Public acceptance of wind energies located near the nuclear power plant



Kaiqi Liu, Shigeo Nishikizawa, Takehiko Murayama, Kultip Suwanteep

Tokyo Institute of Technology

Japan

liu.k.ag@m.titech.ac.jp



- Introduction.
- Objectives & Hypotheses.
- Methodology.
- Results.
- Conclusion & Discussion.



CHAPTER 1. BACKGROUND

Background - Energy situation



Global Nuclear power and Wind power Consumption and Proportion Data source: bp Statistical Review of World Energy

- Wind energy and nuclear energy are developing rapidly
- More overlaps between suitable areas for wind energy and nuclear energy
- Wind energy and nuclear energy compete with each other

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Background - Social acceptance concept





- Public acceptance significantly influence energy development
- Community acceptance is lower than socio-political acceptance
- Local disputes hinder renewable energy development

Social acceptance of renewable energy Source: Wüstenhagen et al (2007)



| Author | Key Focus / Findings |
|--|--|
| Michael Greenberg (2009) | Public in regions where nuclear facilities exist and where electricity is primarily derived from nuclear power may be more supportive of nuclear energy than other energy sources, including wind energy |
| Desvallées L and Arnauld De Sartre X (2023) | France's strong nuclear energy industry has hindered local acceptance and development of the wind industry |
| Cousse et al (2020) | Socio-political acceptance is high, but it faces a number of issues at the level of community acceptance. |
| Sonnberger M and Ruddat M (2017) | Socio-political acceptance is significantly higher than community acceptance. The various acceptance factors have different effects on both the socio-political and the local acceptance. |

Research gaps

- Few research have focused on the relationships between the acceptance of multiple forms of energy, particularly, research exploring the relationship between the acceptance of wind and attitudes towards nuclear energy is very limited.
- Not well clarified the differences in factors affecting the acceptance of wind energy by local residents and general public: particularly of local benefit and risk



CHAPTER 2. OBJECTIVES & HYPOTHESES

Objectives and viewpoints



Objective 1

 Clarifying the relationship between the acceptance of wind energy and public attitudes towards nuclear energy Viewpoints of comparison



Objective 2

 Analyzing differences in wind energy acceptance and influencing pathways between the general public and local residents, and proposing Enhanced Energy Acceptance Model (EEAM) for wind energy





For objective 1

• H1: There is a negative correlation between public attitude towards nuclear energy and wind energy acceptance.

For objective 2

- H2 & H3: The independent variables indirectly affect wind energy acceptance by affecting the mediator variables of perceived benefits (H2) and risks (H3).
- H4: Perceived benefits of wind energy have a positive effect on the acceptance of wind energy.
- H5: Perceived risks of wind energy have a negative effect on the acceptance of wind energy.



CHAPTER 3. METHODOLOGY

Methodology - Framework





Methodology - Conceptual Model for Acceptance





Methodology - Questionnaire design



Section 1: Introduction

Section 2: Personal characteristic

·Gender ·Age ·Education level ·Annual income ·Work type ·Electricity costs ·Residence time ·Love Dalian ·Environmental concern ·Participation in wind energy ·Participation in nuclear energy ·Distance to wind farm ·Distance to nuclear power plant

Section 3: Awareness of wind energy

•Knowing the wind power plants •Experiences •Knowledge •Trusting government •Trusting company •Subjective norms •Affective imagery •Perceived noise •Perceived other impact

Section 4: Perceived benefits and risks of wind energy

·Economic benefits ·Social benefits ·Environmental benefits ·Health risks ·Environmental risks ·Landscape risks ·Accident risks

Section 5: Perceived benefits and risks of nuclear energy

Knowing the nuclear power plant
 Economic benefits
 Social benefits
 Environmental benefits
 Health risks
 Environmental risks
 Landscape risks
 Accident risks

Section 6: Acceptance and preferences

Acceptance of existing wind energy ·and nuclear energy ·Further acceptance of wind energy ·and nuclear energy ·Acceptable distance to wind turbine ·and nuclear facility ·Which energy is better ·Which energy preferred ·Whether nuclear facility affect wind energy development ·Additional benefits of nuclear ·and wind energy

- **50 questions** to survey attitudes towards wind and nuclear energy.
- 5-point Likert scale.
 From 1='strongly disagree' to 5='strongly agree'

• The online and offline surveys used almost same questions.

Online -Distance was answered by questionnaire. Offline -Distance was calculated using ArcGIS.

Section 7: Free text

Methodology - Research Area: Dalian City





Location of Dalian Source: Ministry of Natural Resources of China

- High proportion of clean energy
- Largest nuclear power plant in China



Power generation of Dalian City in 2020 Data source: Liaoning Provincial Bureau of Statistics

- Significant potential for wind power generation
- Low solar potential and lacks hydro energy

Methodology - Survey design





Respondents:

General public of whole Dalian City

Survey method:

Random survey by online survey company

Survey time period:

2023.8.11~2023.11.08

Respondents:

Local residents living in villages within 1km of wind farms

Survey method:

Comprehensive survey through face-toface interviews

Survey time period: 2023.8.23~ 9.03

Methodology - Survey Area





Nuclear power plant and wind power plants location Source: Liaoning Provincial Department of Natural Resources

Details of power plants

| Power plant | Nuclear unit / Wind turbine | Total installed capacity | Completion year |
|-------------------------------------|---|--------------------------|--------------------|
| Hongyanhe nuclear power plant | 6 nuclear units ×745MW | 6712.74MW | 6 unit-2022 |
| Tuoshan I wind farm | 33 wind turbines ×1.5MW | 49.5MW | 2009 |
| Tuoshan Ⅱ wind farm | 33 wind turbines ×1.5MW | 49.5MW | 2010 |
| Tuoshan Ⅲ wind farm | 29 wind turbines ×3.2MW & 2 wind turbines ×3.0MW | 98.8MW | 2020 |
| Dabeishan wind farm | 33 wind turbines ×1.5MW | 49.5MW | 2011 |

Data source: Liaoning Provincial Department of Natural Resources

Methodology - Map of power plants



Source: ArcGIS

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Methodology - Field photo



Wind turbines

Wind farm management station



Village

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CHAPTER 4. RESULTS



| Survey type | Refused | Invalid | Valid | Total | Effective response rate |
|---|---------|---------|-------|-------|-------------------------|
| Offline survey - Local residents | 104 | 17 | 361 | 482 | 74.9% |
| Online survey - General public | 0 | 54 | 341 | 395 | 86.3% |
| Total survey - Total respondents | 104 | 71 | 702 | 877 | 80.0% |

Results - Descriptive statistics



Acceptance of existing wind power plants

Acceptance of further development of wind power



Strongly disagree Disagree Neither agree nor disagree

Acceptance of existing nuclear power plant



Acceptance of further development of nuclear power



Agree Strongly agree



Results - Statistical differences



Independent-samples T-test for wind energy acceptance

| Attributos | Gender | |
|------------|--------|---------|
| Allfibules | Online | Offline |
| Т | -0.270 | -1.756 |
| Р | 0.978 | 0.080 |
| | _ | |

Significant level: P<0.05

One-way ANOVA test for wind energy acceptance

| Attributes | Age | | Age Education lev | | on level | Annual Income | | Electricity Cost | | Whether work related to wind energy | | Residence time | |
|------------|--------|---------|-------------------|---------|----------|---------------|--------|------------------|--------|-------------------------------------|--------|----------------|--|
| | Online | Offline | Online | Offline | Online | Offline | Online | Offline | Online | Offline | Online | Offline | |
| F | 0.251 | 0.654 | 3.711 | 0.107 | 1.924 | 0.401 | 1.177 | 1.853 | 0.790 | 1.002 | 0.608 | 0.684 | |
| Р | 0.909 | 0.624 | 0.060 | 0.898 | 0.090 | 0.808 | 0.321 | 0.119 | 0.500 | 0.368 | 0.693 | 0.505 | |

Significant level: P<0.05

There are **not significant difference** of wind energy acceptance in terms of gender, age and other demographics

Results - SEM measurement model







Acceptable threshold criteria: Factor Loading (FL) > 0.5, Cronbach's α > 0.6, Composite Reliability (CR) > 0.6, Average Variance Extracted (AVE)> 0.4

| | Variables | Variables Itoms Model 1ª | | | | | Model 2 ^b | | | | Model 3 ^c | | | | | | |
|--------------------------------------|-----------|--------------------------|------|----------|-------|-------|----------------------|------|----------|-------|----------------------|-------|------|----------|-------|-------|-------|
| | Valiables | ILEIIIS | Mean | FL | α | CR | AVE | Mean | FL | α | CR | AVE | Mean | FL | α | CR | AVE |
| Acceptance of | WAP | WAp1 | 3.60 | 0.841*** | 0.798 | 0.808 | 0.679 | 4.25 | 0.701*** | 0.651 | 0.653 | 0.485 | 2.98 | 0.825*** | 0.706 | 0.727 | 0.573 |
| wind energy | | WAp2 | 3.81 | 0.806*** | | | | 4.34 | 0.692*** | | | | 3.32 | 0.682*** | | | |
| Perceived benefits | WPB | WENb | 3.46 | 0.866*** | 0.885 | 0.889 | 0.728 | 4.23 | 0.734*** | 0.681 | 0.69 | 0.429 | 2.73 | 0.625*** | 0.67 | 0.679 | 0.414 |
| or wind energy | | WSb | 3.36 | 0.872*** | | | | 4.21 | 0.671*** | | | | 2.57 | 0.662*** | | | |
| | | WECb | 2.91 | 0.821*** | | | | 3.82 | 0.547*** | | | | 2.05 | 0.642*** | | | |
| Perceived risks of wind energy | WPR | WAr | 2.87 | 0.671*** | 0.82 | 0.827 | 0.547 | 2.66 | 0.770*** | 0.858 | 0.861 | 0.608 | 3.08 | 0.576*** | 0.684 | 0.687 | 0.426 |
| o | | WLr | 2.78 | 0.679*** | | | | 2.55 | 0.769*** | | | | 3.00 | - | | | |
| | | WEr | 2.87 | 0.814*** | | | | 2.50 | 0.827*** | | | | 3.22 | 0.614*** | | | |
| | | WHr | 3.11 | 0.782*** | | | | 2.55 | 0.751*** | | | | 3.64 | 0.755*** | | | |
| Acceptance of | NAP | NAp1 | 3.70 | 0.805*** | 0.786 | 0.789 | 0.652 | 3.97 | 0.783*** | 0.799 | 0.816 | 0.689 | 3.44 | 0.795*** | 0.717 | 0.719 | 0.562 |
| nacioal chorgy | | NAp2 | 3.56 | 0.810*** | | | | 3.77 | 0.875*** | | | | 3.36 | 0.702*** | | | |
| Perceived benefits | NPB | NENb | 3.25 | 0.746*** | 0.832 | 0.846 | 0.647 | 3.63 | 0.773*** | 0.78 | 0.787 | 0.552 | 2.90 | 0.628*** | 0.675 | 0.682 | 0.417 |
| or nuclear energy | | NSb | 3.60 | 0.823*** | | | | 4.08 | 0.753*** | | | | 3.14 | 0.687*** | | | |
| _ | | NECb | 2.78 | 0.841*** | | | | 3.61 | 0.700*** | | | | 1.99 | 0.621*** | | | |
| Perceived risks of nuclear energy | NPR | NAr | 3.22 | 0.757*** | 0.857 | 0.863 | 0.614 | 3.09 | 0.774*** | 0.89 | 0.895 | 0.681 | 3.34 | 0.844*** | 0.76 | 0.775 | 0.538 |
| | | NLr | 2.90 | 0.687*** | | | | 2.78 | 0.738*** | | | | 3.02 | - | | | |
| | | NEr | 3.14 | 0.845*** | | | | 2.91 | 0.877*** | | | | 3.35 | 0.676*** | | | |
| | | NHr | 3.16 | 0.835*** | | | | 2.93 | 0.901*** | | | | 3.37 | 0.666*** | | | |
| Energy preference | ENP | Eb | 3.54 | 0.912*** | 0.923 | 0.925 | 0.861 | 4.04 | 0.866*** | 0.886 | 0.887 | 0.796 | 3.07 | 0.924*** | 0.924 | 0.926 | 0.862 |
| | | Ер | 3.63 | 0.943*** | | | | 4.19 | 0.918*** | | | | 3.10 | 0.933*** | | | |

Note: ***P < 0.001, "-" mean this item was deleted. a Model 1 based on all data, b Model 2 based on online survey data, c Model 3 based on #IAIA24 #IAIA24



| | Energy preference | Perceived risks of nuclear energy | Perceived benefits of nuclear energy | Acceptance of nuclear energy | Perceived risks of wind energy | Perceived benefits of wind energy | Acceptance of wind energy | | |
|-----------|----------------------|--------------------------------------|---|---------------------------------|--------------------------------|--------------------------------------|------------------------------|-------|--|
| Variables | ENP | NPR | NPB | NAP | WPR | WPB | WAP | AVE | |
| ENP | 0.928 | | | | | | | 0.861 | |
| NPR | 0.169 | 0.784 | | | | | | 0.614 | |
| NPB | 0.173 | -0.547 | 0.804 | | | | | 0.647 | |
| NAP | -0.178 | -0.602 | 0.744 | 0.807 | | | | 0.652 | |
| WPR | -0.291 | 0.657 | -0.494 | -0.377 | 0.740 | | | 0.547 | |
| WPB | 0.507 | -0.341 | 0.733 | 0.437 | -0.596 | 0.853 | | 0.728 | |
| WAP | 0.642 | -0.188 | 0.561 | 0.471 | -0.607 | 0.807 | 0.824 | 0.679 | |

Note: the data on the diagonal are the square roots of AVE, and the data below the diagonal are correlation coefficients. All correlation coefficients are significant at 0.01 level.

Positive relationship between WAP and NAP

Reject Hypothesis 1

H1: Negative correlation between public attitude towards nuclear energy and wind energy acceptance.



The path difference significance can be calculated by the formula suggested by Duncan (2014):

$$z = \frac{b_1 - b_2}{\sqrt{se_1^2 + se_2^2}}$$

Where b_1 and b_2 represent the unstandardized coefficients of the two paths being compared se_1 , se_2 represent their standard errors.

Results - Path comparison



Significant difference

| Uvpothocia | lynothesized nath | | | Model 3 | | 7 | D |
|------------|--|--------|-------|---------|-------|--------|-------|
| nypoinesiz | eu parn | Unstd. | S.E. | Unstd. | S.E. | Z | F |
| H2a | WPB <wd< td=""><td>n.s.</td><td></td><td>n.s.</td><td></td><td>-</td><td>n.s.</td></wd<> | n.s. | | n.s. | | - | n.s. |
| H2b | WPB <ex< td=""><td>n.s.</td><td></td><td>n.s.</td><td></td><td>-</td><td>n.s.</td></ex<> | n.s. | | n.s. | | - | n.s. |
| H2c | WPB <kn< td=""><td>n.s.</td><td></td><td>n.s.</td><td></td><td>-</td><td>n.s.</td></kn<> | n.s. | | n.s. | | - | n.s. |
| H2d | WPB <pa< td=""><td>n.s.</td><td></td><td>n.s.</td><td></td><td>-</td><td>n.s.</td></pa<> | n.s. | | n.s. | | - | n.s. |
| H2e | WPB <ec< td=""><td>0.123</td><td>0.049</td><td>-0.046</td><td>0.017</td><td>3.258</td><td><0.01</td></ec<> | 0.123 | 0.049 | -0.046 | 0.017 | 3.258 | <0.01 |
| H2f | WPB <sn< td=""><td>0.188</td><td>0.034</td><td>n.s.</td><td></td><td>-</td><td>S.</td></sn<> | 0.188 | 0.034 | n.s. | | - | S. |
| H2g | WPB <ai< td=""><td>0.235</td><td>0.048</td><td>0.117</td><td>0.022</td><td>2.235</td><td>0.025</td></ai<> | 0.235 | 0.048 | 0.117 | 0.022 | 2.235 | 0.025 |
| H2h | WPB <pt< td=""><td>n.s.</td><td></td><td>0.217</td><td>0.08</td><td>-</td><td>S.</td></pt<> | n.s. | | 0.217 | 0.08 | - | S. |
| H2i | WPB <st< td=""><td>0.333</td><td>0.051</td><td>0.209</td><td>0.028</td><td>2.131</td><td>0.033</td></st<> | 0.333 | 0.051 | 0.209 | 0.028 | 2.131 | 0.033 |
| H3a | WPR <wd< td=""><td>n.s.</td><td></td><td>-0.135</td><td>0.035</td><td>-</td><td>S.</td></wd<> | n.s. | | -0.135 | 0.035 | - | S. |
| H3b | WPR <ex< td=""><td>n.s.</td><td></td><td>n.s.</td><td></td><td>-</td><td>n.s.</td></ex<> | n.s. | | n.s. | | - | n.s. |
| H3c | WPR <kn< td=""><td>n.s.</td><td></td><td>n.s.</td><td></td><td>-</td><td>n.s.</td></kn<> | n.s. | | n.s. | | - | n.s. |
| H3d | WPR <pa< td=""><td>0.166</td><td>0.083</td><td>n.s.</td><td></td><td>-</td><td>S.</td></pa<> | 0.166 | 0.083 | n.s. | | - | S. |
| H3e | WPR <ec< td=""><td>n.s.</td><td></td><td>0.107</td><td>0.027</td><td>-</td><td>S.</td></ec<> | n.s. | | 0.107 | 0.027 | - | S. |
| H3f | WPR <sn< td=""><td>-0.134</td><td>0.047</td><td>0.1</td><td>0.033</td><td>-4.075</td><td><0.01</td></sn<> | -0.134 | 0.047 | 0.1 | 0.033 | -4.075 | <0.01 |
| H3g | WPR <ai< td=""><td>n.s.</td><td></td><td>-0.203</td><td>0.034</td><td>-</td><td>S.</td></ai<> | n.s. | | -0.203 | 0.034 | - | S. |
| H3h | WPR <pt< td=""><td>0.173</td><td>0.1</td><td>n.s.</td><td></td><td>-</td><td>S.</td></pt<> | 0.173 | 0.1 | n.s. | | - | S. |
| H3i | WPR <st< td=""><td>-0.176</td><td>0.069</td><td>-0.345</td><td>0.044</td><td>2.065</td><td>0.039</td></st<> | -0.176 | 0.069 | -0.345 | 0.044 | 2.065 | 0.039 |
| H4 | WAP <wpb< td=""><td>0.475</td><td>0.089</td><td>1.304</td><td>0.229</td><td>-3.374</td><td><0.01</td></wpb<> | 0.475 | 0.089 | 1.304 | 0.229 | -3.374 | <0.01 |
| H5 | WAP <wpr< td=""><td>n.s.</td><td></td><td>-1.01</td><td>0.147</td><td>-</td><td>S.</td></wpr<> | n.s. | | -1.01 | 0.147 | - | S. |
| H1a | NAP <npb< td=""><td>0.533</td><td>0.058</td><td>0.868</td><td>0.145</td><td>-2.145</td><td>0.032</td></npb<> | 0.533 | 0.058 | 0.868 | 0.145 | -2.145 | 0.032 |
| H1b | NAP <npr< td=""><td>-0.172</td><td>0.035</td><td>-0.484</td><td>0.047</td><td>5.324</td><td><0.01</td></npr<> | -0.172 | 0.035 | -0.484 | 0.047 | 5.324 | <0.01 |
| H1c | ENP <wap< td=""><td>1.022</td><td>0.153</td><td>0.583</td><td>0.046</td><td>2.748</td><td><0.01</td></wap<> | 1.022 | 0.153 | 0.583 | 0.046 | 2.748 | <0.01 |
| H1d | ENP <nap< td=""><td>-0.764</td><td>0.099</td><td>-1.02</td><td>0.084</td><td>1.972</td><td>0.049</td></nap<> | -0.764 | 0.099 | -1.02 | 0.084 | 1.972 | 0.049 |

Note: "-" means that the calculation could not be performed because the path was not significant in at least one of the models. n.s. means that the comparison is meaningless because the path was not significant in either model. s. means that a significant difference is considered to exist without calculating p-value because the path was significant in one of the models and not in the other. #IAIA24

For general public,

Environment Concern, Subjective Norms, Affective Imagery, Social Trust affect wind energy acceptance by influencing Perceived Benefits.

Perceived Risk on wind energy acceptance was not significant.



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Results - Path analysis

For local residents,

Environment Concern, Affective Imagery, Participation, Social Trust affect wind energy acceptance by influencing Perceived Benefits.

Distance, Environmental Concern, Subjective Norms, Affective Imagery, and Social Trust affect wind energy acceptance by influencing Perceived Risk.



Results - Path analysis



| Uvpothosized path | | Model 1 | а | | | Model 2 | 2 ^b | | | Model 3 ^c | | | |
|-------------------|---|---------|-------|-------|--------|---------|----------------|-------|--------|----------------------|-------|-------|--------|
| пуро | inesized path | Unstd. | S.E. | Р | Std. | Unstd. | S.E. | Р | Std. | Unstd. | S.E. | Р | Std. |
| H2a | WPB <wd< td=""><td>0.167</td><td>0.009</td><td>***</td><td>0.598</td><td>n.s.</td><td></td><td></td><td></td><td>n.s.</td><td></td><td></td><td></td></wd<> | 0.167 | 0.009 | *** | 0.598 | n.s. | | | | n.s. | | | |
| H2b | WPB <ex< td=""><td>n.s.</td><td></td><td></td><td></td><td>n.s.</td><td></td><td></td><td></td><td>n.s.</td><td></td><td></td><td></td></ex<> | n.s. | | | | n.s. | | | | n.s. | | | |
| H2c | WPB <kn< td=""><td>0.038</td><td>0.012</td><td>0.002</td><td>0.083</td><td>n.s.</td><td></td><td></td><td></td><td>n.s.</td><td></td><td></td><td></td></kn<> | 0.038 | 0.012 | 0.002 | 0.083 | n.s. | | | | n.s. | | | |
| H2d | WPB <pa< td=""><td>n.s.</td><td></td><td></td><td></td><td>n.s.</td><td></td><td></td><td></td><td>n.s.</td><td></td><td></td><td></td></pa<> | n.s. | | | | n.s. | | | | n.s. | | | |
| H2e | WPB <ec< td=""><td>n.s.</td><td></td><td></td><td></td><td>0.123</td><td>0.049</td><td>0.012</td><td>0.145</td><td>-0.046</td><td>0.017</td><td>0.007</td><td>-0.148</td></ec<> | n.s. | | | | 0.123 | 0.049 | 0.012 | 0.145 | -0.046 | 0.017 | 0.007 | -0.148 |
| H2f | WPB <sn< td=""><td>0.076</td><td>0.02</td><td>***</td><td>0.103</td><td>0.188</td><td>0.034</td><td>***</td><td>0.338</td><td>n.s.</td><td></td><td></td><td></td></sn<> | 0.076 | 0.02 | *** | 0.103 | 0.188 | 0.034 | *** | 0.338 | n.s. | | | |
| H2g | WPB <ai< td=""><td>0.186</td><td>0.02</td><td>***</td><td>0.264</td><td>0.235</td><td>0.048</td><td>***</td><td>0.297</td><td>0.117</td><td>0.022</td><td>***</td><td>0.33</td></ai<> | 0.186 | 0.02 | *** | 0.264 | 0.235 | 0.048 | *** | 0.297 | 0.117 | 0.022 | *** | 0.33 |
| H2h | WPB <pt< td=""><td>0.179</td><td>0.049</td><td>***</td><td>0.099</td><td>n.s.</td><td></td><td></td><td></td><td>0.217</td><td>0.08</td><td>0.007</td><td>0.147</td></pt<> | 0.179 | 0.049 | *** | 0.099 | n.s. | | | | 0.217 | 0.08 | 0.007 | 0.147 |
| H2i | WPB <st< td=""><td>0.326</td><td>0.02</td><td>***</td><td>0.513</td><td>0.333</td><td>0.051</td><td>***</td><td>0.408</td><td>0.209</td><td>0.028</td><td>***</td><td>0.556</td></st<> | 0.326 | 0.02 | *** | 0.513 | 0.333 | 0.051 | *** | 0.408 | 0.209 | 0.028 | *** | 0.556 |
| H3a | WPR <wd< td=""><td>-0.08</td><td>0.011</td><td>***</td><td>-0.287</td><td>n.s.</td><td></td><td></td><td></td><td>-0.135</td><td>0.035</td><td>***</td><td>-0.202</td></wd<> | -0.08 | 0.011 | *** | -0.287 | n.s. | | | | -0.135 | 0.035 | *** | -0.202 |
| H3b | WPR <ex< td=""><td>n.s.</td><td></td><td></td><td></td><td>n.s.</td><td></td><td></td><td></td><td>n.s.</td><td></td><td></td><td></td></ex<> | n.s. | | | | n.s. | | | | n.s. | | | |
| H3c | WPR <kn< td=""><td>n.s.</td><td></td><td></td><td></td><td>n.s.</td><td></td><td></td><td></td><td>n.s.</td><td></td><td></td><td></td></kn<> | n.s. | | | | n.s. | | | | n.s. | | | |
| H3d | WPR <pa< td=""><td>0.066</td><td>0.037</td><td>0.075</td><td>0.065</td><td>0.166</td><td>0.083</td><td>0.045</td><td>0.114</td><td>n.s.</td><td></td><td></td><td></td></pa<> | 0.066 | 0.037 | 0.075 | 0.065 | 0.166 | 0.083 | 0.045 | 0.114 | n.s. | | | |
| H3e | WPR <ec< td=""><td>0.082</td><td>0.025</td><td>***</td><td>0.121</td><td>n.s.</td><td></td><td></td><td></td><td>0.107</td><td>0.027</td><td>***</td><td>0.207</td></ec<> | 0.082 | 0.025 | *** | 0.121 | n.s. | | | | 0.107 | 0.027 | *** | 0.207 |
| H3f | WPR <sn< td=""><td>n.s.</td><td></td><td></td><td></td><td>-0.134</td><td>0.047</td><td>0.005</td><td>-0.161</td><td>0.1</td><td>0.033</td><td>0.002</td><td>0.156</td></sn<> | n.s. | | | | -0.134 | 0.047 | 0.005 | -0.161 | 0.1 | 0.033 | 0.002 | 0.156 |
| H3g | WPR <ai< td=""><td>-0.107</td><td>0.026</td><td>***</td><td>-0.152</td><td>n.s.</td><td></td><td></td><td></td><td>-0.203</td><td>0.034</td><td>***</td><td>-0.346</td></ai<> | -0.107 | 0.026 | *** | -0.152 | n.s. | | | | -0.203 | 0.034 | *** | -0.346 |
| H3h | WPR <pt< td=""><td>0.138</td><td>0.066</td><td>0.037</td><td>0.076</td><td>0.173</td><td>0.1</td><td>0.083</td><td>0.098</td><td>n.s.</td><td></td><td></td><td></td></pt<> | 0.138 | 0.066 | 0.037 | 0.076 | 0.173 | 0.1 | 0.083 | 0.098 | n.s. | | | |
| H3i | WPR <st< td=""><td>-0.253</td><td>0.026</td><td>***</td><td>-0.398</td><td>-0.176</td><td>0.069</td><td>0.011</td><td>-0.145</td><td>-0.345</td><td>0.044</td><td>***</td><td>-0.553</td></st<> | -0.253 | 0.026 | *** | -0.398 | -0.176 | 0.069 | 0.011 | -0.145 | -0.345 | 0.044 | *** | -0.553 |
| H4 | WAP <wpb< td=""><td>0.822</td><td>0.06</td><td>***</td><td>0.678</td><td>0.475</td><td>0.089</td><td>***</td><td>0.496</td><td>1.304</td><td>0.229</td><td>***</td><td>0.466</td></wpb<> | 0.822 | 0.06 | *** | 0.678 | 0.475 | 0.089 | *** | 0.496 | 1.304 | 0.229 | *** | 0.466 |
| H5 | WAP <wpr< td=""><td>-0.272</td><td>0.051</td><td>***</td><td>-0.225</td><td>n.s.</td><td></td><td></td><td></td><td>-1.01</td><td>0.147</td><td>***</td><td>-0.6</td></wpr<> | -0.272 | 0.051 | *** | -0.225 | n.s. | | | | -1.01 | 0.147 | *** | -0.6 |
| H1a | NAP <npb< td=""><td>0.565</td><td>0.043</td><td>***</td><td>0.61</td><td>0.533</td><td>0.058</td><td>***</td><td>0.705</td><td>0.868</td><td>0.145</td><td>***</td><td>0.412</td></npb<> | 0.565 | 0.043 | *** | 0.61 | 0.533 | 0.058 | *** | 0.705 | 0.868 | 0.145 | *** | 0.412 |
| H1b | NAP <npr< td=""><td>-0.297</td><td>0.03</td><td>***</td><td>-0.394</td><td>-0.172</td><td>0.035</td><td>***</td><td>-0.26</td><td>-0.484</td><td>0.047</td><td>***</td><td>-0.696</td></npr<> | -0.297 | 0.03 | *** | -0.394 | -0.172 | 0.035 | *** | -0.26 | -0.484 | 0.047 | *** | -0.696 |
| H1c | ENP <wap< td=""><td>0.94</td><td>0.055</td><td>***</td><td>0.69</td><td>1.022</td><td>0.153</td><td>***</td><td>0.506</td><td>0.583</td><td>0.046</td><td>***</td><td>0.581</td></wap<> | 0.94 | 0.055 | *** | 0.69 | 1.022 | 0.153 | *** | 0.506 | 0.583 | 0.046 | *** | 0.581 |
| H1d | ENP <nap< td=""><td>-0.837</td><td>0.06</td><td>***</td><td>-0.493</td><td>-0.764</td><td>0.099</td><td>***</td><td>-0.461</td><td>-1.02</td><td>0.084</td><td>***</td><td>-0.657</td></nap<> | -0.837 | 0.06 | *** | -0.493 | -0.764 | 0.099 | *** | -0.461 | -1.02 | 0.084 | *** | -0.657 |

Need more research

Note: n.s. means no significance. a Model 1 based on all data, b Model 2 based on online survey data, c Model 3 based on field surveys data.

Results - Model comparison



For general public, e28 perceived risk of wind **WPB** energy is not important Different .39 .23 PA WECb WSb WENb influencing WAp1 (e17) WAP EC 53 factors (e2) (e3) (e1) WAp2 - e18 SN (e29 AI WPR (e23 PT .58 .72 WEr WLr WAr WHr ENP ST e7 (e6) e5 (e4) (e8) NECb NPB NSb (e9)-(e16) NAp1 NAP NAp2 e11 NHr NEr (e12)-NPR e13 ► NLr e14 NAr



Modified structural model of Model 3 (local residents)



CHAPTER 5. SUMMARY



Conclusion

- The public in Dalian City have shown a high acceptance for wind and nuclear energy. But prefer wind energy.
- There is **no competitive** relationship between acceptance of wind energy and attitude towards nuclear energy in the research area.

Discussion

• This may be due to that both wind and nuclear energy are considered as clean, new energy sources in China.



Conclusion

- Perceived benefits positively affect wind energy acceptance.
- For general public, perceived risks is **not significant**. For local residents, perceived risks is the most important factor negatively affecting acceptance.
- Most of the influencing factors on the acceptance of wind energy significantly differ between local residents and general public.

Discussion

 To enhance acceptance of wind energy, the government should more actively promote the benefits to general public. And try to alleviate the risk concerns of local residents.





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Thanks for your listening!



Let's continue the conversation!

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Post questions and comments in the IAIA24 app.

Kaiqi Liu, Shigeo Nishikizawa, Takehiko Murayama, Kultip Suwanteep

Tokyo Tech

Tokyo Institute of Technology

Japan

liu.k.ag@m.titech.ac.jp

nishikizawa.s.ab@m.titech.ac.jp

murayama.t.ac@m.titech.ac.jp

suwanteep.k.aa@m.titech.ac.jp

Appendix - Abbreviations



| Abbreviations | Full form | Abbreviations | Full form |
|---------------|---|---------------|--|
| WD | Distance to the wind turbine | WEr | Perceived environmental risks of wind energy |
| EX | Experience with wind energy facilities | WLr | Perceived landscape risks of wind energy |
| KN | Perceived knowledge of wind energy | WAr | Perceived accident risks of wind energy |
| PA | Place attachment | NECb | Perceived economic benefits of nuclear energy |
| EC | Environmental concern | NSb | Perceived social benefits of nuclear energy |
| SN | Subjective norms | NENb | Perceived environmental benefits of nuclear energy |
| AI | Affective imagery of wind energy | NHr | Perceived healthy risks of nuclear energy |
| PT | Participation in wind energy projects | NEr | Perceived environmental risks of nuclear energy |
| ST | Social trust | NLr | Perceived landscape risks of nuclear energy |
| WPB | Perceived benefits of wind energy | NAr | Perceived accident risks of nuclear energy |
| WPR | Perceived risks of wind energy | ENP | Preference for wind and nuclear energy |
| NPB | Perceived benefits of nuclear energy | Ep | Individual preferences for wind and nuclear energy |
| NPR | Perceived risks of nuclear energy | Eb | A better energy source for Dalian |
| WECb | Perceived economic benefits of wind energy | Unstd. | Unstandardized path coefficients |
| WSb | Perceived social benefits of wind energy | S.E. | Standard error |
| WENb | Perceived environmental benefits of wind energy | Std. | Standardized path coefficient |
| WHr | Perceived healthy risks of wind energy | SEM | Structural equation model |

Appendix – Map of Tuoshan wind farm





Appendix – Map of Dabeishan wind farm







Appendix – Village case





Map of Paozicun ○ Location of respondents

Acceptance of wind energy High Against Neural Support Wind turbines Buffer-1000m

0 0.050.1 0.2 0.3 0.4



Source: ArcGIS



| Variables | Explanation | Question in questionnaire |
|---|--|---|
| Experience with wind energy facilities (EX) | Ever seen or visited a wind farm | I have seen or visited wind power plants. |
| Place attachment (PA) | Whether love the region (Dalian City) | I love this region. |
| Subjective norms (SN) | Are the people around you influencing your attitude towards wind energy | The support for wind energy from people around me (including family, friends, local community members, etc.) has motivated me to support wind energy. |
| Affective imagery (AI) | What is the first impression of wind energy | Wind energy leaves me a positive impression when mentioned it. |
| Participation in wind energy projects (PT) | Whether you are involved in the process of planning, supervision, etc. of wind farms | Whether you participated in the construction and planning process of wind power projects (in the form of being consulted or submitting unsolicited proposals, etc.) |
| Social trust (ST) | Whether there is trust in governments and companies in the wind energy sector. | I trust the government's policy and regulation of wind power project. I trust energy companies to operate and manage wind power plants. |

Appendix - Demographic information



| Characteristics | Itomo | Total N | =702 | Online su | urvey N=341 | Offline survey N=361 | | |
|-------------------|-------------------------|---------|------------|-----------|-------------|----------------------|------------|--|
| Characteristics | liems | Number | Percentage | Number | Percentage | Number | Percentage | |
| Gender | Male | 354 | 50.4% | 160 | 46.9% | 194 | 53.7% | |
| | Female | 348 | 49.6% | 181 | 53.1% | 167 | 46.3% | |
| Age | Under 18 | 8 | 1.1% | 5 | 1.5% | 3 | 0.8% | |
| | 18-30 | 155 | 22.1% | 149 | 43.7% | 6 | 1.7% | |
| | 31-45 | 175 | 24.9% | 159 | 46.6% | 16 | 4.4% | |
| | 46-60 | 143 | 20.4% | 24 | 7.0% | 119 | 33.0% | |
| | Over 60 | 221 | 31.5% | 4 | 1.2% | 217 | 60.1% | |
| Education level | Junior high and below | 348 | 49.6% | 3 | 0.9% | 345 | 95.6% | |
| | Senior High school | 36 | 5.1% | 21 | 6.2% | 15 | 4.2% | |
| | Junior college | 40 | 5.7% | 39 | 11.4% | 1 | 0.3% | |
| | Bachelor degree | 233 | 33.2% | 233 | 68.3% | 0 | 0.0% | |
| | Master or above | 45 | 6.4% | 45 | 13.2% | 0 | 0.0% | |
| Annual income | Under RMB 10,000 | 147 | 20.9% | 26 | 7.6% | 121 | 33.5% | |
| | RMB 10,000–30,000 | 151 | 21.5% | 36 | 10.6% | 115 | 31.9% | |
| | RMB 30,000–60,000 | 139 | 19.8% | 51 | 15.0% | 88 | 24.4% | |
| | RMB 60,000–100,000 | 110 | 15.7% | 79 | 23.2% | 31 | 8.6% | |
| | RMB 100,000–150,000 | 95 | 13.5% | 89 | 26.1% | 6 | 1.7% | |
| | Over RMB 150,000 | 60 | 8.5% | 60 | 17.6% | 0 | 0.0% | |
| Electricity costs | Under RMB 20 | 16 | 2.3% | 10 | 2.9% | 6 | 1.7% | |
| | RMB 20-35 | 77 | 11.0% | 49 | 14.4% | 28 | 7.8% | |
| | RMB 36-50 | 229 | 32.6% | 67 | 19.6% | 162 | 44.9% | |
| | RMB 51-75 | 184 | 26.2% | 93 | 27.3% | 91 | 25.2% | |
| | Over RMB 75 | 154 | 21.9% | 111 | 32.6% | 43 | 11.9% | |
| | Unknown | 42 | 6.0% | 11 | 3.2% | 31 | 8.6% | |
| Whether work | Unrelated | 645 | 91.9% | 287 | 84.2% | 358 | 99.1% | |
| related to wind | Family related | 39 | 5.6% | 37 | 10.9% | 2 | 0.6% | |
| energy | I related | 15 | 2.1% | 15 | 4.4% | 0 | 0.0% | |
| | I and my family related | 3 | 0.4% | 2 | 0.6% | 1 | 0.3% | |
| Residence time | Under 6 months | 15 | 2.1% | 14 | 4.1% | 1 | 0.3% | |
| | 0.5-1 year | 21 | 3.0% | 21 | 6.2% | 0 | 0.0% | |
| | 1-3 years | 38 | 5.4% | 38 | 11.1% | 0 | 0.0% | |
| | 3-5 vears | 40 | 5.7% | 40 | 11.7% | 0 | 0.0% | |
| | 5-10 years | 61 | 8.7% | 54 | 15.8% | 7 | 1.9% | |
| | Over 10 years | 527 | 75.1% | 174 | 51.0% | 353 | 97.8% | |

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Appendix – Energy Preference





Which energy source is better for Dalian

Which energy source is preferred



Appendix – Negative impact





Noise perception of wind farm

Other negative impact of wind farm



Appendix - Statistical differences



| | Gender | | | | | |
|------------|------------|---------|--|--|--|--|
| Attributes | To nuclear | | | | | |
| | Online | Offline | | | | |
| Т | 0.759 | -0.025 | | | | |
| P | 0.448 | 0.980 | | | | |
| | | | | | | |

Results of t-test for nuclear energy

| | Distance to n | uclear power pla | ant | | |
|------------|----------------|------------------|--------------|----------|------------|
| Attributes | Offline survey | / | Online surve | ey . | |
| | Less 20km | 20-40km | 40-60km | 60-100km | Over 100km |
| Ν | 299 | 62 | 36 | 250 | 55 |
| Mean | 3.418 | 3.315 | 3.875 | 3.892 | 3.764 |
| SD | 0.655 | 0.691 | 0.831 | 0.852 | 0.799 |
| T/F | 1.123 | | 0.526 | | |
| Р | 0.262 | | 0.592 | | |

Results of distance to nuclear power plant differences

Results of One-way ANOVA test for nuclear energy

| Attributes | Age | | Educati | on level | Annual | Income | Electric | ity Cost | Whether whethe | vork related r energy | Resider | nce time |
|------------|--------|---------|---------|----------|--------|---------|----------|----------|--|--------------------------|---------|----------|
| | Online | Offline | Online | Offline | Online | Offline | Online | Offline | Online | Offline | Online | Offline |
| F | 0.193 | 2.712 | 0.560 | 1.725 | 0.386 | 4.752 | 1.251 | 6.963 | 1.630 | 1.055 | 0.951 | 0.093 |
| Р | 0.942 | 0.030 | 0.692 | 0.180 | 0.858 | <0.01 | 0.289 | <0.01 | 0.182 | 0.368 | 0.448 | 0.912 |

Appendix - Discriminate validity

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Discriminate validity of the Model 2

| Variables | ENP | NPR | NPB | NAP | WPR | WPB | WAP | AVE |
|-----------|--------|--------|--------|--------|--------|-------|-------|-------|
| ENP | 0.892 | | | | | | | 0.796 |
| NPR | 0.275 | 0.825 | | | | | | 0.681 |
| NPB | -0.252 | -0.547 | 0.743 | | | | | 0.552 |
| NAP | -0.380 | -0.513 | 0.743 | 0.830 | | | | 0.689 |
| WPR | 0.077 | 0.742 | -0.313 | -0.233 | 0.780 | | | 0.608 |
| WPB | 0.109 | -0.278 | 0.515 | 0.298 | -0.242 | 0.655 | | 0.429 |
| WAP | 0.422 | 0.035 | 0.289 | 0.291 | -0.140 | 0.463 | 0.696 | 0.485 |

Note: the data on the diagonal are the square roots of AVE, and the data below the diagonal are correlation coefficients. All correlation coefficients are significant at 0.01 level.

Discriminate validity of the Model 3

| Variables | ENP | NPR | NPB | NAP | WPR | WPB | WAP | AVE |
|-----------|--------|--------|--------|--------|--------|-------|-------|-------|
| ENP | 0.928 | | | | | | | 0.862 |
| NPR | 0.516 | 0.733 | | | | | | 0.538 |
| NPB | -0.372 | -0.525 | 0.646 | | | | | 0.417 |
| NAP | -0.482 | -0.728 | 0.690 | 0.750 | | | | 0.562 |
| WPR | -0.303 | 0.342 | -0.110 | -0.350 | 0.653 | | | 0.426 |
| WPB | 0.319 | -0.210 | 0.080 | 0.316 | -0.615 | 0.643 | | 0.414 |
| WAP | 0.529 | -0.104 | 0.088 | 0.410 | -0.647 | 0.638 | 0.757 | 0.573 |

Note: the data on the diagonal are the square roots of AVE, and the data below the diagonal are correlation coefficients. All correlation coefficients are significant at 0.01 level.

Appendix - Model fit



Model fit

| Goodness of fit indices | Throshold critoria | Model 1 ^a | | Model 3 ^c | Whether |
|---|----------------------|----------------------|--------------|----------------------|----------|
| Goodness-or-in indices | mesnoù chtena | Test results | Test results | Test results | — passed |
| Parsimonious fit indices | | | | | |
| χ² (chi-square) | The small the better | 370.893 | 323.091 | 259.604 | Yes |
| DF (degrees of freedom) | The large the better | 340 | 292 | 243 | Yes |
| χ^2 /DF (normed chi-square) | <3 | 1.091 | 1.106 | 1.068 | Yes |
| Incremental fit indices | | | | | |
| NFI (normed fit index) | >0.9 | 0.971 | 0.922 | 0.931 | Yes |
| TLI (Tucker-Lewis index) | >0.9 | 0.997 | 0.991 | 0.995 | Yes |
| IFI (incremental fit index) | >0.9 | 0.998 | 0.992 | 0.995 | Yes |
| RFI (relative fit index) | >0.9 | 0.968 | 0.913 | 0.921 | Yes |
| CFI (comparative fit index) | >0.9 | 0.998 | 0.992 | 0.995 | Yes |
| Absolute fit indices | | | | | |
| RMSEA (root mean square error of approximation) | <0.08 | 0.011 | 0.018 | 0.014 | Yes |
| GFI (goodness of fit index) | >0.9 | 0.971 | 0.922 | 0.931 | Yes |
| AGFI (adjusted goodness of fit index) | >0.9 | 0.964 | 0.902 | 0.910 | Yes |

Note: a Model 1 based on all data, b Model 2 based on online survey data, c Model 3 based on offline surveys data.

Used Bollen-Stine Bootstrap correction

Appendix - Model 2

| Hypothesized nath | | Model 2 ^b | | | |
|-------------------|---|----------------------|-------|-----------|--------|
| пуро | nesizeu patri | Unstd. | S.E. | Р | Std. |
| H2a | WPB <wd< td=""><td>n.s.</td><td></td><td></td><td></td></wd<> | n.s. | | | |
| H2b | WPB <ex< td=""><td>n.s.</td><td></td><td></td><td></td></ex<> | n.s. | | | |
| H2c | WPB <kn< td=""><td>n.s.</td><td></td><td>Significa</td><td>nt</td></kn<> | n.s. | | Significa | nt |
| H2d | WPB <pa< td=""><td>n.s.</td><td></td><td></td><td></td></pa<> | n.s. | | | |
| H2e | WPB <ec< td=""><td>0.123</td><td>0.049</td><td>0.012</td><td>0.145</td></ec<> | 0.123 | 0.049 | 0.012 | 0.145 |
| H2f | WPB <sn< td=""><td>0.188</td><td>0.034</td><td>***</td><td>0.338</td></sn<> | 0.188 | 0.034 | *** | 0.338 |
| H2g | WPB <ai< td=""><td>0.235</td><td>0.048</td><td>***</td><td>0.297</td></ai<> | 0.235 | 0.048 | *** | 0.297 |
| H2h | WPB <pt< td=""><td>n.s.</td><td></td><td></td><td>,</td></pt<> | n.s. | | | , |
| H2i | WPB <st< td=""><td>0.333</td><td>0.051</td><td>***</td><td>0.408</td></st<> | 0.333 | 0.051 | *** | 0.408 |
| H3a | WPR <wd< td=""><td>n.s.</td><td></td><td></td><td></td></wd<> | n.s. | | | |
| H3b | WPR <ex< td=""><td>n.s.</td><td></td><td></td><td></td></ex<> | n.s. | | | |
| H3c | WPR <kn< td=""><td>n.s.</td><td></td><td></td><td></td></kn<> | n.s. | | | |
| H3d | WPR <pa< td=""><td>0.166</td><td>0.083</td><td>0.045</td><td>0.114</td></pa<> | 0.166 | 0.083 | 0.045 | 0.114 |
| H3e | WPR <ec< td=""><td>n.s.</td><td></td><td></td><td></td></ec<> | n.s. | | | |
| H3f | WPR <sn< td=""><td>-0.134</td><td>0.047</td><td>0.005</td><td>-0.161</td></sn<> | -0.134 | 0.047 | 0.005 | -0.161 |
| H3g | WPR <ai< td=""><td>n.s.</td><td></td><td></td><td></td></ai<> | n.s. | | | |
| H3h | WPR <pt< td=""><td>0.173</td><td>0.1</td><td>0.083</td><td>0.098</td></pt<> | 0.173 | 0.1 | 0.083 | 0.098 |
| H3i | WPR <st< td=""><td>-0.176</td><td>0.069</td><td>0.011</td><td>-0.145</td></st<> | -0.176 | 0.069 | 0.011 | -0.145 |
| H4 | WAP <wpb< td=""><td>0.475</td><td>0.089</td><td>***</td><td>0.496</td></wpb<> | 0.475 | 0.089 | *** | 0.496 |
| H5 | WAP <wpr< td=""><td>n.s.</td><td></td><td></td><td></td></wpr<> | n.s. | | | |
| H1a | NAP <npb< td=""><td>0.533</td><td>0.058</td><td>***</td><td>0.705</td></npb<> | 0.533 | 0.058 | *** | 0.705 |
| H1b | NAP <npr< td=""><td>-0.172</td><td>0.035</td><td>***</td><td>-0.26</td></npr<> | -0.172 | 0.035 | *** | -0.26 |
| H1c | ENP <wap< td=""><td>1.022</td><td>0.153</td><td>***</td><td>0.506</td></wap<> | 1.022 | 0.153 | *** | 0.506 |
| H1d | ENP <nap< td=""><td>-0.764</td><td>0.099</td><td>***</td><td>-0.461</td></nap<> | -0.764 | 0.099 | *** | -0.461 |

(e28) 39 **WPB** 48 62 0 .39 .23 .45 (e15) PA WECb WSb WENb .25 WAp1 WAP EC .53 (e3 (e1) (e2) WAp2 (e18) SN (e29) -. 16 07 AI 51 WPR 10 (e23 16 .76 PT 82 16 .47 .58 .72 .57 Eb WHr WEr WLr WAr ENP ST Ep .53 **e**6 (e7 e5 (e4) (e8) - NECb 2.2 .63 .79 NPB 46 ► NSb (e9)-(e16) .51 .57 .56 NAp1 (e10) NENb NAP .76 .81 NAp2 e20 (e11)-NHr .80 (e12)-NEr NPR .51 71 NLr (e13)-> .61 Modified structural model of Model 2 NAr (e14)-

Note: n.s. means no significance. b Model 2 based on online survey data

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Appendix - Model 3

| Hypothesized nath | | Model 3 ^c | | | |
|-------------------|---|----------------------|-------|--------|--------|
| пуротп | esized path | Unstd. | S.E. | Р | Std. |
| H2a | WPB <wd< td=""><td>n.s.</td><td></td><td></td><td></td></wd<> | n.s. | | | |
| H2b | WPB <ex< td=""><td>n.s.</td><td></td><td></td><td></td></ex<> | n.s. | | | |
| H2c | WPB <kn< td=""><td>n.s.</td><td>Sic</td><td>nifica</td><td>nt</td></kn<> | n.s. | Sic | nifica | nt |
| H2d | WPB <pa< td=""><td>n.s.</td><td></td><td>J</td><td></td></pa<> | n.s. | | J | |
| H2e | WPB <ec< td=""><td>-0.046</td><td>0.017</td><td>0.007</td><td>-0.148</td></ec<> | -0.046 | 0.017 | 0.007 | -0.148 |
| H2f | WPB <sn< td=""><td>n.s.</td><td></td><td></td><td></td></sn<> | n.s. | | | |
| H2g | WPB <ai< td=""><td>0.117</td><td>0.022</td><td>***</td><td>0.33</td></ai<> | 0.117 | 0.022 | *** | 0.33 |
| H2h | WPB <pt< td=""><td>0.217</td><td>0.08</td><td>0.007</td><td>0.147</td></pt<> | 0.217 | 0.08 | 0.007 | 0.147 |
| H2i | WPB <st< td=""><td>0.209</td><td>0.028</td><td>***</td><td>0.556</td></st<> | 0.209 | 0.028 | *** | 0.556 |
| H3a | WPR <wd< td=""><td>-0.135</td><td>0.035</td><td>***</td><td>-0.202</td></wd<> | -0.135 | 0.035 | *** | -0.202 |
| H3b | WPR <ex< td=""><td>n.s.</td><td></td><td></td><td></td></ex<> | n.s. | | | |
| H3c | WPR <kn< td=""><td>n.s.</td><td></td><td></td><td></td></kn<> | n.s. | | | |
| H3d | WPR <pa< td=""><td>n.s.</td><td></td><td></td><td></td></pa<> | n.s. | | | |
| H3e | WPR <ec< td=""><td>0.107</td><td>0.027</td><td>***</td><td>0.207</td></ec<> | 0.107 | 0.027 | *** | 0.207 |
| H3f | WPR <sn< td=""><td>0.1</td><td>0.033</td><td>0.002</td><td>0.156</td></sn<> | 0.1 | 0.033 | 0.002 | 0.156 |
| H3g | WPR <ai< td=""><td>-0.203</td><td>0.034</td><td>***</td><td>-0.346</td></ai<> | -0.203 | 0.034 | *** | -0.346 |
| H3h | WPR <pt< td=""><td>n.s.</td><td></td><td></td><td></td></pt<> | n.s. | | | |
| H3i | WPR <st< td=""><td>-0.345</td><td>0.044</td><td>***</td><td>-0.553</td></st<> | -0.345 | 0.044 | *** | -0.553 |
| H4 | WAP <wpb< td=""><td>1.304</td><td>0.229</td><td>***</td><td>0.466</td></wpb<> | 1.304 | 0.229 | *** | 0.466 |
| H5 | WAP <wpr< td=""><td>-1.01</td><td>0.147</td><td>***</td><td>-0.6</td></wpr<> | -1.01 | 0.147 | *** | -0.6 |
| H1a | NAP <npb< td=""><td>0.868</td><td>0.145</td><td>***</td><td>0.412</td></npb<> | 0.868 | 0.145 | *** | 0.412 |
| H1b | NAP <npr< td=""><td>-0.484</td><td>0.047</td><td>***</td><td>-0.696</td></npr<> | -0.484 | 0.047 | *** | -0.696 |
| H1c | ENP <wap< td=""><td>0.583</td><td>0.046</td><td>***</td><td>0.581</td></wap<> | 0.583 | 0.046 | *** | 0.581 |
| H1d | ENP <nap< td=""><td>-1.02</td><td>0.084</td><td>***</td><td>-0.657</td></nap<> | -1.02 | 0.084 | *** | -0.657 |

Note: n.s. means no significance. c Model 3 based on offline survey data







Dalian Energy Development Plan

Overall objective:

By 2025, the installed capacity of non-fossil energy power generation will reach more than 11.85 million kilowatts, accounting for 64% of the total, with non-fossil energy power generation accounting for more than 70% of the total.

Wind energy:

Completing the approved 1.9 million kilowatt offshore wind power project. Promote the construction of a 10 million kilowatt wind power base in Dalian by utilizing both land and sea.

Nuclear energy:

Develop nuclear power in an orderly manner.

Commence preliminary construction work on the Zhuanghe Nuclear Power Station.

Additionally Wind and nuclear are the top two energy sources in Dalian's energy development.

Source: Dalian City Energy Development "Fourteenth Five-Year" Plan

Appendix – Hypotheses result



H1: There is a negative correlation between public attitude towards nuclear energy and wind energy acceptance H2a: WD has a negative effect on WPB H3a: WD has a positive effect on WPR H2b: EX has a positive impact on WPB H3b: EX has a negative impact on WPR H2c: KN has a positive effect on WPB H3c: KN has a negative effect on WPR H2d: PA has a positive effect on WPB H3d: PA has a positive effect on WPR H2e: EC has a positive impact on WPB H3e: EC has a negative effect on WPR H2f: SN has a positive effect on WPB H3f: SN has a negative impact on WPR H2g: AI has a positive impact on WPB H3g: AI has a negative impact on WPR H2h: PT has a positive effect on WPB H3h: PT has a negative impact on WPR H2i: ST has a positive impact on WPB H3i: ST has a negative impact on WPR H4: WPB has a positive impact on WAP H5: WPR has a negative effect on WAP

| | Support (\vee) or rejec | t (×) | |
|------------|-------------------------------|-----------------------------------|------------------------------------|
| Hypotneses | Among all public (Model 1) | Among general public (Model 2) | Among local residents (Model 3) |
| H1 | × | × | × |
| H2a | × | × | × |
| H3a | \checkmark | × | \checkmark |
| H2b | × | × | × |
| H3b | × | × | × |
| H2c | | × | × |
| H3c | × | × | × |
| H2d | × | × | × |
| H3d | | | × |
| H2e | × | \checkmark | × |
| H3e | × | × | × |
| H2f | | | × |
| H3f | × | | × |
| H2g | | \checkmark | |
| H3g | | × | |
| H2h | | × | |
| H3h | × | × | × |
| H2i | | | |
| H3i | | | |
| H4 | | | |
| H5 | | × | \checkmark |

Note: " $\sqrt{}$ " means the hypotheses is supported, " \times "means the hypotheses is rejected

· 1-

Appendix – Text analysis



Frequency statistics of free text

| Bonk | Total | | Online survey | | Offline survey | |
|------|-------------------------|-----------|---------------------------------|-----------|--|-------------------|
| Rank | Word | Frequency | Word | Frequency | Word | Frequency |
| 1 | worry | 437 | worry | 209 | worry | 228 |
| 2 | wind power plant | 211 | human health | 75 | wind power plant | 159 |
| 3 | noise | 112 | environment | 72 | noise | 104 |
| 4 | nuclear power plants | 95 | nuclear leakage | 64 | primary issue | 65 ^{nuc} |
| 5 | nuclear radiation | 89 | nuclear accident | 58 | electromagnetic radiation from wind turbines | 56 |
| 6 | human health | 88 | wind power plant | 52 | nuclear power plants | developm 51 |
| 7 | environment | 86 | nuclear radiation | 51 | climate | 48 |
| 8 | nuclear accident | 77 | nuclear power plant | 44 | nuclear radiation | 38 |
| Q | nuclear leakage | 76 | nuclear | 30 | treated radioactive | 38 |
| 3 | nuclear leakaye | 10 | energy | 53 | water | 50 |
| 10 | primary issue | 65 | wind power plant accident | 34 | Dalian | 31 |



High-frequency words relationship network Source: author