For office use only	Team Control Number	For office use only
T1 _____	**78460**	F1 _____
T2 _____		F2 _____
T3 _____	Problem Chosen	F3 _____
T4 _____	**C**	F4 _____

2018
MCM/ICM
Summary Sheet

General assessment of green energy development in Arizona, California, New Mexico and Texas

Summary

Keywords: keyword1; keyword2

General assessment of green energy development in Arizona, California, New Mexico and Texas

February 12, 2018

Summary

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1 Introduction

We tackle 4 sub-problems:

- **to find quantitative relationships between different energy sources**
- **how to analyse four states energy structure and predict the future energy trends based on 1960 to 2009 data**
- **how to quantify the "cleanness index" of four state energy structure**
- **how to quantify and predict every factors impact on total renewable or non-renewable (fossil fuel) energy**

At first, we statistically analyse four state energy structure based on electricity, coal, LPG, and natural gas production and/or consumption structure. To find the association of different sectors consumption (transportation, commerce, residence, and industry etc.) with total consumption, we calculate the correlation coefficient and overall percentage for each sectors respectively. To address the second sub-problem, we use different regression models to fit the state-wide energy consumption and production structure over decades. Every regression models are calculated based on 50 years and 20 years data separately, and we will illustrate each model mathematical significance and assumptions. We project 2025 and 2050 energy profile based on our regression models while discussing each regression model implications potential weakness.

Next, we develop a hierarchical database model to define overall "cleanness index" based on each state energy production and consumption structure. We will quantify each energy source "cleanness" and develop an overall model to discuss the "cleanest" state.

Finally, we will associate other implicit factors, such as population growth and industrial development, with the changes in renewable energy and fossil fuel energy structure. We will recommend several policies for four state governors to reduce each state fossil fuels uses.

1.1 Assumptions

Our general assumptions are listed below. Additional assumptions may be added when performing further analysis.

1 **The policy scenario for renewable energy and fossil fuels will not change from 2009 to 2050.**

2 **The technology of refining fossil fuels, exploit wind, solar, hydro, geothermal energy, transporting the electricity, natural gas, LPG will not achieve a breakthrough in the near future, particularly in 2050.**

3 **The mathematical significance of each regression model will be valid in predicting future energy trend.**

4 **Arizona, New Mexico, California, Texas regional climate, geography, and employable natural resources will be stable in the near future. That is, all carrying capacity for natural resources in 2050 will be essentially the same as in 2009.**

5 **All implicit factors are respectively independent.**

2 Definition of Concepts and Variables

3 Part A: Analysis and Prediction of State Energy Profiles

3.1 Energy Profile of Each State in 2009

3.1.1 Arizona

General Energy profile for Arizonain year 2009 shown below in 1

Name of Parameter (units)	Value
Total Population in Arizona(thousands)	
Total Energy Consumption (Billion Btu)	

Table 1: General Energy Profile

3.1.2 California

The energy profile for Californiaas of year 2009 is shown below

3.1.3 New Mexico

The energy profile for New Mexicoas of year 2009 is shown below

3.1.4 Texas

The energy profile for Texasas of year 2009 is shown below

3.2 Evaluation of Energy Profile

3.2.1 Evaluation Method

why, how, what

3.2.2 Analysis and testing of our method

historical data

3.3 Models for Energy Profile Characteristics(1960 2009) and prediction(2025 2050)

methods of testing and models of fitting -> discuss here

3.3.1 General Trend of Energy profile

Usage of fossil feul, growth rate of fossil feul usage total, growth rate, electricity, growth rate Renewable energy in total , growth rate

3.3.2 Analysis of Major Renewable Energy Source

Wind Water Geothermal Biomass Solar

3.3.3 Analysis of Consumer Sectors and Influential Factors

Hierarchy of Influence Transportation Residential Industrial Commercial

Population, GDP(economic factor), General climate data, resources

3.3.4 Financial Burden Analysis

ratio of renewable energy in total expenditure average price vs. non-renewable table of average price

3.3.5 Prediction

result ->

3.3.6 Analysis and testing of our models of prediction

recent data ->

4 Part B: Goals and Policies

4.1 Setting Renewable Energy Usage Targets

Base on evaluation model and current profile and prediction

4.2 Policy Suggestions

Change how things develop as predicted

5 Conclusions

6 A Summary

7 Strengths and weaknesses

7.1 Strengths

7.2 Weaknesses

8 A Letter to the Governors

References

[1] D. E. KNUTH The TEXbook the American Mathematical Society and Addison-Wesley Publishing Company , 1984-1986.

[2] Lamport, Leslie, LATEX: " A Document Preparation System ", Addison-Wesley Publishing Company, 1986.

[3] http://www.latexstudio.net/

[4] http://www.chinatex.org/

Appendices

Appendix A First appendix

Aliquam lectus. Vivamus leo. Quisque ornare tellus ullamcorper nulla. Mauris porttitor pharetra tortor. Sed fringilla justo sed mauris. Mauris tellus. Sed non leo. Nullam elementum, magna in cursus sodales, augue est scelerisque sapien, venenatis congue nulla arcu et pede. Ut suscipit enim vel sapien. Donec congue. Maecenas urna mi, suscipit in, placerat ut, vestibulum ut, massa. Fusce ultrices nulla et nisl.

Here are simulation programmes we used in our model as follow.

Input matlab source:

```
function [t,seat,aisle]=OI6Sim(n,target,seated)
pab=rand(1,n);
for i=1:n
    if pab(i)<0.4
       aisleTime(i)=0;
    else
        aisleTime(i)=trirnd(3.2,7.1,38.7);
    end
end
```

Appendix B Second appendix

some more text **Input C++ source:**

```
//============================================================================
// Name        : Sudoku.cpp
// Author      : wzlf11
// Version     : a.0
// Copyright   : Your copyright notice
// Description : Sudoku in C++.
//============================================================================

#include <iostream>
#include <cstdlib>
#include <ctime>
```

```
using namespace std;

int table[9][9];

int main() {

    for(int i = 0; i < 9; i++){
        table[0][i] = i + 1;
    }

    srand((unsigned int)time(NULL));

    shuffle((int *)&table[0], 9);

    while(!put_line(1))
    {
        shuffle((int *)&table[0], 9);
    }

    for(int x = 0; x < 9; x++){
        for(int y = 0; y < 9; y++){
            cout << table[x][y] << " ";
        }

        cout << endl;
    }

    return 0;
}
```