SE_ASSIGNMENT

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1. List of requirements:

a) A digital platform that is capable of collecting, managing, and analysing data related to energy production, consumption, and distribution.
b) A system that can monitor and track the performance of renewable energy assets and predict maintenance needs.
c) A system that can provide accurate weather and market forecasts to maximise renewable energy production.
d) A system that can optimise the engineering and construction of new renewable sources and plants.
e) A system that can provide real-time data analysis and decision-making support to improve energy efficiency and reduce emissions.
f) An integrated operations platform that can facilitate the integration of renewable energies and energy policies.
g) A system that can create Smart Grids and interconnect all assets to achieve digitalisation in the energy sector.
h) A system that can provide transparency in the management of renewable energy sources and their impact on the environment.
i) A system that can support the transition to renewable energy generation and reduce the carbon footprint of energy operations.

2) List of tools, technologies and systems to support such needs:

a) Internet of Things (IoT) devices and sensors for collecting data related to energy production, consumption, and distribution.
b) Big Data platforms for managing and analysing large volumes of energy data.
c) Machine learning and artificial intelligence algorithms for predictive maintenance and optimising renewable energy production.
d) Cloud-based platforms for real-time data analysis and decision-making support.
e) Smart Grid technologies for creating digitalised energy networks.
f) Blockchain technology for improving transparency in the management of renewable energy sources.

g) Digital twin technology for modelling, forecasting, and testing energy systems for optimal performance.
h) Energy management software for centralising the management of renewable energy assets.
i) Weather and market forecasting tools for maximising renewable energy production.

3)
Working API code:The following is an example of an API code for accessing energy-related data and performing data analysis:

```python
from flask import Flask, jsonify, request

# create a Flask app
app = Flask(__name__)

# define an API endpoint to retrieve energy data
@app.route('/energy-data', methods=['GET'])
def get_energy_data():
    # read in energy data from a file or database
    # in this example, we'll just use some dummy data
    energy_data = [
        {'date': '2022-01-01', 'consumption': 100},
        {'date': '2022-01-02', 'consumption': 150},
        {'date': '2022-01-03', 'consumption': 200},
        {'date': '2022-01-04', 'consumption': 175},
        {'date': '2022-01-05', 'consumption': 125},
    ]

    # return the data in JSON format
    return jsonify(energy_data)

# define an API endpoint to perform data analysis on the energy dat
@app.route('/analyze-data', methods=['POST'])
def analyze_energy_data():
    # read in the energy data from the request body
    energy_data = request.json

    # perform some analysis on the data (for example, calculate the
    total_consumption = 0
    for entry in energy_data:
        total_consumption += entry['consumption']
    avg_consumption = total_consumption / len(energy_data)

    # return the analysis results in JSON format
    return jsonify({'average_consumption': avg_consumption})

# run the Flask app
if __name__ == '__main__':
    app.run(debug=True)
```