Professor Dr. Carsten Herbes
Nürtingen-Geislingen University

Acceptance of renewable energies in Germany – the case of biogas

Journée Med-Energie – OHM BMP
Aix-en-Provence, September 2014
Agenda

• Introduction: RE and RE acceptance in Germany
• Biogas in Germany: development and acceptance
• Focus: the public discourse on maize and biogas
• Political effects of acceptance issues
11% of primary energy consumption from RES

... and 25% of electricity production from RES
The consumers / citizens: “three in one”

Consumer => „Market acceptance“

Citizen => „socio-political acceptance“

Inhabitant of a certain region => „community acceptance“
Consumers’ willingness to pay (WTP) in Germany

- 33% premium of more than 100€ accepted
- 17% premium up to 100€ accepted
- 11% premium up to 50€ p.a. accepted
- 39% no price premium accepted

Source: Statista 2012
Consumers: real behavior

Percentage of households in Germany subscribed to a "green" electricity tariff

Source: BMU 2013
The consumers / citizens: “three in one”

Consumer => „Market acceptance“

Citizen => „socio-political acceptance“

Inhabitant of a certain region => „community acceptance“
High socio-political acceptance in general...

Utilization and development of renewable energy is...

- Extremely important: 70%
- Important: 24%
- Less or not at all important: 6%
- I don't know, no answer: 1%

Source: TNS Infratest 2012, 4060 informants, on behalf of AEE
but issues with cost: discussion on electricity prices
Desired shares of renewables in the electricity mix

Source: own research, n = 367
The consumers / citizens: “three in one”

Consumer => „Market acceptance“

Citizen => „socio-political acceptance“

Inhabitant of a certain region => „community acceptance“
Citizens’ initiatives against local renewable projects

Sources: Various websites / newspapers
Local acceptance for renewable energy generation

Local acceptance depending on electricity-generation type

- RES plants generally: 67%
- Solar power field: 77%
- Wind power plant: 61%
- Biomass power plant: 36%
- Gas-fired power plant: 21%
- Coal-fired power plant: 8%
- Nuclear power plant: 3%

For providing energy in the vicinity: good / very good

Source: data from AEE 2012, n = 4,060
Agenda

• Introduction: RE and RE acceptance in Germany
• Biogas in Germany: development and acceptance
• Focus: the public discourse on maize and biogas
• Political effects of acceptance issues
Biogas: Development in Germany

Development of the number of biogas plants and the total installed electric output in megawatt [MW] in Germany (as of 6/2014)

© Fachverband Biogas e.V./German Biogas Association
Reservations with regard to biomass (incl. biogas)

### Socio-political acceptance

- **Competition to food production**: 53%
- **GMO**: 30%
- **Reduced biodiversity**: 28%

### Community acceptance

- **Odour nuisance**: 22%
- **Landscape deformation**: 14%
- **Explosion risk**: 11%
- **More traffic**: 7%

*Source: own research, n = 367*
"Maizification" is a major concern

Sources: Various websites / newspapers
Maize cultivation has been rising due to biogas boom

Area under cultivation for silage maize ['000 ha]

Area under cultivation for maize: Total 2,49 m ha (2013)

Source: Deutsches Maiskomitee 2014
Measures to raise the acceptance level

"I would be more willing to accept a biogas plant in the vicinity…"

- never: 10%
- If I can be a co-investor: 15%
- If I am informed: 54%
- If I can purchase energy from it: 56%

Source: own research
Agenda

• Introduction: RE and RE acceptance in Germany
• Biogas in Germany: development and acceptance
• Focus: the public discourse on maize and biogas
• Political effects of acceptance issues
Research questions

How did the discourse around maize for biogas use develop before and after the change of the Renewable Energy Act 2012?

• Arguments & story lines
• Players & discourse coalitions
• Reactions to arguments
• Development of discourse elements over time
Empirical investigation

- Joint project with the Technical University of Munich (TUM)

- Focus on discourse in mass media
  - Analysis of the five biggest quality newspaper operating nationwide (SZ, FAZ, Welt, TZ, FR)
  - Analysis of hearings in parliament (political documents)
  - Qualitative content analysis (Mayring, Krippendorff) plus quantitative analysis
  - Discourse analysis based on Hajer's methodology

- Two analysis periods
  - First period: November 2010 (first discourse elements) until June 2011 (REA 2012 passes parliament)
  - Second period: July 2012 until April 2013 (new law in full operation)
Number of articles in the first period

- **Introduction E10**
- **Fuel producers return to E 5**
- **30.06.2011: REA 2012 adopted by German parliament**

n = 155 (n highly relevant = 46)

30.06.2011: REA 2012 adopted by German parliament
The arguments

- Effects on nature and environment
  - Reduction of biodiversity
  - Negative effects on soil and phreatic water
  - Negative effects on landscape
  - Damages for the climate
  - Benefits for the climate

- Effects on economy / consumers
  - Increasing cost of food production
  - Threats for farmers
  - Negative effects on 'secondary users' of cropland, e.g. beekeepers
  - Safeguarding farmers' economic existence
  - Job creation

- Effects for energy supply
  - Securing energy transition
The story lines (1/2)

- **The biogas boom**
  - Pictures the fast growth of the biogas sector in Germany
  - Mostly linked to a description of negative effects plus the assumption that the political support is not adequate

- **The maizification of our landscape**
  - Pictures the drastic effects of the biogas growth on the landscape
  - Mostly linked to a description of various negative effects on nature and environment

- **Fuel versus food**
  - Pictures the conflict between energy production and food production
  - Used by biogas critics during in the E10 biofuel context
  - Transferred from the biofuel discourse to the biogas discourse
  - Biogas supporters tried to turn this storyline into 'food and fuel'
The story lines (2/2)

• **Not everything called ‚bio‘ is really bio**
  – According to this storyline, the original goal of creating an environmentally friendly energy supply has been missed
  – Mostly linked to a description of negative effects on nature and environment

• **Only the boars like it.**
  – Pictures the negative effects on biodiversity and resulting problems for nature and environment plus damages / losses for hunters, beekeepers, farmers

• **The fight for agricultural land**
  – Pictures the increasing conflict on agricultural land, mostly linked to a description of negative effects on food production
  – Often linked to (allegedly inadequate) subsidies
## Story lines and players in the first period

<table>
<thead>
<tr>
<th></th>
<th>Biogas boom</th>
<th>Maizification</th>
<th>Food vs. fuel</th>
<th>Boars</th>
<th>Not all bio</th>
<th>Fight for agricultural land</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industry players</strong></td>
<td>3</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
<td>11</td>
</tr>
<tr>
<td>Beekeepers</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Biogas producers</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Solar producers</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Farmers</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td></td>
<td></td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td><strong>Politicians</strong></td>
<td>3</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Media</td>
<td>6</td>
<td>14</td>
<td>5</td>
<td>6</td>
<td>5</td>
<td>7</td>
<td>43</td>
</tr>
<tr>
<td>Environmental groups</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td></td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Administration</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Academia</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>14</td>
<td>28</td>
<td>8</td>
<td>8</td>
<td>5</td>
<td>15</td>
<td>78</td>
</tr>
</tbody>
</table>
Number of articles in the second period

Study by Leopoldina

N= 257 (n highly relevant = 54)

Articles on the topic
Highly relevant articles
### Story lines and players in the second period

<table>
<thead>
<tr>
<th>Poor climate balance</th>
<th>Energy storage</th>
<th>Food vs. fuel</th>
<th>Fuel, food &amp; feedst.</th>
<th>Maizification</th>
<th>Diversification of input</th>
<th>Greed for profits</th>
<th>Fight for agricultural land</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Industry players</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>26</td>
</tr>
<tr>
<td>Biogas producers</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>8</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td><strong>Energy suppliers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Farmers</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td><strong>Politicians</strong></td>
<td>4</td>
<td>5</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>4</td>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>Environmental groups</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>1</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>Administration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Citizens</td>
<td>2</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td><strong>Academia</strong></td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>10</td>
<td>11</td>
<td>7</td>
<td>10</td>
<td>10</td>
<td>15</td>
<td>7</td>
<td>9</td>
</tr>
</tbody>
</table>

*Seite 29*
Storylines before and after the new REA 2012

- Biogas boom
- The maizification of the landscape
- Fuel vs. food
- Not everything called 'bio' is really bio
- Only the boars like it
- The fight for agricultural land
- Poor climate balance
- The maizification of the landscape
- Fuel vs. food
- Fuel, food and feedstock
- Greed for profits
- The fight for agricultural land
- Diversification of input material
- Energy storage through biogas
Summary

- Very persistent negative story lines: Maizification, food vs. fuel, fight for agricultural land

- Besides those, most story lines are dynamic: some disappear, some emerge

- Strong effects of single events: biomass study by Leopoldina

- Strong link to seemingly ‘unrelated’ discourse about biofuels

- Biogas sector only managed to establish own positive storylines after the political decision for the maize cap
Agenda

- Introduction: RE and RE acceptance in Germany
- Biogas in Germany: development and acceptance
- Focus: the public discourse on maize and biogas
- Political effects of acceptance issues
Changes in political support (Renewable Energy Act)

- Use of maize in biogas plants not limited
  - 2012
  - Feed-in-tariff of ca. 9 EuroCt/kWh

- Use of maize in biogas plants limited to 60%
  - 2009
  - Feed-in-tariff of 18 EuroCt/kWh

- Use of maize in biogas plants not limited
  - 2014
  - Feed-in-tariff of 19 EuroCt/kWh

Example: Biogas plant of 500kW, running on energy crops
Summary and political implications (1/2)

- Discrepancies between socio-political and community acceptance: Germans have more problems with general issues than with local plants.

- Bioenergy is the least accepted renewable resource.

- Strong reservations in Germany regarding energy crops (competition with food production).

- Public discourse on maize and biogas in mass media and political discourse are often in line (but fuel vs. food seems not very relevant in the political arena).
Summary and political implications (2/2)

• Some story lines appear earlier in the public discourse than in the political discourse (public discourse is a driver)

• Effect: Change in political support:
  – Before REA 2012: generous support for biogas from energy crops
  – REA 2012: Percentage of maize in the input material of biogas plants reduced to a maximum of 60%
  – REA 2014: Electricity production from energy crop-based biogas is economically not viable any more => end of biogas expansion in Germany

• The biogas sector had completely underestimated the potential effects of the public discourse on political decisions