Introduction

Background

能源是人类社会生活和发展的物质基础，在过去，人类所使用的能源主要是石油、天然气、煤炭等一次能源，和二次能源电能。现如今，能源消费总量高度增长，能源需求压力大、供给制约多、生态环境损害严重、清洁可再生能源占有量少等问题严重影响了能源发展前景。

我们需要解决的问题是如何increased usage of cleaner, renewable energy sources，则找出影响因素并将它们量化并据此找出合适的能源策略，通过对影响因素的预测制定合适的goal，是核心关键

对本文所考虑的问题，我们应该做到以下几点

Energy is the fundamental to lives and development of human society. In the past, the main energy used by mankind was primary energy such as oil, natural gas and coal, and secondary energy electricity. Nowadays, some problems have seriously affected the prospects of energy development, such as the rapidly growth of energy total consumption, the high pressure on energy demand, the restrictions for energy supply, the seriously damage of ecology and the low proportion of cleaner and renewable energy sources.

In order to increase the usage of cleaner, renewable energy sources for four states, Arizona, California, New Mexico and Texas, the key point is to seek out the possible influential factors and build up models for them. Consequently, we can find out the reasonably energy strategy and make a prediction to set appropriate goals.

Analysis of the problem and our approach

PART 1

A 为了更好地描述各个州的能源概况，首先应该对数据进行处理，对数据进行分类、并去除冗余数据，进而从605个已给项目中筛选我们觉得重要的变量（如能源种类，四部门消耗），作出这些变量随时间的变化图像，对各个州进行能源概况描述。

A In order to determine and describe the energy profile for each of four states, we should classify the variables first and determine the most important variables. Then filter out some predictors we think is correlated to the variables from all 605 variables and use statistical method to validate them. Plot all the variables we select against Year and describe the aggregate energy profile for each of four states.

B 建立模型，不同于A对能源概况的描述，我们在这里对变量进行优化处理，找到更为合适的变量X组合，这能更好地描述每个州的能源概况，尤其是其中清洁可再生能源的使用情况，并找到相关因变量Y进行描述。我们发现Y（Y1Y2）以及X对时间大部分存在着广义线性关系，因此，我们使用线性回归的方法，通过比对相关性大小，筛选各个州的X，且使用SIS R包进行验证进而对X与Y和X与时间进行拟合，得到函数关系。

B In order to develop a model to characterize how the energy profile of each of the four states has evolved from 1960 – 2009, we regress the variables in the energy profile against Year so that we can describe the evolution of the energy profile. Then in order to address the usage of cleaner, renewable energy sources, we determine the important variables to describe the usage of cleaner, renewable energy as responses and filter out some relevant predictors for each states based on stepwise method and knowledge of the data, as predictors. Then we perform general linear regression on responses and predictors for each states to clarify the similarities and difference between the four states.

C 为了描述清洁可再生能源的使用情况，我们从两方面考虑，一是能源结构，也就是清洁可再生能源和不可再生能源的配比P，这个值越高说明能源结构越优异，二是人均可再生能源消耗Q，这个值越高说明能源消费模式越好。

C In order to figure out the criteria to measure the usage of cleaner, renewable energy, we look into several academic assays and finally determine to adapt the coefficient of energy structure  and per capita renewable energy consumption so as to measure the whole picture of energy structure as well as the renewable energy consumption from people's prospective.

D 为了得到2025和2050的能源概况描述预测值，我们使用B中模型得到的线性回归方程。

D In order to predict the energy profile of each state for 2025 and 2050, we use the model we built above to perform the prediction. The predict performance of the model will be analyze later.

PART 2（这里瞎jb写的待改）

A 为了找到2025和2050的清洁可再生能源使用情况目标，我们将C中建立的criteria即P,Q的年平均增长率为参考指标，然后将参考值与预测值作比对

A In order to determine renewable energy usage targets for 2025 and 2050 and state them as goals for this new four-state energy compact, we get the average growth rate per annum for P and Q, then use it to calculate the value for 2025 and 2050. We compare these value with the predicted ones we get in our model and determine the goal.

B 为了找到应调整的措施，我们应对各个州的与Y2相关的X进行扰动，再抽象化变为政策上的宏观调控。

B In order to propose several solid actions, we analyze the sign of the model predictors and take it as a kind of symbol for increasing or decreasing some aspect of the energy consumed sector or altering the energy structure. Along with some academic assay, we identify and discuss several actions.

PART 3

准备一个一页的能源概况综述的memo，包括现状，预测以及目标