Abstract

Cleaner, renewable energy is the fundamental factor for lives and development in human society. The core purpose of this paper is to form a feasible and reliable new energy compact to increase usage of cleaner, renewable energy sources

We analyze the sectors and structure of energy to build up models fitting the realistic situation in each state respectively, predict the usage of cleaner, renewable energy for each state, propose the criteria measuring the usage and propose the feasible actions to improve the usage of cleaner and renewable energy by analyzing the models.

First, we determine the most important variables based on our knowledge of the data and visualization. Then we filter out the predictors that significantly correlated to the response by BCor-SIS and Stepwise method. Build up the model and analyze to address how the energy profile evolves against time.

Second, we define two criteria to measure the usage of cleaner, renewable energy sources: *The coefficient of energy structure*  and *Per capita renewable energy consumption.* Then we evaluate the usage of cleaner renewable energy of each state based on the criteria and predict it for 2025 and 2050.

Finally we propose goals for the new four-state energy compact based on the prediction, our knowledge of the similarities and differences as well as the criteria. And we also propose several feasible and reasonable actions to help them achieve the goals.

The sparkling advantages of this paper are:

- filtering variables based on both our knowledge of data and statistical method BCor-SIS will ascertain that the predictors will be highly correlated with responses and agree with common sense and life experience;

- The criteria we propose can not only measure the energy structure but also the usage of cleaner, renewable energy from individual prospective.

Key word：Cleaner and renewable energy; Energy structure; Energy compact;

Data analysis; Bcor based Sure Independence Screening

本文通过对四个州能源消耗的方向和结构问题的数据分析，进行多次改进确定分别适合各个州实际情况的模型，分别对各个州的清洁能源使用情况进行预测，制定评判标准，并且通过分析模型得出提高清洁能源使用情况的具体措施。

首先，我们利用数据可视化和对数据感性的认识和确定了主要研究的变量为清洁可再生能源“CRTCB”(自创)，再结合Bcor-SIS和forward-backward 方法从605个变量中筛选出最相关的若干个影响因素，建立模型，结合各州的地理工业人口气候等可能因素分析变量随时间的发展情况以及各州的异同。

其次，我们定义了两个衡量清洁能源使用情况的criteria分别为：The coefficient of energy structure  and Per capita renewable energy consumption , 由此判断各州的清洁能源使用情况的优劣，并且预测了2025和2050年各州的清洁能源使用情况。

最后我们结合上面的模型预测、对各州的异同认识和criteria，制定了2025年和2050年的新四周能源契约目标，并且提出了几条符合实际，现实可行的策略。

本文的特点在于结合对数据的感性认识和Bcor-SIS的理性分析交叉筛选变量，保证的筛选出来的变量确实与因变量高度相关且具有现实意义；定义的criteria既包括coefficient of energy structure，刻画能源结构的优劣，又包括Per capita renewable energy consumption，从个人的角度分析洲际的清洁能源使用情况；在研究一些变量随时间的变化模型时，结合实际情况使用sum of sine拟合方法来描述变量随时间的周期性波动上升变化趋势。