netCDF Naming Conventions

Change Log (Make a note when you make a change!):

Version	Date	Name	Comments
1.0	05/19/2014	Marc Mueller-Stoffels	Initial Document
1.01	05/21/2014	Marc Mueller-Stoffels	Update Filename format to include days/hours in filename
1.02	05/22/2014	Marc Mueller-Stoffels	Slight change to timestamp usage in file name to prevent punctuation issues on Mac OSX.
1.03	06/17/2014	Nathan Green	Changed Site to PlaceName and Installation to StationName in order to remain consistent with header convention
1.04	09/09/2014	Luis Miranda	edited the Abbreviation Conventions table: the 'Reactive Power', 'Q', units were 'var', but it looks like 'kVAR' makes more sense.
1.05	09/09/2014	Luis Miranda	Added Power Factor to the Abbreviation Conventions table. Added a few more rows to the table(Ere, Eap, Rec, Del, Net, Tot, Pos, Neg, Ang, Pf, Thd, Hmn).
1.06	10/08/2014	Luis Miranda	Added Flickering, Crest Factor, K

			Factor, Under deviation, Over deviation, Sequence and Unbalance
1.07	2/13/2015	Luis Miranda	Added Demand, Capacity, Limit, Output, Input, Setpoint, Droop, Humidity, Charge and Discharge
1.08	3/14/2016	Heike Merkel	Added Seawater heat pump

File naming

The source files will be named PlaceName-StationName-ASIMname@ISO8601-timestamp@ISO8601-period@ISO8601-sample-rate.nc

Where:

- PlaceName = Geographical location of measurement, e.g., Cordova
- StationName = Name of installation, e.g., PowerCreek. If non-descript, use an identifier such as ‘powerhouse’, ‘substation’, etc.
- ASIMname = CamelCase name such as Gen1P, Hydro4Q, see next section for a defintion. (Corresponds to ChannelName)
- ISO8601-timestamp = 2014-04-01T000000Z, that is YYYY-MM-DDTHHMMSSZ(all times use UTC, without exception)
- ISO8601-period = P1M (Period 1 Month)
- ISO8601-sampling rate = PT1S (Sampling Rate 1 Second) (Time in between two measurements)

  [To resolve ambiguity, "P1M" is a one-month duration and "PT1M" is a one-minute duration (note the time designator, T, that precedes the time value).]

More info on ISO8601: http://en.wikipedia.org/wiki/ISO_8601

Example:
The reactive power on turbine 1 in the Power Creek Hydrostation at Cordova for the month of May 2013, starting at May 1, 000000 UTC, sampled at 1 second intervals would be:

Cordova-PowerCreek-Hydro1Q@2013-05-01T000000Z@P1M@PT1S.nc

ASIM Naming

ASIM is a hybrid simulator for power systems available from www.powerwater.com.au/solardiesel. It uses a moderately concise naming convention which is useful the translation, creation and checking of names.

1. All names are in CamelCase, which means that individual components of the name consist of a Bigchar followed by 0 or more Littlechar where Bigchar = A..Z,0..9,_ and Littlechar = a..z,0..9. Names are sequences of components which in turn are abbreviations for values. The final component often defines the measured unit, e.g. P → kW, Q → kvar, F → Hz. For example:

Wtg33P → Wtg 33 P → Wind Turbine Generator 33 Power in kW
Gen1P → Gen 1 P → Generator 1 Power in kW

2. Derived statistics over time ranges are often represented using the stat component, e.g. the daily minimum of Wtg1WindSpd might be named Wtg1WindSpd_min

3. For each unit a single precision and scale will be selected from the IEEE/SI section: http://www.ewh.ieee.org/soc/ias/pub-dept/abbreviation.pdf.

Abbreviation Conventions (add more as needed; damn Google docs doesn't allow sorting tables, so pardon the mess):

Abbreviation	Description	Units	Comment
Gen	Diesel Generator	N/A	
Tg	Fuel driven turbine generator	N/A	E.g., a CapStone turbine
Orc	Organic Rankine Cycle Generator	N/A	
Nuc	Nuclear Power Plant	N/A	
Wtg	Wind turbine generator	N/A	

Hydro	Hydropower turbine	N/A	Traditional hydro power
Rhk	In-river hydrokinetic generator	N/A	
Mhk	Marine hydrokinetic generator	N/A	Wave and tidal energy
Pv	Solar PV Generator	N/A	
Hpmp	Heat pump	N/A	Sea water heat pump
Sys	System Measurement	N/A	E.g., total power online - sum of all generator P's online
Bus	Measurements at a bus	N/A	E.g., the aggregated power of several generators.
Load	Measurements at a load	N/A	
Fed	Feeder measurements	N/A	
Disp	Dispatchable Load	N/A	E.g., a boiler or secondary load controller
Pcc	Point of Common Coupling	N/A	
Bat	Battery	N/A	
Fw	Fly-wheel	N/A	
Cap	Capacitor	N/A	
P	Real Power	kW	Follow same convention as Voltage (see Vxy) for specific phase measurements
Q	Reactive Power	kVAR	Follow same convention as Voltage (see Vxy) for

			specific phase measurements
S	Apparent Power	kVA	S = (P^2 + Q^2)^(½) Follow same convention as Voltage (see Vxy) for specific phase measurements
F	Frequency	Hz	
I	3-phase RMS or DC Current	A	
V	3-phase RMS or DC Voltage	V	
Ix	Line Current	A	With x ={a,b,c}, e.g. measurement from phase A: Ia
Vxy	Line-to-line, or line-to-neutral voltage	V	With x,y ={a,b,c,n}, e.g. measurement from phase A to B: Vab
T	Temperature	K	
Pres	Pressure	kPa	
E	Energy	kWh	
Ere	Reactive Energy	kVARh	
Eap	Apparent Energy	kVAh	
St	Status	Boolean	1 is good, 0 is bad
Al	Alarm	Boolean	1 is Alarm is active, 0 is Alarm is inactive
Set	Setpoint	N/A	
Max	Maximum	N/A	
Min	Minimum	N/A	
Std	Standard Deviation	N/A	

Mean	Average	N/A	Arithmetic Mean/Average = sum of elements/number of elements
Avail	Available	N/A	E.g., the power available from a PV array would be PAvail
Spin	Spinning reserve	N/A	E.g., spinning reserve power would be PSpin
Rec	Received	N/A	
Del	Delivered	N/A	
Net	Net	N/A	
Tot	Total	N/A	
Ang	Phase Angle	Degrees	
Pf	Power Factor	N/A	
Pos	Positive	N/A	Can be applied to Reactive Energy, referring to Inductive Energy
Neg	Negative	N/A	Can be applied to Reactive Energy, referring to Capacitive Energy
Thd	Total Harmonic Distortion	%	
Hmn	nth Harmonic Magnitude	N/A	
Flicknks	Flickering	N/A	Ficker of line n for k seconds
Crestf	Crest Factor	N/A	.i .e, VnCrestf
Kf	K Factor	N/A	
Od	Over Deviation		

Ud	Under Deviation		
Seq	Sequence	N/A	.i .e, VPosSeq
Unb	Unbalance	N/A	
Dem	Demand	N/A	PDem at Inverter
Capacity	Capacity	N/A	PCapacity at Inverter
Lim	Limit	N/A	PLimDem set point given to an Inverter
Out	Output	N/A	An Inverter measured output
In	Input	N/A	An Inverter measured input
Setpoint	Setpoint	N/A	A given PSetpoint to an Inverter
Droop	Droop	%	Voltage/Frequency Droop
Humidity	Humidity	%	Inverter enclosure Humidity
Charge	Charge	N/A	Inverter charge capacity
Discharge	Discharge	N/A	Inverter discharge capacity
Hght	Height/Length	meter	.i .e, DamHght

Derived Data and SCADA Systems

The alert reader will have noticed that some of the data in the SCADA system may require mangling to get it into a format suitable for our naming convention, e.g.

1. CORD_COM_GEN3_ST might be a 16 bit register where bit 1=running, bit 2=stopped, bit 3=overload so we'd need to generate Gen3RunningSt, Gen3StoppedSt and Gen3OverloadSt from the single 16 bit register.
2. CORD_SQ_WTG1_MW would be be mapped to Wtg1P but would be in kW (not MW).

3. Sums/min/maxs of data are often required, e.g. given a grid with N points of measurement knowing that SysMinV > 0 indicates that the system is operating. LoadP is very useful to have.
4. It is certain that some of the SCADA data will be in the wrong units, not connected or upside down. Once you have the data in the common naming format rules for checking include things such as Gen1P > 10 implies Gen1RunningSt. Using a set of rules for this is a good idea.