**1️ Show all recent data**

from(bucket: "energy\_lab")

|> range(start: -24h)

*Fetches every record from the last 24 hours.*

### 2️ Filter by measurement

from(bucket: "energy\_lab")

|> range(start: -1h)

|> filter(fn: (r) => r.\_measurement == "power\_samples")

Keeps only rows written to the *power\_samples* measurement.

### 3️ Filter a specific field

from(bucket: "energy\_lab")

|> range(start: -24h)

|> filter(fn: (r) => r.\_measurement == "power\_samples" and r.\_field == "vrms")

Shows only voltage readings.

### 4 Filter by tag (sensor name)

from(bucket: "energy\_lab")

|> range(start: -30m)

|> filter(fn: (r) => r.sensor == "sim\_pi01")

Selects data from one sensor.

### 5 Latest reading only

from(bucket: "energy\_lab")

|> range(start: -1h)

|> filter(fn: (r) => r.\_field == "p\_real")

|> last()

👉 Returns the newest real-power value.

### 6 Minimum and maximum voltage

data = from(bucket: "energy\_lab")

|> range(start: -6h)

|> filter(fn: (r) => r.\_field == "vrms")

minV = data |> min()

maxV = data |> max()

union(tables: [minV, maxV])

Shows the min and max voltages in the last 6 hours.

### 7 Count how many samples were written

from(bucket: "energy\_lab")

|> range(start: -24h)

|> filter(fn: (r) => r.\_measurement == "power\_samples")

|> count()

Counts total records stored today.

### 8 Average voltage per site

from(bucket: "energy\_lab")

|> range(start: -2h)

|> filter(fn: (r) => r.\_field == "vrms")

|> group(columns: ["site"])

|> mean()

Aggregates by the *site* tag.

### 9 Find the time of highest power

from(bucket: "energy\_lab")

|> range(start: -24h)

|> filter(fn: (r) => r.\_field == "p\_real")

|> max()

Returns the row with the highest *p\_real* and its timestamp.

### 10 Compute apparent vs real power ratio

p = from(bucket: "energy\_lab")

|> range(start: -2h)

|> filter(fn: (r) => r.\_field == "p\_real")

s = from(bucket: "energy\_lab")

|> range(start: -2h)

|> filter(fn: (r) => r.\_field == "s\_apparent")

join(tables: {p: p, s: s}, on: ["\_time","sensor"])

|> map(fn: (r) => ({ r with \_value: r.\_value\_p / r.\_value\_s, \_field: "PF\_calc" }))

Joins two fields to compute PF = P / S.

### 11 Detect low-voltage events (< 231.5 V)

from(bucket: "energy\_lab")

|> range(start: -24h)

|> filter(fn: (r) => r.\_field == "vrms")

|> filter(fn: (r) => r.\_value < 231.5)

Lists every point where voltage dipped below 231.5 V.

### 12 Latest stats of multiple fields

fields = ["vrms","irms","p\_real","pf","energy\_kwh"]

from(bucket: "energy\_lab")

|> range(start: -10h)

|> filter(fn: (r) => r.\_measurement == "power\_samples" and contains(value: r.\_field, set: fields))

|> group(columns: ["\_field"])

|> last()

Provides the most recent value of each metric

### 13 Power vs Voltage correlation

join(

tables: {

v: from(bucket: "energy\_lab")

|> range(start: -1h)

|> filter(fn: (r) => r.\_field == "vrms"),

p: from(bucket: "energy\_lab")

|> range(start: -1h)

|> filter(fn: (r) => r.\_field == "p\_real")

},

on: ["\_time","sensor"]

)

|> map(fn: (r) => ({ r with \_value: r.\_value\_p / r.\_value\_v, \_field: "P\_per\_V" }))

Illustrates how power varies with voltage.

### 14 Daily summary table (min/avg/max power)

p = from(bucket: "energy\_lab")

|> range(start: -1d)

|> filter(fn: (r) => r.\_field == "p\_real")

union(tables: [

p |> min() |> map(fn: (r) => ({ r with stat: "min" })),

p |> mean() |> map(fn: (r) => ({ r with stat: "mean" })),

p |> max() |> map(fn: (r) => ({ r with stat: "max" }))

])

|> group(columns: ["stat"])

Creates a compact table comparing min/avg/max.