weaveworks

⚡Lightning Talk

# Green(ing) CI/CD: A Sustainability Journey with GitOps

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Confidential do not distribute

# Energy Usage: Data Centers

- Data centers account for 1-1.5% of global electricity use (International Energy Agency 2022)

# Energy Usage: Traditional CI

- Deploy at the end of CI
- GitHub Actions runners = EC2 instances
- No granular carbon/energy data
- Lack of monitoring

# Energy Usage: `flux-system` Namespace

**Flux + eBPF-based Kepler + Prometheus**

```
curl -sG http://localhost:9090/api/v1/query
--data-urlencode
"query=sum(rate(pod_curr_energy_millijoule
{pod_namespace='flux-system'}[24h]))" | jq
```

github.com/nikimanoledaki/
sustainability-journey-with-gitops


```
{
  "status": "success",
  "data": {
    "resultType": "vector",
    "result": [
      {
        "metric": {},
        "value": [
          1666707733.214,
          "807640069765.2614"
        ]
      }
    ]
  }
}
```

# Energy Usage: `flux-system` Namespace

**~ total 186.95 W in 24 hours!**

**9.8 smartphones charged**

(US Environmental Protection Agency,
Greenhouse Gas Equivalencies Calculator)

# Declarative GitOps → Turn IT Off 💡

**Metrics + GitOps + Scheduling + Policies**

# GitOps Facilitates Green Tools

**Energy Metrics**
Kepler

**Carbon Metrics**
WattTime API
Electricity Maps

**Scheduling**
Karpenter
KEDA
Nomad
Intel k8s power manager
Intel TAS

# Next Steps 🌱

- Use metrics optimise / compare GitOps-based architectures
- Adapt eBPF-based Kepler to more environments

**GitOps WG - Environmental Sustainability Subgroup**
**Tuesday 15th November at 6pm CET/12pm ET/9am PT**
**#opengitops CNCF Slack**