



# Sustainable viticulture and greenhouse gas management with FAIR'N GREEN

*The practical sustainability system for viticulture*

Keith Ulrich, Chairman of Fair'n Green

[www.fair-and-green.com](http://www.fair-and-green.com)

**„Fair'n Green is an independent,  
holistic and modern system for the  
sustainable viticulture of the future.“**







**At Fair'n Green responsible companies work together on the future  
issues of viticulture.**

**FAIR'N GREEN consists of four main sections:**



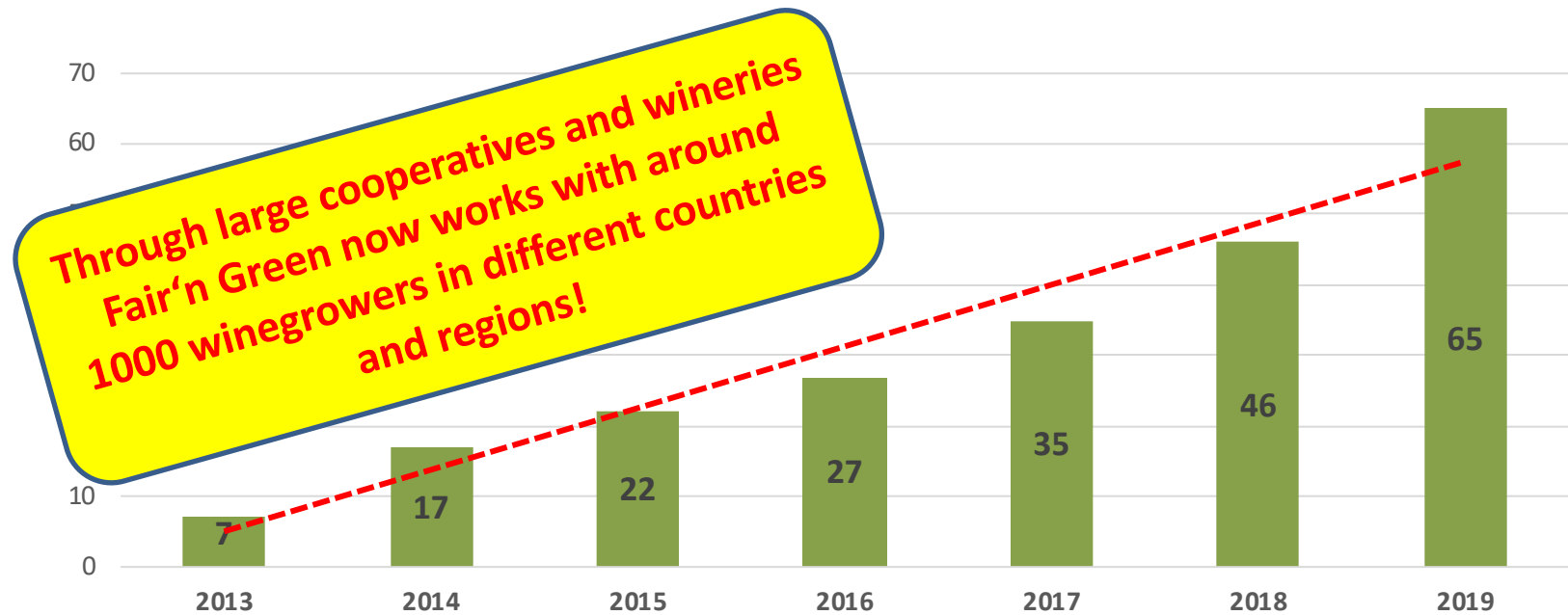
## Sustainability is evaluated on the basis of these categories:

<b>BUSINESS MANAGEMENT</b> 	<b>ENVIRONMENT</b> 	<b>SOCIAL RESPONSIBILITY</b> 	<b>VALUE CHAIN</b> 
<b>BUSINESS STRATEGY</b>	<b>ENVIRONMENTAL FOOTPRINT</b>	<b>REGULAR STAFF</b>	<b>SOIL MANAGEMENT</b>
<b>KEY PERFORMANCE INDICATOR (KPI)</b>	<b>ENERGY USAGE</b>	<b>SEASONAL STAFF</b>	<b>NUTRIENT INFLUX</b>
<b>ASSET DEVELOPMENT</b>	<b>WATER USAGE</b>	<b>PROFESSIONAL TRAINING</b>	<b>PLANT PROTECTION</b>
<b>INVESTMENT &amp; INNOVATION</b>	<b>CARBON FOOTPRINT</b>	<b>STAKEHOLDER</b>	<b>BIODIVERSITY</b>
<b>OPERATION PROCEDURES</b>	<b>RESOURCE &amp; WASTE MANAGEMENT</b>	<b>CORPORATE SOCIAL RESPONSIBILITY (CRS)</b>	<b>VINIFICATION</b>
<b>PROCUREMENT</b>	<b>SOIL COMPACTION</b>	<b>PROMOTION OF CULTURAL HERITAGE</b>	<b>QUALITY MANAGEMENT</b>
<b>LAW &amp; REGULATION</b>	<b>REDUCING TOXIC EFFECTS OF PLANT PROTECTION</b>		<b>COMMUNICATION</b>
<b>IT-MANAGEMENT</b>			<b>DISTRIBUTION &amp; TRANSPORT</b>

## What is special about FAIR'N GREEN?

- It **equally considers all aspects of sustainability** (ecological, economical, society-factors, concept of strong sustainability)
- Its development had a practical aim and was executed by scientists (based in practice, guided by science).
- It is the **only system for sustainable wine** that is **successfully used in several countries** (so far Germany, Austria, Switzerland, France, Italy and Israel)
- It combines **novel instruments for future topics of the wine industry** (including **greenhouse gas emissions, carbon footprinting**, biodiversity and plant protection) into one **holistic service innovation**
- Third party verified by GUTcert
- Mandatory improvements of members

# The network of Fair'n Green members is growing



- Most members are **wine estates** (combination of growing and production, own sale of bottled wine)
- First **cooperative** certified in 2018, first winery in 2019 (wineries can only be certified if they use a steady group of producers with longterm contracts)
- First **wine estate in Israel** certified 2019

# Activities on CO<sub>2</sub>-Reduction

- **FNG was founded in September 2013**
  - Reducing CO<sub>2</sub>-emissions was goal from the start
  - Started to promote light-weight glas bottles in early 2014
- **Start of the „Save Climate Initiative“ in 2015**
  - Collection of measures (manifest) wineries can adopt to mitigate carbon emissions
  - Renewable energy, green logistic, machine combinations etc.
- **First CO<sub>2</sub>-neutral wine estate in 2016**
- **Dialogue with several value chain partners on CO<sub>2</sub> reduction since 2015**
- **Member of OIV working group on CO<sub>2</sub> reduction since 2019**



Presentation of Fair'n Green at a press conference with the federal secretary for the environment, Berlin 2013



Wine Estate Egon Schmitt – Fair'n Green since 2014 and CO<sub>2</sub>-neutral since 2016



# Four main areas of CO2-Emissions in winemaking:

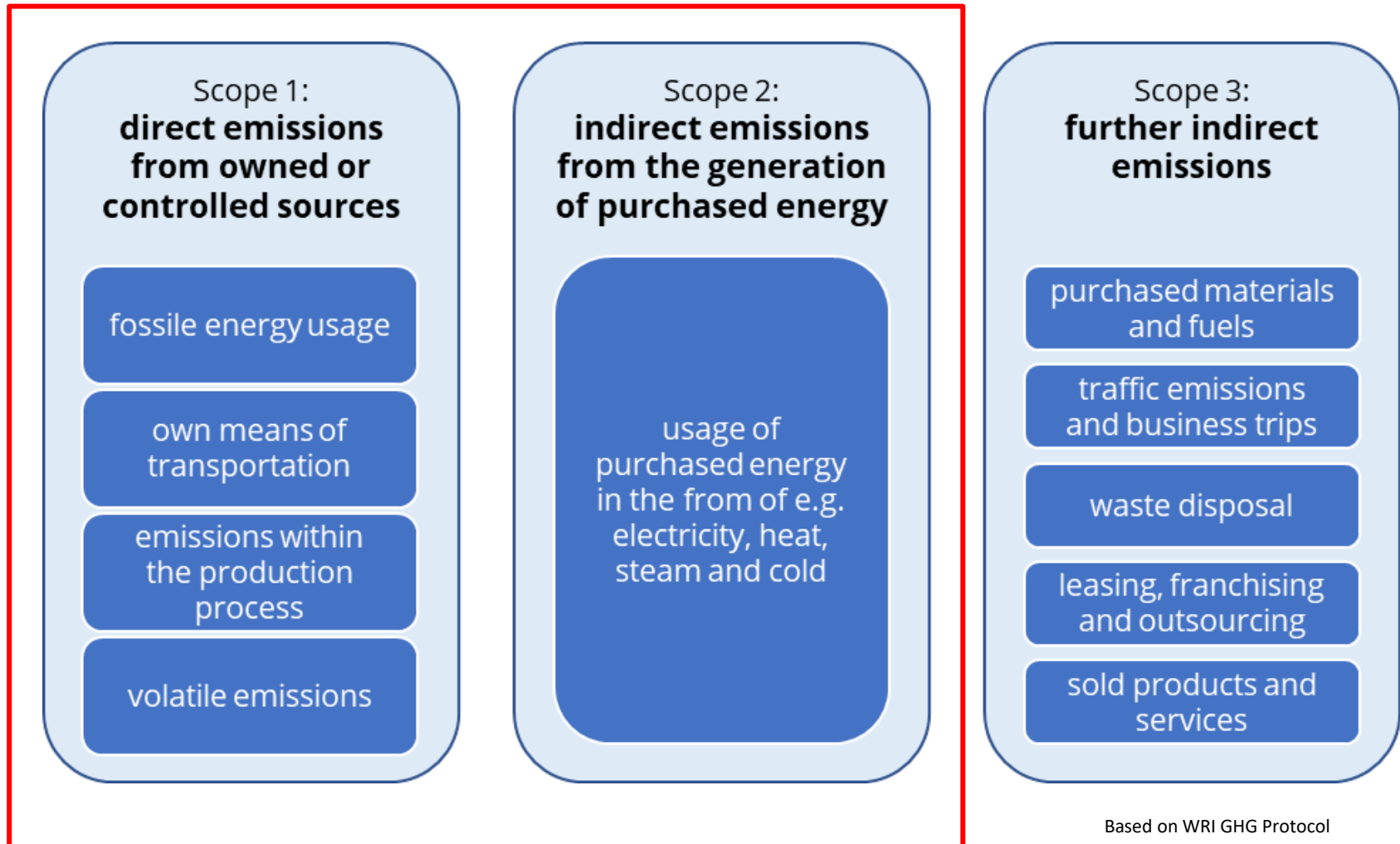




# Four main areas of CO<sub>2</sub>-Emissions in winemaking:



# Scopes of CO<sub>2</sub>-Accounting:



Fair'n Green

Fair'n Green +  
Save Climate

- **Direct and indirect emissions**
- **We measure direct emissions for all FNG members annually**
- **Some wine estates want to go further, which means to account for indirect emissions (Scope 3)**
- **Basic principle: Emissions have to be**
  - **Relevant and**
  - **Manageable**

# Accounting for **direct** GHG emissions as part of the FNG certification:



## Collection of data

- Physical data (true for 95 % of all FNG data)
- Financial data if volume not physically counted (e.g. fuel consumption)
- Fixed template for data collection



## Transformation into GHG emissions

- Matching emissions factors
- Analysis of most important sources and related practices (e.g. tank cooling and storage cooling)



## Benchmarking & Solutions

- Comparison of wineries
- Similar sizes and structures
- Development of new solutions (green energy, electric vehicles etc.)



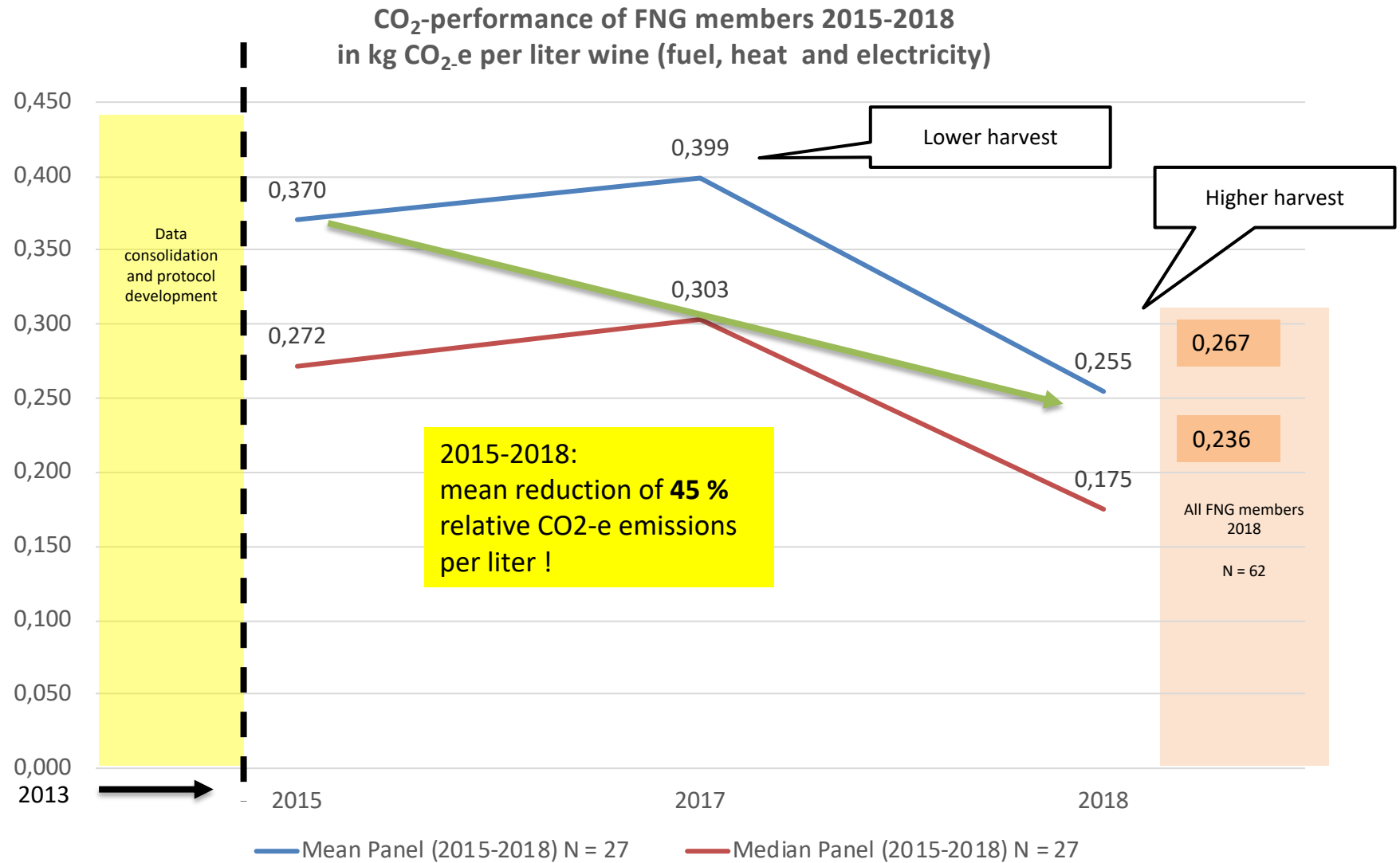
- **All wine estates consume fuel and electricity, heat energy usually plays only a minor role**
- **Fuel and electricity account for around 70 % of direct GHG emissions**
- **Electricity oftentimes contributes more than fuel (!)**



Picture: <https://www.fendt.com/de/traktoren/200-250-vario-technik>

# Exploration of panel data 2015-2018

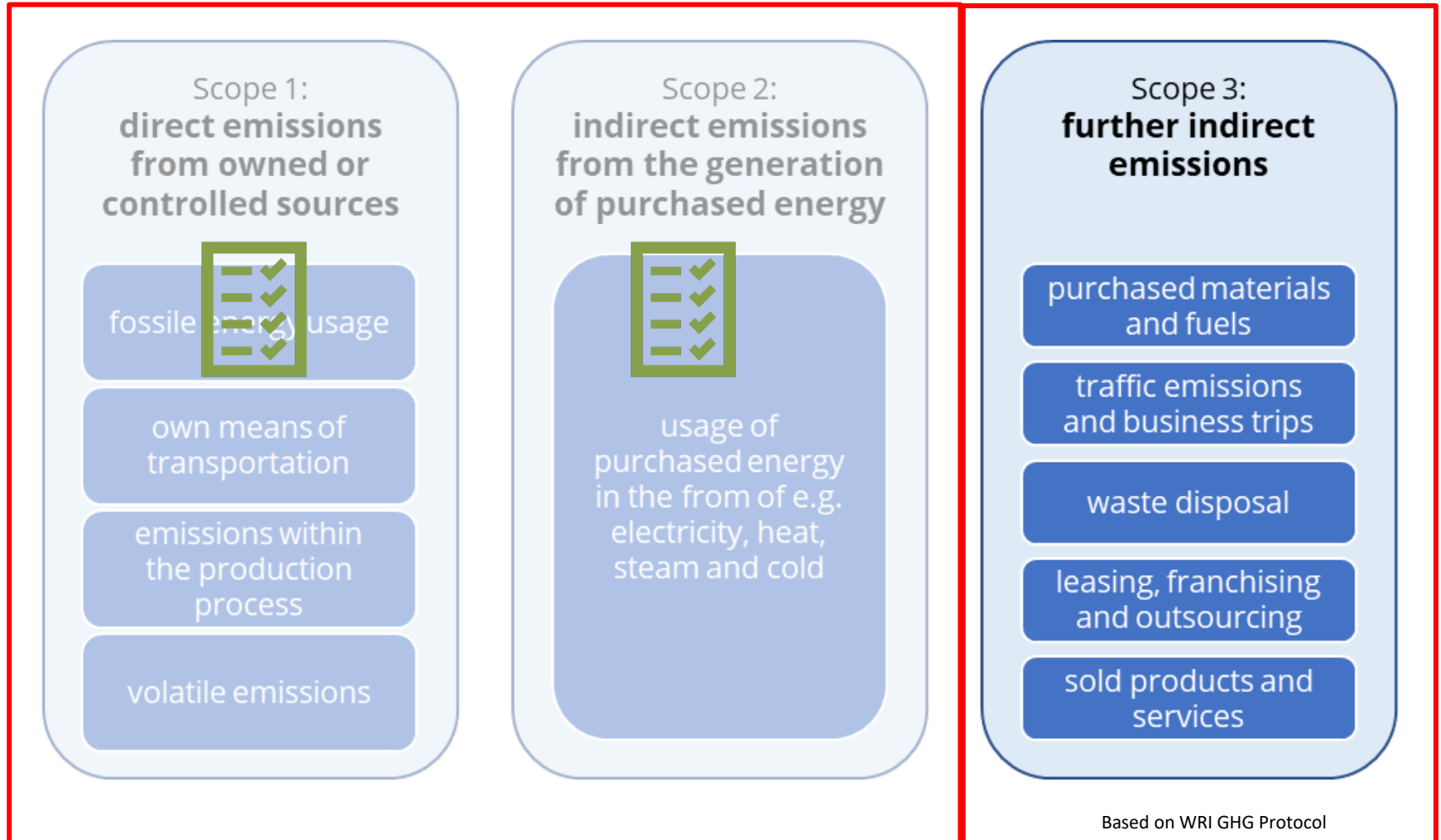
*Preliminary analysis,  
not intended for publication*





- **Green energy is the easiest way to effectively reduce company carbon emissions**
- **Through green energy direct emissions can be cut by at least 30-45 percent (depending on harvest volume)**
- **Not all green energy is the same → only certified energy providers are accepted**
- **Regular electric energy in Germany already consists of 38% green energy and is rising year by year**

# What about the indirect GHG emissions?

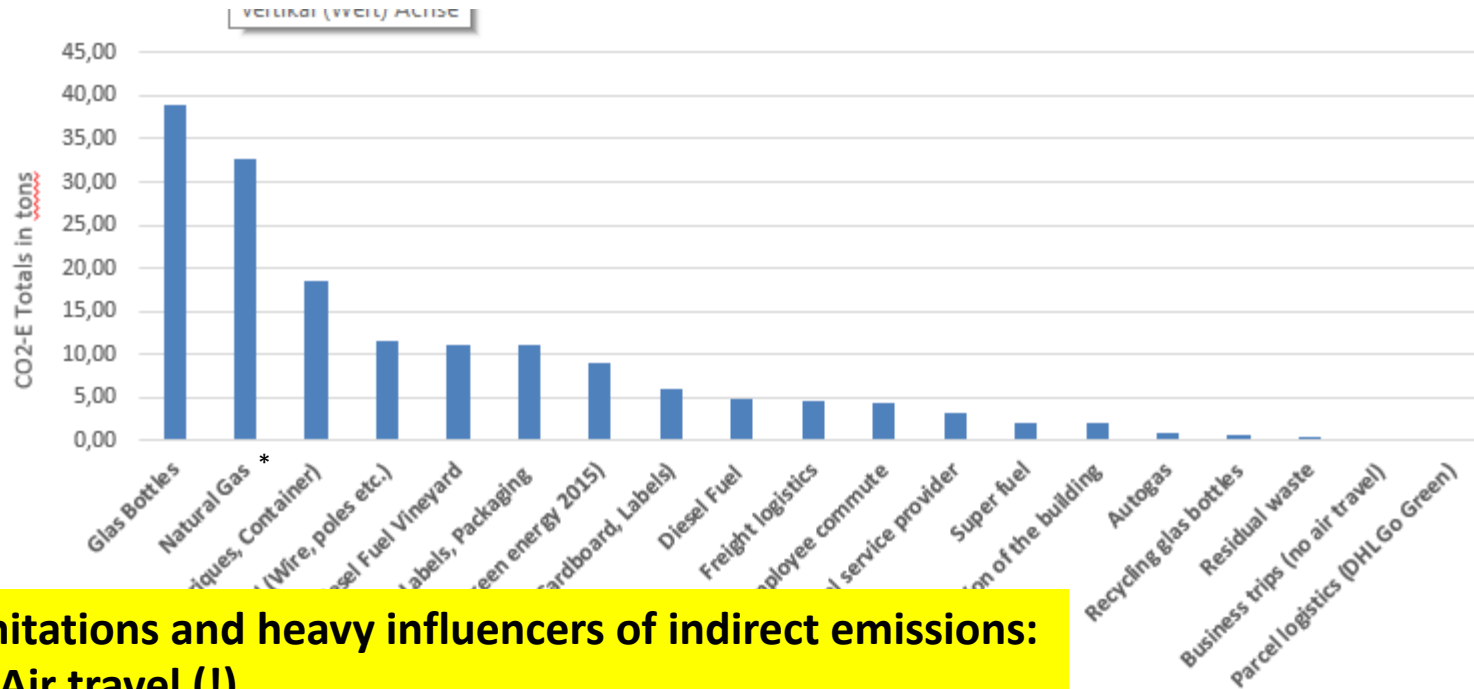


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## Single biggest GHG source in wine business

The single biggest source of GHG emissions in the wine industry is glass bottles!



### Limitations and heavy influencers of indirect emissions:

- Air travel (!)
- International product logistics
- Everyone uses glass bottles

Data: Fair'n Green, 2015

\* In this case: natural gas = second biggest source because of co-generation of heat and power (CHP-engine)

# Heavy glass bottles are the SUVs of the wine industry

- They make no sense in everyday life
- They pollute heavily compared to other solutions
- They are more expensive than other solutions
- They are less useful (parking an SUV vs. carrying a box of six heavy bottles)



# Light-weight Glass Bottles reduce the carbon footprint

## Example 1: Wine Estate Meyer Näkel (Ahr)

Weingut Meyer Näkel

### Leichtere Flaschen sparen CO2

Von Christine Schulze

DERNAU. Die umweltfreundliche Bekämpfung des Traubenwicklers durch Pheromone an der gesamten Ahr ist beschlossene Sache. Nicht genug damit.



Dörte (von links) und Meike Näkel mit (v.l.) einer schweren, einer mittelschweren und einer leichten Flasche. Foto: Martin Gausmann

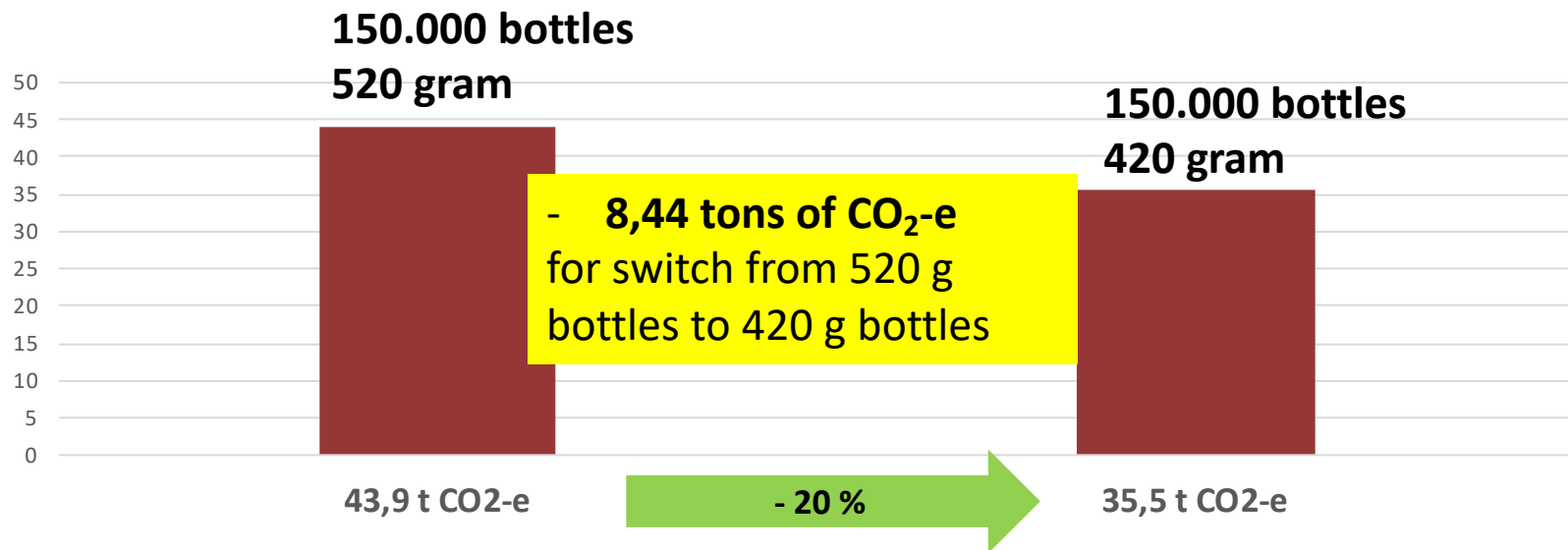
## Example 2: Winery Cantina Kaltern

→ Cantina Kaltern was able to reduce its indirect CO2 emissions by 20 tons through lightweight glass bottles in one product line!



## Impact of glass-weight on GHG emissions in the wine industry

- **25 % reduction in glass weight translates into 20 % reduction of GHG emissions**
- Effect depends on the average bottle weight of the company (oftentimes larger than 520 gram!)
- Most wine businesses use several different bottles: goal must be to reduce the weight of the most used bottles (similar to fleet average in car industry)





## **What can wineries do to reduce greenhouse gas emissions? („Save Climate Manifest“)**

**All Fair'n Green members agree to pursue the following goals:**

- 1. Purchase of green electricity in the winery**
- 2. Improving energy efficiency and promoting the operation of modern energy supply technologies such as geothermal energy, combined heat and power plants, solar and photovoltaic systems**
- 3. Reduction of fuel consumption and adoption of electric vehicles**
- 4. Use of light glass bottles (with a guideline of 420g) for all wines of the base segment**
- 5. Extensive recycling and minimization of waste**
- 6. No use of mineral nitrogen fertilizer in order to avoid related GHG emissions**
- 7. Securing and promoting biodiversity (possible carbon sink)**
- 8. Regional sourcing to avoid emissions from (inbound) logistics**
- 9. Use of climate-neutral transports locally and promotion of climate-neutral transports abroad**
- 10. Reduction of business air travel / air shipments**

# Conclusion

- **Winemaking is heavily influenced by climate change and should therefore address the issue decisively**
- **Winemaking can be a rolemodel for other branches of agriculture**
- **Winemaking can use its contact to the consumer to engage winebuyers in the topic**
- **There are many active measures wineries can start adopting tomorrow which not only reduce CO<sub>2</sub> but also can reduce costs (e.g. light-weight bottles, green energy, see Save Climate Manifest)**

- **In 2020 FNG will start developing a new web-based tool for emissions accounting and reduction for the wine industry**
- **GHG neutrality is possible**
- **We encourage all winemakers to join the initiative**

**Thank you for your attention!**

**[www.fair-and-green.com](http://www.fair-and-green.com)**

## **Case Study:**

**CO<sub>2</sub>-neutral wine estate**

**Wine Estate Egon Schmitt**

**Pfalz**

**Jochen Schmitt**

## Activities Wine Estate Egon Schmitt

- The estate was awarded the **first Fair'n Green sustainability award in 2018** for its diverse and comprehensive sustainability and climate efforts.
- The estate recently launched a „**Green Vibes**“ product line which features new vines which are especially robust and more resilient against pests.



Susanne Moosmann (GUTcert verification body), Jochen Schmitt and Klaus Schneider, president of the German Winegrowing association at the Fair'n Green event in Berlin , December 12, 2018

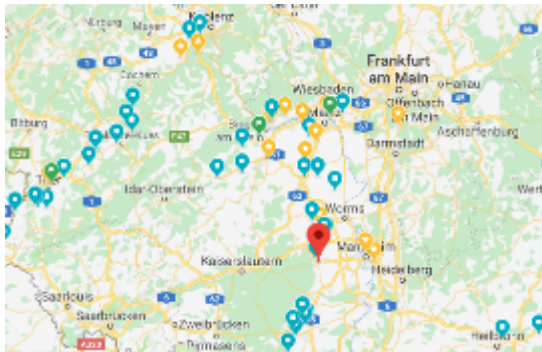


The new „Muscaris“ is already sold out at the estate.

# Case Study:

## Calculation of Greenhouse Gas Emissions for Wine Estate Egon Schmitt

- Base year 2015
- Farm size approx. 20 ha, Various Grapes (Reds and Whites)
- Growing international customer base
- Palatinate, Germany

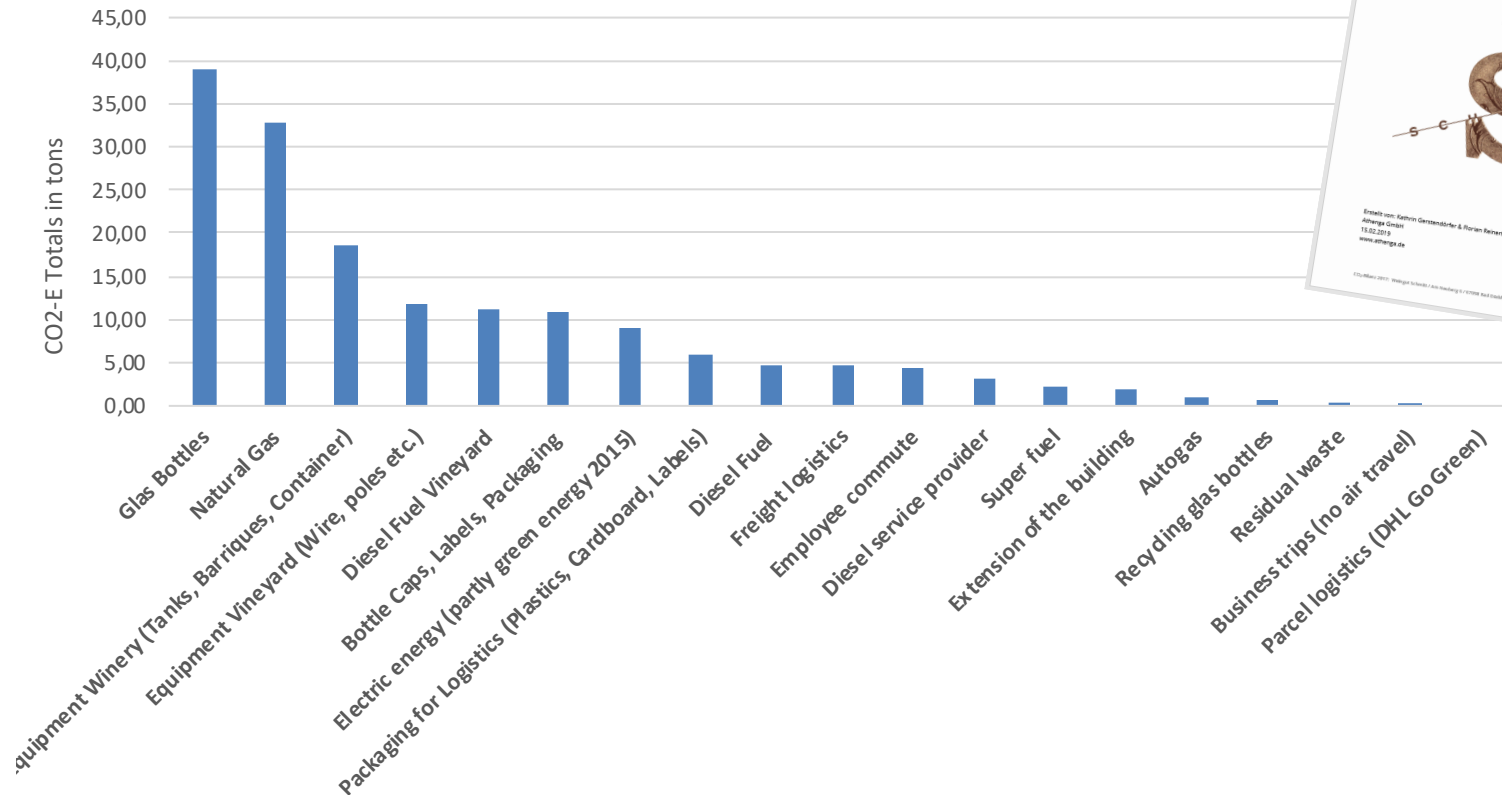


→ As part of a yearly carbon accounting all direct and indirect GHG emissions of the company are measured. Remaining emissions are compensated with gold standard certificates.



# Case Study: Calculation of Greenhouse Gas Emissions for Wine Estate Egon Schmitt

## Overview of company CO<sub>2</sub>-Emissions



Data: Fair'n Green, 2015

- **Improvement of fuel consumption through recycling sprayer**
- **Own CHP-power generation**
- **Up to date cooling system** (tanks and storage) and recently renewed winery building
- **Hybrid-vehicle**
- Large percentage of **light-weight glass**, share of recycling glass
- Own **photovoltaik energy** plus green energy from energy provider

# Result: Carbon Neutral Wine



Wine package



Wine back label

- Sustainability and CO<sub>2</sub>-neutrality go hand in hand and are visible to the consumer.
- Many customers of the wine estate especially appreciate the activities of the wine estate in order to be carbon neutral and contribute to climate-friendly winemaking in addition to its sustainability certification.
- Both topics are actively used by the wine estate to engage customers and have conversations with them on these issues.

- **Many sources of carbon emissions can be actively influenced by the winemaker (Which bottles to buy, which energy to use, (...))**
- **Over the years the company was able to significantly reduce its carbon footprint through various active measures**
- **Remaining CO<sub>2</sub>-emissions have been compensated through certified emissions certificates (UN Goldstandard)**
- **In addition to its sustainability certification the wine estate now has a proactive tool to communicate its environmental efforts to consumers**

# Thank you for your attention

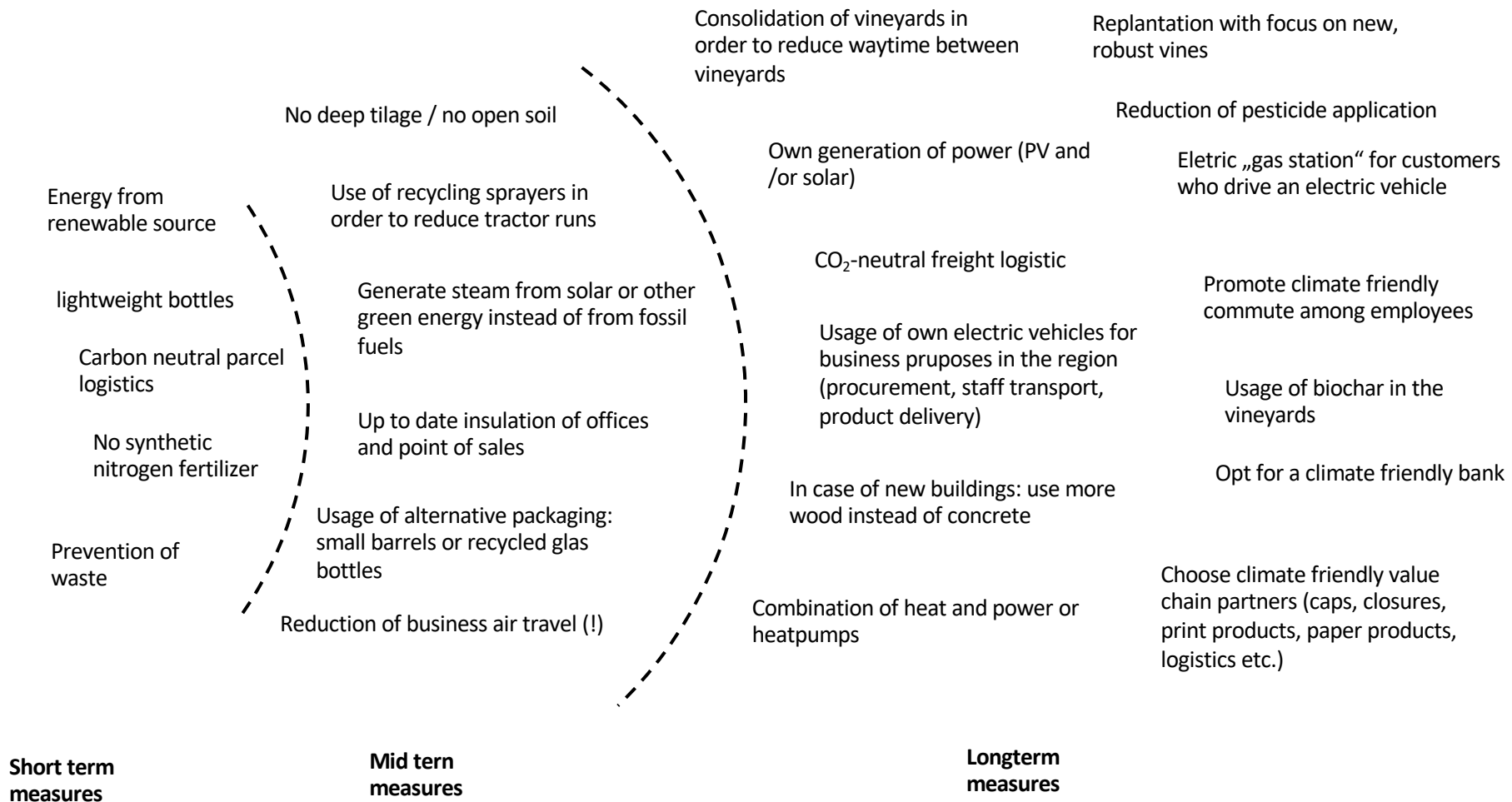


Climate Change and Sustainable Winemaking – ways forward?

# DISCUSSION



# Ways for winemakers to reduce GHG emissions



# Backup



- **Each member company must submit resource usage such as electricity consumption, fuel and heat (among others)**
- **Consumption is transformed into GHG emissions through emission factors**
- **Source:** German Environment Agency (UBA) or others national agencies



- Out data indicates that electricity accounts for roughly one third of direct GHG emissions of wine estates (grape producing + cellar processes)
- These emissions can easily be neutralized by using electricity from renewable sources (wind, water, solar)

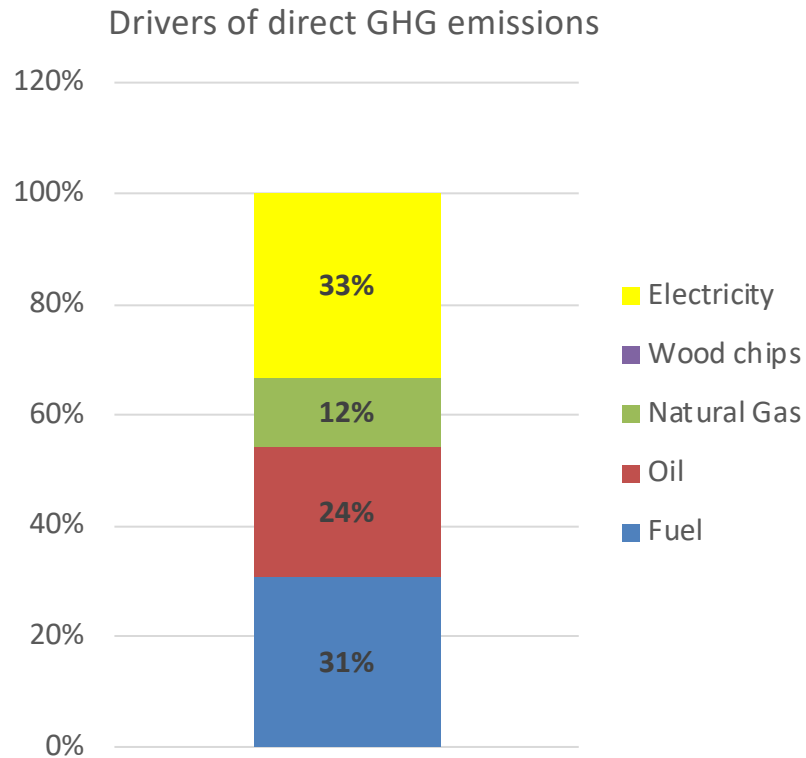


## What about other sources of GHG emissions?

### Example winery: 100.000 liters, 150.000 bottles annually

Direct Emissions	Emissions Source	Physical Volume	GHG Emissions in t CO <sub>2</sub> -E	Emissions after reduction	
(Scope 1-2)	Fuel	3750 Liters	11,96	10,17	-15%
	Natural Gas	8000 kWh	2,00	0,10	-95%
	Electricity	25.000 kWh	13,00	0,10	-99%
Indirect Emissions					
Scope 3	Glass Bottles, 150.000 units, average 550 Gram each	82,5 tons of glas	43,91	35,47	-19%
	Flight FRA – JFK	4 flights	12,27	3,07	-75%
	Packaging		?		
	Closures		?		
	Vineyard Material		?		
	(...)		?		
	Totals		83,15	48,91	-41%

# What drives direct carbon emissions?



2018 mean value:  
**0,489 kg CO<sub>2</sub>-e**

**without green  
energy**



2018 mean value:  
**0,267 kg CO<sub>2</sub>-e**

**Using green energy**

## Challenges:

- Private consumption on site
- Other businesses' consumption (e.g. restaurants) on site



# What is special about FAIR'N GREEN?

- Fair'n Green measures greenhouse gas emissions ever since its foundation in 2013
- Important goal was to promote active steps for climate friendly winemaking
- GHG accounting is inspired by international protocols (WRI GHG Protocol, ISO, OIV-Guidelines)
- Important rule: emissions have to be
  - Relevant
  - Manageable



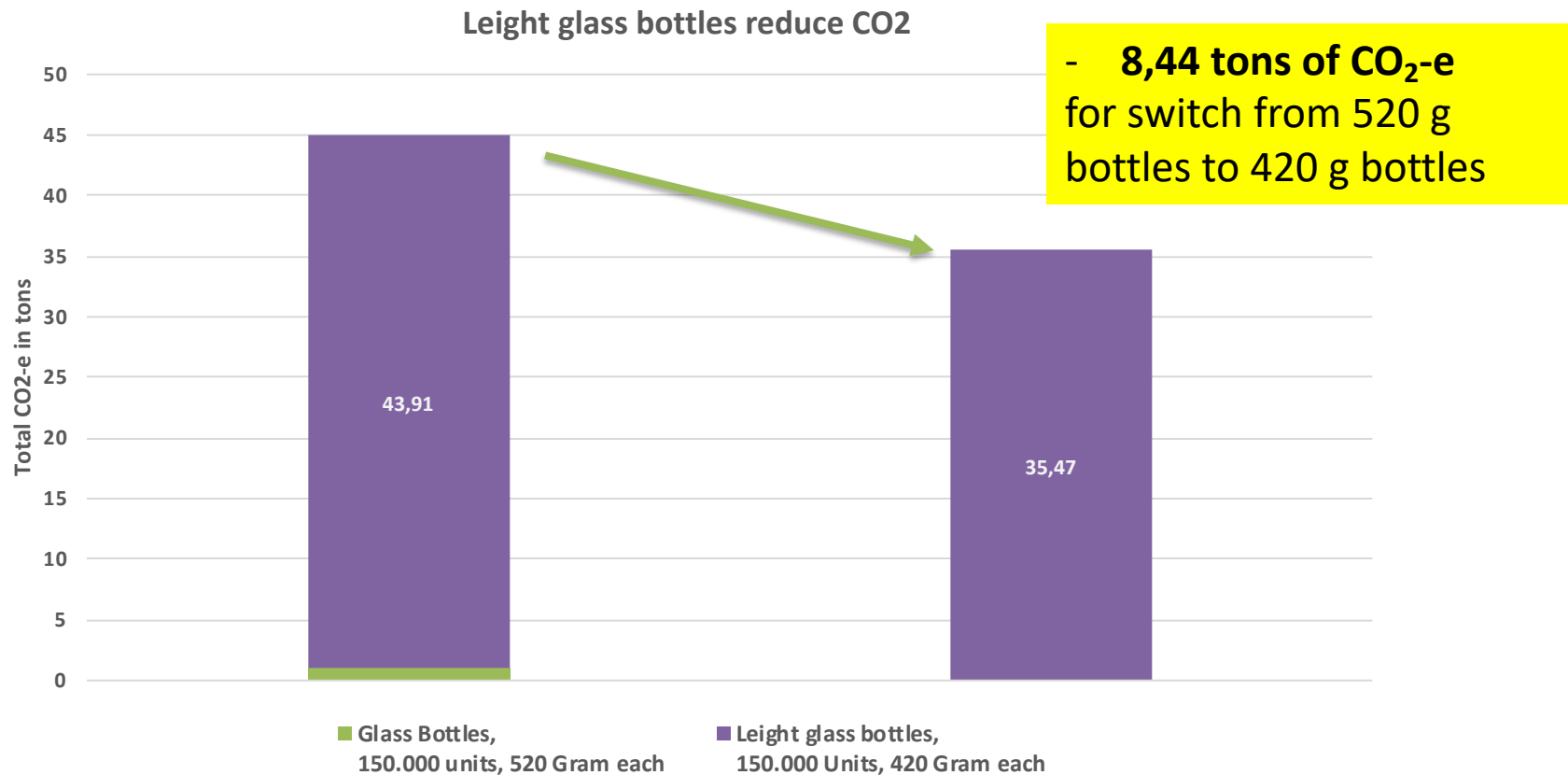
## What we know from the literature

- **Around the world many wine businesses have begun measuring their carbon footprint**
- **Carbon footprinting (CF) has become an important environmental indicator for sustainability management**
- **We have adequate tools to allocate and measure carbon emissions of wineries**
- **In winemaking, in general four areas are of main concern:**
  - **Procurement** (Bottles, Caps, Packaging)
  - **Vineyard** (Machinery, fuel)
  - **Production** (Cooling, Electricity)
  - **Logistics** / Airtravel

### **Special issue: Soil**

- Impact of fertilizer and tillage on carbon emissions
- Soil interactions, Possible carbon sink
- ongoing research

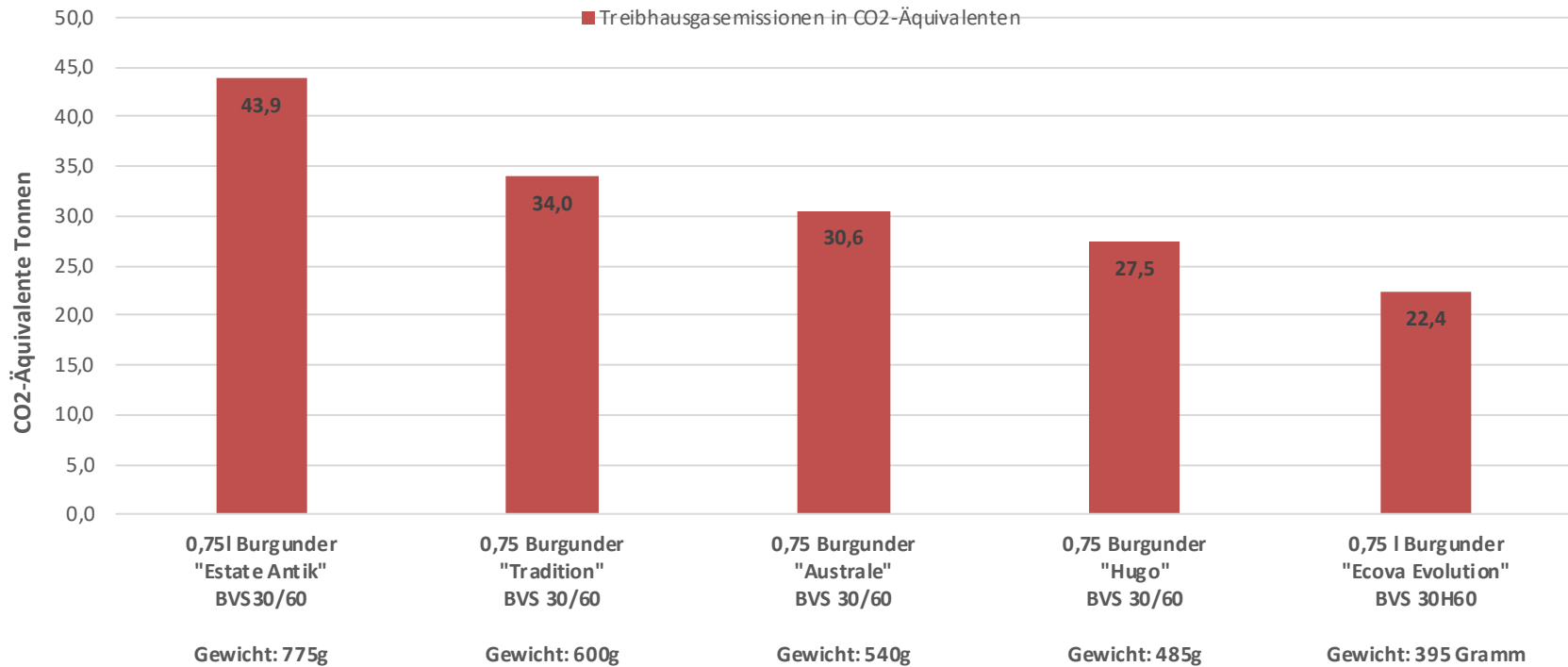
# Leight glass can significantly reduce indirect GHG emissions



- If you reduce bottle weight by just 25% you can reduce 20% of indirect GHG emissions related to glass production!
- This comes close to the fuel emissions of a wine estate with 100.000 liters

# Leight glass bottles reduces GHG emissions

## Berechnung der CO<sub>2</sub>-Emissionen für 100.000 füllfertige\* Flaschen



**Eine Reduktion des Flaschengewichts von 485 auf 395 Gramm spart pro 100.000 Flaschen rund 5t CO<sub>2</sub>-Emissionen.**

**Dies entspricht einer Minderung von rund 20%.**

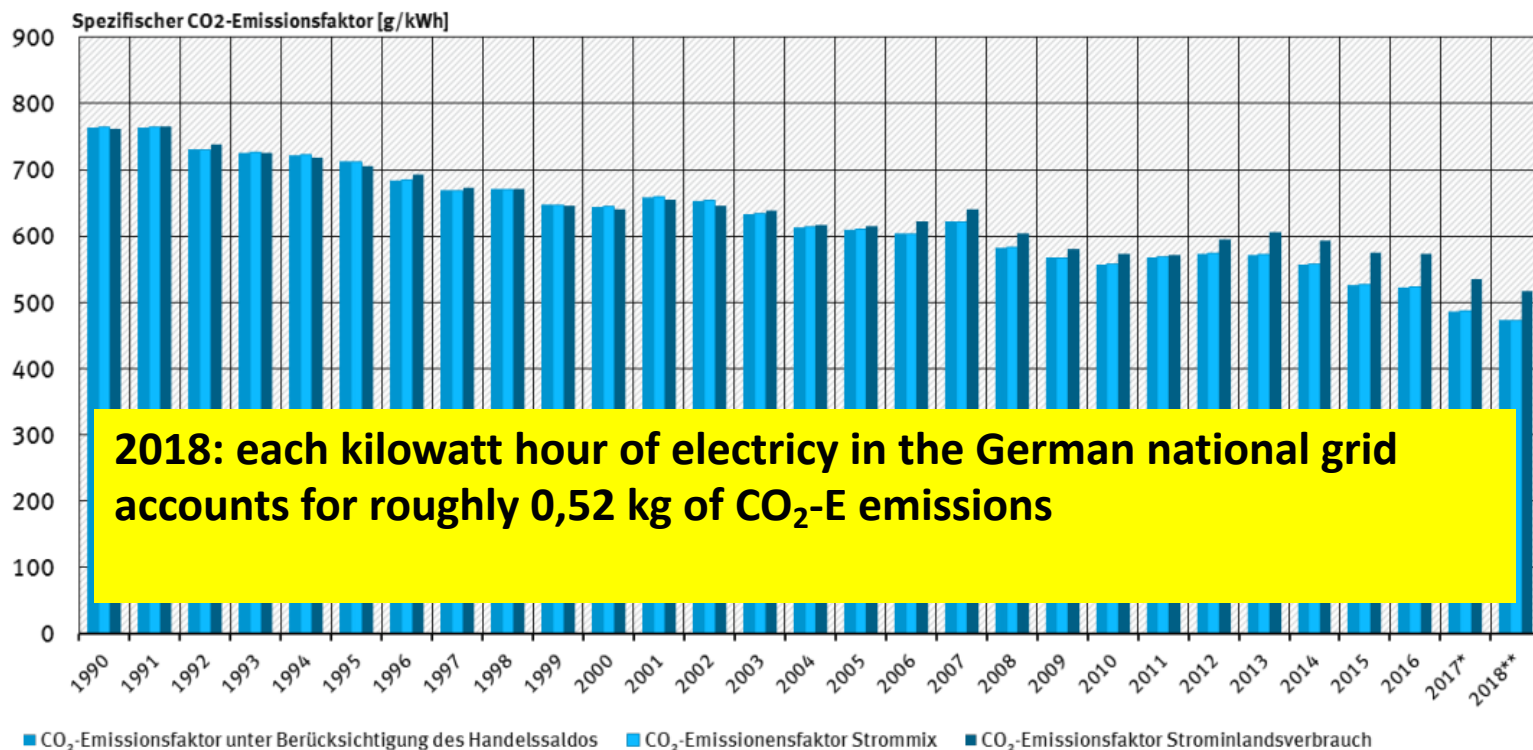
\* Es wurde die Glasherstellung (Behälterglas) sowie der Transport der Flaschen zum Weingut über eine Entfernung von 100 km berücksichtigt. Der Anteil des Transports an den Gesamtemissionen der Flasche beträgt in diesem Szenario rund 0,6%. Die Sterilisierung der Flaschen wurde nicht berücksichtigt, da hier der Energieaufwand pro Flasche weitestgehend identisch ist bzw. nicht vom Gewicht der Flasche abhängt. Emissionsfaktor Behälterglas = 563kg CO<sub>2</sub>-E/Tonne; Quelle:

# How to calculate the carbon footprint of a winery?

- **GHG Protocol**
- **ISO 14067**
- **OIV-Guidelines**



**Abb. 2: Spezifische Kohlendioxid-Emissionen des deutschen Strommix mit und ohne Berücksichtigung des Stromhandelssaldos**



2017\* vorläufig 2018\*\* geschätzt

Quelle: eigene Berechnungen Umweltbundesamt März 2019



## **Case Study 1:**

# **Sustainability activities and climate protection at Wine Estate Georg Breuer Rheingau**

**Theresa Breuer**

**The estate Georg Breuer is active in many field of sustainable winemaking such as:**

- **biodiversity management**
- **Recultivation of steep slope vineyards**
- **Renovation of historic cellar and buildings**
- **Preservation and promotion of cultural landscapes**
- **Increased trainings for employees**
- **Flexible working hours to align work and family**
- **Procurement of green energy and GHG-neutral natural gas**



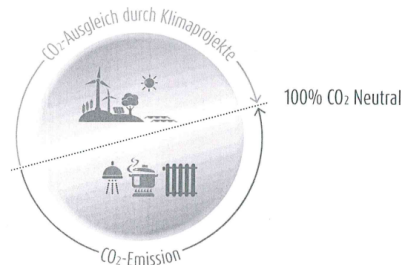
**High degree of manual labor in the steep vineyards contribute to both grape quality and lower CO<sub>2</sub>-emissions.**



**The wine estates practices environmentally friendly plant protection and uses neither insecticides nor herbicides.**

# Actions to mitigate direct CO<sub>2</sub>-Emissions at Wine Estate Georg Breuer

Wine Estate Breuer **uses energy from renewable** sources and also **climate-friendly natural gas** (compensation of emissions by an „all-green“ energy provider Lichtblick)



→ **No direct emissions from natural gas or electricity!**

Only direct emissions from fuel for vineyard work remain.

Other measures are adopted as well!



Picture: Wine Estate Georg Breuer



Many thanks for your attention!



Dr. Keith **Ulrich**

[keith.ulrich@fair-and-green.com](mailto:keith.ulrich@fair-and-green.com)

Tel: 0228 886 844 80

Fax: 0228 886 844 79



Florian **Reinert** M.Sc.

[florian.reinert@fair-and-green.com](mailto:florian.reinert@fair-and-green.com)

Tel: 0228 886 844 86

Fax: 0228 886 844 79

[www.fair-and-green.com](http://www.fair-and-green.com)

