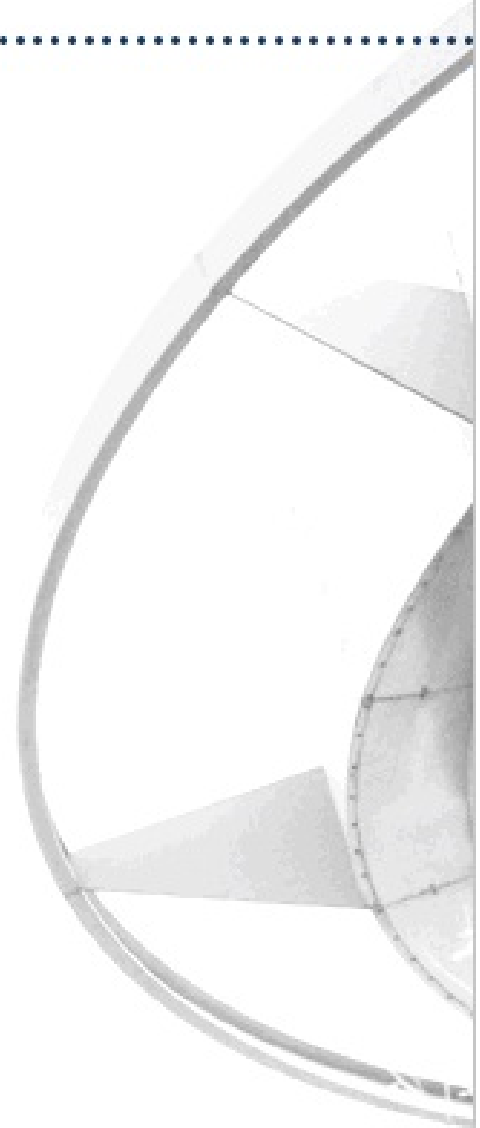
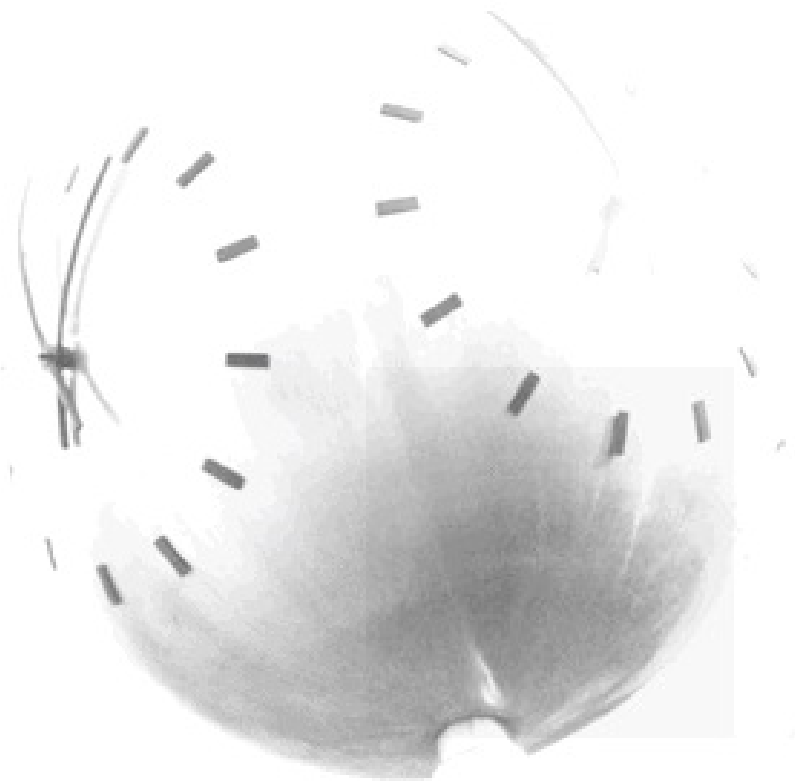


# Renewable and Low Carbon Energy Options Topic Paper

March 2017





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## 1. INTRODUCTION

- 1.1 The *National Planning Policy Framework (NPPF)* states that “Renewable energy covers energy flows that occur naturally and repeatedly in the environment. Low carbon technologies are those that can help reduce emissions (compared to conventional use of fossil fuels)”.
- 1.2 There is a statutory duty on local planning authorities (LPAs) to include policies in their Local Plan designed to tackle climate change and its impacts under Section 19 (1A) of the *Planning and Compulsory Purchase Act 2004*<sup>1</sup>. Policies must be designed to secure development and the use of land in the LPA area to contribute to the mitigation of, and adaptation to, climate change.
- 1.3 Increasing the use of renewable and low carbon energy technologies will work towards making sure that the UK continues to have a secure energy supply. It will aid in the reduction of greenhouse gas emissions to slow down climate change and also stimulate investment in new jobs and businesses.

### Report Structure

- 1.4 This topic paper is structured around the following sections:
  - **Section 2 – The Process** details the national policy relating to this topic paper along with its purpose;
  - **Section 3 – Policy Background** looks at the policy background relating to renewable and low carbon energy in planning;
  - **Section 4 – Study Area** gives a brief overview of the Basildon Borough;
  - **Section 5 – Existing Energy Consumption** gives a brief overview of the existing energy consumption and emissions within the Basildon Borough;
  - **Section 6 – Renewable and Low Carbon Energy Evidence Base and Consultation Responses** details how the *Renewable and Low Carbon Energy Constraints and Opportunities Assessment* (December 2015) informed the Draft Local Plan climate change policies. This section also gives a brief overview of the comments received as part of the Draft Local Plan consultation and sets out the resulting action required;

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<sup>1</sup> Planning and Compulsory Purchase Act 2004: <http://www.legislation.gov.uk/ukpga/2004/5/contents>

- **Section 7 - Option One** reviews the proposal for a Combined Heat and Power plant and District Heating system being promoted by KTI Energy Limited at Dunton, Basildon;
- **Section 8 - Option Two** reviews the application of eco-industrial park principles to the Burnt Mills Industrial Estate through improved resource and energy efficiency and renewable and low carbon energy production through Anaerobic Digestion and Combined Heat and Power Plant installation and a Dry Anaerobic Digestion and In Vessel Composting facility;
- **Section 9 – Recommendations** makes recommendations based on the reviews of the renewable and low carbon energy options one and two considered in the previous two sections;
- **Section 10 – Local Policies for Climate Change** considers the Draft Local Plan public consultation comments further along with the results of the above renewable and low carbon energy options one and two to establish if the climate change policies in the Draft Local Plan need amending.

## 2. THE PROCESS

- 2.1 The *NPPF* provides clear guidance for LPAs on how they should be working towards a low carbon future, specifically in the following four paragraphs.
- 2.2 Paragraph 94<sup>2</sup> states: “Local planning authorities should adopt proactive strategies to mitigate and adapt to climate change, taking full account of flood risk, coastal change and water supply and demand considerations”.
- 2.3 Paragraph 95<sup>3</sup> states: “To support the move to a low carbon future, local planning authorities should:
- plan for new development in locations and ways which reduce greenhouse gas emissions;
  - actively support energy efficiency improvements to existing buildings; and
  - when setting any local requirement for a building’s sustainability, do so in a way consistent with the Government’s zero carbon buildings policy and adopt nationally described standards.
- 2.4 Paragraph 97<sup>4</sup> states: “To help increase the use and supply of renewable and low carbon energy, local planning authorities should recognise the responsibility on all communities to contribute to energy generation from renewable or low carbon sources. They should:
- have a positive strategy to promote energy from renewable and low carbon sources;
  - design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily, including cumulative landscape and visual impacts;
  - consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources;
  - support community-led initiatives for renewable and low carbon energy, including developments outside such areas being taken forward through neighbourhood planning; and

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<sup>2</sup> Para 94, Section 10, p 22, National Planning Policy Framework, March 2012

<sup>3</sup> Para 95, Section 10, p 22, National Planning Policy Framework, March 2012

<sup>4</sup> Para 97, Section 10, pp 22-23, National Planning Policy Framework, March 2012

- identify opportunities where development can draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.”
- 2.5 Paragraph 99<sup>5</sup> states that: “Local Plans should take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure”.

### **Purpose**

- 2.6 The purpose of this topic paper is to review the details of the Renewable and Low Carbon Energy Options One and Two in terms of the schemes, the locations proposed, design and layout, operation of the facilities, opportunities, potential constraints and the expected energy outputs, where identifiable. The aim is then to identify if the proposals would be considered as sustainable and deliverable and should be incorporated into Basildon Council’s Local Plan as a Renewable and Low Carbon Energy proposal(s) to secure development.
- 2.7 It is then necessary to consider the proposed policies in the climate change chapter put forward in the Draft Local Plan. Applying the responses from the public consultation held January to March 2016 and the results from this topic paper it will be possible to identify whether the climate change policies in the Draft Local Plan need amending.

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<sup>5</sup> Para 99, Section 10, p 23, National Planning Policy Framework, March 2012



### 3. POLICY BACKGROUND

- 3.1 There are a number of International, European and National policies in place which aim to reduce the impacts of climate change and encourage the use of renewable and low carbon energy. Some of these important policies are detailed further below.

#### International and European policy

- 3.2 The *Kyoto Protocol*<sup>6</sup> was an international agreement setting targets for industrialised countries to cut their greenhouse gas emissions. The *Kyoto Protocol* emerged from the *UN Framework Convention on Climate Change (UNFCCC)*, which was signed by nearly all nations at the 1992 Earth Summit meeting in Kyoto. The treaty was finalised in 1997 and became a legally binding agreement in February 2005. The UK agreed to reduce emissions of six greenhouse gases by 12.5% below 1990 levels by the period 2008-2012.
- 3.3 The *Doha Climate Change Conference*<sup>7</sup> in 2012 led to the adoption of an amendment to the *Kyoto Protocol* during the second commitment period, from 2013 to 2020. Parties have committed to reduce greenhouse gas emissions by at least 18 per cent below 1990 levels.
- 3.4 On 12 December 2015 Parties to the Convention adopted the *Paris Agreement*, which provides a new framework for all Parties to take action on climate change through reducing emissions and building resilience. To maximise participation, commitments will be nationally determined, allowing each country to consider its own national circumstances and put forward its own ambitious contribution to the global effort. The *Paris Agreement* sets out the overall framework and high-level rules for this process and is legally-binding, it was entered into force on 4 November 2016<sup>8</sup>. The overarching aim of the *Paris Agreement* is to hold the increase in global temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit it to 1.5°C.
- 3.5 In April 2009, the European Union adopted the *Directive on Renewable Energy (2009/28/EC)*<sup>9</sup>, which set targets for all Member States that the EU will reach a 20% share of energy from renewable sources by 2020. The UK's binding target is to meet 15% of its energy consumption from renewable sources by 2020. On the 24 October 2014, European Leaders agreed to a clear set of climate and energy targets for 2030 in European Council. These include:
- reducing domestic greenhouse gas emissions by at least 40% by 2030 compared to 1990 levels;

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<sup>6</sup> Kyoto Protocol: <http://kyotoprotocol.com/>

<sup>7</sup> Doha Climate Change Conference: [http://europa.eu/rapid/press-release\\_MEMO-13-956\\_en.htm](http://europa.eu/rapid/press-release_MEMO-13-956_en.htm)

<sup>8</sup> Paris Agreement: <http://www.housing.gov.ie/environment/climate-change/policy/eu-climate-change-policy>

<sup>9</sup> Directive on Renewable Energy: <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex:32009L0028>

- increase the share of renewable energy to at least 27% of the EU's energy consumption by 2030;
  - an indicative target of at least 27% for improved energy efficiency at EU level by 2030.
- 3.6 On 30 November 2016, the Commission published a proposal for a revised *Renewable Energy Directive* to make the EU a global leader in renewable energy. EU Countries have agreed on a new renewable energy target of at least 27% of final energy consumption in the EU as a whole by 2030 as part of the EU's energy and climate goals for 2030.

### National policy

- 3.7 The *Climate Change Act 2008*<sup>10</sup> establishes a legally binding target to reduce the UK's greenhouse gas emissions by at least 80% by 2050 from 1990 levels.
- 3.8 The *2009 UK Renewable Energy Strategy*<sup>11</sup> (*RES*) provides a series of measures to meet the legally-binding target set in the *Renewable Energy Directive*. The *RES* envisages that more than 30% of UK electricity should be generated from renewable sources.
- 3.9 The *Planning and Energy Act 2008*<sup>12</sup> is also relevant in that it enables LPA's to set requirements for energy use and energy efficiency in local plans. As detailed earlier Local Policies Section 19 (1A) of the *Planning and Compulsory Purchase Act 2004*<sup>13</sup> requires LPA's to include in their Local Plans "policies designed to secure that the development and use of land in the LPA's contribute to the mitigation of, and adaptation to, climate change". This will be a consideration when a Local Plan is examined along with the other guidance.
- 3.10 The *Energy Act 2016* received Royal Assent on 12 May 2016. It makes provision about the Oil and Gas Authority and its functions as well as devolves consent for large onshore wind farms from central government to LPA's.

### Local policy

- 3.11 LPA's are responsible for renewable and low carbon energy development of 50 megawatts or less installed capacity (under the *Town and Country Planning Act 1990*<sup>14</sup>). Renewable and low carbon development over 50 megawatts capacity will be considered by the Secretary of State for

<sup>10</sup> Climate Change Act 2008: <http://www.legislation.gov.uk/ukpga/2008/27/contents>

<sup>11</sup> 2009 UK Renewable Energy Strategy: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/228866/7686.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228866/7686.pdf)

<sup>12</sup> Planning and Energy Act 2008: <http://www.legislation.gov.uk/ukpga/2008/21/contents>

<sup>13</sup> Planning and Compulsory Purchase Act 2004: <http://www.legislation.gov.uk/ukpga/2004/5/contents>

<sup>14</sup> Town and Country Planning Act 1990: <http://www.legislation.gov.uk/ukpga/1990/8/contents>

Energy, under the *Planning Act 2008*<sup>15</sup>, and the LPA will be a statutory consultee.

- 3.12 Some forms of renewable and low carbon energy, especially Microgeneration, is often permitted development<sup>16</sup> and may not require an application for planning permission.
- 3.13 Local and neighbourhood plans are the key to delivering development that has the backing of local communities. When drawing up a Local Plan LPA's should consider what the local potential is for renewable and low carbon energy generation. Communities can make use of neighbourhood planning through Neighbourhood Development Plans (NDPs) and Neighbourhood Development Orders (NDOs) which can be used to guide local development including the use of renewable and low carbon energy. There are currently no adopted NDPs or NDOs within the Basildon Borough at the date of publication.

### **NPPF and PPG**

- 3.14 The *Planning Practice Guidance (PPG)* and the *NPPF* (as detailed in the above section) provide essential guidance on planning for renewable and low carbon energy.
- 3.15 The *PPG*<sup>17</sup> states that "In shaping local criteria for inclusion in Local Plans and considering planning applications in the meantime, it is important to be clear that:
  - the need for renewable or low carbon energy does not automatically override environmental protections;
  - cumulative impacts require particular attention, especially the increasing impact that wind turbines and large scale solar arrays can have on landscape and local amenity as the number of turbines and solar arrays in an area increases;
  - local topography is an important factor in assessing whether wind turbines and large scale solar arrays could have a damaging effect on landscape and recognise that the impact can be as great in predominately flat landscapes as in hilly or mountainous areas;
  - great care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting;

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<sup>15</sup>Planning Act 2008: <https://www.gov.uk/government/policies/providing-regulation-and-licensing-of-energy-industries-and-infrastructure/supporting-pages/planning-and-consents-for-national-energy-infrastructure>

<sup>16</sup> Permitted Development (Part 14): <http://www.legislation.gov.uk/ukxi/2015/596/contents/made>

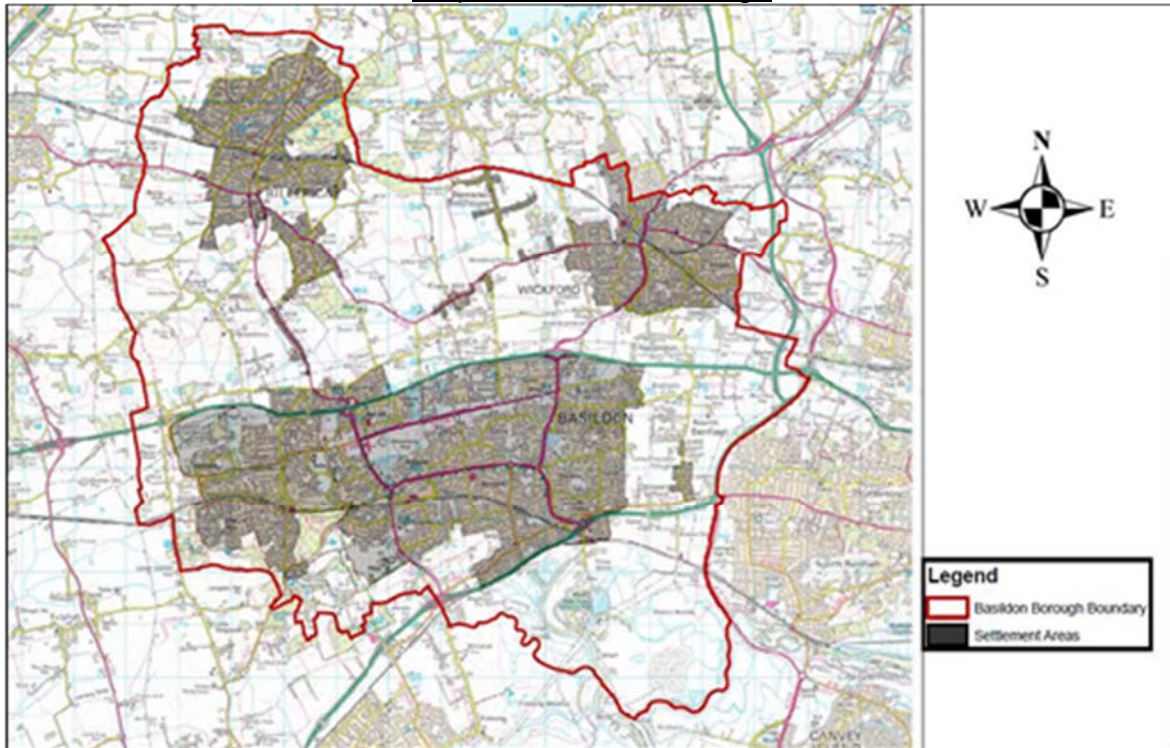
<sup>17</sup> PPG: <http://planningguidance.planningportal.gov.uk/blog/guidance/renewable-and-low-carbon-energy/developing-a-strategy-for-renewable-and-low-carbon-energy/>

- proposals in National Parks and Areas of Outstanding Natural Beauty, and in areas close to them where there could be an adverse impact on the protected area, will need careful consideration; and
- protecting local amenity is an important consideration which should be given proper weight in planning decisions.”

## 4. STUDY AREA

- 4.1 In 2011 the census recorded there to be approximately 74,000 dwellings accommodating 174,497 people within the Basildon Borough.
- 4.2 The Basildon Borough consists of three main towns which are Basildon to the south of the Borough, Wickford to the north east and Billericay to the north west. Figure 1 below shows a map of the study area.

Map of Basildon Borough



(©Crown copyright and database rights 2014 Ordnance Survey 100018871)

Figure 1: Map of the Basildon Borough

- 4.3 The former New Town area of Basildon also contains Pitsea to the east and Laindon to the west. Each of these settlements, along with Billericay and Wickford are located around a town centre.
- 4.4 There are other smaller serviced settlements in the Borough; these are Bowers Gifford that lies to the east of Pitsea, Ramsden Bellhouse to the north of the Borough between Billericay and Wickford, and Crays Hill, which is to the south of Ramsden Bellhouse in the centre of the Borough. The Borough also has two unserviced settlements, which are Little Burstead and Noak Hill. Little Burstead is to the south of Billericay and Noak Hill is a ribbon development to the south of Billericay.
- 4.5 There are a number of strategic roads within the Borough. The A127 runs east to west through the centre of the Borough and forms a key route through the main employment areas, connecting to the A130. The A130 runs north to south -along the eastern boundary of the Borough and

connects to the A13, which runs along the southern edge of the Borough and links to the A12, south of Chelmsford City.

- 4.6 There are five railway stations located within the Borough at Pitsea, Laindon, Basildon, Billericay and Wickford.

## 5. EXISTING ENERGY CONSUMPTION AND EMISSIONS IN BASILDON

- 5.1 The *Renewable and Low Carbon Energy Constraints and Opportunities Assessment*<sup>18</sup> (December 2015) reviewed the existing energy consumption of the Basildon Borough.
- 5.2 It was identified that gas (1,301 GWh - 40%) had the highest energy consumption levels in Basildon, followed by petroleum products (1,101 GWh - 34%) then electricity (792.1 GWh - 25%).
- 5.3 For comparison purposes the Borough's electricity use is 90.41MW and gas use is 148.52MW.

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<sup>18</sup> Renewable and Low Carbon Energy Constraints and Opportunities Assessment (Dec 2015):  
<http://www.basildon.gov.uk/CHttpHandler.ashx?id=6576&p=0>



## 6. DRAFT LOCAL PLAN – RENEWABLE AND LOW CARBON ENERGY EVIDENCE BASE AND CONSULTATION RESPONSES

### Renewable and Low Carbon Energy Evidence Base

- 6.1 The *Renewable and Low Carbon Energy Constraints and Opportunities Assessment* (December 2015) considered a number of renewable and low carbon energy generation methods and found that there is significant potential to generate a large amount of renewable and low carbon energy within the Basildon Borough. If all the methods reviewed as part of the assessment were combined and utilised then approximately 181.78MW of electricity could be generated which equals a substantial 201% of the Borough's electricity needs based on the 2012 statistics.
- 6.2 The assessment showed that large scale solar arrays could provide the most electricity for the Borough followed by microgeneration and wind turbines.
- 6.3 By promoting the use of renewable and low carbon energy generation methods at commercial and domestic scale (in appropriate locations) the Borough could reduce greenhouse gas emissions and contribute to the UK having a continuous and secure energy supply.
- 6.4 Given the potential for substantial electricity generation through renewable and low carbon energy in the Borough and the positive benefits it would bring not only to the Borough but to the UK as a whole, it was considered appropriate to set targets within the emerging Local Plan for new developments and conversions to existing buildings to incorporate renewable and low carbon energy generation. It was suggested that the Merton Rule be applied at a rate of 10-20% CO<sub>2</sub> emissions arising from each development site. This would require on-site renewable /low carbon energy provision at 10-20% of the sites total energy consumption.
- 6.5 Advice given in the *Basildon Outline Landscape Appraisals of Potential Strategic Development Sites*<sup>19</sup> (December 2015) combined with the *Renewable and Low Carbon Energy Constraints and Opportunities Assessment* (December 2015) also gave support for some of the strategic housing site policies to promote renewable and low carbon energy generation where it was felt it might be suitable within the landscape.

### Draft Local Plan Consultation Responses – Climate Change

- 6.6 The Draft Local Plan was published for public consultation for eight weeks between January and March 2016. The Council received over 21,500 comments in relation to this consultation.
- 6.7 A Statement of Consultation was prepared which set out how the consultation was promoted, how people were engaged and how

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<sup>19</sup> Renewable and Low Carbon Energy Constraints and Opportunities Assessment (December 2015): <http://www.basildon.gov.uk/article/4948/Evidence-Base---Landscape-and-Green-Belt>



information was made available for residents and other stakeholders. It summarises the results of the consultation, identifying the key issues that arose under each thematic planning issue addressed in the Draft Local Plan. It also makes recommendations as to the actions that could be taken to ensure that the next version of the Local Plan addresses those issues raised by consultees through the consultation process before the Council submits the plan to Government in 2017.

- 6.8 Comments received in relation to the Climate Change chapter were generally supportive of the policies proposed, although some technical amendments were sought in relation to some policies to improve their clarity and/or soundness.
- 6.9 The following action was therefore agreed in response to those comments:
- ACTION 43: Consider making amendments to the policies in chapter 15 where they would improve the clarity of policies, or improve the soundness of the Local Plan.
- 6.10 A single comment, submitted by a site promoter, proposed that policy CC 7 (Renewable Energy Infrastructure) is amended to include the provision of a major Combined Heat & Power (CHP) plant to the west of the borough, on the boundary with Brentwood.
- 6.11 A key element of the promoter's argument for this proposal for a CHP plant is the limited provision that the Draft Local Plan makes for specific large scale renewable energy generation.
- 6.12 It should be noted that since the Draft Local Plan was published for consultation, Basildon Borough Council and Essex County Council have completed a joint feasibility study in relation to turning the Burnt Mills Industrial Estate in east Basildon into an Eco-Industrial Park. This would see renewable energy generation occurring as part of a wider approach to the circular economy within the existing urban area. There is therefore a need to consider the proposals for the CHP plant to the west of the borough, but this should be done in light of the proposals for the Burnt Mills Eco-Industrial Park as an alternative approach in order that the most sustainable and deliverable option for the borough can be pursued.
- 6.13 The following action was agreed in relation to the consultation responses and forms the basis of this Topic Paper:
- ACTION 44: Consider the sustainability and deliverability of the CHP plant proposed to the west of the Borough, and also the proposals identified for the Burnt Mills Eco-Industrial Park. If appropriate, consider amending policy CC 7, and any other relevant policies, to reflect the findings of this evidence and assessment work.

## 7. OPTION ONE – KTI ENERGY LIMITED – PROPOSED COMBINED HEAT AND POWER PLANT AND DISTRICT HEATING NETWORK AT DUNTON, WEST BASILDON

### Overview

- 7.1 KTI Energy Limited are a private company who have put forward a site located at Dunton, within the Basildon Borough, for a proposed Combined Heat and Power (CHP) plant and District Heating (DH) network referred to as DunCHP.

### Background

- 7.2 CHP is the simultaneous generation of usable heat and power (usually electricity) in a single process. CHP systems are highly efficient, making use of the heat which would otherwise be wasted when generating electrical or mechanical power through the burning of various fuels (including renewable based). Whilst they are an expensive and complicated technology, when installed efficiently they can be extremely viable. DH (also known as Community Heating) is the system for distributing heat from a centralised location (such as a CHP plant) for residential and commercial heating requirements. Multiple users are connected through a piped network to the main plant.
- 7.3 DH can be retrofitted for existing heat customers or installed in new developments. Retrofit heat networks are most suited to areas with at least one large anchor load (e.g. a major hospital) which is located in an area with a high heat density (the *Renewable and Low Carbon Energy Constraints and Opportunities Assessment*<sup>20</sup> (December 2015) sets out the varying levels of heat density for the Borough).

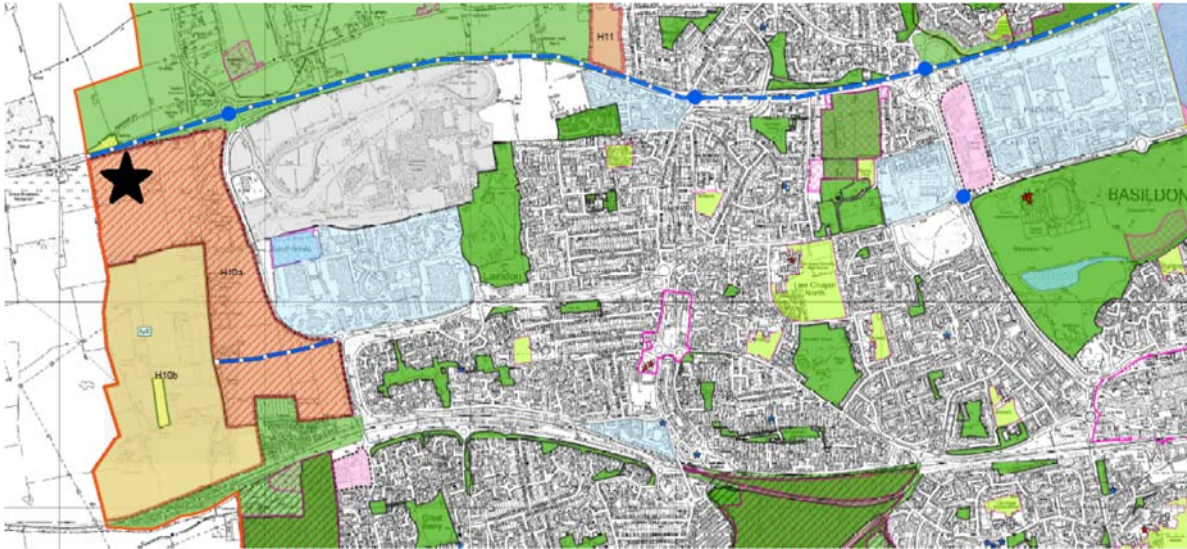
### The Site Location and Its Setting

- 7.4 A six hectare site in Dunton, west Basildon has been identified by KTI Energy Limited for their proposed DunCHP. The site would be located within Basildon Borough Council on the boundary adjacent to Brentwood Borough Council to the west and it would lie adjacent to the National Grid high pressure gas pipe on land at Friern Manor Farm. The DH main/spine would extend eastwards to land off Gardiner's Lane South (falling under a different landowner).
- 7.5 It would be sited to the north west corner of the proposed strategic housing allocation H 10 (West Basildon Urban Extension) as identified in the Basildon Draft Local Plan and shown in Figure 2 with a black star. It would lie south of the A127 and west of Lower Dunton Road. A site plan provided by KTI Energy Limited (Figure 3) shows the proposed site location highlighted in orange.

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<sup>20</sup> Renewable and Low Carbon Energy Constraints and Opportunities Assessment (Dec 2015): <http://www.basildon.gov.uk/CHttpHandler.ashx?id=6576&p=0>

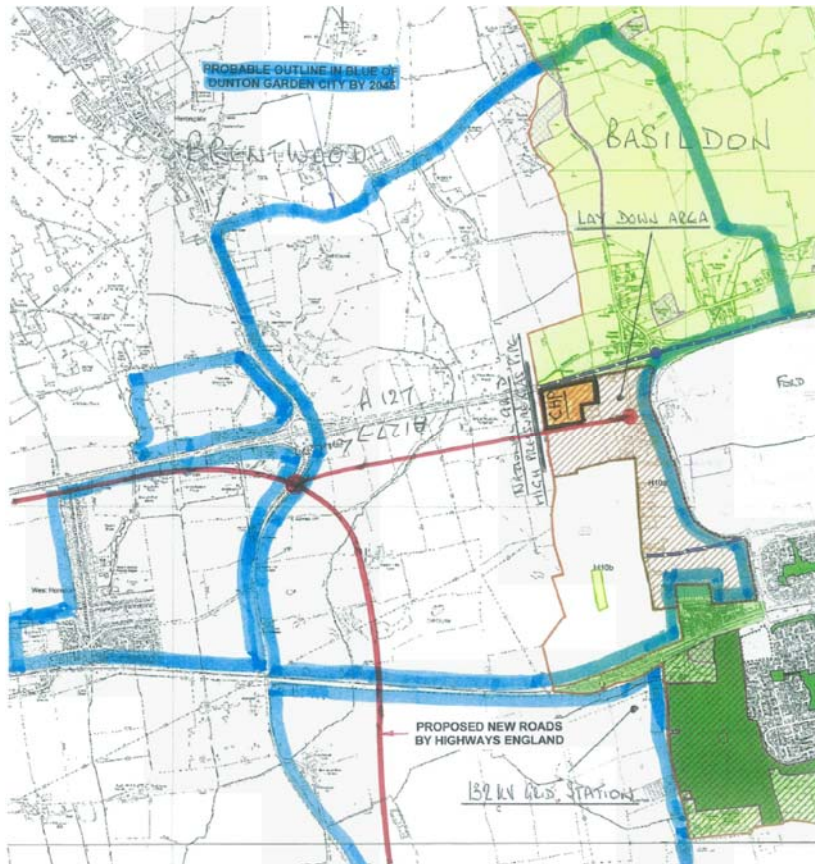
Basildon Draft Local Plan Policy Map – extract showing proposed H 10 West Basildon Urban Extension



(Source: Basildon Borough Council<sup>21</sup>)

Figure 2: Basildon Borough Council Draft Local Plan Policies Map

KTI Energy Limited – Proposed DunCHP Site Location



(Source: KTI Energy Limited<sup>22</sup>)

Figure 3: KTI Energy Limited – Proposed DunCHP site location

<sup>21</sup> Basildon Borough Council Draft Local Plan Policies Map: <http://www.basildon.gov.uk/CHttpHandler.ashx?id=6598&p=0>

<sup>22</sup> KTI Energy Limited representation: [https://www.essex.gov.uk/Environment%20Planning/Planning/Minerals-Waste-Planning-Team/Planning-Policy/Documents/REP-609943-02\\_KTIEnergy\\_ExhibitA\\_Pre-PlanningService\\_%20DunCHP.pdf](https://www.essex.gov.uk/Environment%20Planning/Planning/Minerals-Waste-Planning-Team/Planning-Policy/Documents/REP-609943-02_KTIEnergy_ExhibitA_Pre-PlanningService_%20DunCHP.pdf)

- 7.6 The land is currently designated as Green Belt. It lies within Area 67 of the Green Belt which has been assessed within the *Basildon Borough Green Belt Review 2017* (March 2017) and concluded to make ‘a good contribution to the Green Belt purposes and keeping the land permanently open’<sup>23</sup>. Area 67 is a large site and it has been proposed within the Draft Local Plan to remove the area from the Green Belt and allocate the land for future development. It should be noted however that at the time of producing this topic paper the Local Plan was still in draft form and the final strategic allocations have not yet been confirmed for the submission stage of the Local Plan and the strategic allocations are subject to change.
- 7.7 The *Basildon Outline Landscape Appraisals of Potential Strategic Development Sites* (December 2015) identified the proposed site as ‘Site 22’ and concluded that there may be potential for a CHP plant to be ‘incorporated within the development area where partly screened from open landscape to the west by buildings within the development’. The Landscape Appraisal found the site to have a higher landscape sensitivity to the north west corner which would need to be factored into any development in that location. There have not been any plans provided by KTI Energy Limited detailing the proposed layout of the site, or the scale, massing and height of any built facilities.

## **The Proposal**

- 7.8 DunCHP would be an entirely new CHP plant and DH system. It is proposed that the fuel would be delivered from the Burnt Mill Mechanical and Biological Treatment (MBT) plant and other waste processing plants in Essex operated by private processors. It is proposed that refuse-derived fuel (RDF) is used to operate the CHP plant which is a fuel produced from various types of waste such as municipal solid waste (MSW), industrial waste or commercial waste.
- 7.9 KTI Energy Limited have proposed that DunCHP would be designed to uniquely serve all new properties planned by Basildon Borough Council, Brentwood Borough Council and Thurrock Council on land surrounding Friern Manor.

## **Description of Development**

- 7.10 The CHP scheme would have a life of 99 years. It would be built in two stages. Stage 1 would be the construction of a Combined Cycle Gas Turbine (CCGT), connected to the adjacent National Grid high pressure gas pipe, alongside a heat house (which would contain heat exchangers, pumps, water treatment and control room) that would be connected to an extensive primary district heating main (spine). Stage 2 would be concurrent or consecutive, and involve the construction of a twin multi-fuel boiler and waste/virgin biomass fuel reception hall connected to the steam turbine of the adjacent CCGT which is connected to the heat house.

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<sup>23</sup> Basildon Borough Green Belt Review 2017 (March 2017)

- 7.11 The CHP plant would consist of the following:
- a) Gas turbine driven 11kV alternator;
  - b) Steam turbine driven 11kV alternator;
  - c) Water treatment plant;
  - d) Cooling tower;
  - e) 11kV/132kV electricity sub-station connected to UK Power Networks Grid Station on Lower Dunton Road;
  - f) High pressure gas terminal to connect the gas turbine;
  - g) Heat house containing heat exchangers, pumps and water treatment control room;
  - h) Primary district heating network (spine);
  - i) Building, landscaping and carp park to approved architectural finish;
  - j) Twin multi-fuel boilers of 41.6 kg/s superheated steam output;
  - k) Scrubber/baghouse pollution control to each boiler;
  - l) Boiler de-ashing plant;
  - m) Automated fuel store holding 5 day's supply of waste/virgin biomass fuel; and
  - n) Extended building and landscaping to approved architectural finish.
- 7.12 The elements described above form a CCGT. This type of CHP Prime Mover uses the high temperature exhaust from a gas turbine to generate high-pressure steam which then passes through steam turbines to generate more power. This combination provides much higher electrical efficiency than standard gas turbines (i.e. more electrical output and less heat). It is typically used in large-scale power generation and makes use of gaseous fuels<sup>24</sup>.

## **Design and Layout**

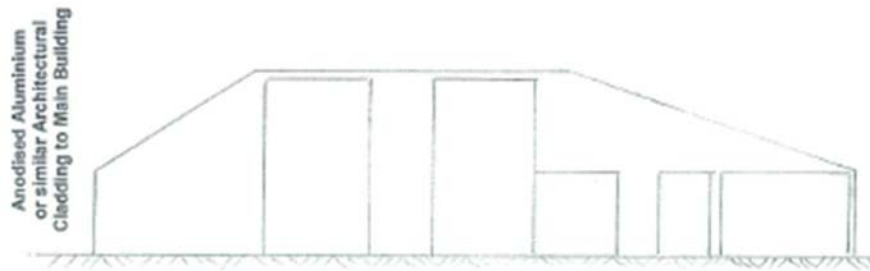
- 7.13 Whilst information of the equipment expected to be used to form the CHP plant is described above, the technical specifications have not been provided which would give more detail as to the expected size, scale and layout of the development required for the scheme.
- 7.14 Details of a proposed plant building have been provided which would measure 265m by 205m (54,325m<sup>2</sup>), no height has been given but it is presumed to be at least two stories in height (See Figure 4 and Figure 5).

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<sup>24</sup> *Combined Heat and Power: Air Quality Guidance for Local Authorities (February 2012):*  
[http://www.iaqm.co.uk/text/guidance/epuk/chp\\_guidance.pdf](http://www.iaqm.co.uk/text/guidance/epuk/chp_guidance.pdf)



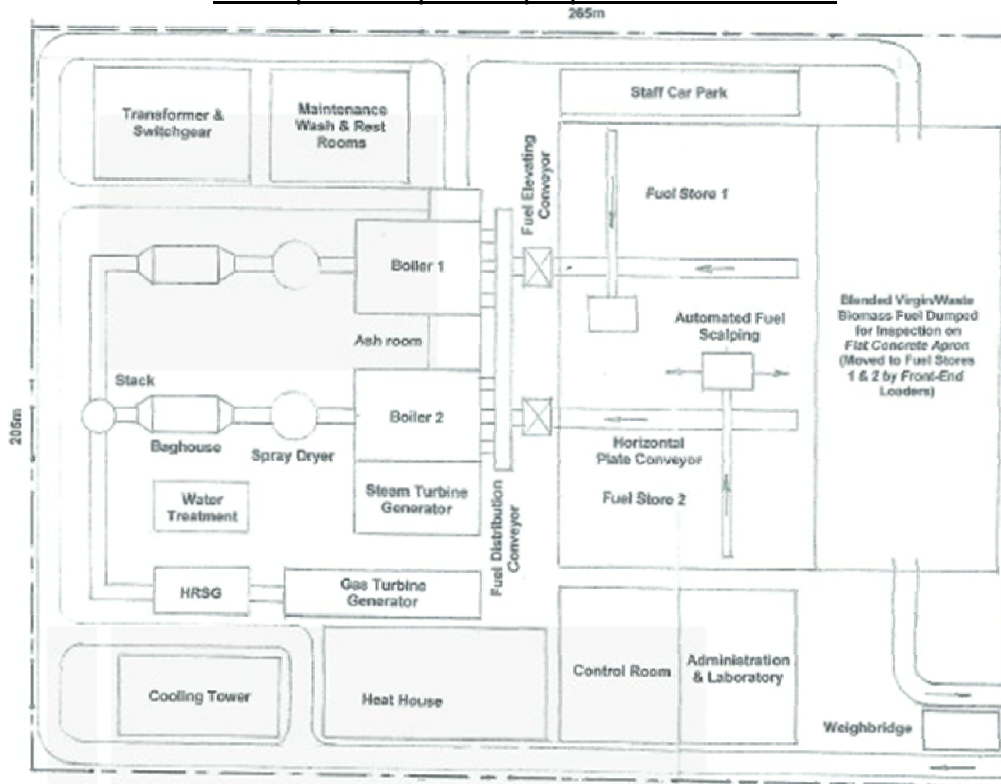
### Example elevation of proposed plant building



Source: KTI Energy Limited

Figure 4: Example elevation of proposed plant building

### Example floor plan of proposed CHP station



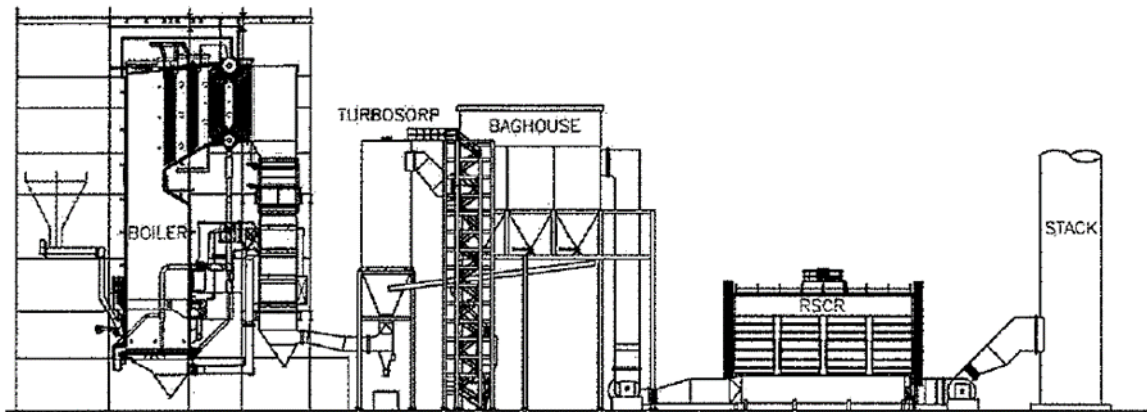
Source: KTI Energy Limited<sup>25</sup>

Figure 5: Example floor plan of proposed CHP station

7.15 Scale drawings of the other plant equipment have not been provided, however illustrations have been given which are shown below (Figure 6 and Figure 7). It is presumed the CHP plant equipment would need to be of a significant height to ensure the emissions from the CHP stack are above any neighbouring properties.

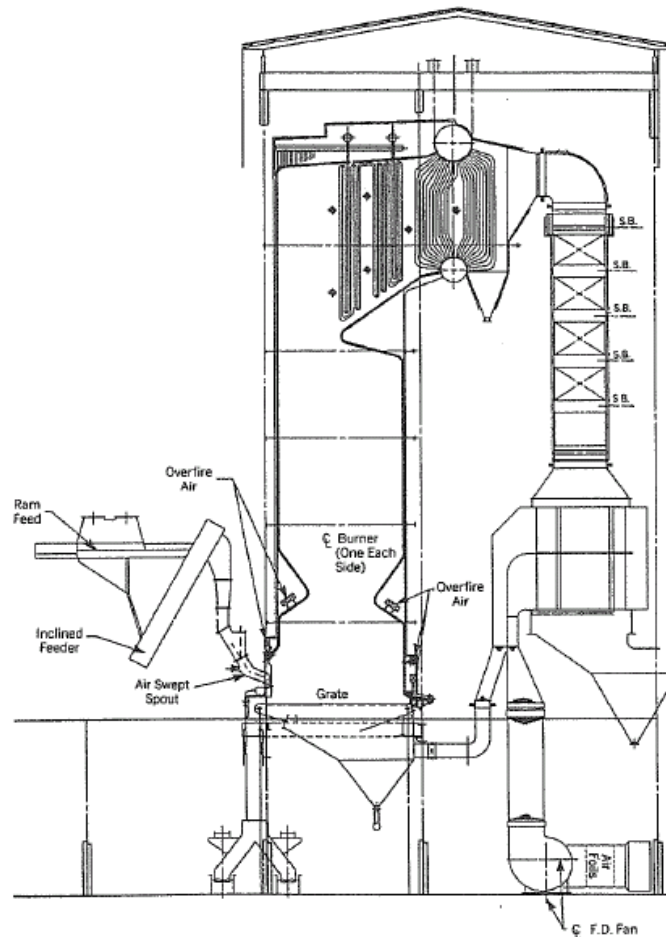
<sup>25</sup> KTI Energy Limited representation: [https://www.essex.gov.uk/Environment%20Planning/Planning/Minerals-Waste-Planning-Team/Planning-Policy/Documents/REP-609943-02\\_KTIEnergy\\_ExhibitA\\_Pre-PlanningService\\_%20DunCHP.pdf](https://www.essex.gov.uk/Environment%20Planning/Planning/Minerals-Waste-Planning-Team/Planning-Policy/Documents/REP-609943-02_KTIEnergy_ExhibitA_Pre-PlanningService_%20DunCHP.pdf)

### Example elevation of CHP plant



Source: KTI Energy Limited  
Figure 6: Example elevation of CHP plant

### Example elevation of CHP plant



Source: KTI Energy Limited<sup>26</sup>  
Figure 7: Example elevation of CHP plant

<sup>26</sup> KTI Energy Limited representation: [https://www.essex.gov.uk/Environment%20Planning/Planning/Minerals-Waste-Planning-Team/Planning-Policy/Documents/REP-609943-02\\_KTIEnergy\\_ExhibitA\\_Pre-PlanningService\\_%20DunCHP.pdf](https://www.essex.gov.uk/Environment%20Planning/Planning/Minerals-Waste-Planning-Team/Planning-Policy/Documents/REP-609943-02_KTIEnergy_ExhibitA_Pre-PlanningService_%20DunCHP.pdf)

- 7.16 A new access road to the site would be required which would need to support 460,000 tonnes per annum (tpa) of fuel delivered by road in minimum 23 tonne loads. KTI Energy Limited have suggested in their representations that the Dunton Road roundabout on the A127 is capable of receiving 600,000 tpa RDF/woodchip in 23-25 tonne bulk loads of which 200,000 tpa would be sourced from the Tovi processing plant and another 400,000 tpa produced from Essex and East London non-household waste. However, it is not clear as to whether this capacity assessment takes into account the cumulative traffic arising from development proposals within this area.

### **Operation of the Facility**

- 7.17 The *Basildon Borough Renewable and Low Carbon Energy Constraints and Opportunities Assessment* (December 2015) identified that for CHP and DH schemes to be economically viable they would need a heat density over 3,000 kW/km<sup>2</sup>. The mapping detailed in that Assessment showed that the area proposed could meet this requirement.
- 7.18 The full technical specification of the CHP plant and DH system equipment have not been provided, however it has been proposed that the total net installed capacity would be 99.0MWe in pure electricity mode, of which 39MWe is gas fired and 60MWe is biomass fuel fired, reverting over 15-30 years to circa 60MWe net electricity output and 120MWe net heat output.

### **Opportunities**

- 7.19 The details provided by KTI Energy Limited set out that DunCHP would seek to meet a significant proportion of the 95MWe existing electricity demand of Basildon through the CHP plant and DH system which is in line with Government targets.
- 7.20 There is a nearby anchor load, Ford Motor Company, which was identified through the *Basildon Borough Renewable and Low Carbon Energy Constraints and Opportunities Assessment* (December 2015) which could benefit from DunCHP as it has a constant heat requirement. However, it is not clear as to whether the Ford Motor Company would wish to use this resource.

### **Potential Constraints**

- 7.21 The site currently lies within the Green Belt where there is a presumption against inappropriate development. Figure 3 shows the proposed plant is within the area of the draft housing allocation H 10. However, figure 3 also shows swathes of development extending into Brentwood and Thurrock. This development, proposed by KTI Energy, would be beyond the scale of development set out in the respective Local Plans of the affected authorities, and would decimate the Green Belt in this location causing a number of settlements to coalesce. Furthermore, there is also no guarantee that development would commence on the proposed site H 10



as the site, along with a number of other sites, is still currently being considered through the Local Plan process and a decision at this time has not been reached as to whether H 10 will be allocated for development in the next version of the Local Plan.

- 7.22 Further work would be required to ascertain if the DunCHP scheme is suitable for the proposed strategic housing allocation policy H 10 currently set out in the Draft Local Plan and if it suits the requirements of the landowner/developer. A strategic approach to the planning and phasing of CHP plant and DH infrastructure is crucial for success
- 7.23 There are multiple landowners and local authorities that KTI Energy Limited are proposing to involve, there will likely be varying local authority capacity and commitment to lead and enable delivery. There is also a risk associated with encouraging private and/or public sector investment unless certain outputs can be guaranteed.
- 7.24 It is not possible at this stage for KTI Energy Limited to carry out a feasibility assessment, therefore it is not possible to fully determine the sustainability and deliverability of the proposal, especially when considering that KTI Energy Limited propose to serve three Council's and the energy requirements for all their forthcoming housing needs.
- 7.25 The costs of setting up and running a CHP and DH network can be substantial and a viability assessment would also be required for the proposal.
- 7.26 The scale of DunCHP would be relatively large and industrial in nature. Design, size, layout and scale of the plant would need to be carefully considered to ensure the proposal would fit in with the character of the redeveloped area. Due to the size of the proposed CHP plant, it falls within the criteria for a Nationally Significant Infrastructure Project (NSIP) as it would be proposing to generate energy from biomass and/or waste >50 MW. Therefore the application would be considered by the Secretary of State for Energy and not by the LPA.
- 7.27 Impacts to the existing landscape would need to be considered as the site is currently Green Belt and part of the site where the CHP plant is proposed has been identified to have a higher landscape sensitivity.
- 7.28 CHP systems will likely have an impact on air quality. The exact impact will depend upon the technology and fuel used, the size and design of the plant, the presence of any emission abatement equipment, the nature of emission dispersion from exhaust stacks. A detailed assessment of air quality impacts from the combustion plant by dispersion modelling of emissions from the boiler would be necessary to ascertain if the emissions would be significantly detrimental to health. Dispersion modelling is also used to calculate the stack height necessary to ensure adequate dispersal of pollutants.

- 7.29 Whilst it is proposed that fuel could be delivered from the Burnt Mill MBT plant and other waste processing plants in Essex, an existing arrangement is already in place for this waste to be recycled, therefore sourcing waste to run DunCHP may not be straightforward and the security of a load is required to create a viable network.
- 7.30 If the fuel can be obtained as stated above, it is proposed to be collected from elsewhere, both inside and outside the Borough, the existing transport network may require improvements to support the amount of perceived fuel deliveries. A Transport Assessment would need to be carried out and considered by the LPA and Highways to assess if there would be any potential issues that would affect the development going forward.

**Please Note**

- 7.31 The information detailed as part of Option One has been sourced from a number of formal consultation representations and communications received from KTI Energy Limited outlining their proposal.

## **8. OPTION TWO – INTERNATIONAL SYNERGIES – TRANSFORMATION POTENTIAL TO CREATE BURNT MILLS ECO-INDUSTRIAL PARK, BASILDON**

### **Overview**

- 8.1 On behalf of Basildon Borough Council and Essex County Council, International Synergies have produced a 'Transformation Potential and Plan of Action' for Burnt Mills Industrial Estate to assess the Estate's feasibility for converting to Eco-Industrial Park principles. International Synergies has applied its proven methodology, Regional Economic Development through Intelligence Based Industrial Symbiosis (RED IBIS), to develop a picture of the area's resource strengths and material supply risks/opportunities.

### **Background**

- 8.2 An Eco-Industrial Park (EIP) (also known as a Resource Recovery Park) is described as 'an industrial park in which businesses cooperate with each other and with the local community in an attempt to reduce waste and pollution, efficiently share resources (such as information, materials, water, energy, infrastructure, and natural resources), and help achieve sustainable development, with the intention of increasing economic gains and improving environmental quality'<sup>27</sup>.

### **The Site Location and Its Setting**

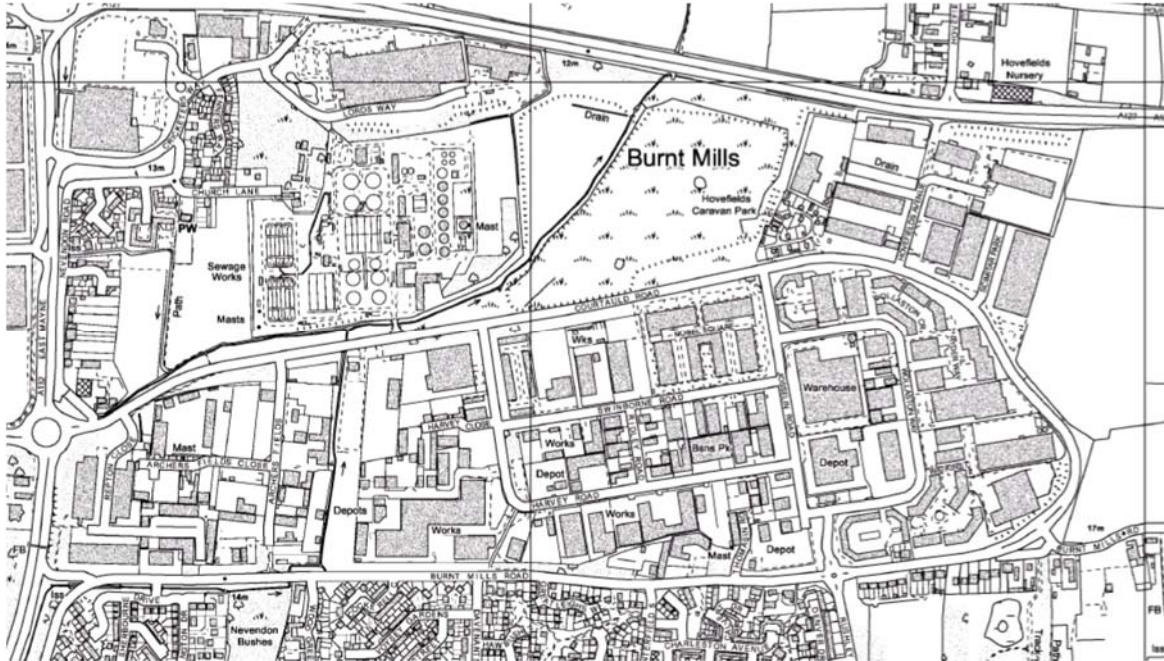
- 8.3 Burnt Mills is an established employment area that lies within the urban area. It forms a self-contained industrial area that accommodates offices, light industrial and storage and distribution uses. The site has good connections to the strategic road network with immediate access to the A132.
- 8.4 The Estate covers around 85.3 hectares and is bounded to the north by Courtauld Road and Burnt Mills Road to the South. To the north of Courtauld Road is the Basildon Sewage Treatment Works and to the east is a separate smaller self-contained industrial estate on Hovefields Avenue. To the north of the Basildon Sewage Treatment Works is the PMS International Group PLC distribution centre and the Lords Court Business Park. It was identified in 2013 that there were 305 existing B-class employment premises within the Industrial Estate.
- 8.5 The industrial estate was reviewed in the Basildon Employment Land and Premises Study (ELPS) (July 2013) and 'Site 3' was recommended to be protected for B-class employment uses. The initial findings of the Economic Development Needs Assessment (EDNA) (2017) for the south Essex sub-region has scored the Burnt Mills Industrial Estate highly in terms of the predominant stock quality present at the site and in terms of

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<sup>27</sup> Eco-Industrial Park definition from Wikipedia: [https://en.wikipedia.org/wiki/Eco-industrial\\_park](https://en.wikipedia.org/wiki/Eco-industrial_park)

the quality of the site as a B-Class employment site overall. It is therefore likely that the re-appraisal of employment land in the Basildon Borough as contained in the EDNA will also recommend the future protection of the site for B-Class employment purposes. A site map of the Burnt Mills Industrial Estate is shown in Figure 8.

Site map of Burnt Mills Industrial Estate



(©Crown copyright and database rights 2014 Ordnance Survey 100018871)

Figure 8: Site map of Burnt Mill Industrial Estate, Basildon

## The Proposal

- 8.6 Under the Eco-Park model, businesses would cooperate with each other to reduce waste and pollution, and share or reuse resources including materials, water, energy and infrastructure. The savings for businesses on the eco-park could collectively amount to £2million, and significantly reduce waste and carbon emissions.
- 8.7 Information was gathered on the companies from the Burnt Mills Estate regarding their existing resource flows, infrastructure, and economic activity to inform an analysis of the current industry mix and the main resource flows and utility use.
- 8.8 The three main themes identified were:
- material recovery;
  - energy recovery and production; and
  - water recovery.

8.9 The three time frames for results from the site are proposed as follows:

- Today: Partners and resource flow exist
- Tomorrow: Technology is known but partner(s) missing
- Future: Innovation around clean-tech/green-tech.

8.10 The aim for the EIP is shown in the diagram below (Figure 9):



*Source: Burnt Mills Eco-Industrial Park, Transformation Potential and Plan of Action*

Figure 9: Priority action plan for today, tomorrow and future time horizons, working to position Basildon as a leader in resources recovery technologies.

## Description of Development

8.11 There is already a considerable flow of construction based materials in and out of the Burnt Mills Industrial Estate through the existing waste reprocessing infrastructure. Using Environment Agency data, the indicative flows per annum are:

- 3,800 tonnes of mixed construction & demolition waste;
- 9,600 tonnes of soil and stones;
- 1,800 tonnes of glass; and
- Unknown quantity of secondary aggregate material from the Urbaser MBT.

- 8.12 Heard Environmental already operates a facility for processing construction and demolition (C&D) wastes into aggregate materials. The Tovi Eco Park MBT plant, operated by Urbaser, produces a stream of secondary aggregate material which further adds to this sizeable quantity of inert material.
- 8.13 The analysis identifies opportunities for future economic development within the Estate. Key resource streams for action include: organics, plastics, wood, waste electrical and electronic equipment (WEEE), and materials suitable for secondary aggregate applications.
- 8.14 There are planning conditions in place for Tovi Eco Park to construct a 65k tonne capacity dry Anaerobic Digestion (AD) and In Vessel Composting (IVC) facility to complement the existing MBT. This facility, which will be designated to take local authority waste for the county, also has the potential to provide services for local industry and provide heat and power for the Burnt Mills Estate. This could make Burnt Mill self-sufficient in respect of power consumption, effectively taking the Estate off grid.
- 8.15 Below is a summary table identifying the opportunities and appropriate timescales for implementation (Figure 10):

Summary of Opportunities Identified

Timeframe	Opportunity
<p>Today 1-6 months</p>	<ul style="list-style-type: none"> <li>- Establish a wood collection “milk round” to collect the small quantities of wood generated by the SMEs on the Estate to increase the amount of wood recovered economically.</li> <li>- Connect existing potential users of secondary aggregate materials (Tarmac, White Hare, C&amp;K Construction, Bardon Aggregates) with the existing suppliers of recovered materials.</li> <li>- Large infrastructure schemes (Crossrail, London Gateway, Lower Thames Crossing) present opportunities to use existing secondary aggregate materials flowing through the Burnt Mills Estate involving both waste re-processors (e.g. Heard Environmental, Urbaser) and construction supply chain companies.</li> <li>- Aggregate clean plastics streams for reprocessing at Rainham plastics reprocessing facilities would provide a revenue stream to a large number of businesses with £10 per tonnes for loose material and £25 per tonne being paid for baled plastics.</li> <li>- Work with plastics recyclers and Tarmac asphalt production to add 10% plastics to bitumen and aggregate coatings, improving the technical properties in the construction of flexible pavements.</li> <li>- Use the Low Carbon Programme for Essex to investigate with individual companies and the local community the potential for onsite micro generation. Basildon’s report estimates that with</li> </ul>

	<p>supportive planning conditions that there is a potential to generate almost 40% of the Borough's needs.</p> <ul style="list-style-type: none"> <li>- Roll out water and energy efficiency measures in partnership with current utility providers to industrial and residential customers.</li> </ul>
<p>Tomorrow 1-3 years</p>	<ul style="list-style-type: none"> <li>- Develop a network to access further wood inputs for recycling or energy generation from tree clearing activities in local parks and by Highways England, Network Rail, National Grid, etc.</li> <li>- Create a Community Wood Recycling enterprise (see case study) to generate employment.</li> <li>- Process road sweepings from the Burnt Mills Estate and environs into composite streams of compostable organics, aggregates and extractable precious metals (platinum, palladium and rhodium).</li> <li>- Establish a temporary resource depot to house alternative raw materials (ARMs) and recycled waste for construction projects.</li> <li>- Create a local MIROG (Major Infrastructure Resource Optimisation Group) with support from the Essex Minerals Planning Authority to take advantage of the existing infrastructure and processing capability within Burnt Mills, and address the ready-made market of large-scale local infrastructure projects, and the capacity gap for C&amp;D waste reprocessing identified in the draft Local Waste Plan 2016.</li> <li>- Establish improved business waste sorting and small scale collection rounds to feed a new processing facilities to capture the existing plastic waste streams and convert into recycled plastic product. The facility could incorporate sorting and washing technologies with a number of established technology suppliers in the area such as 3E Machinery.</li> <li>- Waste plastic is being used extensively in providing a new range of alternative construction products such as kerb stones, paving slabs, concrete additives and building blocks. This can be through the use of high temperature extrusion processes to create and predominantly uses sources of low density polyethylene (LDPE) such as plastic bags, packaging films, containers and pipes. This again represents a future synergy if the plastic can be produced in the appropriate product formulation for use by Tarmac and White Hare Aggregates.</li> <li>- Incorporate repair and refurbishment centre on WEEE recovery site to create around 20 jobs for local community (linked with training to enhance local skill base).</li> </ul>

- Attract inward investment to process high value WEEE components, recover PGM and REE, and recover plastics through technologies such as pyrolysis and gasification.
- A future pyrolysis facility could take in plastics from WEEE to produce synthetic gas and liquid fuel.
- Investigate a larger-scale wind and solar strategy for the Estate, as part of a wider energy and heat appraisal for the Estate, incorporating the surrounding residential areas to further engage them in the development of the Estate.
- Set up a wood waste hub on one of the sites in the area where the wood could be utilized to power a biomass combined heat & power (CHP) unit and the heat/electricity used on site.
- Establish a local pyrolysis plant that accepts the SRF currently produced by Urbaser to meet local energy and heat needs as well as generating a fuel stream for transport fleets associated with the large logistics companies located on Burnt Mills. Leverage local logistics companies, and their transport fleets, and the potential to produce biofuels and energy through technology such as pyrolysis. Pyrolysis is widely viewed as a complementary processing technology for AD, which is already planned for Tovi Eco Park.
- Set up a collection facility for used oils, solvents, greases and fuels generated locally, and reprocess to provide a base feedstock for lubricating oils.
- Establish routes to divert food waste into the planned AD for energy generation site on the Tovi Eco Park.
- Deploy small scale low temperature AD solutions for high COD waste streams. Using technologies such as those provided by NVP Energy.
- Install the infrastructure required to divert Anglian Water WWTP treated water from the Thames Tideway back into industrial use.
- Trial Microbial Fuel Cell (MFC) with industries producing organic-rich, high COD effluent to generate electricity and hydrogen gas. Potential users on the Burnt Mills Estate include Urbaser and 2 Sisters Food Group.
- Convert the Urbaser SUDS lagoon into a Living Machine<sup>15</sup> to filter larger flows of waste water, and channel industrial wash water to the converted lagoon for purification. Add micro turbines to the wash water pipes to capture some of the kinetic energy from the water flows.



	<ul style="list-style-type: none"> <li>- Use treated greywater as a new industrial input for low grade use such as non-quality critical process washing.</li> </ul>
Future 3+ years	<ul style="list-style-type: none"> <li>- There is the potential to develop some innovation around treated wood. For example, the CleanWood project established a demonstration plant in Lissarda, Ireland to recover clean wood chips from contaminated wood feedstocks primarily from C&amp;D activities.</li> <li>- As part of construction resource hub, establish technology to convert waste plastics into recycled products including refuse sacks, point of sale display materials and external hoardings.</li> <li>- The introduction of a WEEE reprocessor would enable the recovery of plastics as well as precious metals from this waste stream.</li> <li>- Both supply and drainage pipework could be fitted with micro turbines using the flow of liquid as a medium for generating electricity. This technology can equally be retrofitted to existing company storm water drainage, guttering and potable water supplies.</li> <li>- Develop an ecologically based wastewater treatment servicing the nearby residential areas, treating storm water run-off, and non-hazardous industrial wastewater.</li> <li>- Connect outflow from the local community/ nearby residential areas to the ecological water purification system (former SUDs lagoon), and free up capacity at the Anglian Water facility.</li> </ul>

Source: *Burnt Mills Eco-Industrial Park, Transformation Potential and Plan of Action*  
Figure 10: Summary of Opportunities Identified

8.16 By analysing similar installations and studying previous International Synergies case studies, the following economic and environmental benefits are estimated as possible over the next 5 years:

- £2.2M of cost savings for Burnt Mills businesses through landfill diversion activities
- £142 Million of Private Investment
- 187 new jobs created
- 381,200 tonnes of CO<sub>2</sub> Reduction
- 131,700 tonnes of landfill diversion

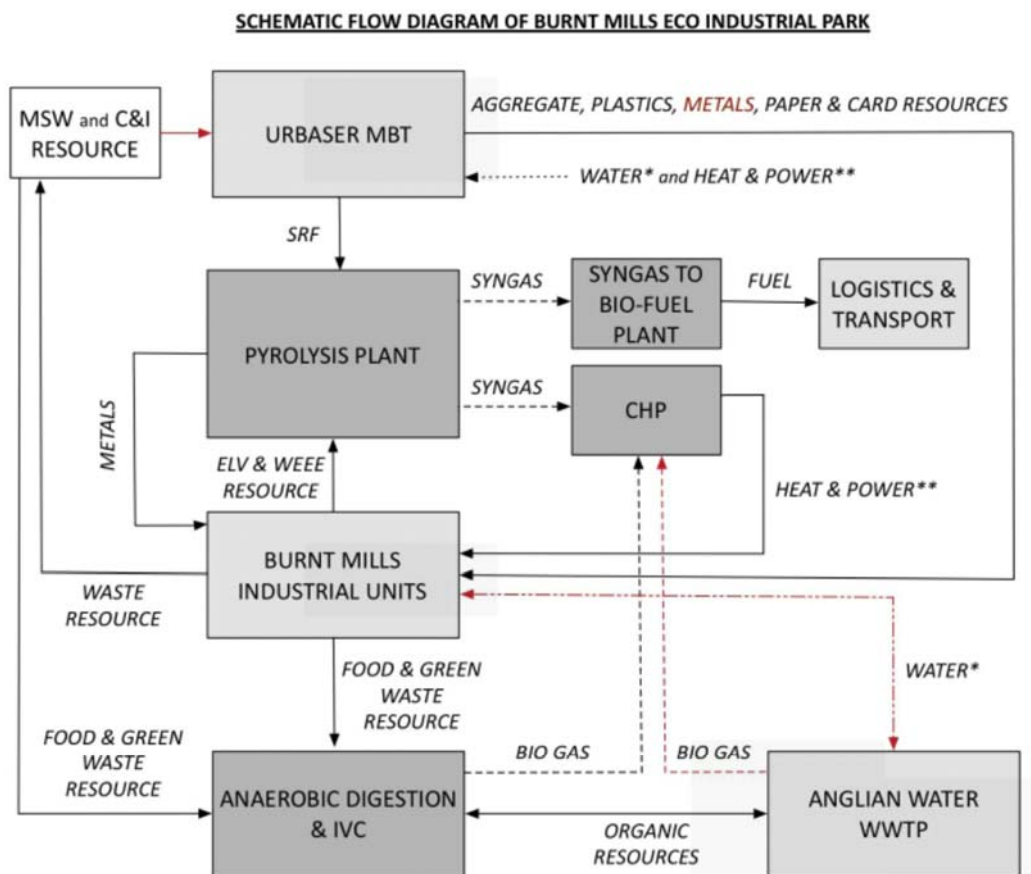
## Design and Layout

8.17 There are numerous elements to the EIP scheme and future development proposals for the site may or may not require planning permission, however these would be dealt with on a case by case basis and have been considered by the study carried out by International Synergies to be achievable.

## Operation of the Eco-Industrial Park

8.18 The schematic below (Figure 11) represents a model of the core connections within a fully integrated Eco-Industrial Park at the Burnt Mills Site. The proposal incorporates an opportunity to attract in large scale clean-tech / green-tech operators which is a key objective of Basildon Council.

Basildon Eco-Industrial Park Resource Flow Diagram



### Schematic Key



Source: Burnt Mills Eco-Industrial Park, Transformation Potential and Plan of Action  
Figure 11: Basildon Eco-Industrial Park Resource Flow Diagram

8.19 Figure 12 shows the estimated Economic and Environmental benefits resulting from the proposed technology investment in Burnt Mills Estate and environs. (Supply chain jobs, jobs created by new markets for materials, jobs safeguarded, and new businesses attracted into the area are not included.)

### Estimated Economic and Environmental benefits

Technology / Opportunity	Jobs Created	Private Investment £000	CO <sub>2</sub> Reduction tonnes	Landfill Diversion tonnes	Source Reference / Link
Pyrolysis & CHP	50	120,000	200,000	-	<a href="http://chinookum.com/future-projects/why-dagenham/">http://chinookum.com/future-projects/why-dagenham/</a>
AD Plant	6	3,100	1,700	65,000	<a href="http://www.tamar-energy.com/our-network/basingstoke-ad-facility/">http://www.tamar-energy.com/our-network/basingstoke-ad-facility/</a>
Horticulture (Tomato Production)	80	15,000	12,500	-	<a href="https://www.2degreesnetwork.com/groups/2degrees-community/resources/why-nitrogen-manufacturer-and-vegetable-farmer-make-perfect-bedfellows/">https://www.2degreesnetwork.com/groups/2degrees-community/resources/why-nitrogen-manufacturer-and-vegetable-farmer-make-perfect-bedfellows/</a>
Plastics Processing (HDPE & PET)	36	1,100	57,500	45,000	NISP West Midlands Case Study (Plastics Reprocessor)
Direct Business to Business Opportunities	-	-	39,500	21,700	Defra Approved Carbon Calculator (NISP UK)
WEEE Processing	5	1,200	70,000	-	Assumed throughputs on 5,000 te of plastics and 500 te of metal. NISP Case Study (WEEE Processing)
Biofuel Production	10	2,000	-	-	NISP Case Study (RIX Green Energy)
<b>TOTALS</b>	<b>187</b>	<b>142,400</b>	<b>381,200</b>	<b>131,700</b>	

*Source: Burnt Mills Eco-Industrial Park, Transformation Potential and Plan of Action*  
Figure 12: Estimated Economic and Environmental benefits

## Opportunities

- 8.20 The study established that the industrial demographic and resource availability at the Estate makes it a suitable area for transformation using EIP principles. International Synergies highlighted many opportunities to support immediate, medium and long-term business growth, diversification objectives and environmental targets.
- 8.21 Burnt Mills has a significant residential development in close proximity which can benefit from the EIP model. There are a number of outputs from the proposed model that are of equal value to the local community as they are to resident industry, including water, heat and power, fuel and compost.
- 8.22 Leveraging existing resources, waste products and solution providers, local business and the community can benefit economically (cost savings and revenues) from aggregating small quantities for their underutilised resources and by-products. This approach will also boost the local economy and generate new job opportunities.

- 8.23 There is also an opportunity for businesses to benefit from local heat and power generation, essentially allowing the Estate to operate off grid and de-risk the development from future energy supply disruptions. This may also provide an opportunity to give beneficial rates of supply to industry and act as further incentive for future location at Burnt Mills.
- 8.24 Having a surrounding infrastructure of industry that supply resource inputs and provides markets for the end products creates a much better foundation for success, a stronger case for investment and a driver for relocation. In the new world of resource scarcity and volatility, waste is a valuable resource, and the locations that process today's "waste" will rapidly become the anchors of industry going forward.
- 8.25 Co-locating near recovered resource supplies mitigates supply chain risk from global events (floods and other natural disasters have interrupted global supply chains in the last decade) while reducing cost of inputs and of disposal.
- 8.26 By sourcing the necessary waste material from close by it reduces the need for transportation over long distances which reduces the associated transport costs as well as reduces CO<sub>2</sub> emissions and potential traffic issues.

### **Potential Constraints**

- 8.27 The transition of Burnt Mills Estate from business as usual to an EIP is likely to take some time, however it is eminently achievable. This is clearly evidenced by the opportunities presented in International Synergies study over multiple time horizons: in the short term (today) providing 'quick wins' to gain momentum and further buy-in; in the medium term (tomorrow) requiring investment in technologies and infrastructure; and into the future, with a vision of Burnt Mills EIP.
- 8.28 As detailed under Option One, CHP systems will likely have an impact on air quality. A detailed assessment of air quality impacts from the combustion plant by dispersion modelling of emissions from the boiler would be necessary to ascertain if the emissions would be significantly detrimental to health. Dispersion modelling is also used to calculate the stack height necessary to ensure adequate dispersal of pollutants.
- 8.29 It would also be necessary to consider where the CHP system would be located in relation to the potential effects on the existing residential development nearby.
- 8.30 Whilst it is proposed that fuel could be sourced from the Burnt Mill MBT plant it is not a guarantee that the resource would be available to the EIP, therefore sourcing waste may not be as straightforward and the security of a load is required to create a viable network.

8.31 The various opportunities identified as part of the EIP would not necessarily all come into fruition, therefore the overall potential identified from the EIP may not be achieved to the sites maximum potential.

## 9. RECOMMENDATIONS

### Option One – CHP and DH Scheme at Dunton

- 9.1 In Section 7 under the heading ‘Potential Constraints’, a number of significant constraints were outlined that DunCHP, as proposed by KTI Energy Limited to the west of Basildon, would need to overcome in order to commence and operate successfully.
- 9.2 The main concern is whether the proposed site would be removed from the Green Belt and allocated for development as part of Basildon Council’s Local Plan, known as strategic site H 10. Without this site allocation coming forward the proposed site would remain in the Green Belt and would be both considered as inappropriate development in the Green Belt and also lack an element of the required development to provide heat and power to.
- 9.3 If the site allocation H 10 were to come forward then there are still a number of issues to address such as how the fuel will be sourced, where it will come from and how it will be delivered. There are also matters surrounding the design, size, layout and scale of the proposal as well as the specifications and impact on landscape and air quality which would need to be carefully assessed at planning application (NSIP) stage where more information would need to be provided.
- 9.4 There are also concerns regarding the funding of such a scheme to ensure it would be viable and achievable. Information in relation to this has not been detailed sufficiently to assess at this stage, however it is an essential consideration for the scheme.
- 9.5 The land owner of the proposed site for the CHP plant has expressed support for the use of the land for DunCHP. However, it is not clear whether the current proposed developers for surrounding land parcels support the proposal. This is an important consideration, as they would need to provide some of the necessary funding for both the CHP plant and the DH network which may render development less viable. Development in the west Basildon area is already marginal in terms of viability, and significant costs associated with CHP and DN proposals may prevent development being brought forward, undermining the housing delivery component of the Local Plan. Additionally, it is unclear as to whether the Ford Motor Company would be interested in utilising the heat arising from the CHP, as the only potential anchor for such a facility in this location.
- 9.6 It was proposed by KTI Energy Limited that DunCHP could serve the energy needs for Basildon Borough Council, Thurrock Council and Brentwood Council. This would involve a significant DH network which, without further technical detail) seems potentially unrealistic, particularly as the proposal is based on the extent of development shown in figure 3, which is not proposed by the three Local Planning Authorities due to the

erosion it would cause to the Green Belt, and the coalescence that would arise between settlements in this location.

- 9.7 All the concerns identified above demonstrate that the proposed DunCHP is unlikely to be the most sustainable of the two proposals reviewed as part of this Topic Paper, and the deliverability of the proposal is also questionable given its reliance on funding from surrounding development which is already marginal in terms of viability, and not of the extent expected in figure 3. The Draft Local Plan, through policy CC 1, currently seeks the provision of 'commercial and domestic scale renewable energy and decentralised energy as part of development proposals in appropriate locations'. The proposals for the DunCHP, as currently understood does not indicate that this would be an appropriate location, although a significant amount of further detail would be required to be able to fully assess the merits of this proposal.

## **Option Two – Eco-Industrial Park at Burnt Mills Industrial Estate**

- 9.8 The possibility for Burnt Mills to become an EIP have been meticulously considered and the potential variety of methods proposed are sustainable and deliverable now (today), in the short term (tomorrow) and in the future (3+ years).
- 9.9 The methods identified are estimated to create up to £2.2M of cost savings for Burnt Mills businesses through landfill diversion activities, up to £142 Million of Private Investment, create up to 187 new jobs, and result in up to 381,200 tonnes of CO<sub>2</sub> reduction and up to 131,700 tonnes of landfill diversion. This would benefit the Basildon Borough in numerous ways.
- 9.10 The variety of methods that have been explored would provide an additionally efficient use of the site by encouraging various uses for waste including recycling and renewable and low carbon energy generation methods. These methods can be implemented independently of one another, and over a period of time aligning with investment opportunities and resource availability. This improves the sustainability and feasibility of the EIP over a standalone CHP plant.
- 9.11 It is clear that Option Two is deliverable and sustainable, and could immediately bring about numerous benefits to the Basildon Borough. It is therefore considered that this would be the most appropriate option for increasing renewable and low carbon energy generation for the Borough. Furthermore, once successfully implemented within Burnt Mills Industrial Estate, the principles could be extended into adjacent industrial areas and employment allocations, as appropriate and over time. Consideration will be given to including a policy within the Local Plan to promote and support delivery of this development as an option that is encouraged by the *NPPF*.



## **10. LOCAL PLANNING POLICY: MEETING THE CHALLENGE OF CLIMATE CHANGE**

- 10.1 By promoting the use of renewable and low carbon energy generation methods at commercial and domestic scale (in appropriate locations) the Borough could reduce greenhouse gas emissions and contribute to the UK having a continuous and secure energy supply which is in line with the legislation and policies detailed in Section 3.
- 10.2 A number of policies were identified within the Draft Local Plan to help meet the challenges of climate change. Four were more specific to renewable and low carbon energy and these policies have been reviewed as part of this Topic Paper and through consideration of the Draft Local Plan public consultation responses.

### **Strategic Policy CC 1: Responding to Climate Change**

- 10.3 Given the potential for substantial electricity generation through renewable and low carbon energy in the Borough and the positive benefits it would bring not only to the Borough but to the UK as a whole, it would be appropriate to set targets within the emerging Local Plan for new developments and conversions to existing buildings to incorporate renewable and low carbon energy generation and to reduce CO<sub>2</sub> emissions.
- 10.4 It was suggested as part of the Draft Local Plan Policy CC 1 that the Merton Rule be applied. The policy stated the following in relation to this:
- 1. e) Seeking the provision of commercial and domestic scale renewable energy and decentralised energy as part of development proposals in appropriate locations. The Council will require all developments, either new build or conversions, with a combined floorspace of 500sq.m, or one or more residential units, to incorporate on-site renewable energy equipment to reduce predicted CO<sub>2</sub> emissions by at least 20%. If the percentage target is technically unfeasible, or can be proven to make the development financially unviable, off-site generation will be considered.*
- 10.5 The Merton Rule was a ground breaking planning policy developed by Merton Council. The policy required new developments to generate at least 10% of their energy needs from on-site renewable energy equipment, in order to help reduce annual carbon dioxide (CO<sub>2</sub>) emissions in the built environment. The rule applied to all types of buildings, not just homes. Merton Council developed the rule and adopted it in 2003. Since then the Mayor of London and many councils implemented it, and it became part of national planning guidance. It was initially set at 10%, although more recently, the London Plan has increased the requirement to 20% in order to align with the current target for European countries to reduce carbon emissions by 20% by 2020. This type of planning policy would encourage renewable and low carbon energy generation contributing to the UK's target reductions.

- 10.6 Concern was raised as part of the Draft Local Plan consultation that the 20%, as promoted by the Merton Rule, would be too high and would make development unviable. The *Basildon Council Local Plan Viability Study – December 2015* considered this proposed policy, along with other proposed policies, in terms of their viability by applying the proposed policies and testing the resulting viability of the strategic housing sites in the Draft Local Plan.
- 10.7 In terms of identifying how the cost of this policy would apply to the development, the *Basildon Council Local Plan Viability Study – December 2015* considered policy CO<sub>2</sub> reductions would be similar to achieving the abandoned Code for Sustainable Homes Level 4, and assumed that a 2.5% on top of the identified build costs would apply in meeting this policy. This assumption has been informed by a Davis Langdon report (September 2013) which assessed the extra over capital costs per dwelling for CSH4 may be between £2k to £3k on BCIS building costs to 2010 Building Regulations standards.
- 10.8 The *Basildon Council Local Plan Viability Study – December 2015* concluded that ‘In general, the site specific site testing demonstrates that the delivery of the larger sites are broadly achievable alongside the infrastructure funding, affordable housing delivery and various policy obligations recommendations as set out in the main report’.
- 10.9 It is therefore considered that there is sufficient support for this policy to remain within the Draft Local Plan. However, research by the Building Research Establishment (BRE) into the Government’s renewable energy targets has reviewed a number of approaches to reducing CO<sub>2</sub> emissions including the Merton Rule as well as the ‘Fabric First’ approach. The Fabric First approach to energy efficiency means getting the building to do the work by incorporating energy efficiency into the build envelope first rather than using renewable energy technology.
- 10.10 Three policy options were considered by BRE in terms of reducing CO<sub>2</sub> emissions:
- Achieving a 10% reduction in energy use by implementing improvements to building fabric and services
  - Achieving a 10% reduction in energy use through the implementation of renewable energy technologies
  - Achieving a reduction in energy use through the combined effects of scenarios 1 and 2.
- 10.11 The modelling identified that the most cost effective way of reducing energy consumption (by approximately 10%) lies in improving building fabric and services. The greatest lifetime reduction in CO<sub>2</sub> emissions, however, was achieved from implementing renewable energy

technologies. This was 4.2 times higher in cost per tonne of CO<sub>2</sub> saved for only an additional 1.1% reduction in energy use.

- 10.12 Combining improvements to building fabric and services to achieve approximately a 20% reduction in energy use was cheaper per tonne of CO<sub>2</sub> emissions reduced than by achieving a 10% reduction by using renewables alone.
- 10.13 It was concluded that improvements to building fabric and services should be implemented first with additional renewable energy installations to follow.
- 10.14 Enhancing the thermal performance of the building envelope helps to future-proof the structure and also yields the greatest CO<sub>2</sub> savings. Adding renewable technologies will then yield maximum emission reductions with lower long-term costs for the construction industry.
- 10.15 It is suggested that the wording to the policy is amended to strengthen and reflect the findings above as well as the soundness of the policy in line with comments received as part of the Draft Local Plan public consultation. The policy should be amended as follows: (This will be achieved by...)

1. e) Seeking **the reduction of CO<sub>2</sub> emission through the fabric first approach and through** the provision of commercial and domestic scale renewable energy and decentralised energy as part of development proposals in appropriate locations. The Council will require all developments, either new build, or conversions, with a combined floorspace of 500sq.m, or one or more residential units, to incorporate **the fabric first approach and** on-site renewable energy equipment to reduce predicted CO<sub>2</sub> emissions by at least 20%. If the percentage target is **demonstrated as** technically unfeasible, or can be proven to make the development financially unviable, off-site generation should be **employed as an alternative approach**.

- 10.16 This Topic Paper has also considered how the Eco-Industrial Park (EIP) principles can assist in reducing carbon emissions and the impact the Borough has on climate change, in line with policy CC 1. Considering the conclusions detailed above it has been identified that a policy should be introduced to support EIP principles. Policy CC 1 should be amended to include an additional point on achieving this: (This will be achieved by...)

**1. f. Supporting and promoting the implementation of Eco-Industrial Park (EIP) principles within the Borough in line with the criteria set out in policy CC 7.**

- 10.17 Further detail in relation to the EIP aspect of the policy will be given in Policy CC 7, detailed further below.

## Development Management Policy CC 5 & CC 6: Sustainable Buildings

10.18 The government, in their paper *'Fixing the foundations: Creating a more prosperous nation'* (July 2015), have advised that they do not intend to proceed with the zero carbon Allowable Solutions carbon offsetting scheme. Reference to the allowable solutions option has therefore been removed from the Local Plan and the climate change chapter.

10.19 In line with the changes proposed to policy CC 1 discussed above it also felt necessary to refer to the fabric first approach within policy CC 5 and CC 6 as well as amend the wording from justify to demonstrate to provide clarity:

CC 5: All new development proposals will be required to satisfy the following criteria, unless the developer can robustly **demonstrate** why this is not technically or financially viable:

a. The design of all new development should incorporate measures for achieving high levels of energy efficiency and the use of decentralised energy sources, consistent with the requirement of policy CC 1. Development is expected to demonstrate how its design, siting and layout has maximised the opportunities for solar gain, daylight penetration, **measures encompassed as part of a fabric first approach** and the use of decentralised energy sources.

CC 6: All new extensions, alterations and conversions will be required to satisfy the following criteria, unless the developer can robustly demonstrate why this is not technically or financially viable...

e. Applicants are encouraged to consider whether opportunities exist to make improvements to the energy and water efficiency of the existing building, **use of the fabric first approach and use of decentralised energy sources** alongside the construction works required to deliver the proposed extension or alteration;

10.20 It is also felt necessary to add a paragraph clarifying what would happen if national policy were to change the expected standards in development:

**Where new national standards exceed those set out above, the national standards will take precedence.**

## Development Management Policy CC 7: Renewable Energy Infrastructure

10.21 Following review of the EIP proposal at Burnt Mills Industrial Park, detailed in Sections 8 and 9 above, it has been identified that the principles of EIP should be promoted and supported across the Borough. It is suggested that the following policy be incorporated into the Local Plan, along with the text detailed above as part of policy CC 1, and the Council should commit to an early review of the policy to ensure EIP principles can be expanded on where necessary:

**2. Proposals supporting the Eco Industrial Park (EIP) principles will be positively considered providing they are in a sustainable location and do not result in demonstrable harm to local wildlife and their habitats, and residential amenity through pollution, including noise generation, dust or vibration. Any proposed development must not be unacceptably visually prominent within its setting or the surrounding landscape, and must not cause harm to heritage assets, harm to the community, or harm to the openness or purpose of including land within the Green Belt. In order to ensure that the principles of the EIP process are current the Council will carry out an early review of this policy.**

10.22 It is necessary to provide further clarity as to where up-to-date information relating to anchor loads can be found to ensure that current data can always be identified should any changes occur. The following change is proposed to policy CC 7:

3. Additionally, proposals for the installation of Combined Heat and Power (CHP) and associated community heating networks should make use of an existing anchor load as shown on the Policies Map **and as updated by DECC per their UK CHP Development Map**. Where a CHP plant would not be located near an anchor load sufficient evidence would need to be provided to ensure that it would be viable.

## **Conclusion**

10.23 The above proposed changes to the policies strengthens them by providing further clarification which makes them more sound in line with Action 43 and 44 as set out in Section 6.

## 11. GLOSSARY OF TERMS

Relevant Abbreviation	Term	Definition
AD	Anaerobic digestion	A process in which organic matter broken down by bacteria in the absence of air, produce a gas (methane) and a solid (digestate) product. The by-products, for example biogas, can be used in a furnace, gas engine, turbine or gas-powered vehicles, and digestates can be re-used on farms as a fertiliser.
	Anchor loads	A pre-existing heat load that could be connected to a district heating network (DH).
AONB	Areas of Outstanding Natural Beauty	Area of Outstanding Natural Beauty (AONB): is a landscape whose distinctive character and natural beauty are so outstanding that it is in the nation's interest to safeguard them. Created by the legislation of the National Parks and Access to the Countryside Act of 1949.
	Basildon	When "Basildon" is mentioned in text, it refers only to the area of the Basildon New Town including Laindon and Pitsea and not the whole Borough.
	Biomass (animal and plant)	Biomass is biological material derived from living, or recently living organisms. In the context of biomass for energy this is often used to mean plant based material, but biomass can equally apply to both animal and vegetable derived material.
	Climate Change	Climate change is a large-scale, long-term shift in the planet's weather patterns or average temperatures.

Relevant Abbreviation	Term	Definition
	Climate Change Act 2008	<p>The Climate Change Act 2008 makes the UK the first country in the world to have a legally binding long-term framework to cut carbon emissions. It also creates a framework for building the UK's ability to adapt to climate change.</p> <p>The act sets out the target for 2050: the net UK carbon account for the year 2050 should be at least 80% lower than the 1990 baseline.</p>
CHP	Combined Heat and Power	<p>Combined Heat and Power (CHP) is the simultaneous generation of usable heat and power (usually electricity) in a single process. The heat generated during this process is supplied to an appropriately matched heat demand that would otherwise be met by a conventional boiler. CHP systems are highly efficient, making use of the heat which would otherwise be wasted when generating electrical or mechanical power. This allows heat requirements to be met that would otherwise require additional fuel to be burnt. A CHP plant can be run on fossil or renewable fuels.</p>
	Decentralised Energy	Electricity production at or near the point of use.
	Density	The intensity of development within a given area, usually measured for housing in terms of the number of dwellings per hectare.
DCLG	Department Communities and Local Government	The central Government department with responsibility for Planning.
DECC	Department of Energy and Climate Change	The Government department responsible for energy and climate change.

<b>Relevant Abbreviation</b>	<b>Term</b>	<b>Definition</b>
DEFRA	Department of Environment, Food and Rural Affairs	The Government department responsible for environmental protection, food production and standards, agriculture, fisheries and rural communities
	Designated Heritage Asset	A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.
	Directive on Renewable Energy 2009/28/EC	The European Union directive which mandates levels of renewable energy use within the European Union.
DH	District Heating	A low carbon system for distributing heat, which is generated in a local centralised location for residential and commercial heating requirements.
	Doha Climate Change Conference	The Doha Climate Change Conference in 2012 led to the adoption of an amendment to the Kyoto Protocol during the second commitment period, from 2013 to 2020. Parties have committed to reduce greenhouse gas emissions by at least 18 per cent below 1990 levels.
EIP	Eco-Industrial Park	An industrial park in which businesses cooperate with each other and with the local community in an attempt to reduce waste and pollution, efficiently share resources (such as information, materials, water, energy, infrastructure, and natural resources), and help achieve sustainable development, with the intention of increasing economic gains and improving environmental quality.



<b>Relevant Abbreviation</b>	<b>Term</b>	<b>Definition</b>
	Energy Act 2016	The Energy Act 2016 received Royal Assent on 12 May 2016. It makes provision about the Oil and Gas Authority and its functions as well as devolves consent for large onshore wind farms from central government to local planning authorities.
	Energy Efficiency	Using less energy to provide the same service.
EfW	Energy from Waste	Energy-from-waste (EfW) is the process of generating energy in the form of electricity and/or heat from the primary treatment of waste.
	Evidence Base	The collection of information and studies which a Local Planning Authority will use to draw up suitable planning policies for its area.
Fabric First approach		Fabric First approach to energy efficiency means getting the building to do the work by incorporating energy efficiency into the build envelope first rather than using renewable energy technology.
FiT	Feed in Tariff	A scheme to incentivise renewable electricity installations up to a maximum capacity of 5 MW. The impact of FITs will significantly increase revenue for small-scale generators of renewable electricity, such as photovoltaic systems or small wind turbines. The FITs may also make it easier to obtain finance for such projects as it provides a guaranteed price for the electricity generated.
	Green Belt	A restrictive land use designation around major built up areas that have existed since 1947 to restrict urban growth and safeguard the countryside for agriculture, forestry and recreation.

<b>Relevant Abbreviation</b>	<b>Term</b>	<b>Definition</b>
		They are protected by the national and local policies.
IVC	In Vessel Composting	In-vessel composting (IVC) can be used to treat food and garden waste mixtures. These systems ensure that composting takes place in an enclosed environment, with accurate temperature control and monitoring.
	Kyoto Protocol	The Kyoto Protocol, also known as the Kyoto Accord, is an international treaty among industrialized nations that sets mandatory limits on greenhouse gas emissions.
	Local Plan	Policy Plan for the Borough setting out detailed planning policies, proposals and Policies Maps for use when determining planning applications and spatially guiding strategic development.
LPA	Local Planning Authority	The local authority responsible for planning matters in its area. Essex County Council and Basildon Borough Council are both Local Planning Authorities for different planning matters in Basildon Borough.
	Low Carbon Energy	Low carbon technologies are those that can help reduce carbon emissions.
MBT	Mechanical Biological Treatment	A mechanical biological treatment (MBT) system is a type of waste processing facility that combines a sorting facility with a form of biological treatment such as composting or anaerobic digestion. MBT plants are designed to process mixed household waste as well as commercial and industrial wastes.

Relevant Abbreviation	Term	Definition
	Merton Rule	<p>The Merton Rule was a ground breaking planning policy, developed by Merton Council, which required new developments to generate at least 10% of their energy needs from on-site renewable energy equipment, in order to help reduce annual carbon dioxide (CO<sub>2</sub>) emissions in the built environment. The rule applied to all types of buildings, not just homes. Merton Council developed the rule and adopted it in 2003. Since then the Mayor of London and many councils implemented it, and it became part of national planning guidance.</p>
	Microgeneration	<p>This refers to the use of on-site technologies to generate heat and/or electricity from low or zero carbon sources.</p>
	National Parks	<p>An area of countryside, or occasionally sea or fresh water, protected by the state for the enjoyment of the general public or the preservation of wildlife.</p>
NPPF	National Planning Policy Framework	<p>Sets out the Government's economic, environmental and social planning policies for England.</p> <p>It was published March 2012.</p>
NSIP	Nationally Significant Infrastructure Project	<p>A project of a type and scale defined under the Planning Act 2008 and by order of the Secretary of State relating to energy, transport, water, waste water and waste generally. These projects require a single development consent. Planning permission, listed building consent and scheduled monument consent amongst others are not required for Nationally Significant Infrastructure Projects.</p>

<b>Relevant Abbreviation</b>	<b>Term</b>	<b>Definition</b>
NDO	Neighbourhood Development Order	Communities can use NDOs to permit the development they want to see – in full or in outline – without the need for planning applications.
NDP	Neighbourhood Development Plan	Neighbourhood forums and parish councils can use new neighbourhood planning powers to establish general planning policies for the development and use of land in a neighbourhood.
	Neighbourhood Planning	Introduced by the Localism Act (2011) to allow local communities to shape new development in their area, through the building of homes, jobs and community facilities.
	Paris Agreement	On 12 December 2015 Parties to the Convention adopted the Paris Agreement, which provides a new framework for all Parties to take action on climate change through reducing emissions and building resilience. The Paris Agreement entered into force on 4 November 2016. The overarching aim of the Paris Agreement is to hold the increase in global temperature to well below 2°C above pre-industrial levels and to pursue efforts to limit it to 1.5°C.
	Planning Act 2008	An Act to establish the Infrastructure Planning Commission and make provision about its functions.
	Planning and Compulsory Purchase Act 2004	The primary legislation for the development plan process.
	Planning and Energy Act 2009	An Act to enable local planning authorities to set requirements for energy use and energy efficiency in local plans.
PD	Permitted development	Minor development or changes of use that can be made to a house or building within the need for planning permission.

<b>Relevant Abbreviation</b>	<b>Term</b>	<b>Definition</b>
PPG	Planning Practice Guidance	Planning guidance to support the NPPF.
	Renewable Energy	Renewable energy covers those energy flows that occur naturally and repeatedly in the environment – from the wind, the fall of water, the movement of the oceans, from the sun and also from biomass.
RES	2009 UK Renewable Energy Strategy	The strategy which sets out how the UK will reach our goal of 15% of energy from renewables by 2020.
Solar PV	Solar photovoltaics/ solar arrays	Renewable system converting sunlight into electricity, which can be used to power (or partially power) electrical equipment and appliances.
	Town and Country Planning Act 1990	Legislation which regulates the development of land in England and Wales.
WEEE	Waste Electrical and Electronic Equipment	Waste electrical and electronic equipment is end-of-life electrical and electronic equipment and covers virtually everything with a plug or battery. It can be classed as either household or non-household WEEE.