# Economic benefits of locally owned on farm wind clusters in Aberdeenshire

Julian Bell, Elaine Booth
SAC Consulting

# Outline

- 1) Objectives of study
- 2) On farm wind turbines in Aberdeenshire
- 3) Costs and returns
- 4) Local economic and employment benefits

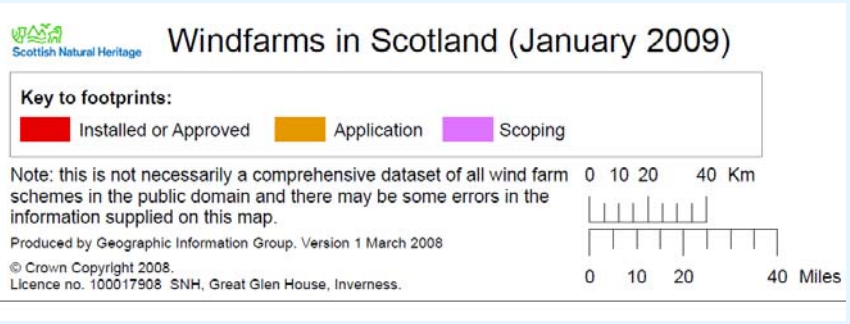
# 1) Study objectives

- to determine the economic benefits of local ownership of on-farm wind clusters in Aberdeenshire

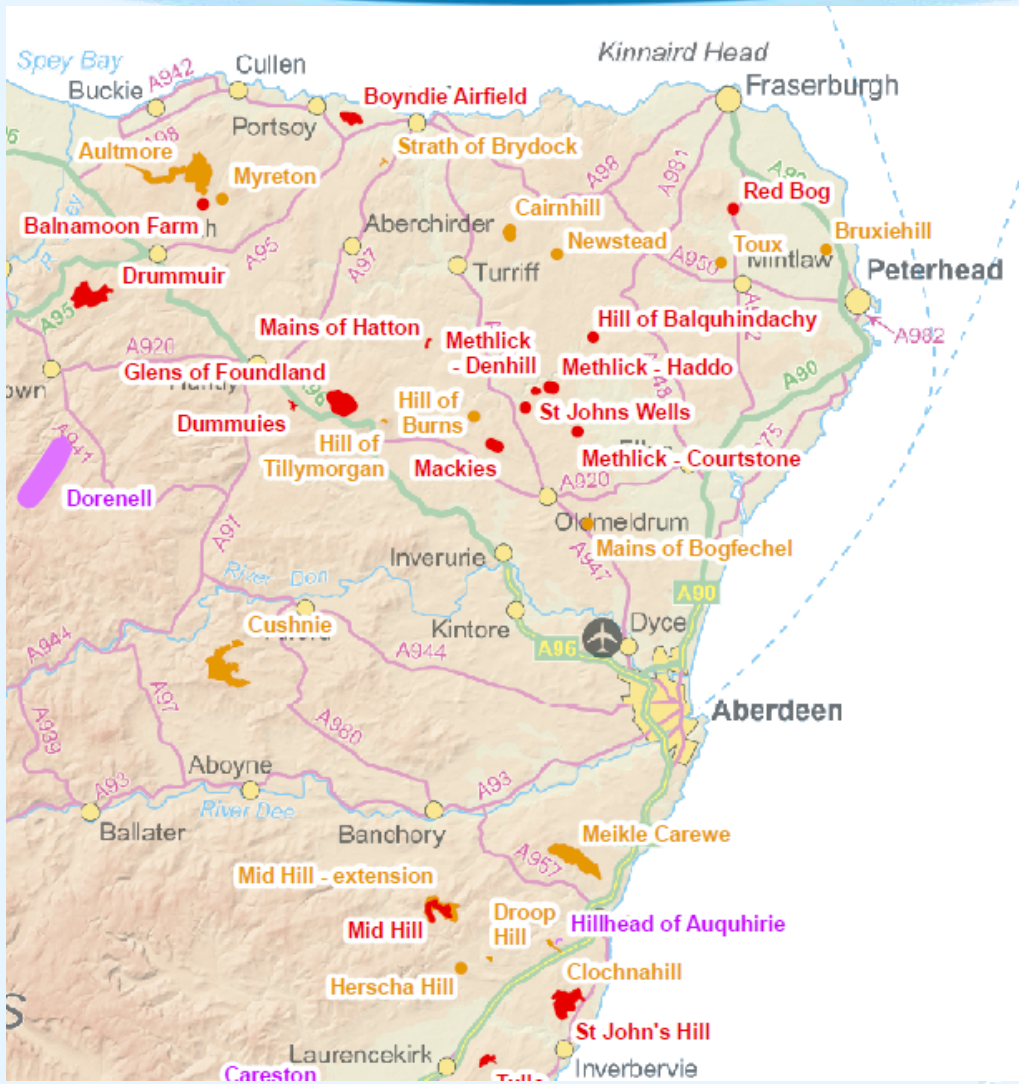
    - in terms of local income and jobs

# 2) Wind project developments in Aberdeenshire

# Aberdeenshire – wind projects - January 2009




Source: SNH



# Patterns of wind project development in Aberdeenshire

**(i) First commercial schemes - 2005-07** – operational

**(ii) First farmer schemes – 2007- 2010** - operational

- mostly 0.8 or 0.85MW turbines

**(iii) Larger farm schemes – currently in planning**

- 0.8, 0.85MW and move towards 2.3MW turbines

**(iv) Introduction of Feed in Tariffs – 2010** – also supports move to smaller turbines **–** farm schemes include 'commercial' scale turbines of below 0.5MW

# Wind project developments in Aberdeenshire – summary

- 194MW operational/permitted + 192MW in planning

- 71% of wind projects in operation, permitted and in planning are farmers owned

- 33% of wind project capacity in operation, permitted and in planning is farmer owned

- farmer owned schemes are much smaller 2.40MW compared to 24.19MW developed by outsiders

- these estimates exclude the large number of projects that are not yet in planning

# 3) Costs and returns of local farmer owned wind turbines project

# Typical costs and returns – 0.8MW turbine – capital costs

| | Single 800 kW turbine |
|---|---|
| Turbine | 870,000 |
| Civils/electrical engineering | 125,000 |
| Grid connection | 150,000 |
| Financing | 50,000 |
| Professional | 80,000 |
| Interest During Construction | 20,000 |
| Insurance | 10,000 |
| Contingency | 95,000 |
| **Total capital cost** | **1,400,000** |

# Typical costs and returns – 0.8MW turbine – operating costs

| | |
|---|---|
| Maintenance | 20,000 |
| Meter operator | 500 |
| Rates | 7,000 or 0 |
| Community benefit | 2,000 |
| Insurance | 5,000 |
| Telecom lines | 600 |
| Contingency | 10,000 |
| **Sub total** | **45,100** |
| Capital & interest* | 121,800 |
| *( 20 yrs @ 6%) | |
| **Total** | **166,900** |

# Typical costs and returns – 0.8MW turbine – power output

- Rated output
- 800kw * 24 hrs *365 days = 7,008,000kWh
- Capacity factor 32%
- Actual output = **2,242,560kWh**

# Typical costs and returns – 0.8MW turbine – ROC income

- ROC's = 10.5p/kWh
- 'brown' electricity price + ROCs, LECs, embedded benefits and REGOs
- Income = 2,242,560 * 10.5p
- **= £235,469**

NOTE – ROC (Renewable Obligation Certificate), LEC (Levy Exemption Certificate), REGO (Renewable Energy Guarantee of Origin)

# Typical costs and returns – 0.8MW turbine – FIT income

- FIT's = 14.4p/kWh
- 'brown' electricity price of 5pkWh + FITs at 9.4p/kWh,
- Income = 2,242,560 * 14.4p
- **= £322,929**

NOTE – FIT (Feed in Tariff)

# Typical costs and returns – 0.8MW turbine – operating costs

| | |
|---|---|
| **Annual costs** | **166,900** |
| **A – ROC's** | |
| Annual income (ROCs) | 235,469 |
| | |
| Annual return (ROCs) | **68,569** |
| **B - FITs** | |
| Annual income (FITs) | 322,929 |
| | |
| Annual return (FITs) | **156,029** |

# Typical costs and returns – 0.8MW turbine – farmer owned vs leased out

| | |
|---|---|
| **Leased out** | **9,000** |
| | |
| Annual return (ROCs) | 68,569 |
| **Increased income** | **59,569** |
| | |
| | |
| Annual return (FITs) | 156,029 |
| **Increased income** | **147,029** |
| | |

# Farmer owned wind turbine developments – 0.8kW - summary

- High risk through planning stage with no guarantee of success
- + high capital costs
- = open mainly to larger, owner occupied farms
- But where farmers are prepared to take the risks and develop themselves the returns are far higher (20* leasing)
- FITs – will boost uptake of wind power on farm, spreading benefit to smaller farms
- This extra income is a major boost to farming families
- AND to the local economy

# 4) Economic and employment benefits of local ownership

# Local economic impact assessment - outline

Where turbines are owned by local farmers incomes will be raised and a proportion of this will be spent locally, helping generate employment e.g.;

- household expenditure in local shops, businesses, etc
- Increased investment in;
  - farming
  - diversified businesses
  - property renovation

Employment may be direct, indirect or induced

**Where turbines are owned by external investors these local benefits do not arise**

# Local economic impact assessment - employment impact

(i) Project expenditure estimated

- by category

(ii) Then converted using employment multiplier

– Scottish Input – output tables

(iii) To give estimates of direct, indirect and induced employment attributed to -

- Scotland (O'Herlihy)
- Aberdeenshire (SAC/industry)

(v) Results - per 0.8Mw turbine

- extrapolated across all farmer owned schemes through planning in Aberdeenshire

# Local economic impact assessment – 0.8MW turbine – local income effect

| | Output/expenditure (£) | | Difference |
|---|---|---|---|
| | FARMER/LOCAL owned | EXTERNALLY owned | |
| **TOTAL 1 – construction** | 322,000 | 322,000 | 0 |
| **Operation and maintenance** | 20,000 | 20,000 | 0 |
| **Land agreement** | 156,029 | 9,000 | 147,029 |
| **TOTAL 2 – annual** | 176,029 | 29,000 | 147,029 |

# Local economic impact assessment – 0.8MW turbine – local jobs effect

| | Output/expenditure (£) | | Difference |
|---|---|---|---|
| | FARMER /LOCAL owned | EXTERNALLY owned | |
| **TOTAL 1 – construction** | 3.45 | 3.45 | 0 |
| **Operation and maintenance** | 0.14 | 0.14 | 0 |
| **Land agreement** | 1.33 | 0.09 | 1.24 |
| **TOTAL 2 – annual** | 1.47 | 0.23 | 1.24 |

# **Summary -** local ownership of wind turbines brings benefits

- ADDITIONAL annual income to the local economy of - **£147,000** per **0.8MW** turbine and in **Aberdeenshire;**
  - **£10m** for operational/approved projects*
  - a further **£13.4m from projects in planning#**

- ADDITIONAL employment to the local economy of **1.47 jobs** per **0.8MW** turbine and in Aberdeenshire;
  - **82 jobs for operational/approved projects***
  - **a further 113 jobs from projects in planning#**

- These are general estimates, each project is unique
- Surveying actual impact would provide firmer data
- Farmers are expected to be particularly good at recycling extra income back to the farm & local economy

- (farmer owned projects *53MW in operation or permitted, #73MW in planning)

# Medium to small scale wind development – issues to consider

- Issues for local developers
  - Average wind speed
  - Planning permission – costs, high risk (Renewables Loan Fund proposed)
  - Grid connection – cost and access
  - Finance – security vs non recourse
- Issues for Councils
  - Size of turbines – 0.8MW = 80m, 2.3MW = 100m (x3 power for 20% extra height)
  - Local developer vs large company
  - Cumulative effects vs contribution to renewable targets and economic development

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