What you receive now



**T R A N S P O W E R**

Telephone : 0800 488 500

Facsimile : 07 843 7176

**To:** CAN Energy Traders

Date: 20 Jun 2006, 01:43

**From:** System Operator

## **Standby Reserve (CAN) for Insufficient dispatch proposals on 20-Jun-2006**

The System Operator advises participants that there are insufficient standby reserves available for the following trading periods:

Following a contingent event:

- There may be insufficient generation reserve available for the System Operator to re-dispatch the system to a secure state (i.e. manage a subsequent contingent event).
- Demand management may be required

Market Day	Time	Period	North Island	South Island	New Zealand
20-Jun-2006	17:30	36	153.672		237.426
20-Jun-2006	18:00	37	174.635		232.119
20-Jun-2006	18:30	38	155.366		177.755
20-Jun-2006	19:00	39	29.24		15.53

This situation can be alleviated by participants revising their demand and generation offers for those trading periods. A revision of this notice will be issued if there is any change to the situation advised above.

# What you receive now: issues

The notice:

- does not indicate how margin is calculated
- does not indicate what can be done to remedy issue in any detail

Therefore it is difficult to maintain industry (& our) understanding of SRC function

# What the SRC is about

- two checks:
  - do we have the ability to:
    1. replace energy without considering reserves (energy check)?
    2. replace energy and schedule reserves to cover next risk (capacity check)?

# 1. Replace energy

- do we have the ability to replace largest energy risk?
- reserve is not considered for the next risk
- worst case scenario - cannot replace energy lost after a contingent event

# 1. Replace energy

- calculation involves:
  - + energy offers from generators
  - total energy offer quantity of the risk generator
  - required frequency keeping band
  - energy requirement (demand + Losses)
  - + HVDC received (limited by SI offers)

## 2. Replace energy & schedule reserves (Capacity Check)

- ability to replace the largest risk energy with other energy?
- ability to schedule reserves to cover the next largest risk after 30 minutes?
- this is most common scenario:
  - cannot get back to N-1 for reserve

## 2. Replace energy & schedule reserves (Capacity check)

- calculation involves:
  - + available total generator capability offered (includes manual subtractor)
  - + offered Interruptible Load
  - risk station capability offered
  - required frequency keeping band
  - energy requirement (demand + losses)
  - next largest risk capability offered
  - + HVDC received (limited by SI offers)

# What we are changing in SRC

- manual subtractor
  - subtractor to allow spur line constraints and commissioning units to be deducted from the available generation capability offered
- manual risk
  - Largest single risk unit (normally only the South Island)
- peak island power system demand multiplier
  - Peak demand versus energy requirement value

# What will be published – Graph

## Standby Residual Check Charts

**Search Criteria**

**Rolling View**

On  
 Off

Date  
08/05/2007

**Price Type**

SDS/SDPQ  
 PDS

**Submit**

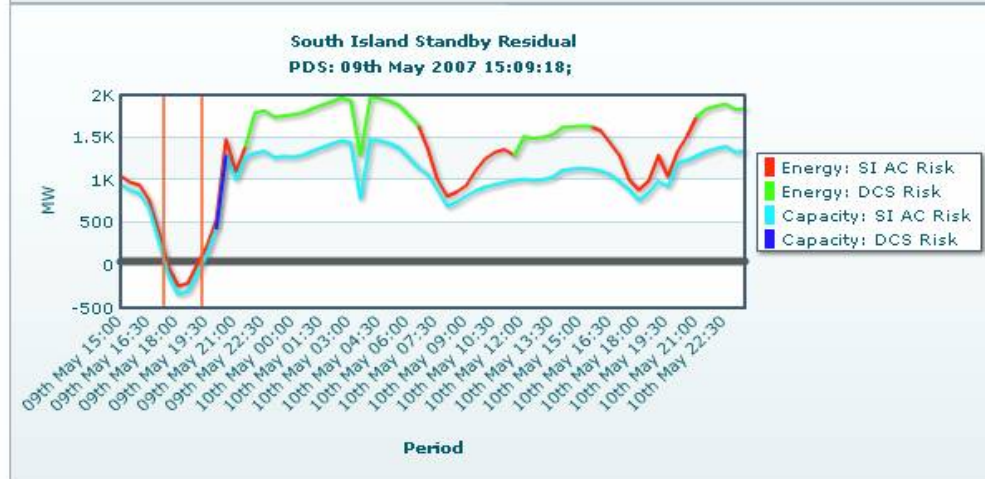
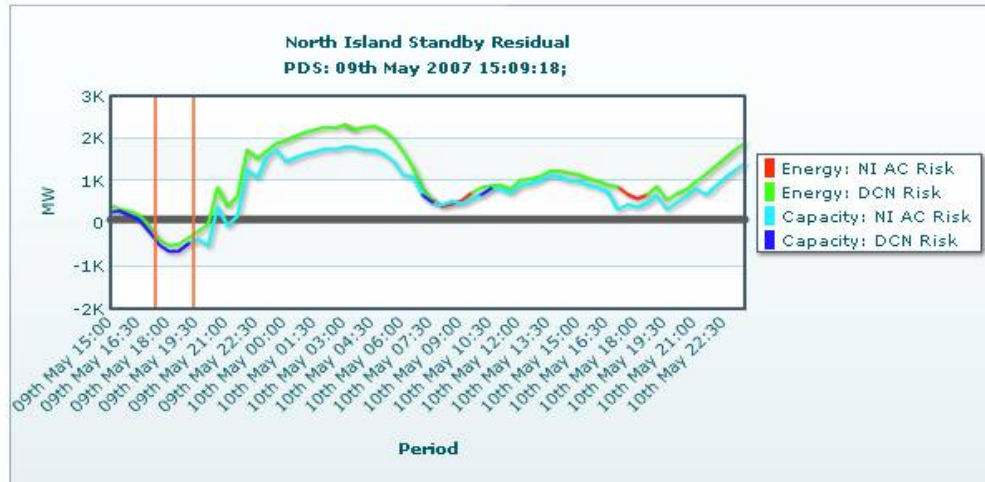
**Email Notification**

**Email**  
david.bullen@transpower.co.nz

On  Off

✓ Changes successfully made

**Submit**



SRC Results  
 SRC Calcomponents

# What will be published

- total island energy offer quantity
- total island risk unit energy offer quantity
- island frequency keeping band
- island energy requirement (demand & losses)
- HVDC received
- total island offered capacity
- total island offered Interruptible Load
- total island risk unit capability
- island next largest risk offered capability

Calculated off the SDS, PDS & SDPQ

# Which Check

Reserve

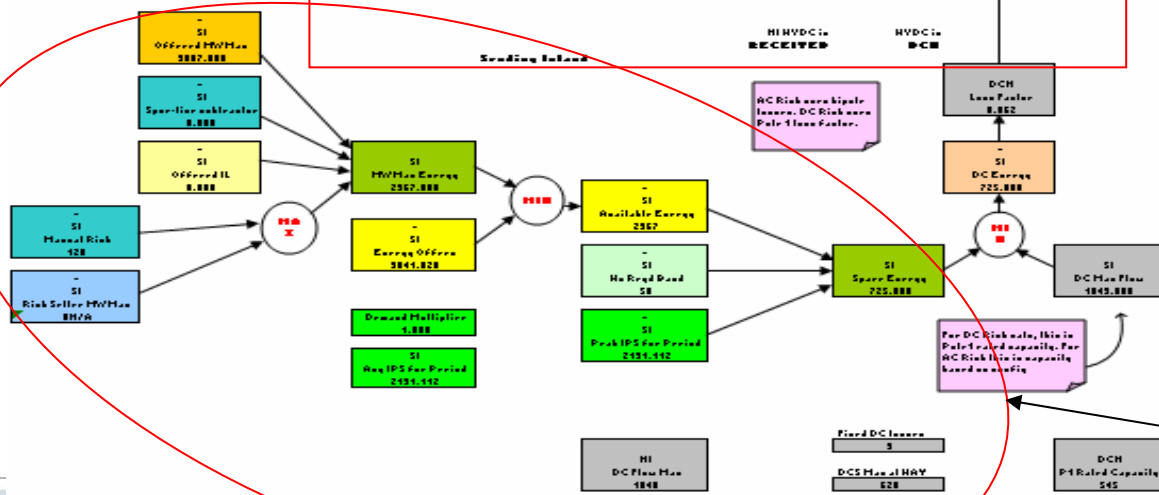
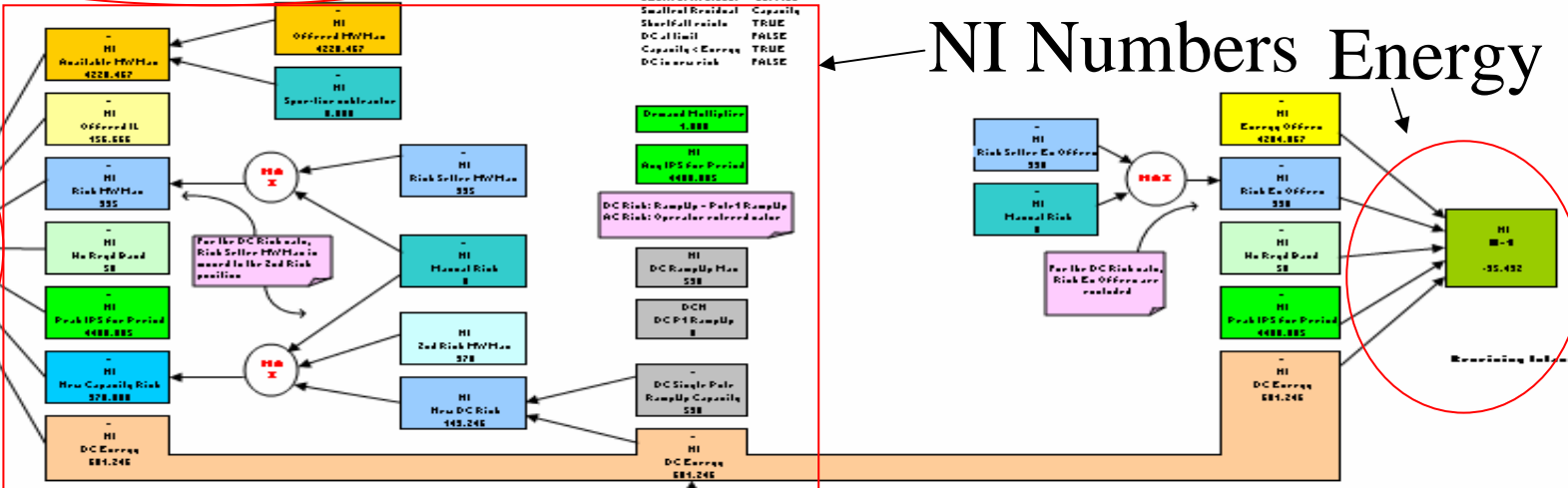
NI Numbers Energy

Date: 20-05-2008  
 period: 30  
 starting: 17:30

Unit:  NI  SI  
 Set Seller:  AC Sell  DC Sell (per of Per 2)  
 DCMax (ignore availability)

## STANDBY RESERVE CHECK

Shortfall area: NI  
 Smallest Reserve: 237.426  
 Smallest Reserve Capacity: NI  
 Shortfall ratio: TRUE  
 DC Util limit: FALSE  
 Capacity < Energy: TRUE  
 DC Clear risk: FALSE



SI Numbers

# The Checks

- To break down the detail in the model
- Energy and Reserves check for the North Island

# Selecting the calculation components



date: 01-05-2007  
period: 29  
starting: 14:00  
run time: 01-May-07 14:11  
schedule type: SDPQ

Island

NI

SI

Risk Setting

AC Risk

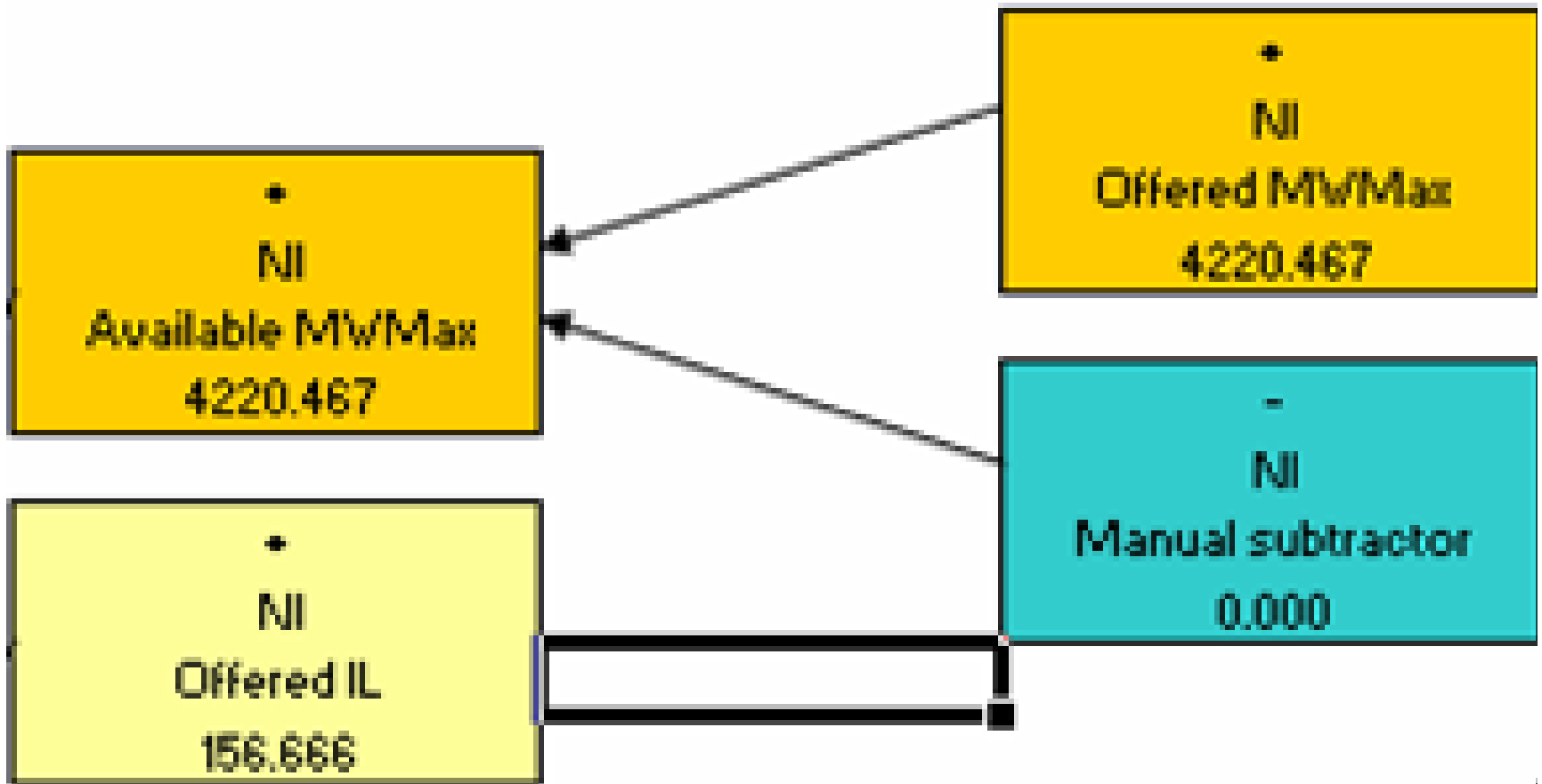
DC Risk (loss of Pole 2)

DCMax  
(ignore sending  
island spare energy)



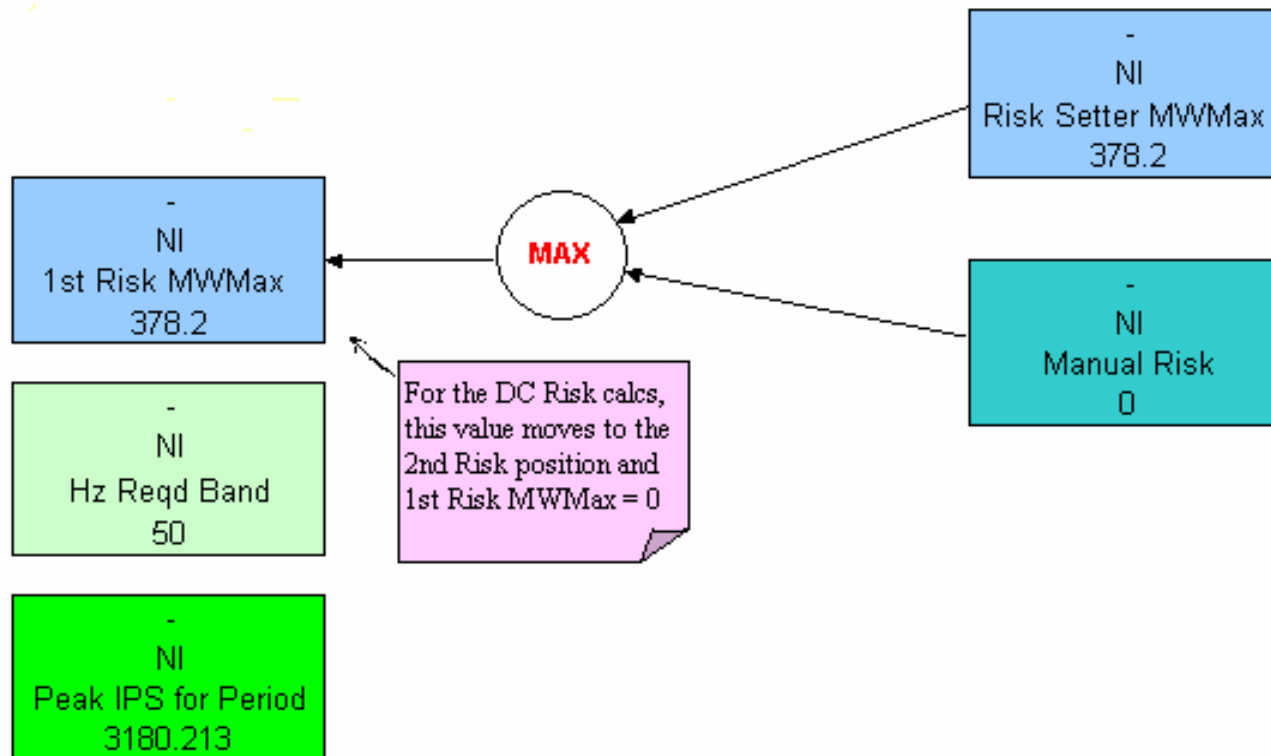
# Components Cont'd

## Available MWMAX + Offered IL



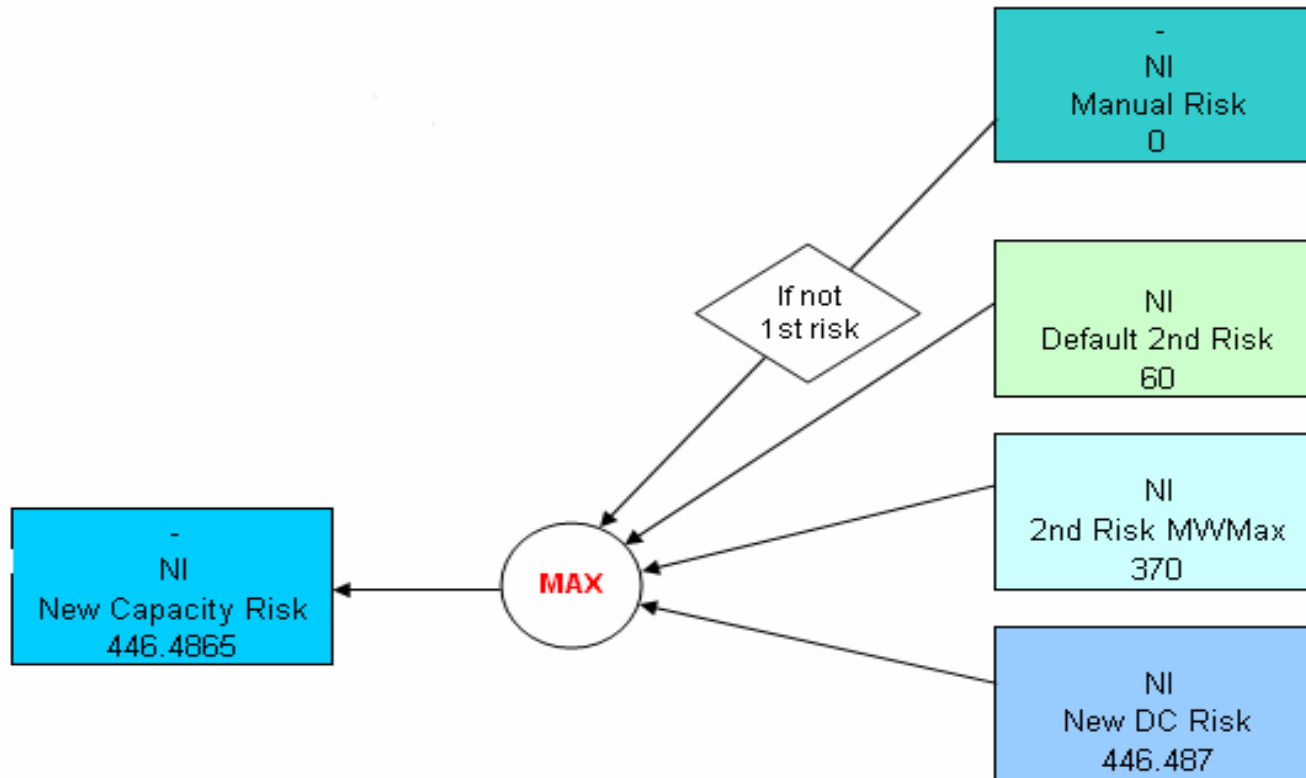
# Components cont'd

- Risk MW – Hz Band – Peak IPS



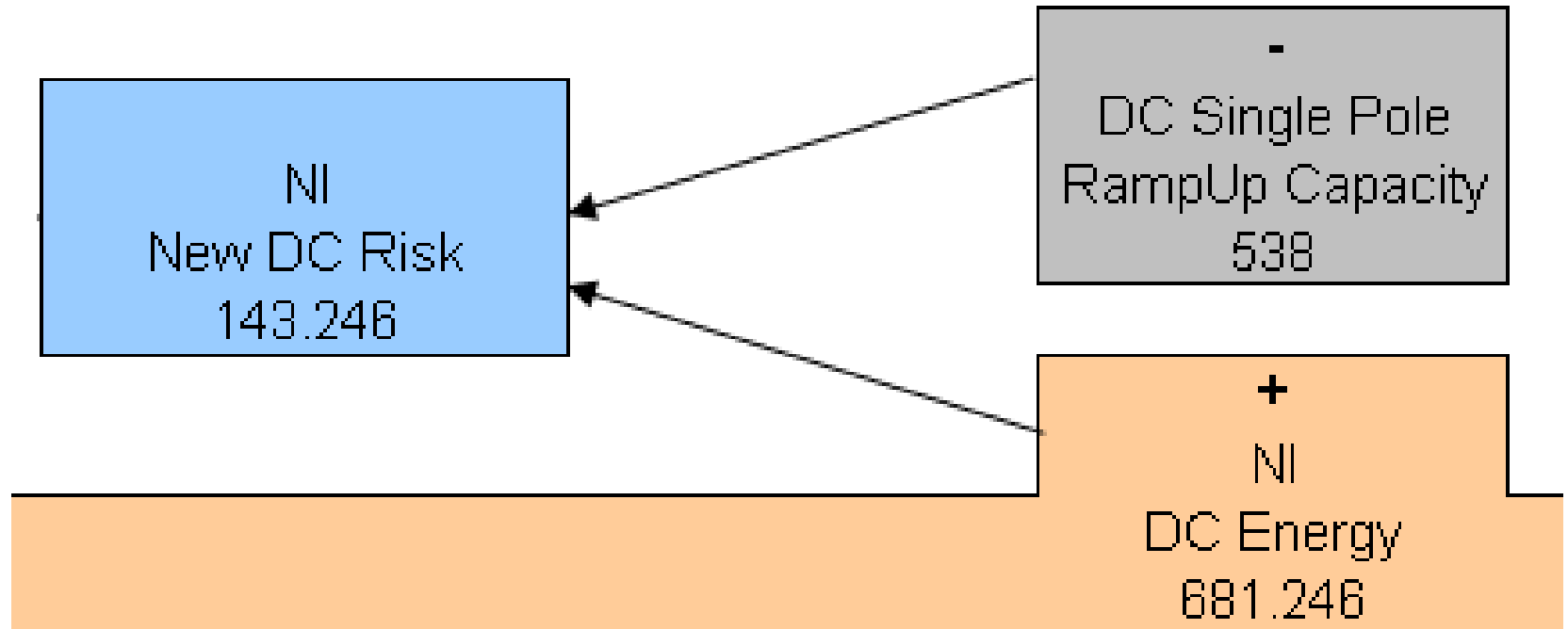
# Components cont'd

## – New Capacity Risk

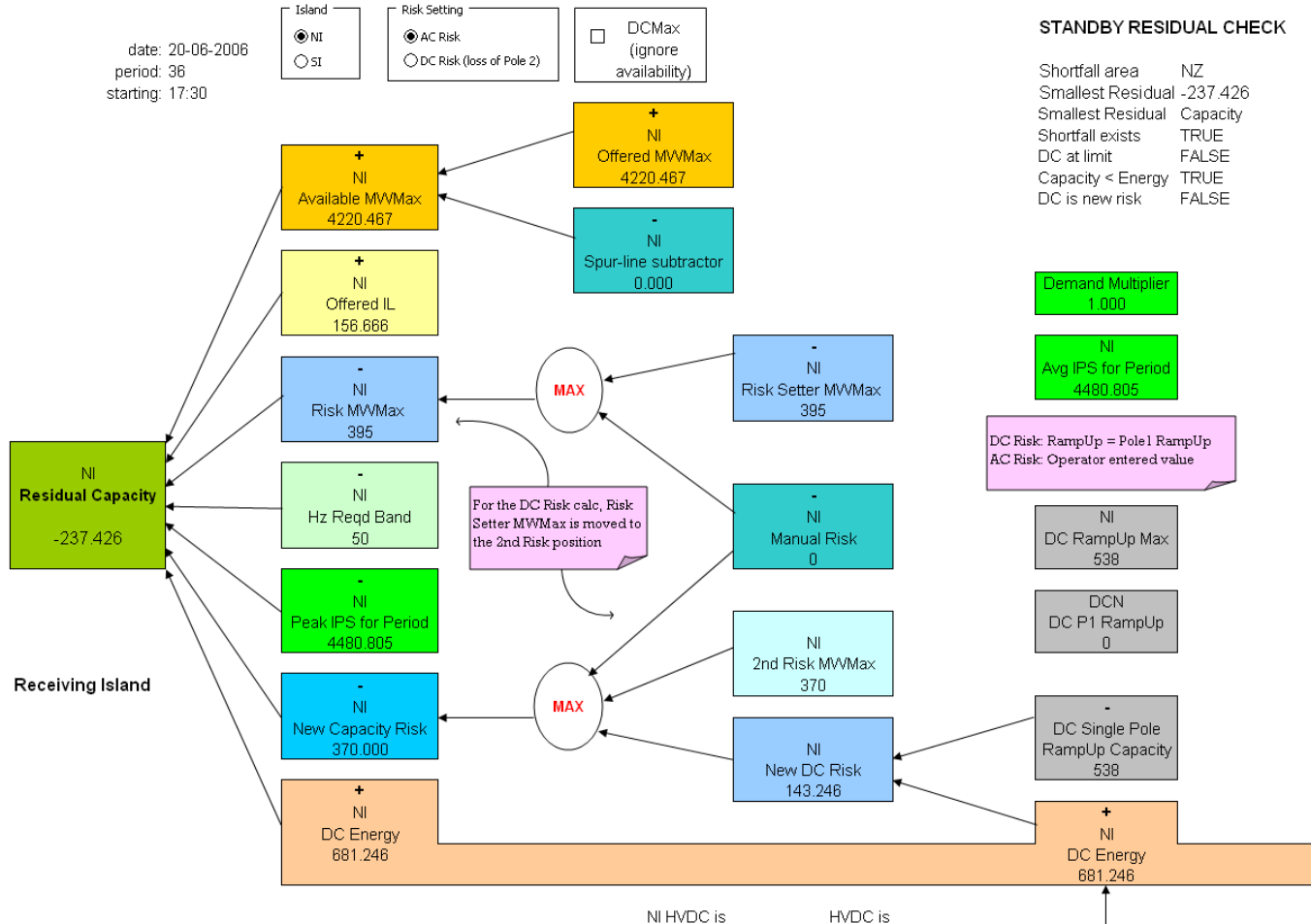


# Components cont'd

## + HVDC Received



# Components cont'd



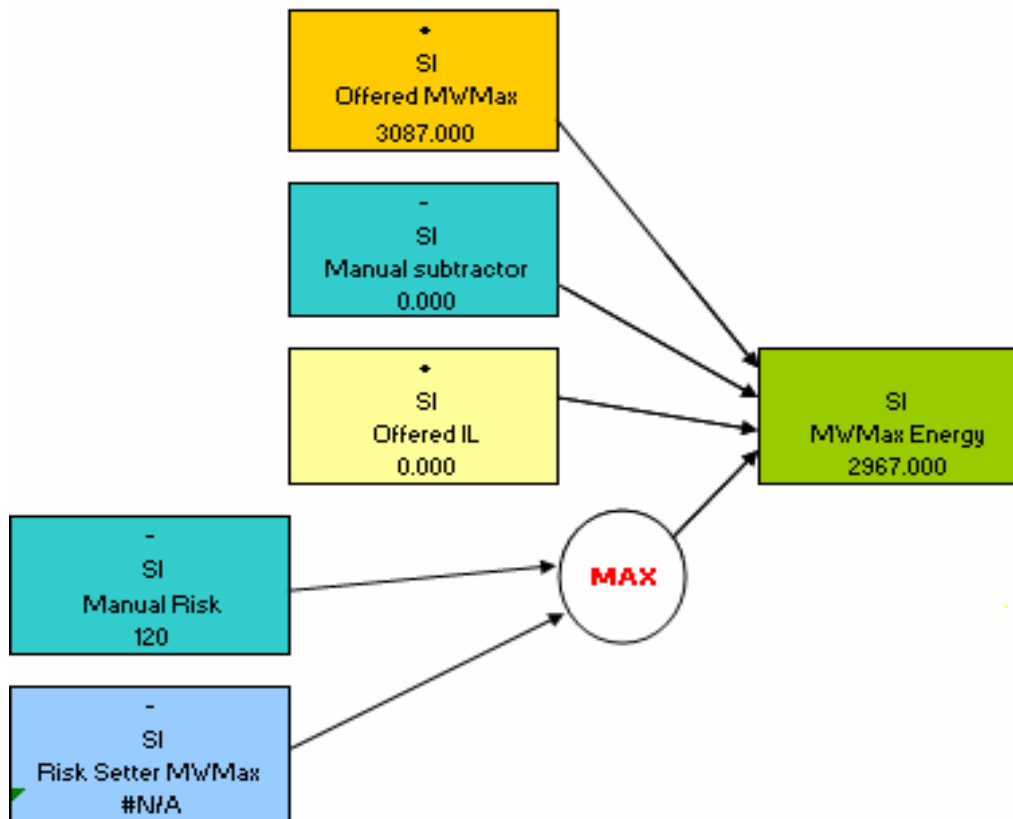
# The Checks

## Energy and Reserves Check for New Zealand

- Need to check the SI capability to supply to the North Island
- As opposed to HVDC capability to transfer SI capability

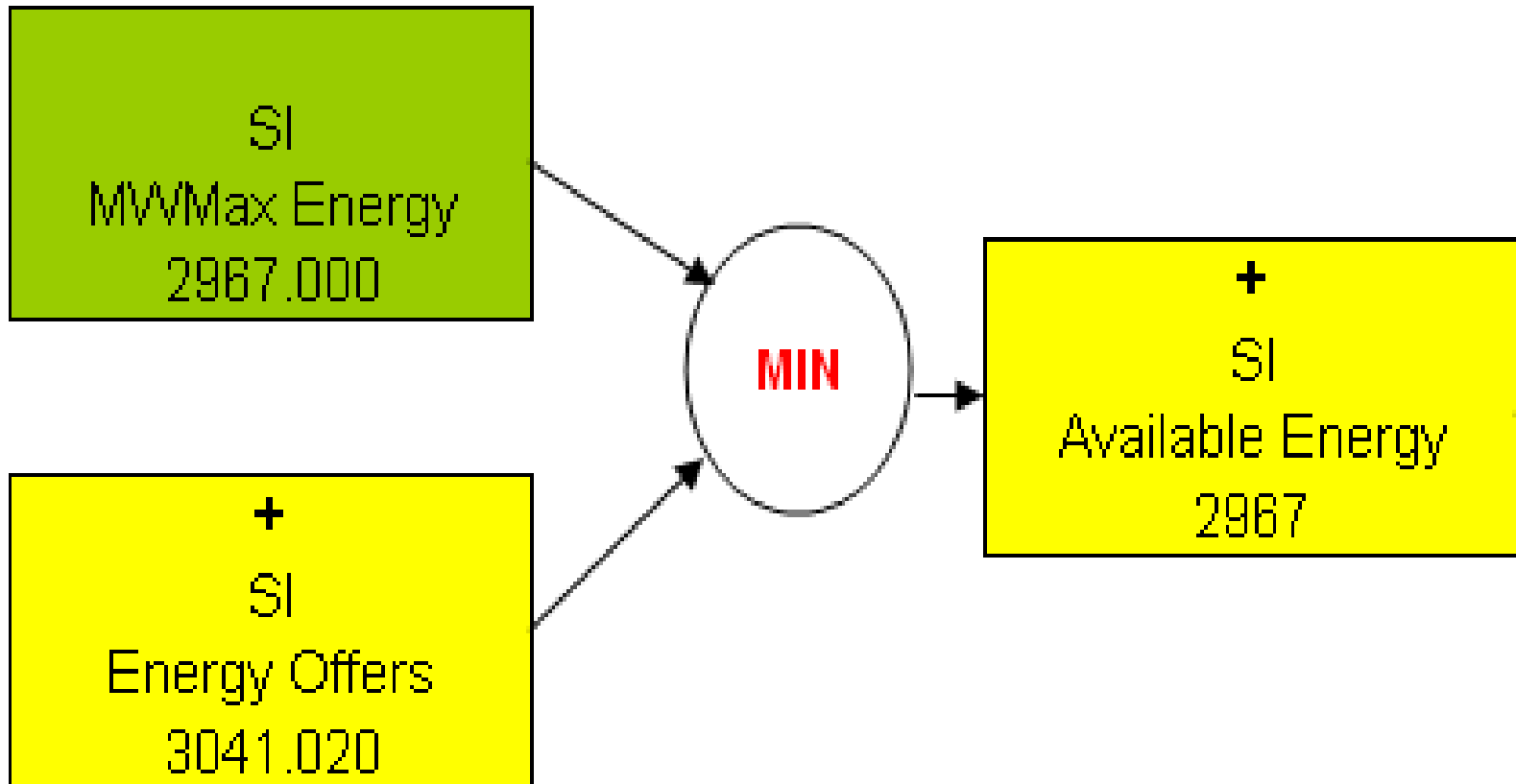
# Components cont'd

## What is available in SI for NI?



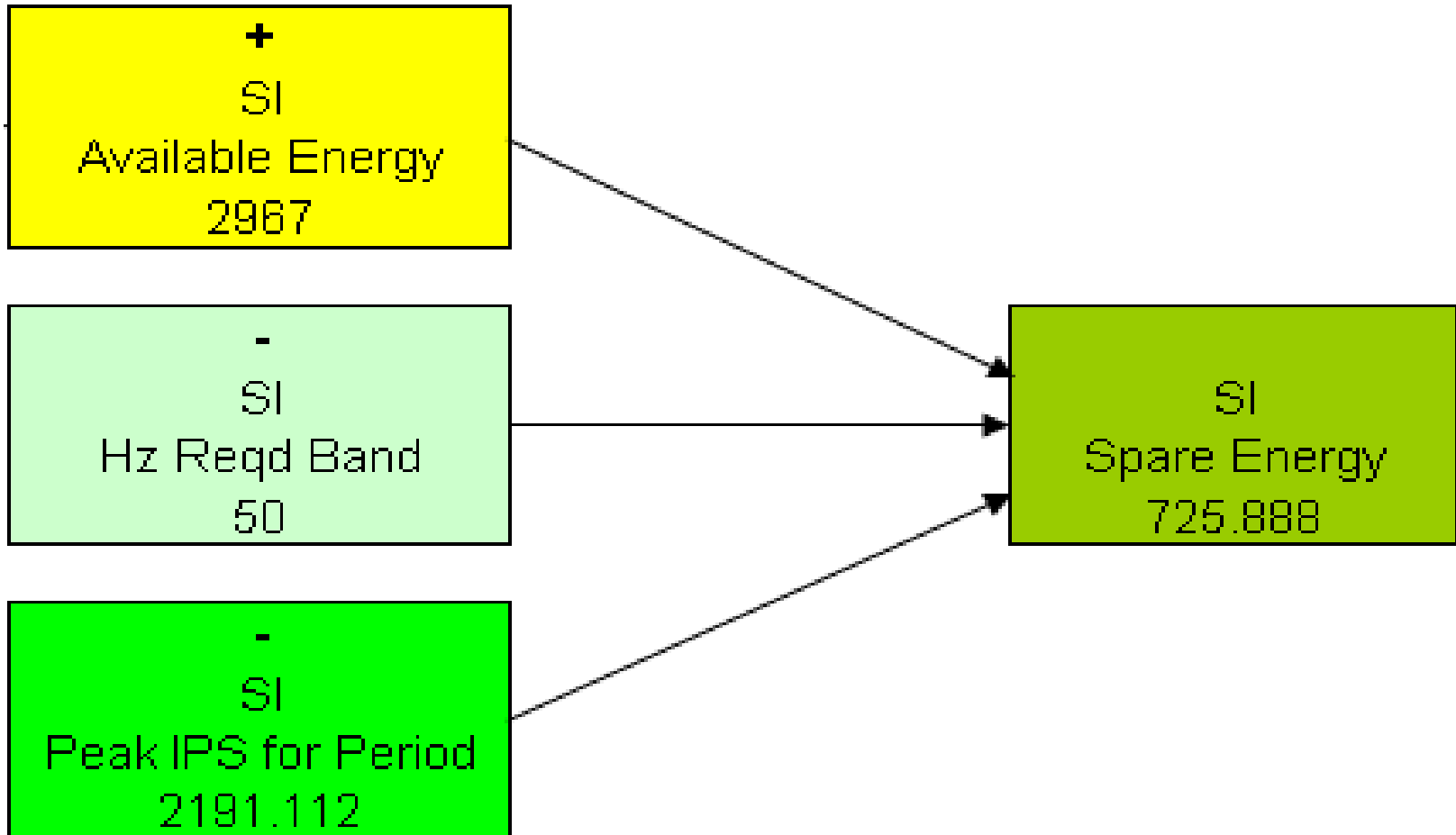
# Components

## What is available in SI for NI?



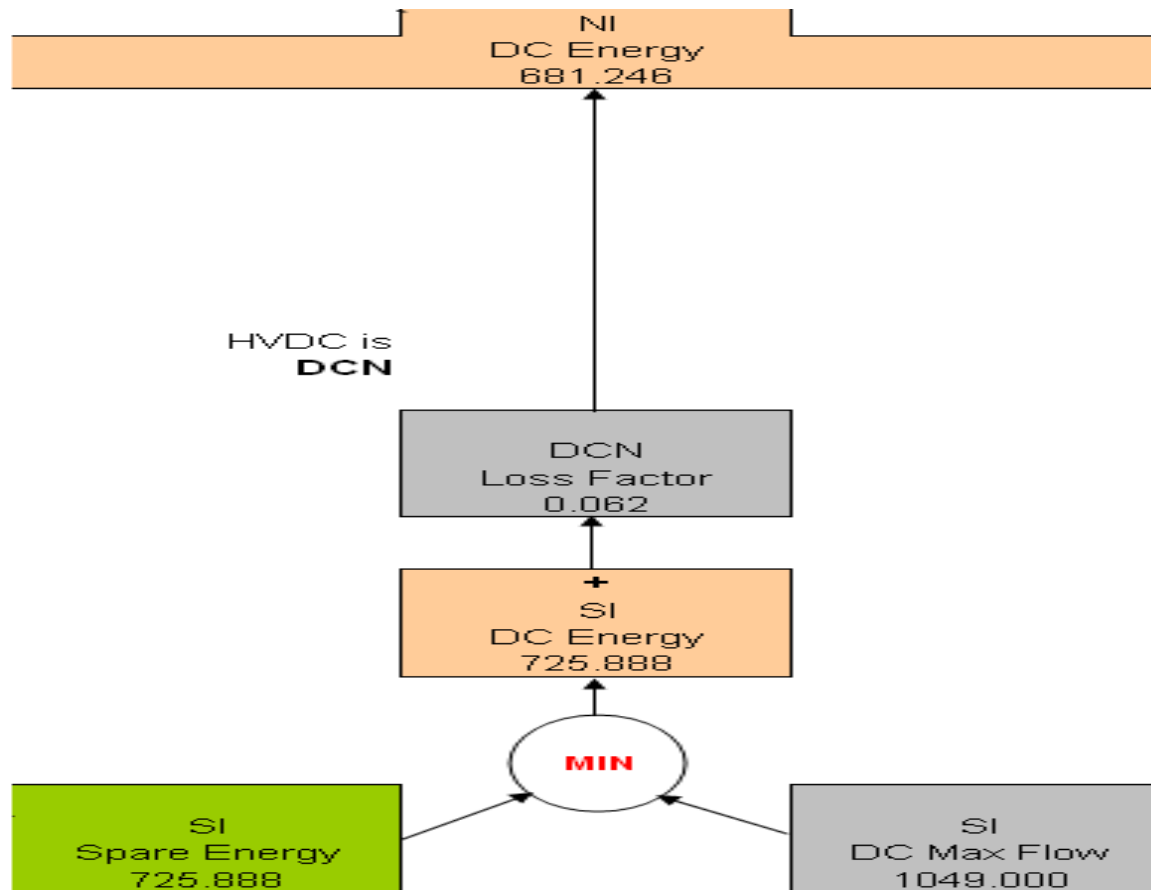
# Components cont'd

## What is available in SI for NI?



# Components

## What is available in SI for NI?



# Components cont'd

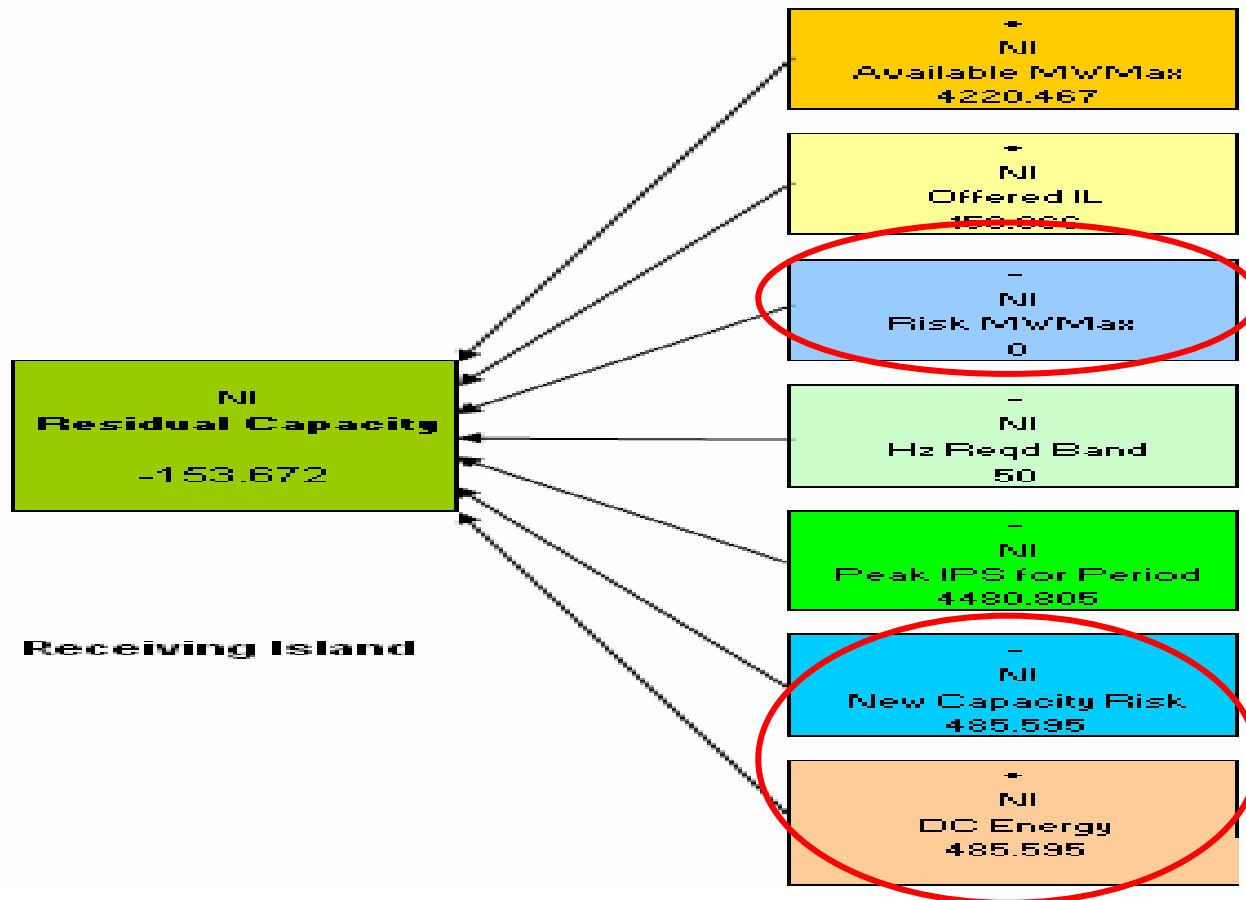
## put together with the SI capability

- + NI Available MWMAX 4220
- + NI Offered IL 156
- - NI Risk MWMAX 395
- - Hz Required Band 50
- - NI Energy Requirement 4881
- - NI Next largest risk 370
- + HVDC received (limited by SI Offers) 681
- = -237 < 0 so National problem
- Implies cannot cover another contingency for reserves post 1st event

# How much required from the NI?

- How much of the shortfall must be made up from the NI?

# DC contingency shortfall requirement

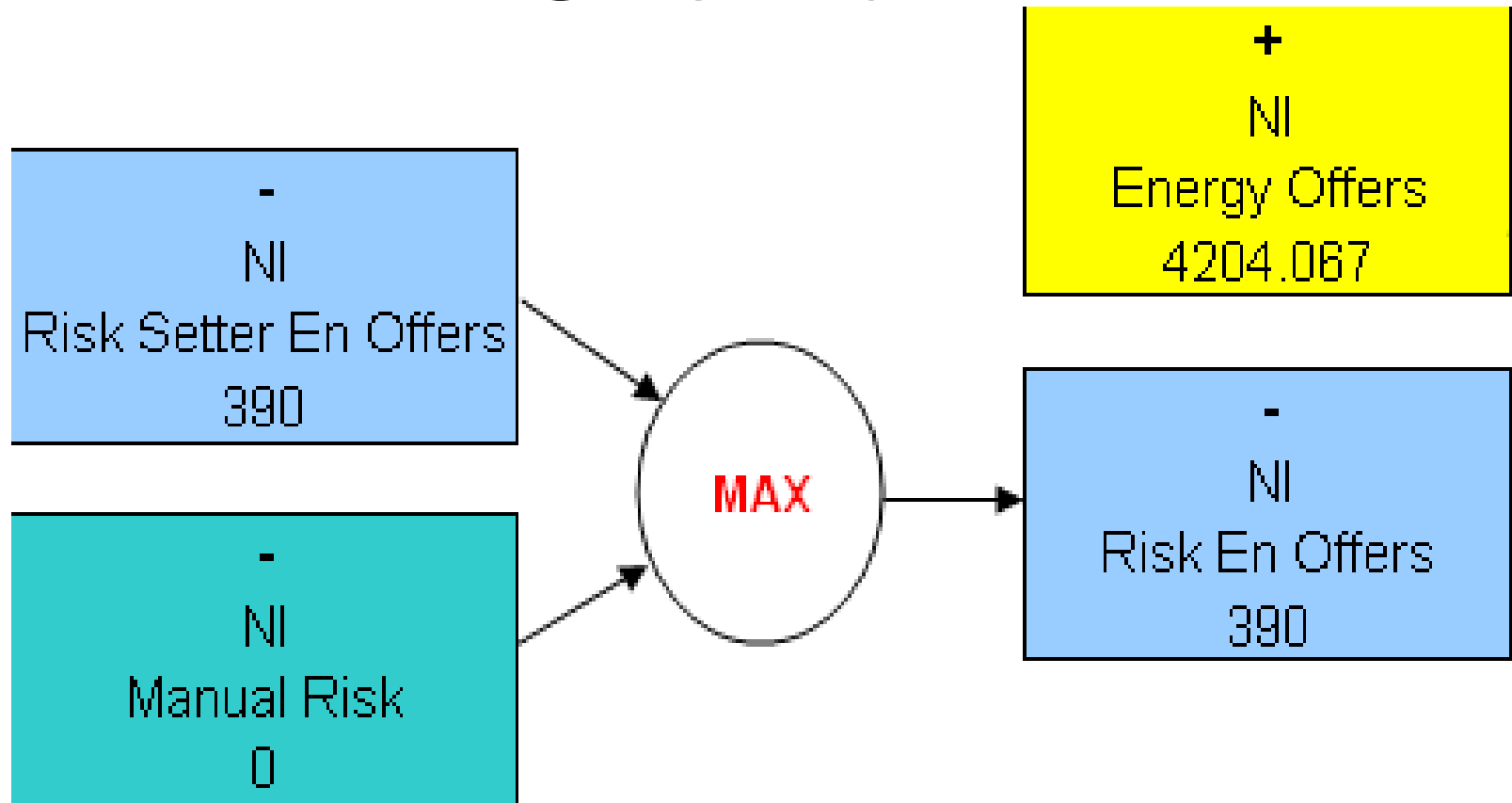


# The Checks

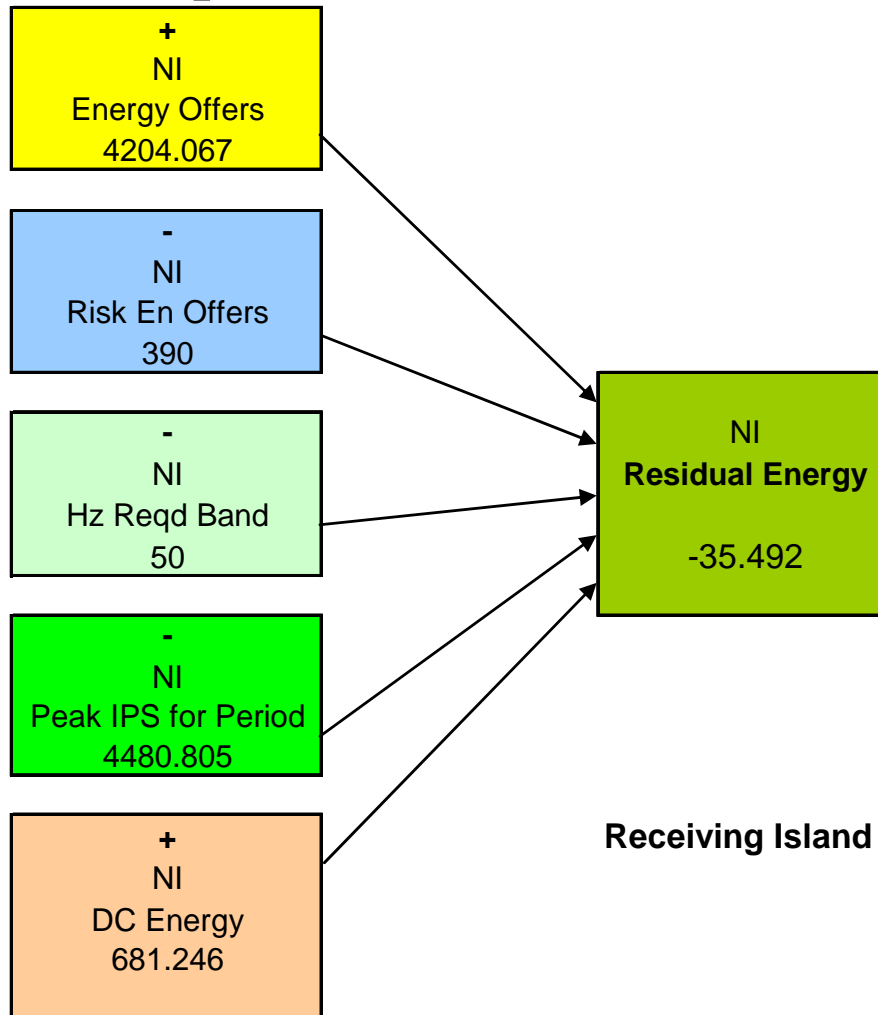
## Energy Check for the North Island

- Can we replace energy after the loss of the largest risk generator

# The components of Energy Shortfall



# Components cont'd



# Components cont'd

put together with SI capability

- + NI Energy Offers 4204
- - NI Risk energy offers 390
- - Hz required Band 50
- - NI Energy Requirement 4481
- + HVDC received (limited by SI Offers) 681
- =  $-35 < 0$  so National problem
- Implies if lose the largest risk cannot meet demand post event – the most serious scenario.

# Exercises

- Using the model for each of the data sets to answer and discuss
  - What are the issues?
    - Is it a NI or NZ problem?
    - How did you identify it in the model?
    - Can you help in the SI – doing what?
    - Can you help in the NI – doing what?