UNI CLIMATE FRIENDLY ENERGY PLAN

Plan Summary:

The goal for this updated energy plan is to move the University of Northern Iowa away from its sole power source, that is the coal power plant. The plan will use renewable energy sources to help lower UNI's environmental impact. Secondary goals include maintaining/increasing the UNI power workforce, affordability and diversification of energy sources.

UNI's Current Power Plant

- Nameplate capacity of 7.5 MW (highest possible energy output)
- Plant Averages at 35% capacity, ~2.63 MW
- Annual generation 22,708 MWh
- Annual CO2 emissions of 7,832 Tons
- Annual CO2 emission rate of 689.77 lb/MWh (regional average is 936.5)
- Estimated annual energy costs of $3.5 million*

Source: University of Northern Iowa

Data Courtesy EPA (2023)

Project Goals

- **7.5 MW grid capacity**
  - Total capacity of all energy sources meets or exceeds the current maximum capacity of the power plant
  - Annual generation reaches at least 25,000 MWh
- **Increase in average capacity factor**
  - Current rate is below average for coal plants, let alone all sources of energy
  - Lower capacity factor means inefficiency
- **Keep similar yearly power costs**
  - An increase in spending is expected with renewable energy, but will be tempered with this new plan
- **Half current CO2 emissions**
  - Goal is less than 340 lb/MWh

* Information is not publicly disclosed, see paper for how it was estimated

Potential Energy Sources

Solar Energy

Source: RER Energy Group

Cedar Falls Solar farm

Cedar Falls, Iowa

- 1.9 MW Nameplate capacity (2025)
- 17% plant capacity factor (2023)
- $110/unit
- 2,289 MWh a year
- Energy costs: $0.0569 per KWh (Oct – May), else $0.0619 per KWh
- 300 kwh a year/per unit
- Average solar CO2 emissions are 40g/KWh

Wind Energy

Source: Equinox Access Solutions

Wellsburg Wind Project*

Wellsburg, Iowa

- 140.8 MW Nameplate Capacity (2023)
- 36% plant capacity factor (2023)
- 441,755 MWh a year
- Average wind CO2 emissions are 11g/KWh

Whispering Willows Wind farm – East*

Bradford, Iowa

- 199.7 MW Nameplate Capacity (2023)
- 26% plant capacity factor (2023)
- 459,373 MWh a year
- Average wind CO2 emissions are 11g/KWh

Source: Ayres Associates

* Sources denoted only sell via PPA to Utility companies, pricing is unknown

Nuclear Energy

Source: Constellation Energy

QUAD CITIES GENERATING STATION*

Cordova, Illinois

- 2,081.6 MW nameplate capacity
- 86% plant capacity factor (2023)
- 15,164 GWh a year

DUANE ARNOLD ENERGY CENTER*

Cedar Rapids, Iowa

- Set to reopen 2029
- 615 MW nameplate capacity
- 99% plant capacity factor (2017)
- 5,235 GWh a year

Source: Wikipedia

Hydropower

Source: National Hydropower Association

RED ROCK HYDROELECTRIC PLANT*

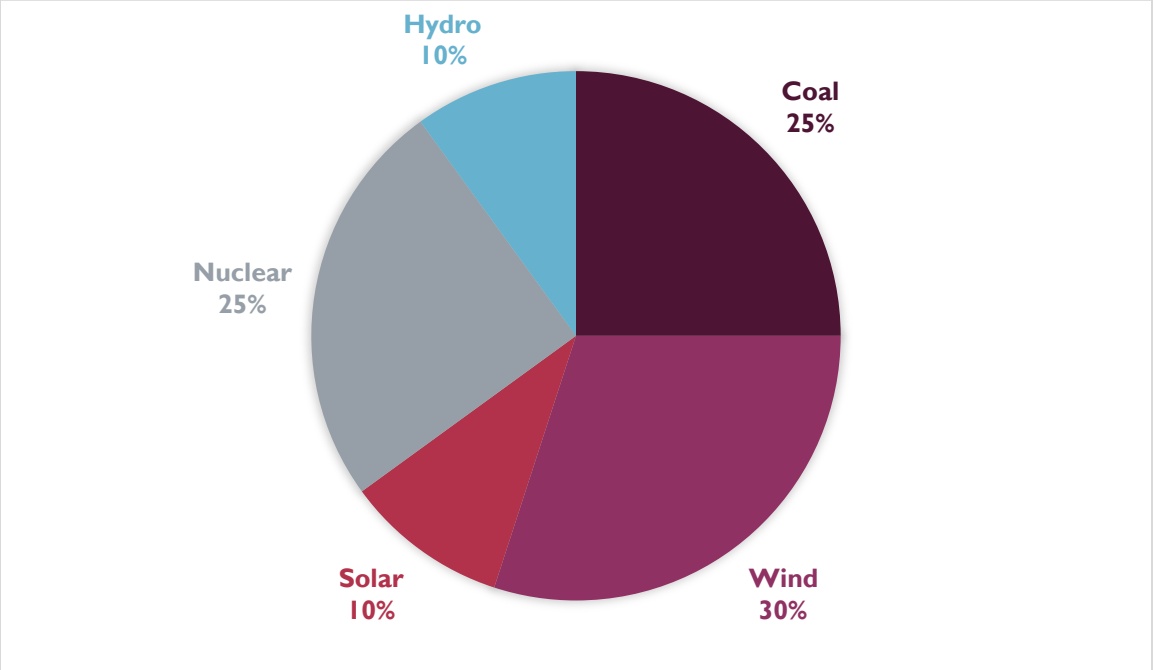
Pella, Iowa

- 55.2 MW nameplate capacity
- 21% MW plant capacity factor (2023)
- 103,592 MWh a year

* Sources denoted only sell via PPA to Utility co mpanies, pricing is unknown

Energy Grid

Focuses on existing and operational infrastructure. As such, the costs of implementing this plan would be more affordable in exchange for higher emission rates. Local power suppliers are used when available and UNI's current power plant will continue to be used for low grid capacity rate hours.



	Type	Energy Used *(MW)*	Annual Output *(MWh)*	Average P.C.F.	High Est. Total Cost	CO2 Emissions *(lb/MWh)*
UNI Plant	Coal	1.875	5,677	35%	$875,000.00	689.77
Cedar Falls Solar Farm	Solar	.75	1,144.5	17%	$67,983.30	88.18
Wellsburg Wind Project	Wind	2.25	7,059.295	36%	$607,099.37	24.25
Quad Cities Generating Station	Nuclear	1.875	13,658.964	86%	$3,004,972.08	0
Red Rock Hydroelectric	Hydro	.75	1,407.5	21%	$140,700.00	52.91
Total *(rates are weighted)*	_	7.5	28,947.259	44.85%	$4,695,754.75	193.83