```
import numpy as np
import matplotlib.pyplot as plt
# Simulate hourly energy usage over a 24-hour period (in kwh)
hours np.arange(0, 24)
original_usage np.array([1.5, 1.2, 1.0, 0.9, 0.8, 1.0, 1.5, 2.0, 2.8, 2.5, 2.0, 1.8, 1.5, 1.3, 1.0, 0.9])
2.5, 3.0, 3.2, 3.5, 3.8, 3.6, 3.2, 3.0,

#Optimization: reduce consumption by 20% during peak hours (10 AM to 4 PM)
optimized_usage original_usage.copy()
optimized_usage [10:17] *0.8 # 20% reduction

#Plot the results
plt.figure(figsize=(10, 6))
plt.plot(hours, original_usage, label='Original Usage', marker='o')
plt.plot(hours, optimized_usage, label='Optimized Usage', marker's')
plt.fill_between (hours, original_usage, optimized_usage, where (original_usage >
optimized_usage),
color='green', alpha=0.3, label='Energy Saved")

plt.title('Energy Efficiency Optimization Over 24 Hours')
plt.xlabel('Hour of Day')
plt.ylabel('Energy Usage (kWh)')
plt.xticks (hours)
plt.grid(True)
plt.legend()
plt.tight_layout()
plt.show()
```