**Per-window energy**

(

(

avg\_over\_time(argus\_container\_cpu\_util\_pct[WINDOW]) / 100 \* (65 / 1000)

+

(

(avg\_over\_time(argus\_container\_gpu\_util\_pct[WINDOW])

or

avg\_over\_time(argus\_container\_cpu\_util\_pct[WINDOW]) \* 0)

) / 100 \* (200 / 1000)

)

) \* (WINDOW\_SECONDS / 3600)

**Carbon Footprint (Last 15 seconds)**

sum(

(

(

avg\_over\_time(argus\_container\_cpu\_util\_pct[15s]) / 100 \* (65 / 1000)

+

(

(avg\_over\_time(argus\_container\_gpu\_util\_pct[15s])

or

avg\_over\_time(argus\_container\_cpu\_util\_pct[15s]) \* 0)

) / 100 \* (200 / 1000)

)

) \* (15 / 3600)

) \* scalar(region\_no2\_emission\_factor{region="Manila"} or vector(0.691))

**Carbon Footprint (Last 5 minutes)**

sum(

(

(

avg\_over\_time(argus\_container\_cpu\_util\_pct[5m]) / 100 \* (65 / 1000)

+

(

(avg\_over\_time(argus\_container\_gpu\_util\_pct[5m])

or

avg\_over\_time(argus\_container\_cpu\_util\_pct[5m]) \* 0)

) / 100 \* (200 / 1000)

)

) \* (300 / 3600)

) \* scalar(region\_no2\_emission\_factor{region="Manila"} or vector(0.691))

**Carbon Footprint (Last 20 minutes)**

sum(

(

(

avg\_over\_time(argus\_container\_cpu\_util\_pct[20m]) / 100 \* (65 / 1000)

+

(

(avg\_over\_time(argus\_container\_gpu\_util\_pct[20m])

or

avg\_over\_time(argus\_container\_cpu\_util\_pct[20m]) \* 0)

) / 100 \* (200 / 1000)

)

) \* (1200 / 3600)

) \* scalar(region\_no2\_emission\_factor{region="Manila"} or vector(0.691))

**Carbon Footprint (Last hour)**

sum(

(

(

avg\_over\_time(argus\_container\_cpu\_util\_pct[1h]) / 100 \* (65 / 1000)

+

(

(avg\_over\_time(argus\_container\_gpu\_util\_pct[1h])

or

avg\_over\_time(argus\_container\_cpu\_util\_pct[1h]) \* 0)

) / 100 \* (200 / 1000)

)

) \* (3600 / 3600)

) \* scalar(region\_no2\_emission\_factor{region="Manila"} or vector(0.691))

**Heat Index (Last 15 seconds)**

avg\_over\_time(argus\_container\_sensor\_temp\_c[15s])

+

0.5 \*

(

increase(argus\_cpu\_throttle\_total[15s])

or avg\_over\_time(argus\_container\_sensor\_temp\_c[15s]) \* 0

)

**Heat Index (Last 5 minutes)**

avg\_over\_time(argus\_container\_sensor\_temp\_c[5m])

+

0.5 \*

(

increase(argus\_cpu\_throttle\_total[5m])

or avg\_over\_time(argus\_container\_sensor\_temp\_c[5m]) \* 0

)

**Heat Index (Last 20 minutes)**

avg\_over\_time(argus\_container\_sensor\_temp\_c[20m])

+

0.5 \*

(

increase(argus\_cpu\_throttle\_total[20m])

or avg\_over\_time(argus\_container\_sensor\_temp\_c[20m]) \* 0

)

**Heat Index (Last hour)**

avg\_over\_time(argus\_container\_sensor\_temp\_c[1h])

+

0.5 \*

(

increase(argus\_cpu\_throttle\_total[1h])

or avg\_over\_time(argus\_container\_sensor\_temp\_c[1h]) \* 0

)

**Urban Heat Island (Last 15 seconds)**

avg(

avg\_over\_time(argus\_container\_cpu\_util\_pct\_zone{zone="urban"}[15s])

)

-

avg(

avg\_over\_time(argus\_container\_cpu\_util\_pct\_zone{zone="rural"}[15s])

)

**Urban Heat Island (Last 5 minutes)**

avg(

avg\_over\_time(argus\_container\_cpu\_util\_pct\_zone{zone="urban"}[5m])

)

-

avg(

avg\_over\_time(argus\_container\_cpu\_util\_pct\_zone{zone="rural"}[5m])

)

**Urban Heat Island (Last 20 minutes)**

avg(

avg\_over\_time(argus\_container\_cpu\_util\_pct\_zone{zone="urban"}[20m])

)

-

avg(

avg\_over\_time(argus\_container\_cpu\_util\_pct\_zone{zone="rural"}[20m])

)

**Urban Heat Island (Last hour)**

avg(

avg\_over\_time(argus\_container\_cpu\_util\_pct\_zone{zone="urban"}[1h])

)

-

avg(

avg\_over\_time(argus\_container\_cpu\_util\_pct\_zone{zone="rural"}[1h])

)

**Early Warning System (Starter)**

histogram\_quantile(

0.95,

sum(rate(h\_app\_latency\_seconds\_bucket[WINDOW])) by (le, instance, host\_id, container\_id)

)

**Early Warning System (Last 15 seconds)**

(

(avg\_over\_time(argus\_app\_error\_rate\_pct[15s]) > bool 5)

or

(histogram\_quantile(0.95, sum(rate(h\_app\_latency\_seconds\_bucket[15s])) by (le, instance, host\_id, container\_id)) > bool 0.5)

or

(increase(argus\_pod\_restarts\_total[15s]) > bool 3)

)

or on(instance,host\_id,container\_id) vector(0)

**Early Warning System (Last 5 minutes)**

(

(avg\_over\_time(argus\_app\_error\_rate\_pct[5m]) > bool 5)

or

(histogram\_quantile(0.95, sum(rate(h\_app\_latency\_seconds\_bucket[5m])) by (le, instance, host\_id, container\_id)) > bool 0.5)

or

(increase(argus\_pod\_restarts\_total[5m]) > bool 3)

)

or on(instance,host\_id,container\_id) vector(0)

**Early Warning System (Last 20 minutes)**

(

(avg\_over\_time(argus\_app\_error\_rate\_pct[20m]) > bool 5)

or

(histogram\_quantile(0.95, sum(rate(h\_app\_latency\_seconds\_bucket[20m])) by (le, instance, host\_id, container\_id)) > bool 0.5)

or

(increase(argus\_pod\_restarts\_total[20m]) > bool 3)

)

or on(instance,host\_id,container\_id) vector(0)

**Early Warning System (Last hour)**

(

(avg\_over\_time(argus\_app\_error\_rate\_pct[1h]) > bool 5)

or

(histogram\_quantile(0.95, sum(rate(h\_app\_latency\_seconds\_bucket[1h])) by (le, instance, host\_id, container\_id)) > bool 0.5)

or

(increase(argus\_pod\_restarts\_total[1h]) > bool 3)

)

or on(instance,host\_id,container\_id) vector(0)

**Drought Vulnerability (Last 15 seconds)**

(

sum(

(

(

avg\_over\_time(argus\_container\_cpu\_util\_pct[15s]) / 100 \* (65 / 1000)

+

(

(avg\_over\_time(argus\_container\_gpu\_util\_pct[15s])

or

avg\_over\_time(argus\_container\_cpu\_util\_pct[15s]) \* 0)

) / 100 \* (200 / 1000)

)

) \* (15 / 3600)

)

\* scalar(region\_wue{region="Manila"} or vector(0))

)

+

scalar(region\_water\_avail{region="Manila"} or vector(0))

**Drought Vulnerability (Last 5 minutes)**

(

sum(

( (avg\_over\_time(argus\_container\_cpu\_util\_pct[5m]) /100 \* (65/1000)

+

((avg\_over\_time(argus\_container\_gpu\_util\_pct[5m]) or avg\_over\_time(argus\_container\_cpu\_util\_pct[5m]) \* 0)/100 \* (200/1000))

) \* (300/3600) )

) \* scalar(region\_wue{region="Manila"} or vector(0))

)

+ scalar(region\_water\_avail{region="Manila"} or vector(0))

**Drought Vulnerability (Last 20 minutes)**

(

sum(

( (avg\_over\_time(argus\_container\_cpu\_util\_pct[20m]) /100 \* (65/1000)

+

((avg\_over\_time(argus\_container\_gpu\_util\_pct[20m]) or avg\_over\_time(argus\_container\_cpu\_util\_pct[20m]) \* 0)/100 \* (200/1000))

) \* (300/3600) )

) \* scalar(region\_wue{region="Manila"} or vector(0))

)

+ scalar(region\_water\_avail{region="Manila"} or vector(0))

**Drought Vulnerability (Last hour)**

(

sum(

( (avg\_over\_time(argus\_container\_cpu\_util\_pct[60m]) /100 \* (65/1000)

+

((avg\_over\_time(argus\_container\_gpu\_util\_pct[60m]) or avg\_over\_time(argus\_container\_cpu\_util\_pct[60m]) \* 0)/100 \* (200/1000))

) \* (300/3600) )

) \* scalar(region\_wue{region="Manila"} or vector(0))

)

+ scalar(region\_water\_avail{region="Manila"} or vector(0))

**Monsoon Extremes (Last 15 seconds)**

clamp\_max(

clamp\_min(

1 - (

(increase(argus\_failover\_events\_total[15s]) or vector(0)) \* 30

) / 15

, 0)

, 1)

**Monsoon Extremes (Last 5 minutes)**

clamp\_max(

clamp\_min(

1 - (

(increase(argus\_failover\_events\_total[5m]) or vector(0)) \* 30

) / 300

, 0)

, 1)

**Monsoon Extremes (Last 20 minutes)**

clamp\_max(

clamp\_min(

1 - (

(increase(argus\_failover\_events\_total[20m]) or vector(0)) \* 30

) / 1200

, 0)

, 1)

**Monsoon Extremes (Last hour)**

clamp\_max(

clamp\_min(

1 - (

(increase(argus\_failover\_events\_total[1h]) or vector(0)) \* 30

) / 3600

, 0)

, 1)

**Tropical Cyclone Index (Last 15 seconds)**

(

(increase(argus\_failover\_events\_total[15s]) or vector(0))

+

(increase(argus\_latency\_spike\_total[15s]) or vector(0))

)

/

(

scalar(sum(argus\_orchestrator\_pod\_count) or vector(1))

)

**Tropical Cyclone Index (Last 5 minutes)**

(

(increase(argus\_failover\_events\_total[5m]) or vector(0))

+

(increase(argus\_latency\_spike\_total[5m]) or vector(0))

)

/

(

scalar(sum(argus\_orchestrator\_pod\_count) or vector(1))

)

**Tropical Cyclone Index (Last 20 minutes)**

(

(increase(argus\_failover\_events\_total[20m]) or vector(0))

+

(increase(argus\_latency\_spike\_total[20m]) or vector(0))

)

/

(

scalar(sum(argus\_orchestrator\_pod\_count) or vector(1))

)

**Tropical Cyclone Index (Last hour)**

(

(increase(argus\_failover\_events\_total[20m]) or vector(0))

+

(increase(argus\_latency\_spike\_total[20m]) or vector(0))

)

/

(

scalar(sum(argus\_orchestrator\_pod\_count) or vector(1))

)

**Air Quality (Last 15 seconds)**

sum(

(

(

avg\_over\_time(argus\_container\_cpu\_util\_pct[15s]) / 100 \* (65 / 1000)

+

(

(avg\_over\_time(argus\_container\_gpu\_util\_pct[15s])

or

avg\_over\_time(argus\_container\_cpu\_util\_pct[15s]) \* 0)

) / 100 \* (200 / 1000)

)

) \* (15 / 3600)

) \* scalar(region\_no2\_emission\_factor{region="Manila"} or vector(0.691))

**Air Quality (Last 5 minutes)**

sum(

(

(

avg\_over\_time(argus\_container\_cpu\_util\_pct[5m]) / 100 \* (65 / 1000)

+

(

(avg\_over\_time(argus\_container\_gpu\_util\_pct[5m])

or

avg\_over\_time(argus\_container\_cpu\_util\_pct[5m]) \* 0)

) / 100 \* (200 / 1000)

)

) \* (15 / 3600)

) \* scalar(region\_no2\_emission\_factor{region="Manila"} or vector(0.691))

**Air Quality (Last 20 minutes)**

sum(

(

(

avg\_over\_time(argus\_container\_cpu\_util\_pct[20m]) / 100 \* (65 / 1000)

+

(

(avg\_over\_time(argus\_container\_gpu\_util\_pct[20m])

or

avg\_over\_time(argus\_container\_cpu\_util\_pct[20m]) \* 0)

) / 100 \* (200 / 1000)

)

) \* (15 / 3600)

) \* scalar(region\_no2\_emission\_factor{region="Manila"} or vector(0.691))

**Air Quality (Last hour)**

sum(

(

(

avg\_over\_time(argus\_container\_cpu\_util\_pct[60m]) / 100 \* (65 / 1000)

+

(

(avg\_over\_time(argus\_container\_gpu\_util\_pct[60m])

or

avg\_over\_time(argus\_container\_cpu\_util\_pct[60m]) \* 0)

) / 100 \* (200 / 1000)

)

) \* (15 / 3600)

) \* scalar(region\_no2\_emission\_factor{region="Manila"} or vector(0.691))